# Data Validation Package

## June 2011
## Groundwater and Surface Water Sampling at the Old and New Rifle, Colorado, Processing Sites

**October 2011**

U.S. DEPARTMENT OF ENERGY | Legacy Management

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# Contents

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# Sampling Event Summary

**Site:** Old and New Rifle, Colorado, Processing Sites

**Sampling Period:** June 13–15, 2011 and August 9–11, 2011

Thirty four water samples were collected at New Rifle and Old Rifle, Colorado, Processing Sites between June 13–15, 2011. Ten New Rifle locations could not be sampled as planned in June due to flooding river conditions. Six of those locations were sampled between August 9–11, 2011. New Rifle groundwater location 0590 was not sampled because that location remained inaccessible due to flooding. New Rifle surface locations 0320, 0452, and 0453 were not sampled because, although these locations were distinct in the past, but they are now flooded by a large pond. Duplicate samples were collected from New Rifle locations 0201 and 0322, and Old Rifle location 0310. One equipment blank was collected. Sampling and analysis were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated). The samples collected in June were submitted to ALS Laboratory Group, Fort Collins, Colorado for general chemical analysis under requisition number 11063854; and for stable isotope analysis to Reston Stable Isotope Laboratory, Reston, Virginia under requisition number 11063855. The samples collected in August were submitted to ALS Laboratory Group, Fort Collins, Colorado for general chemical analysis under requisition number 11073976.

New Rifle Site

Samples were collected at the New Rifle site from 16 monitoring wells and 6 surface locations in compliance with the 2008 *Ground Water Compliance Action Plan for the New Rifle, Colorado, Processing Site*. Water levels were measured at each sampled well.

The contaminants of concern (COCs) at the New Rifle site are arsenic, molybdenum, nitrate + nitrite as nitrogen, selenium, uranium, and vanadium. All COCs except vanadium have a remedial action goal of the U.S. Environmental Protection Agency (EPA) groundwater standard or background concentration; an alternate concentration limit (ACL) of 50 milligrams per liter (mg/L) has been proposed for vanadium. The groundwater monitoring wells were sampled to monitor plume movement and natural flushing. Wells with sample concentrations that exceeded either the EPA groundwater standards or the maximum background concentration, whichever is greater, are listed in Table 1.

*Table 1. New Rifle Locations that Exceed Standards*

| Analyte | Standard[a] | MBC[b] | Location | Concentration (mg/L) |
|---|---|---|---|---|
| Arsenic | 0.05 mg/L | 0.03 mg/L | 0658 | 0.150 |
| | | | 0855 | 0.520 |
| Molybdenum | 0.10 mg/L | 0.03 mg/L | 0201 | 1.80 |
| | | | 0217 | 1.10 |
| | | | 0635 | 0.42 |
| | | | 0658 | 1.30 |
| | | | 0659 | 1.70 |
| | | | 0664 | 0.24 |
| | | | 0669 | 1.50 |
| | | | 0670 | 0.28 |
| | | | 0855 | 1.10 |
| Nitrate + Nitrite as Nitrogen | 10 mg/L | 5.22 mg/L | 0170 | 13.0 |
| | | | 0201 | 38.0 |
| | | | 0620 | 19.0 |
| | | | 0664 | 8.7 |
| Selenium | 0.01 mg/L | 0.036 mg/L | 0201 | 0.046 |
| | | | 0658 | 1.30 |
| | | | 0659 | 0.038 |
| | | | 0664 | 0.190 |
| | | | 0670 | 0.280 |
| | | | 0855 | 1.10 |
| Uranium | 0.044 mg/L | 0.067 mg/L | 0172 | 0.068 |
| | | | 0201 | 0.099 |
| | | | 0217 | 0.120 |
| | | | 0620 | 0.069 |
| | | | 0659 | 0.089 |
| | | | 0664 | 0.069 |
| | | | 0669 | 0.130 |
| | | | 0670 | 0.190 |

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.
[b] Maximum background concentration listed in *Ground Water Compliance Action Plan for the New Rifle, Colorado, Processing Site*.

Time-concentration graphs from the locations sampled are included with the analytical data. Concentrations of the COCs are stable or decreasing at most locations. The concentrations of arsenic, molybdenum, selenium, and vanadium in well 0855 continue to decrease after spiking in 2009. The vanadium in well 0658 remains high, at a concentration near the proposed ACL.

Ammonia is not a COC however, it is monitored as an indicator for nitrate reduction. Well 0590 has shown an increase in ammonia concentration for the past two years as shown on the included time-concentration graph. Unfortunately, unusually high runoff in the Colorado River caused elevated pond water elevations and well 0590 was not accessible during this sampling event.

Elevated contaminate concentrations were observed at the two Roaring Fork ponds locations (RFN01-0323 and RFN01-0575). Contaminate concentrations at the two Colorado River surface water locations (RFN01-0322 and RFN01-0324) remain low indicating no impact due to groundwater discharge.

Old Rifle Site

Samples were collected at the Old Rifle site from 12 monitoring wells and 8 surface locations as specified in the 2001 *Ground Water Compliance Action Plan for the Old Rifle, Colorado, UMTRA Project Site*. Water levels were measured at each sampled well.

The COCs at the Old Rifle site are selenium, uranium, and vanadium. Locations with sample concentrations that exceeded EPA groundwater standards or ACLs are listed in Table 2.

*Table 2. Old Rifle Locations that Exceed Standards or ACLs*

| Analyte | Standard[a] | ACL or MBC | Location | Concentration (mg/L) |
|---|---|---|---|---|
| Selenium | 0.01 mg/L | 0.05 mg/L[b] | 0292A | 0.027 |
| | | | 0305 | 0.031 |
| | | | 0655 | 0.076 |
| | | | 0658 | 0.013 |
| | | | B-04 | 0.140 |
| | | | LQ-108 | 0.063 |
| Uranium | 0.044 mg/L | 0.067 mg/L[c] | 0310 | 0.200 |
| | | | 0655 | 0.140 |
| | | | 0656 | 0.170 |
| | | | B-04 | 0.270 |
| | | | LQ-107 | 0.210 |
| | | | LQ-108 | 0.160 |
| | | | LQ-109 | 0.091 |

[a] Groundwater standards are listed in 40 CFR 192.02 Table 1 to Subpart A.
[b] ACL proposed in *Ground Water Compliance Action Plan for the Old Rifle, Colorado, UMTRA Project Site* (GCAP).
[c] Maximum background concentration listed in *Ground Water Compliance Action Plan for the Old Rifle, Colorado, UMTRA Project Site* (GCAP).

Time-concentration graphs from the locations sampled are included with the analytical data and indicate that the concentrations of the COCs are decreasing at many locations with the following notable exceptions. The selenium concentration in well 0655 continues to increase as has been observed since 2009. The uranium concentration in well 0656 decreased, after showing an upward trend since 2005, but remains above the maximum concentration limit (MCL).

Analytical results for surface locations 0396 and 0741 that are adjacent to and downgradient of the site along the Colorado River remain low indicating no impact due to groundwater discharge.

Isotopic Analyses for Old Rifle

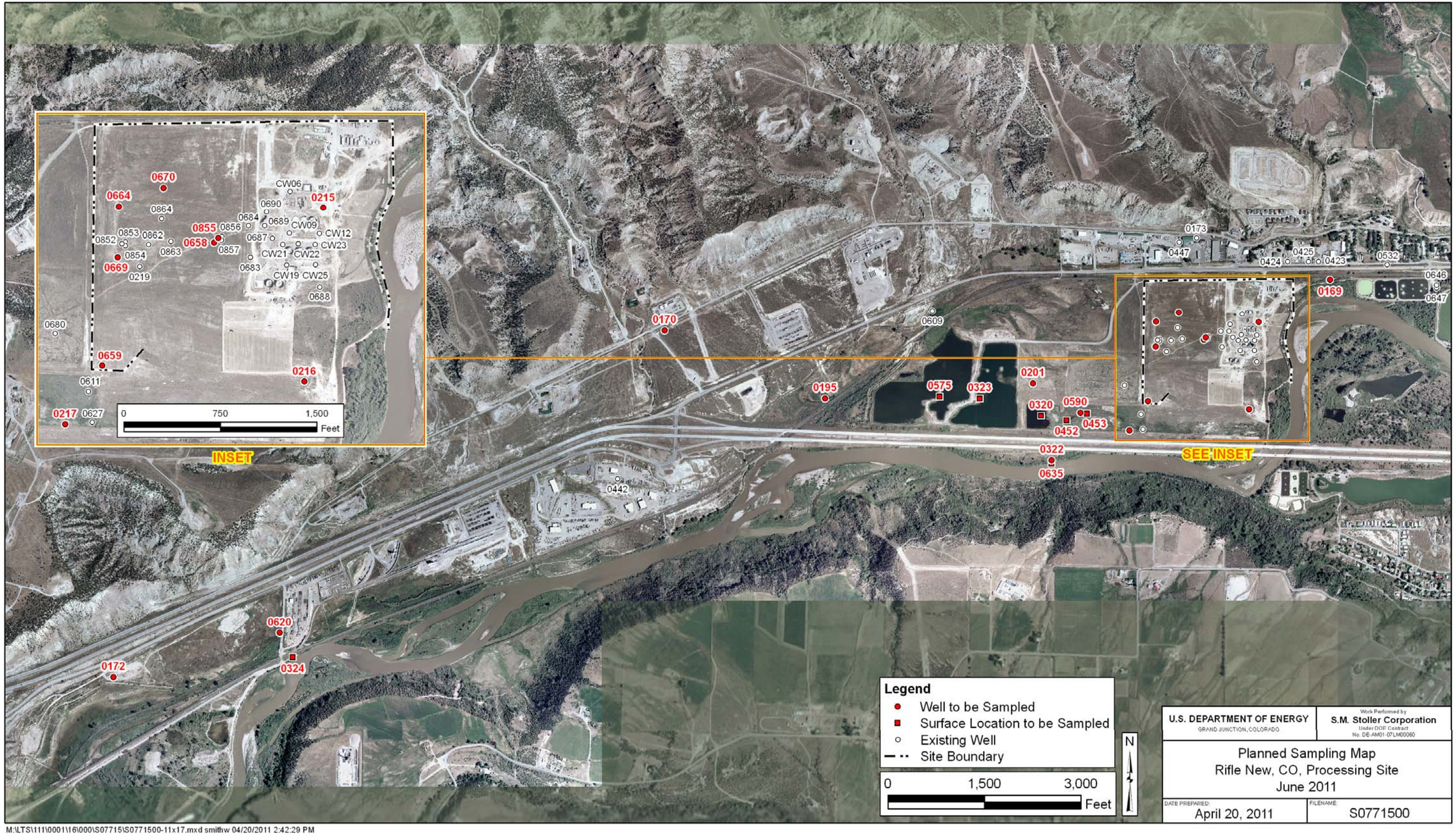
Isotopic analyses including U-234/U-238, D-2/H-1, and S34/S32 ratios were conducted for several well and surface (seep) water samples as part of the continuing characterization for this site. A full evaluation and interpretation of these results will be provided in the 2012 Verification Monitoring Report.

Richard E Dayvault

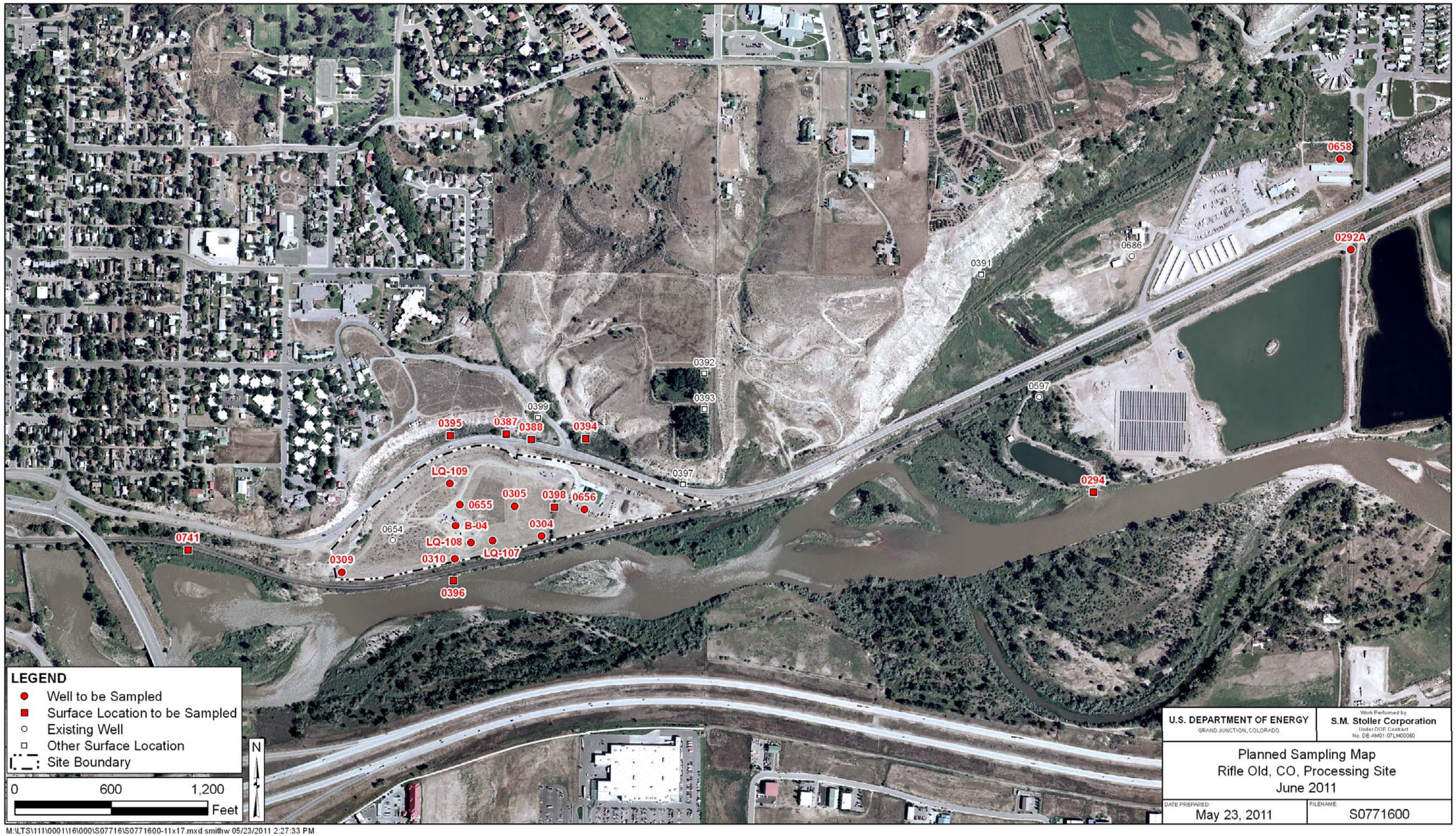
Richard Dayvault
Site Lead, S. M. Stoller Corporation

4/11/2011

Date




*Rifle New, Colorado Processing Site Sample Location Map*




*Rifle Old, Colorado Processing Site Sample Location Map*

# Data Assessment Summary

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# Water Sampling Field Activities Verification Checklist

| | | | |
|---|---|---|---|
| **Project** | Old and New Rifle, Colorado, Processing Sites | **Date(s) of Water Sampling** | October 6, 2011 |
| **Date(s) of Verification** | June 13–15, 2011 and August 9–11, 2011 | **Name of Verifier** | Steve Donivan |

| | Response (Yes, No, NA) | Comments |
|---|---|---|
| 1. Is the SAP the primary document directing field procedures? | Yes | |
| List other documents, SOPs, instructions. | | Work Order letter dated May 24, 2011. |
| 2. Were the sampling locations specified in the planning documents sampled? | No | Four New Rifle locations were not sampled because of flooding conditions. |
| 3. Was a pre-trip calibration conducted as specified in the above-named documents? | Yes | Pre-trip calibrations were performed on June 9 and August 8, 2011. |
| 4. Was an operational check of the field equipment conducted daily? | Yes | |
| Did the operational checks meet criteria? | Yes | |
| 5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified? | Yes | |
| 6. Was the category of the well documented? | Yes | |
| 7. Were the following conditions met when purging a Category I well: | | |
| Was one pump/tubing volume purged prior to sampling? | Yes | |
| Did the water level stabilize prior to sampling? | Yes | |
| Did pH, specific conductance, and turbidity measurements stabilize prior to sampling? | Yes | |
| Was the flow rate less than 500 mL/min? | Yes | |
| If a portable pump was used, was there a 4-hour delay between pump installation and sampling? | NA | |

# Water Sampling Field Activities Verification Checklist (continued)

| | Response (Yes, No, NA) | Comments |
|---|---|---|
| 8. Were the following conditions met when purging a Category II well: | | |
| Was the flow rate less than 500 mL/min? | Yes | |
| Was one pump/tubing volume removed prior to sampling? | Yes | |
| 9. Were duplicates taken at a frequency of one per 20 samples? | Yes | Duplicate samples were collected from New Rifle locations 0201 and 0322, and Old Rifle location 0310. |
| 10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment? | Yes | |
| 11. Were trip blanks prepared and included with each shipment of VOC samples? | NA | |
| 12. Were QC samples assigned a fictitious site identification number? | Yes | |
| Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report? | Yes | |
| 13. Were samples collected in the containers specified? | Yes | |
| 14. Were samples filtered and preserved as specified? | Yes | |
| 15. Were the number and types of samples collected as specified? | Yes | |
| 16. Were chain of custody records completed and was sample custody maintained? | Yes | |
| 17. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the “Date Signed” fields (FDCS)? | Yes | |
| 18. Was all other pertinent information documented on the field data sheets? | Yes | |
| 19. Was the presence or absence of ice in the cooler documented at every sample location? | Yes | |
| 20. Were water levels measured at the locations specified in the planning documents? | Yes | |

## Laboratory Performance Assessments

General Information

| | |
|---|---|
| Report Number (RIN): | 11063854 |
| Sample Event: | June 13-15, 2011 |
| Site(s): | Rifle Processing Sites, Colorado |
| Laboratory: | ALS Laboratory Group, Fort Collins, Colorado |
| Work Order No.: | 1106266 |
| Analysis: | Metals, Radiochemistry, and Wet Chemistry |
| Validator: | Steve Donivan |
| Review Date: | October 4, 2011 |

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 3.

*Table 3. Analytes and Methods*

| Analyte | Line Item Code | Prep Method | Analytical Method |
|---|---|---|---|
| Ammonia as N | WCH-A-005 | MCAWW 350.2 | MCAWW 350.1 |
| Arsenic, Molybdenum, Selenium, Uranium, Vanadium | LMM-02 | SW-846 3005A | SW-846 3005/6020 |
| Nitrate + Nitrite as N | WCH-A-022 | MCAWW 353.2 | MCAWW 353.2 |
| Uranium Isotopes | LMR-02 | SOP776R12, SOP778R13 | SOP714R12 |

Data Qualifier Summary

Analytical results were qualified as listed in Table 4. Refer to the sections below for an explanation of the data qualifiers applied.

*Table 4. Data Qualifier Summary*

| Sample Number | Location | Analyte(s) | Flag | Reason |
|---|---|---|---|---|
| 1106266-1 | 0170 | Ammonia as N | J | Matrix spike failure |
| 1106266-6 | 0324 | Vanadium | U | Less than 5 times the calibration blank |
| 1106266-16 | Equipment Blank | Vanadium | U | Less than 5 times the calibration blank |
| 1106266-17 | 0292A | Vanadium | U | Less than 5 times the calibration blank |
| 1106266-18 | 0294 | Vanadium | U | Less than 5 times the calibration blank |
| 1106266-21 | 0309 | Vanadium | U | Less than 5 times the calibration blank |
| 1106266-25 | 0394 | Vanadium | U | Less than 5 times the calibration blank |
| 1106266-25 | 0394 | Uranium-235 | U | Less than the Decision Level concentration |
| 1106266-27 | 0396 | Vanadium | U | Less than 5 times the calibration blank |
| 1106266-32 | 0741 | Vanadium | U | Less than 5 times the calibration blank |

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 37 water samples on June 17, 2011, accompanied a Chain of Custody form. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The air bill numbers were listed in the receiving documentation. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler at 1.4 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

*Method MCAWW 350.1*
Calibrations for ammonia as N were performed using six calibration standards on June 23, 2011. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the method detection limit (MDL). Initial and continuing calibration verification checks were made at the required frequency resulting in five verification checks. All calibration check results were within the acceptance criteria.

*Method MCAWW 353.2*
Calibrations for nitrate + nitrite as N were performed using seven calibration standards on June 22, 2011. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in six verification checks. All calibration check results were within the acceptance criteria.

*Method SW-846 6020*
Calibrations were performed for arsenic, molybdenum, selenium, uranium, and vanadium on June 28, 2011, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in eight verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the

linearity of the calibration curve near the practical quantitation limit (PQL) and all results were within the acceptance range with the following exception. One uranium check result was above the acceptance range. There were no sample results associated with this check. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Radiochemical Analysis

Radiochemical results are qualified with a "U" flag (not detected) when the result is greater than the minimum detectable concentration (MDC) but less than the Decision Level Concentration, estimated as 3 times the one-sigma total propagated uncertainty. Results above the Decision Level Concentration and the MDC are qualified with a "J" flag (estimated) when the result is less than Determination Limit (3 times the MDC).

*Alpha Spectrometry*
Alpha spectrometry calibrations and instrument backgrounds were performed within a month prior to sample analysis. Calibration standards were counted to obtain a minimum of 10,000 counts per peak. Daily instrument checks met the acceptance criteria. The tracer recoveries met the acceptance criteria of 30 to 110 percent for all samples. The full width at half maximum was reviewed to evaluate the spectral resolution. All internal standard full width at half maximum values were below 100 kiloelectron volts demonstrating acceptable resolution. All internal standard peaks were within 50 kiloelectron volts of the expected position. The regions of interest for analyte peaks were reviewed. All regions of interest were satisfactory and all manual integrations were performed correctly.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis.

*Metals and Wet Chemistry*
All method blank and calibration blank results associated with the samples were below the PQLs. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

*Radiochemistry*
The method blank results for uranium isotopes were below the decision level concentration.

Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spike results met the recovery and precision criteria for all analytes evaluated with the following exception. The spike recoveries of ammonia as N were below the acceptance range. The associated sample result is qualified with a "J" flag and an estimated value.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than the PQL, the range should be no greater than the PQL. The replicate results met these criteria, demonstrating acceptable laboratory precision.

Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Method 6020 serial dilution data are evaluated when the concentration of the undiluted sample is greater than 100 times the PQL. All evaluated serial dilution data were acceptable.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable (EDD) File

The EDD file arrived on July 5, 2011. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

# SAMPLE MANAGEMENT SYSTEM

## General Data Validation Report

**RIN:** 11063854 **Lab Code:** PAR **Validator:** Steve Donivan **Validation Date:** 10/3/2011

**Project:** Rifle Disposal/Processing Site (old/new) **Analysis Type:** ☑ Metals ☑ General Chem ☑ Rad ☐ Organics

**# of Samples:** 37 **Matrix:** WATER **Requested Analysis Completed:** Yes

**Chain of Custody**

**Present:** OK **Signed:** OK **Dated:** OK

**Sample**

**Integrity:** OK **Preservation:** OK **Temperature:** OK

**Select Quality Parameters**

| | |
|---|---|
| ☑ Holding Times | All analyses were completed within the applicable holding times. |
| ☑ Detection Limits | The reported detection limits are equal to or below contract requirements. |
| ☑ Field/Trip Blanks | There was 1 trip/equipment blank evaluated. |
| ☑ Field Duplicates | There were 2 duplicates evaluated. |

## SAMPLE MANAGEMENT SYSTEM

### Metals Data Validation Worksheet

**RIN:** 11063854 **Lab Code:** PAR **Date Due:** 7/15/2011

**Matrix:** Water **Site Code:** RFL **Date Completed:** 7/5/2011

| Analyte | Method Type | Date Analyzed | CALIBRATION | | | | | | Method Blank | LCS %R | MS %R | MSD %R | Dup. RPD | ICSAB %R | Serial Dil. %R | CRI %R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Int. | R^2 | ICV | CCV | ICB | CCB | | | | | | | | |
| Arsenic | ICP/MS | 06/28/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 101.0 | 105.0 | 106.0 | 1.0 | 108.0 | | 116.0 |
| Arsenic | ICP/MS | 06/28/2011 | | | | | | | OK | 96.0 | 98.0 | 99.0 | 1.0 | | | 111.0 |
| Molybdenum | ICP/MS | 06/28/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 100.0 | 103.0 | 102.0 | 0.0 | 101.0 | 3.0 | 92.0 |
| Molybdenum | ICP/MS | 06/28/2011 | | | | | | | OK | 95.0 | 97.0 | 99.0 | 2.0 | | | 71.0 |
| Selenium | ICP/MS | 06/28/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 103.0 | 108.0 | 106.0 | 1.0 | 108.0 | 9.0 | 89.0 |
| Selenium | ICP/MS | 06/28/2011 | | | | | | | OK | 101.0 | 100.0 | 101.0 | 0.0 | | | 95.0 |
| Uranium | ICP/MS | 06/28/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 104.0 | 116.0 | 117.0 | 0.0 | 114.0 | 1.0 | 140.0 |
| Uranium | ICP/MS | 06/28/2011 | | | | | | | OK | 101.0 | 102.0 | 105.0 | 3.0 | | | 120.0 |
| Vanadium | ICP/MS | 06/28/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 98.0 | 103.0 | 103.0 | 0.0 | 103.0 | | 108.0 |
| Vanadium | ICP/MS | 06/28/2011 | | | | | | | OK | 94.0 | 96.0 | 97.0 | 2.0 | | | 102.0 |

## SAMPLE MANAGEMENT SYSTEM

### Wet Chemistry Data Validation Worksheet

**RIN:** 11063854 **Lab Code:** PAR **Date Due:** 7/15/2011

**Matrix:** Water **Site Code:** RFL **Date Completed:** 7/5/2011

| Analyte | Date Analyzed | CALIBRATION | | | | | | Method Blank | LCS %R | MS %R | MSD %R | DUP RPD | Serial Dil. %R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Int. | R^2 | ICV | CCV | ICB | CCB | | | | | | |
| AMMONIA AS N | 06/23/2011 | 0.000 | 1.0000 | OK | OK | OK | OK | OK | 96.00 | 53.0 | 53.0 | 1.00 | |
| Nitrate+Nitrite as N | 06/22/2011 | 0.000 | 0.9999 | OK | OK | OK | OK | OK | 98.00 | | | | |

# SAMPLE MANAGEMENT SYSTEM
## Radiochemistry Data Validation Worksheet

**RIN:** 11063854 **Lab Code:** PAR **Date Due:** 7/15/2011

**Matrix:** Water **Site Code:** RFL **Date Completed:** 7/5/2011

| Sample | Analyte | Date Analyzed | Result | Flag | Tracer %R | LCS %R | MS %R | Duplicate |
|---|---|---|---|---|---|---|---|---|
| 0304 | U-234 | 06/23/2011 | | | 72.8 | | | |
| 0310 | U-234 | 06/23/2011 | | | 41.4 | | | |
| 0387 | U-234 | 06/23/2011 | | | 88.6 | | | |
| 0388 | U-234 | 06/23/2011 | | | 82.7 | | | |
| 0394 | U-234 | 06/23/2011 | | | 79.4 | | | |
| 0395 | U-234 | 06/23/2011 | | | 79.7 | | | |
| LQ-107 | U-234 | 06/23/2011 | | | 48.7 | | | |
| LQ-109 | U-234 | 06/23/2011 | | | 74.4 | | | |
| Blank_Spike | U-234 | 06/23/2011 | | | 69.5 | 107.00 | | |
| Blank_Spike_Du | U-234 | 06/23/2011 | | | 78.4 | 99.70 | | 0.50 |
| Blank | U-234 | 06/23/2011 | 0.0300 | U | 77.5 | | | |
| Blank | U-235 | 06/23/2011 | -0.0070 | U | | | | |
| Blank | U-238 | 06/23/2011 | 0.0070 | U | | | | |
| Blank_Spike | Uranium-238 | 06/23/2011 | | | | 110.00 | | |
| Blank_Spike_Du | Uranium-238 | 06/23/2011 | | | | 106.00 | | 0.30 |

General Information

Requisition No. (RIN): 11063855
Sample Event: June 13 – 15, 2011
Site(s): Rifle, Colorado
Laboratory: Reston Stable Isotope Laboratory, Reston, Virginia
Analysis: Stable Isotopes
Validator: Steve Donivan
Review Date: July 20, 2011

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 1, Data Deliverables Examination. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 5.

*Table 5. Analytes and Methods*

| Analyte | Line Item Code | Prep Method | Analytical Method |
|---|---|---|---|
| H-2/H-1 and O-18/O-16 Isotope Ratios | LMW-08 | NA | Mass Spectrometry |
| S-34/S-32 Isotope Ratios | LMW-09 | NA | Mass Spectrometry |

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

The Reston Stable Isotope Laboratory in Reston, Virginia, received eight water samples on June 24, 2011, submitted for the determination of stable hydrogen, oxygen, and sulfur isotope ratios. The analytical report was checked to confirm that all of the samples scheduled were received and analyzed.

Preservation and Holding Times

The sample shipment was received intact with all samples in the correct container types preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Analysis

Hydrogen-isotope-ratio analyses was performed using a hydrogen equilibration technique based on measuring the deuterium activity. Water samples are measured for delta O-18 using the $CO_2$ equilibration technique of Epstein and Mayeda (1953), which has been automated (Revesz and Coplen 2008). Therefore, both oxygen and hydrogen isotopic ratio measurements are reported as activities.

Oxygen and hydrogen isotopic results are reported in per mill relative to VSMOW (Vienna Standard Mean Ocean Water) and normalized on scales such that the oxygen and hydrogen isotopic values of SLAP (Standard Light Antarctic Precipitation) are -55.5 per mill and -428 per mill, respectively. The 2-sigma uncertainties of oxygen and hydrogen isotopic results are 0.2 per mill and 2 per mill, respectively, unless otherwise indicated.

Sulfur isotope samples are prepared for isotopic analysis using the methods of Carmody and others (1997). For sulfur isotope ratio measurements, dissolved sulfate is converted to $BaSO_4$, which is analyzed by conversion to sulfur dioxide with an elemental analyzer and subsequent analysis with a continuous flow isotope ratio mass spectrometer (Brenna 1997). Samples are analyzed simultaneously with $BaSO_4$ isotopic reference materials. No correction for oxygen isotopic composition is made to reported data.

Sulfur isotope ratios are reported in parts per thousand (per mill) relative to VCDT, defined by assigning a value of -0.3 per mill exactly (Coplen and Krouse, 1998) to IAEA-S-1 silver sulfide (previously known as NZ-1).

The 2-sigma uncertainty of sulfur isotopic results is 0.4 per mill, unless otherwise indicated.

Completeness

The electronic data deliverable was the only deliverable received for this RIN.

Electronic Data Deliverable File

The EDD files arrived on July 11, 2011.

General Information

| | |
|---|---|
| Report Number (RIN): | 11073976 |
| Sample Event: | August 9-11, 2011 |
| Site(s): | Rifle Processing Sites, Colorado |
| Laboratory: | ALS Laboratory Group, Fort Collins, Colorado |
| Work Order No.: | 1108139 |
| Analysis: | Metals and Wet Chemistry |
| Validator: | Steve Donivan |
| Review Date: | October 4, 2011 |

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 6.

*Table 6. Analytes and Methods*

| Analyte | Line Item Code | Prep Method | Analytical Method |
|---|---|---|---|
| Ammonia as N | WCH-A-005 | MCAWW 350.2 | MCAWW 350.1 |
| Arsenic, Molybdenum, Selenium, Uranium, Vanadium | LMM-02 | SW-846 3005A | SW-846 3005/6020 |
| Nitrate + Nitrite as N | WCH-A-022 | MCAWW 353.2 | MCAWW 353.2 |

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received nine water samples between August 11 and 13, 2011, accompanied Chain of Custody forms. The Chain of Custody forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The air bill numbers were listed in the receiving documentation. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced coolers at 2.8 °C and 3.5 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

*Method MCAWW 350.1*
Calibrations for ammonia as N were performed using six calibration standards on August 25, 2011. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in seven verification checks. All calibration check results were within the acceptance criteria.

*Method MCAWW 353.2*
Calibrations for nitrate + nitrite as N were performed using seven calibration standards on August 18, 2011. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in four verification checks. All calibration check results were within the acceptance criteria.

*Method SW-846 6020*
Calibrations were performed for arsenic, molybdenum, selenium, uranium, and vanadium August 29-30, 2011, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in seven verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range with the following exception. One uranium check result was above the acceptance range. There were no sample results associated with this check. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQLs, with the exception of two calibration blanks for vanadium. The samples bracketed by these blanks either had vanadium concentrations greater than 10 times the blank concentration or were re-analyzed with acceptable blanks.

Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spike results met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than the PQL, the range should be no greater than the PQL. The replicate results met these criteria, demonstrating acceptable laboratory precision.

Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Method 6020 serial dilution data are evaluated when the concentration of the undiluted sample is greater than 100 times the PQL. All evaluated serial dilution data were acceptable.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD file arrived on August 31, 2011. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

# SAMPLE MANAGEMENT SYSTEM

## General Data Validation Report

**RIN:** 11073976 **Lab Code:** PAR **Validator:** Steve Donivan **Validation Date:** 10/4/2011

**Project:** Rifle Disposal/Processing Site (old/new) **Analysis Type:** ☑ Metals ☑ General Chem ☐ Rad ☐ Organics

**# of Samples:** 9 **Matrix:** WATER **Requested Analysis Completed:** Yes

**Chain of Custody**

**Present:** OK **Signed:** OK **Dated:** OK

**Sample**

**Integrity:** OK **Preservation:** OK **Temperature:** OK

**Select Quality Parameters**

| | |
|---|---|
| ☑ Holding Times | All analyses were completed within the applicable holding times. |
| ☑ Detection Limits | The reported detection limits are equal to or below contract requirements. |
| ☐ Field/Trip Blanks | |
| ☑ Field Duplicates | There was 1 duplicate evaluated. |

## SAMPLE MANAGEMENT SYSTEM

### Metals Data Validation Worksheet

**RIN:** 11073976 **Lab Code:** PAR **Date Due:** 9/10/2011

**Matrix:** Water **Site Code:** RFL **Date Completed:** 9/2/2011

| Analyte | Method Type | Date Analyzed | CALIBRATION | | | | | | Method Blank | LCS %R | MS %R | MSD %R | Dup. RPD | ICSAB %R | Serial Dil. %R | CRI %R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Int. | R^2 | ICV | CCV | ICB | CCB | | | | | | | | |
| Arsenic | ICP/MS | 08/29/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 93.0 | 96.0 | 95.0 | 1.0 | 107.0 | | 108.0 |
| Molybdenum | ICP/MS | 08/29/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 93.0 | 94.0 | 97.0 | 2.0 | 102.0 | 10.0 | 103.0 |
| Selenium | ICP/MS | 08/29/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 96.0 | | | | 105.0 | | 95.0 |
| Selenium | ICP/MS | 08/30/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | | | 103.0 | 100.0 | 3.0 | | | 108.0 |
| Uranium | ICP/MS | 08/29/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 94.0 | 101.0 | 97.0 | 1.0 | 104.0 | 7.0 | 100.0 |
| Vanadium | ICP/MS | 08/29/2011 | 0.0000 | 1.0000 | OK | OK | OK | OK | OK | 94.0 | 91.0 | 92.0 | 1.0 | 103.0 | 6.0 | 128.0 |

## SAMPLE MANAGEMENT SYSTEM

### Wet Chemistry Data Validation Worksheet

**RIN:** 11073976 **Lab Code:** PAR **Date Due:** 9/10/2011

**Matrix:** Water **Site Code:** RFL **Date Completed:** 9/2/2011

| Analyte | Date Analyzed | CALIBRATION | | | | | | Method Blank | LCS %R | MS %R | MSD %R | DUP RPD | Serial Dil. %R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Int. | R^2 | ICV | CCV | ICB | CCB | | | | | | |
| AMMONIA AS N | 08/25/2011 | 0.000 | 1.0000 | OK | OK | OK | OK | OK | 96.00 | 75.0 | 75.0 | 1.00 | |
| Nitrate+Nitrite as N | 08/18/2011 | 0.000 | 1.0000 | OK | OK | OK | OK | OK | 100.00 | 103.0 | 104.0 | 1.00 | |

## Sampling Quality Control Assessment

The following information summarizes and assesses quality control for this sampling event.

### Sampling Protocol

Sample results for all monitoring wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. All wells met the Category I criteria with the following exceptions:

- New Rifle wells 0669 and 0670 were classified as Category II.

The sample results for these wells were qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.

### Equipment Blank Assessment

An equipment blank (field ID 2949) was collected after decontamination of the tubing reel used to collect the surface water samples. Arsenic, molybdenum, and uranium were detected in this blank. The associated sample results were greater than 5 times the blank concentration, not requiring qualification. The equipment blank results indicate adequate decontamination of the sampling equipment.

### Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than the PQL, the range should be no greater than the PQL. Duplicate samples were collected at locations RFN01-0201, RFN01-0322, and RFO01-0310 (field IDs 2948, 2187, and 2927, respectively). All duplicate results met the acceptance criteria, demonstrating acceptable overall precision.

# SAMPLE MANAGEMENT SYSTEM

## Validation Report: Equipment/Trip Blanks

**RIN:** 11063854 **Lab Code:** PAR **Project:** Rifle Disposal/Processing Site (old/new) **Validation Date:** 10/4/2011

**Blank Data**

| Blank Type | Lab Sample ID | Lab Method | Analyte Name | Result | Qualifier | MDL | Units |
|---|---|---|---|---|---|---|---|
| Equipment Blank | 1106266-16 | SW6020 | Arsenic | 0.026 | B | 0.015 | UG/L |

| Sample ID | Sample Ticket | Location | Result | Dilution Factor | Lab Qualifier | Validation Qualifier |
|---|---|---|---|---|---|---|
| 1106266-5 | JHS 779 | 0323 | 1.1 | 5 | | |
| 1106266-6 | JHS 780 | 0324 | 0.43 | 1 | | |
| 1106266-7 | JHS 783 | 0575 | 2.5 | 1 | | |

**Blank Data**

| Blank Type | Lab Sample ID | Lab Method | Analyte Name | Result | Qualifier | MDL | Units |
|---|---|---|---|---|---|---|---|
| Equipment Blank | 1106266-16 | SW6020 | Molybdenum | 0.21 | | 0.032 | UG/L |

| Sample ID | Sample Ticket | Location | Result | Dilution Factor | Lab Qualifier | Validation Qualifier |
|---|---|---|---|---|---|---|
| 1106266-5 | JHS 779 | 0323 | 2600 | 10 | | |
| 1106266-6 | JHS 780 | 0324 | 2.1 | 1 | | |
| 1106266-7 | JHS 783 | 0575 | 34 | 1 | | |

**Blank Data**

| Blank Type | Lab Sample ID | Lab Method | Analyte Name | Result | Qualifier | MDL | Units |
|---|---|---|---|---|---|---|---|
| Equipment Blank | 1106266-16 | SW6020 | Uranium | 0.017 | | 0.0029 | UG/L |

| Sample ID | Sample Ticket | Location | Result | Dilution Factor | Lab Qualifier | Validation Qualifier |
|---|---|---|---|---|---|---|
| 1106266-18 | JHS 798 | 0294 | 0.72 | 1 | | |
| 1106266-23 | JHS 799 | 0387 | 33 | 1 | | |
| 1106266-24 | JHS 800 | 0388 | 42 | 1 | | |
| 1106266-27 | JHS 804 | 0396 | 0.8 | 1 | | |
| 1106266-32 | JHS 806 | 0741 | 0.77 | 1 | | |
| 1106266-5 | JHS 779 | 0323 | 320 | 10 | | |
| 1106266-6 | JHS 780 | 0324 | 0.76 | 1 | | |
| 1106266-7 | JHS 783 | 0575 | 17 | 1 | | |

# SAMPLE MANAGEMENT SYSTEM

## Validation Report: Field Duplicates

**RIN:** 11063854 **Lab Code:** PAR **Project:** Rifle Disposal/Processing Site (old/new) **Validation Date:** 10/3/2011

**Duplicate:** 2927 **Sample:** 0310

| Analyte | Sample Result | Sample Flag | Sample Error | Sample Dilution | Duplicate Result | Duplicate Flag | Duplicate Error | Duplicate Dilution | RPD | RER | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Selenium | 2.7 | | | 5 | 2.6 | | | 5 | 3.77 | | UG/L |
| Uranium | 200 | | | 5 | 200 | | | 5 | 0 | | UG/L |
| Vanadium | 11 | | | 5 | 12 | | | 5 | 8.70 | | UG/L |

**Duplicate:** 2948 **Sample:** 0201

| Analyte | Sample Result | Sample Flag | Sample Error | Sample Dilution | Duplicate Result | Duplicate Flag | Duplicate Error | Duplicate Dilution | RPD | RER | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AMMONIA AS N | 85 | | | 20 | 87 | | | 20 | 2.33 | | MG/L |
| Arsenic | 0.5 | | | 2 | 0.57 | | | 2 | 13.08 | | UG/L |
| Molybdenum | 1800 | | | 10 | 1700 | | | 10 | 5.71 | | UG/L |
| Nitrate+Nitrite as N | 38 | | | 20 | 38 | | | 20 | 0 | | MG/L |
| Selenium | 46 | | | 10 | 45 | | | 10 | 2.20 | | UG/L |
| Uranium | 99 | | | 10 | 94 | | | 10 | 5.18 | | UG/L |

# SAMPLE MANAGEMENT SYSTEM

## Validation Report: Field Duplicates

**RIN:** 11073976 **Lab Code:** PAR **Project:** Rifle Disposal/Processing Site (old/new) **Validation Date:** 10/4/2011

**Duplicate:** 2187 **Sample:** 0322

| Analyte | Sample | | | | Duplicate | | | | RPD | RER | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Result | Flag | Error | Dilution | Result | Flag | Error | Dilution | | | |
| AMMONIA AS N | 0.1 | U | | 1 | 0.1 | U | | 1 | | | MG/L |
| Arsenic | 0.52 | | | 1 | 0.5 | | | 1 | 3.92 | | UG/L |
| Molybdenum | 4.2 | | | 1 | 4.3 | | | 1 | 2.35 | | UG/L |
| Nitrate+Nitrite as N | 0.018 | | | 1 | 0.011 | | | 1 | | | MG/L |
| Selenium | 0.37 | | | 1 | 0.34 | | | 1 | 8.45 | | UG/L |
| Uranium | 1.4 | | | 1 | 1.4 | | | 1 | 0 | | UG/L |
| Vanadium | 1.3 | | | 1 | 1.2 | | | 1 | 8.00 | | UG/L |

## Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Steve Donivan — Steve Donivan — 10-26-2011 — Date

Data Validation Lead: Steve Donivan — Steve Donivan — 10-26-2011 — Date

# Attachment 1
# Assessment of Anomalous Data

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# Potential Outliers Report

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## Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the SEEPro database. The application compares the new data set with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition.

Four analytical results were identified as potentially anomalous. Analyte concentrations at many of the associated locations are trending upward or downward. No analytical errors were noted during the review of the selenium data from locations 0170 and 0310 and the uranium data from location 0396. The molybdenum concentration at location 0217 is following a downward trend and more variability in analyte concentration is expected. No analytical errors were noted during the review of the data and all data from these sampling events may be treated as validated results.

**Data Validation Outliers Report - No Field Parameters**
**Comparison: All Historical Data**
Laboratory: ALS Laboratory Group
RIN: 11063854
Report Date: 10/11/2011

| | | | | | Current | | | Historical Maximum | | | Historical Minimum | | | Number of Data Points | | Statistical Outlier |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Qualifiers | | | Qualifiers | | | Qualifiers | | | | |
| Site Code | Location Code | Sample ID | Sample Date | Analyte | Result | Lab | Data | Result | Lab | Data | Result | Lab | Data | N | N Below Detect | |
| RFN01 | 0170 | N001 | 06/14/2011 | Nitrate + Nitrite as Nitrogen | 13 | | F | 37 | | F | 16.4 | | F | 7 | 0 | No |
| RFN01 | 0170 | N001 | 06/14/2011 | Selenium | 0.013 | | F | 0.0101 | N | F | 0.0029 | B | | 14 | 0 | Yes |
| RFN01 | 0172 | N001 | 06/14/2011 | Arsenic | 0.0079 | | F | 0.0058 | | JF | 0.0006 | U | F | 15 | 2 | No |
| RFN01 | 0201 | N001 | 06/14/2011 | Nitrate + Nitrite as Nitrogen | 38 | | F | 130 | | F | 52 | | F | 10 | 0 | No |
| RFN01 | 0201 | N002 | 06/14/2011 | Nitrate + Nitrite as Nitrogen | 38 | | F | 130 | | F | 52 | | F | 10 | 0 | No |
| RFN01 | 0215 | N001 | 06/13/2011 | Selenium | 0.0021 | | F | 0.0018 | | F | 0.00002 | U | F | 24 | 9 | No |
| RFN01 | 0323 | N001 | 06/14/2011 | Nitrate + Nitrite as Nitrogen | 76 | | | 130 | | | 91 | | | 10 | 0 | No |
| RFN01 | 0324 | 0001 | 06/14/2011 | Uranium | 0.00076 | | | 0.00285 | | | 0.00098 | | | 11 | 0 | No |
| RFN01 | 0620 | N001 | 06/14/2011 | Molybdenum | 0.0088 | | F | 0.07 | | | 0.0097 | | F | 26 | 2 | No |
| RFN01 | 0658 | N001 | 06/13/2011 | Ammonia Total as N | 47 | | F | 180 | | F | 48 | | FJ | 9 | 0 | No |
| RFN01 | 0658 | N001 | 06/13/2011 | Nitrate + Nitrite as Nitrogen | 4.1 | | F | 75 | | F | 12 | | F | 9 | 0 | No |
| RFN01 | 0659 | N001 | 06/13/2011 | Arsenic | 0.0083 | | F | 0.195 | | L | 0.0093 | | F | 28 | 0 | No |
| RFN01 | 0659 | N001 | 06/13/2011 | Molybdenum | 1.7 | | F | 7.7 | | | 2.08 | | F | 30 | 0 | No |
| RFN01 | 0659 | N001 | 06/13/2011 | Nitrate + Nitrite as Nitrogen | 3.7 | | F | 50 | | F | 9.18 | | F | 14 | 0 | No |
| RFN01 | 0659 | N001 | 06/13/2011 | Selenium | 0.038 | | F | 1.4 | | F | 0.0398 | | | 25 | 0 | No |
| RFN01 | 0659 | N001 | 06/13/2011 | Vanadium | 0.65 | | F | 13.8 | | | 0.71 | | F | 33 | 0 | No |
| RFN01 | 0664 | N001 | 06/13/2011 | Molybdenum | 0.24 | | F | 0.888 | | | 0.27 | | F | 19 | 0 | No |
| RFN01 | 0664 | N001 | 06/13/2011 | Selenium | 0.19 | | F | 0.13 | | F | 0.0157 | | | 16 | 0 | No |

**Data Validation Outliers Report - No Field Parameters**
**Comparison: All Historical Data**
Laboratory: ALS Laboratory Group
RIN: 11063854
Report Date: 10/11/2011

| | | | | | Current | | | Historical Maximum | | | Historical Minimum | | | Number of Data Points | | Statistical Outlier |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Qualifiers | | | Qualifiers | | | Qualifiers | | | | |
| Site Code | Location Code | Sample ID | Sample Date | Analyte | Result | Lab | Data | Result | Lab | Data | Result | Lab | Data | N | N Below Detect | |
| RFN01 | 0669 | N001 | 06/13/2011 | Arsenic | 0.0029 | | FQ | 0.0162 | | | 0.0044 | | FQ | 14 | 0 | No |
| RFN01 | 0669 | N001 | 06/13/2011 | Nitrate + Nitrite as Nitrogen | 0.019 | | FQ | 26.3 | | FQ | 0.23 | | FQ | 11 | 0 | No |
| RFN01 | 0669 | N001 | 06/13/2011 | Vanadium | 0.73 | | FQ | 14.3 | | | 1.1 | | | 24 | 0 | No |
| RFN01 | 0670 | N001 | 06/13/2011 | Arsenic | 0.0039 | | FQ | 0.0175 | | FQ | 0.0045 | | F | 13 | 0 | No |
| RFN01 | 0855 | N001 | 06/13/2011 | Molybdenum | 1.1 | | F | 18 | | FQ | 1.2 | | F | 17 | 0 | No |
| RFO01 | 0294 | 0001 | 06/14/2011 | Uranium | 0.00072 | | | 0.0027 | | | 0.00079 | | | 13 | 0 | No |
| RFO01 | 0310 | N001 | 06/15/2011 | Selenium | 0.0027 | | F | 0.0016 | | F | 0.000041 | B | F | 34 | 14 | Yes |
| RFO01 | 0396 | 0001 | 06/15/2011 | Uranium | 0.0008 | | | 0.0028 | | | 0.00081 | | | 25 | 0 | Yes |
| RFO01 | 0655 | N001 | 06/14/2011 | Selenium | 0.076 | | F | 0.067 | | F | 0.0088 | | F | 33 | 0 | No |
| RFO01 | 0741 | 0001 | 06/14/2011 | Uranium | 0.00077 | | | 0.0027 | | | 0.00091 | | | 30 | 2 | No |
| RFO01 | LQ-107 | N001 | 06/15/2011 | Selenium | 0.00063 | | F | 0.037 | | F | 0.001 | UN | F | 6 | 1 | No |

**Data Validation Outliers Report - No Field Parameters**
**Comparison: All Historical Data**
Laboratory: ALS Laboratory Group
RIN: 11073976
Report Date: 10/11/2011

| | | | | | Current | | | Historical Maximum | | | Historical Minimum | | | Number of Data Points | | Statistical Outlier |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Qualifiers | | | Qualifiers | | | Qualifiers | | | | |
| Site Code | Location Code | Sample ID | Sample Date | Analyte | Result | Lab | Data | Result | Lab | Data | Result | Lab | Data | N | N Below Detect | |
| RFN01 | 0195 | N001 | 08/09/2011 | Ammonia Total as N | 0.23 | | F | 46 | | F | 0.309 | | F | 9 | 0 | No |
| RFN01 | 0195 | N001 | 08/09/2011 | Molybdenum | 0.021 | | F | 0.6 | | FJ | 0.0334 | | F | 18 | 0 | No |
| RFN01 | 0195 | N001 | 08/09/2011 | Uranium | 0.012 | | F | 0.177 | | | 0.016 | | F | 18 | 0 | No |
| RFN01 | 0216 | N001 | 08/09/2011 | Ammonia Total as N | 4.7 | | F | 8.7 | | F | 4.9 | | F | 11 | 0 | No |
| RFN01 | 0217 | N001 | 08/09/2011 | Molybdenum | 1.1 | | F | 2.1 | | F | 1.54 | | | 16 | 0 | Yes |
| RFN01 | 0635 | N001 | 08/11/2011 | Ammonia Total as N | 77 | | F | 210 | | F | 84.6 | | F | 9 | 0 | No |
| RFN01 | 0635 | N001 | 08/11/2011 | Nitrate + Nitrite as Nitrogen | 4 | | F | 85 | | F | 6 | | F | 9 | 0 | No |

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

# Attachment 2
# Data Presentation

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# New Rifle
# Groundwater Quality Data

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**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0169 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/09/2011 | N001 | 3.13 | - | 18.13 | 436 | | F | # | | |
| Ammonia Total as N | mg/L | 08/09/2011 | N001 | 3.13 | - | 18.13 | 0.1 | U | F | # | 0.1 | |
| Arsenic | mg/L | 08/09/2011 | N001 | 3.13 | - | 18.13 | 0.00064 | | F | # | 0.000015 | |
| Molybdenum | mg/L | 08/09/2011 | N001 | 3.13 | - | 18.13 | 0.0056 | | F | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 08/09/2011 | N001 | 3.13 | - | 18.13 | 0.01 | U | F | # | 0.01 | |
| Oxidation Reduction Potential | mV | 08/09/2011 | N001 | 3.13 | - | 18.13 | 54.9 | | F | # | | |
| pH | s.u. | 08/09/2011 | N001 | 3.13 | - | 18.13 | 6.95 | | F | # | | |
| Selenium | mg/L | 08/09/2011 | N001 | 3.13 | - | 18.13 | 0.0019 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 08/09/2011 | N001 | 3.13 | - | 18.13 | 2752 | | F | # | | |
| Temperature | C | 08/09/2011 | N001 | 3.13 | - | 18.13 | 15.47 | | F | # | | |
| Turbidity | NTU | 08/09/2011 | N001 | 3.13 | - | 18.13 | 1.43 | | F | # | | |
| Uranium | mg/L | 08/09/2011 | N001 | 3.13 | - | 18.13 | 0.026 | | F | # | 0.0000029 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0170 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 92.23 | - | 112.23 | 513 | | F | # | | |
| Ammonia Total as N | mg/L | 06/14/2011 | N001 | 92.23 | - | 112.23 | 0.18 | N | FJ | # | 0.1 | |
| Arsenic | mg/L | 06/14/2011 | N001 | 92.23 | - | 112.23 | 0.00032 | | F | # | 0.000015 | |
| Molybdenum | mg/L | 06/14/2011 | N001 | 92.23 | - | 112.23 | 0.0033 | | F | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | N001 | 92.23 | - | 112.23 | 13 | | F | # | 0.1 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 92.23 | - | 112.23 | 57.5 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 92.23 | - | 112.23 | 6.95 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 92.23 | - | 112.23 | 0.013 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 92.23 | - | 112.23 | 3155 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 92.23 | - | 112.23 | 14.94 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 92.23 | - | 112.23 | 1.73 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 92.23 | - | 112.23 | 0.059 | | F | # | 0.0000029 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0172 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 6.98 | - | 31.98 | 807 | | F | # | | |
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/09/2011 | N001 | 6.98 | - | 31.98 | 820 | | F | # | | |
| Ammonia Total as N | mg/L | 06/14/2011 | N001 | 6.98 | - | 31.98 | 0.1 | U | F | # | 0.1 | |
| Arsenic | mg/L | 06/14/2011 | N001 | 6.98 | - | 31.98 | 0.0079 | | F | # | 0.000015 | |
| Arsenic | mg/L | 08/09/2011 | N001 | 6.98 | - | 31.98 | 0.0057 | | F | # | 0.000015 | |
| Molybdenum | mg/L | 06/14/2011 | N001 | 6.98 | - | 31.98 | 0.0062 | | F | # | 0.000032 | |
| Molybdenum | mg/L | 08/09/2011 | N001 | 6.98 | - | 31.98 | 0.0054 | | F | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | N001 | 6.98 | - | 31.98 | 0.01 | | F | # | 0.01 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 6.98 | - | 31.98 | -64.6 | | F | # | | |
| Oxidation Reduction Potential | mV | 08/09/2011 | N001 | 6.98 | - | 31.98 | -88 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 6.98 | - | 31.98 | 6.91 | | F | # | | |
| pH | s.u. | 08/09/2011 | N001 | 6.98 | - | 31.98 | 6.95 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 6.98 | - | 31.98 | 0.00052 | | F | # | 0.000032 | |
| Selenium | mg/L | 08/09/2011 | N001 | 6.98 | - | 31.98 | 0.00027 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 6.98 | - | 31.98 | 17604 | | F | # | | |
| Specific Conductance | umhos /cm | 08/09/2011 | N001 | 6.98 | - | 31.98 | 17770 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 6.98 | - | 31.98 | 14.84 | | F | # | | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0172 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature | C | 08/09/2011 | N001 | 6.98 | - | 31.98 | 14.95 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 6.98 | - | 31.98 | 9.85 | | F | # | | |
| Turbidity | NTU | 08/09/2011 | N001 | 6.98 | - | 31.98 | 1.73 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 6.98 | - | 31.98 | 0.068 | | F | # | 0.0000029 | |
| Uranium | mg/L | 08/09/2011 | N001 | 6.98 | - | 31.98 | 0.066 | | F | # | 0.0000029 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0195 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/09/2011 | N001 | 5.29 | - | 25.29 | 388 | | F | # | | |
| Ammonia Total as N | mg/L | 08/09/2011 | N001 | 5.29 | - | 25.29 | 0.23 | | F | # | 0.1 | |
| Arsenic | mg/L | 08/09/2011 | N001 | 5.29 | - | 25.29 | 0.0014 | | F | # | 0.000015 | |
| Molybdenum | mg/L | 08/09/2011 | N001 | 5.29 | - | 25.29 | 0.021 | | F | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 08/09/2011 | N001 | 5.29 | - | 25.29 | 0.01 | U | F | # | 0.01 | |
| Oxidation Reduction Potential | mV | 08/09/2011 | N001 | 5.29 | - | 25.29 | -58.2 | | F | # | | |
| pH | s.u. | 08/09/2011 | N001 | 5.29 | - | 25.29 | 6.95 | | F | # | | |
| Selenium | mg/L | 08/09/2011 | N001 | 5.29 | - | 25.29 | 0.00024 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 08/09/2011 | N001 | 5.29 | - | 25.29 | 1238 | | F | # | | |
| Temperature | C | 08/09/2011 | N001 | 5.29 | - | 25.29 | 18.77 | | F | # | | |
| Turbidity | NTU | 08/09/2011 | N001 | 5.29 | - | 25.29 | 3.8 | | F | # | | |
| Uranium | mg/L | 08/09/2011 | N001 | 5.29 | - | 25.29 | 0.012 | | F | # | 0.0000029 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0201 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 7.35 | - | 22.35 | 249 | | F | # | | |
| Ammonia Total as N | mg/L | 06/14/2011 | N001 | 7.35 | - | 22.35 | 85 | | F | # | 2 | |
| Ammonia Total as N | mg/L | 06/14/2011 | N002 | 7.35 | - | 22.35 | 87 | | F | # | 2 | |
| Arsenic | mg/L | 06/14/2011 | N001 | 7.35 | - | 22.35 | 0.0005 | | F | # | 0.00003 | |
| Arsenic | mg/L | 06/14/2011 | N002 | 7.35 | - | 22.35 | 0.00057 | | F | # | 0.00003 | |
| Molybdenum | mg/L | 06/14/2011 | N001 | 7.35 | - | 22.35 | 1.8 | | F | # | 0.00032 | |
| Molybdenum | mg/L | 06/14/2011 | N002 | 7.35 | - | 22.35 | 1.7 | | F | # | 0.00032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | N001 | 7.35 | - | 22.35 | 38 | | F | # | 0.2 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | N002 | 7.35 | - | 22.35 | 38 | | F | # | 0.2 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 7.35 | - | 22.35 | 164.3 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 7.35 | - | 22.35 | 6.76 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 7.35 | - | 22.35 | 0.046 | | F | # | 0.00032 | |
| Selenium | mg/L | 06/14/2011 | N002 | 7.35 | - | 22.35 | 0.045 | | F | # | 0.00032 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 7.35 | - | 22.35 | 4214 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 7.35 | - | 22.35 | 13.14 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 7.35 | - | 22.35 | 1.25 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 7.35 | - | 22.35 | 0.099 | | F | # | 0.000029 | |
| Uranium | mg/L | 06/14/2011 | N002 | 7.35 | - | 22.35 | 0.094 | | F | # | 0.000029 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0215 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 334 | | F | # | | |
| Ammonia Total as N | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 3.3 | | F | # | 0.1 | |
| Arsenic | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 0.00044 | | F | # | 0.000015 | |
| Molybdenum | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 0.013 | | F | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 0.03 | | F | # | 0.01 | |
| Oxidation Reduction Potential | mV | 06/13/2011 | N001 | 6.84 | - | 21.84 | 17.3 | | F | # | | |
| pH | s.u. | 06/13/2011 | N001 | 6.84 | - | 21.84 | 7.13 | | F | # | | |
| Selenium | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 0.0021 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/13/2011 | N001 | 6.84 | - | 21.84 | 1673 | | F | # | | |
| Temperature | C | 06/13/2011 | N001 | 6.84 | - | 21.84 | 13.2 | | F | # | | |
| Turbidity | NTU | 06/13/2011 | N001 | 6.84 | - | 21.84 | 1.19 | | F | # | | |
| Uranium | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 0.029 | | F | # | 0.0000029 | |
| Vanadium | mg/L | 06/13/2011 | N001 | 6.84 | - | 21.84 | 0.0021 | E | F | # | 0.000015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0216 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 212 | | F | # | | |
| Ammonia Total as N | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 4.7 | | F | # | 0.1 | |
| Arsenic | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 0.032 | E | F | # | 0.00015 | |
| Molybdenum | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 0.085 | | F | # | 0.00032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 0.01 | U | F | # | 0.01 | |
| Oxidation Reduction Potential | mV | 08/09/2011 | N001 | 5.5 | - | 20.5 | -10.3 | | F | # | | |
| pH | s.u. | 08/09/2011 | N001 | 5.5 | - | 20.5 | 7.49 | | F | # | | |
| Selenium | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 0.00047 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 08/09/2011 | N001 | 5.5 | - | 20.5 | 1020 | | F | # | | |
| Temperature | C | 08/09/2011 | N001 | 5.5 | - | 20.5 | 16.34 | | F | # | | |
| Turbidity | NTU | 08/09/2011 | N001 | 5.5 | - | 20.5 | 1.03 | | F | # | | |
| Uranium | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 0.033 | | F | # | 0.000029 | |
| Vanadium | mg/L | 08/09/2011 | N001 | 5.5 | - | 20.5 | 0.16 | | F | # | 0.00015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0217 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 203 | | F | # | | |
| Ammonia Total as N | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 68 | | F | # | 2 | |
| Arsenic | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 0.001 | | F | # | 0.000074 | |
| Molybdenum | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 1.1 | | F | # | 0.0016 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 0.01 | U | F | # | 0.01 | |
| Oxidation Reduction Potential | mV | 08/09/2011 | N001 | 7.4 | - | 22.4 | 92.2 | | F | # | | |
| pH | s.u. | 08/09/2011 | N001 | 7.4 | - | 22.4 | 6.8 | | F | # | | |
| Selenium | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 0.011 | | F | # | 0.00016 | |
| Specific Conductance | umhos /cm | 08/09/2011 | N001 | 7.4 | - | 22.4 | 3759 | | F | # | | |
| Temperature | C | 08/09/2011 | N001 | 7.4 | - | 22.4 | 15.42 | | F | # | | |
| Turbidity | NTU | 08/09/2011 | N001 | 7.4 | - | 22.4 | 1.4 | | F | # | | |
| Uranium | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 0.12 | | F | # | 0.00015 | |
| Vanadium | mg/L | 08/09/2011 | N001 | 7.4 | - | 22.4 | 1.7 | | F | # | 0.00076 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0620 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 6.7 | - | 10.7 | 556 | | F | # | | |
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/09/2011 | N001 | 6.7 | - | 10.7 | 549 | | F | # | | |
| Ammonia Total as N | mg/L | 06/14/2011 | N001 | 6.7 | - | 10.7 | 0.1 | U | F | # | 0.1 | |
| Arsenic | mg/L | 06/14/2011 | N001 | 6.7 | - | 10.7 | 0.00062 | | F | # | 0.000015 | |
| Arsenic | mg/L | 08/09/2011 | N001 | 6.7 | - | 10.7 | 0.00063 | | F | # | 0.000015 | |
| Molybdenum | mg/L | 06/14/2011 | N001 | 6.7 | - | 10.7 | 0.0088 | | F | # | 0.000032 | |
| Molybdenum | mg/L | 08/09/2011 | N001 | 6.7 | - | 10.7 | 0.0093 | | F | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | N001 | 6.7 | - | 10.7 | 19 | | F | # | 0.1 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 6.7 | - | 10.7 | -23 | | F | # | | |
| Oxidation Reduction Potential | mV | 08/09/2011 | N001 | 6.7 | - | 10.7 | 19 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 6.7 | - | 10.7 | 6.99 | | F | # | | |
| pH | s.u. | 08/09/2011 | N001 | 6.7 | - | 10.7 | 7.08 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 6.7 | - | 10.7 | 0.015 | | F | # | 0.000032 | |
| Selenium | mg/L | 08/09/2011 | N001 | 6.7 | - | 10.7 | 0.023 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 6.7 | - | 10.7 | 6557 | | F | # | | |
| Specific Conductance | umhos /cm | 08/09/2011 | N001 | 6.7 | - | 10.7 | 6661 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 6.7 | - | 10.7 | 14.42 | | F | # | | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0620 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature | C | 08/09/2011 | N001 | 6.7 | - | 10.7 | 16.44 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 6.7 | - | 10.7 | 2.56 | | F | # | | |
| Turbidity | NTU | 08/09/2011 | N001 | 6.7 | - | 10.7 | 1.42 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 6.7 | - | 10.7 | 0.069 | | F | # | 0.0000029 | |
| Uranium | mg/L | 08/09/2011 | N001 | 6.7 | - | 10.7 | 0.066 | | F | # | 0.0000029 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0635 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/11/2011 | N001 | 12 | - | 17 | 288 | | F | # | | |
| Ammonia Total as N | mg/L | 08/11/2011 | N001 | 12 | - | 17 | 77 | | F | # | 2 | |
| Arsenic | mg/L | 08/11/2011 | N001 | 12 | - | 17 | 0.00029 | | F | # | 0.000015 | |
| Molybdenum | mg/L | 08/11/2011 | N001 | 12 | - | 17 | 0.42 | | F | # | 0.00016 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 08/11/2011 | N001 | 12 | - | 17 | 4 | | F | # | 0.05 | |
| Oxidation Reduction Potential | mV | 08/11/2011 | N001 | 12 | - | 17 | 203.8 | | F | # | | |
| pH | s.u. | 08/11/2011 | N001 | 12 | - | 17 | 6.94 | | F | # | | |
| Selenium | mg/L | 08/11/2011 | N001 | 12 | - | 17 | 0.0029 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 08/11/2011 | N001 | 12 | - | 17 | 2632 | | F | # | | |
| Temperature | C | 08/11/2011 | N001 | 12 | - | 17 | 16.11 | | F | # | | |
| Turbidity | NTU | 08/11/2011 | N001 | 12 | - | 17 | 4.4 | | F | # | | |
| Uranium | mg/L | 08/11/2011 | N001 | 12 | - | 17 | 0.049 | | F | # | 0.000015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0658 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 811 | | F | # | | |
| Ammonia Total as N | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 47 | | F | # | 1 | |
| Arsenic | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 0.15 | | F | # | 0.003 | |
| Molybdenum | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 1.3 | | F | # | 0.0064 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 4.1 | | F | # | 0.05 | |
| Oxidation Reduction Potential | mV | 06/13/2011 | N001 | .5 | - | 5.5 | 156.7 | | F | # | | |
| pH | s.u. | 06/13/2011 | N001 | .5 | - | 5.5 | 6.79 | | F | # | | |
| Selenium | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 1.3 | | F | # | 0.0065 | |
| Specific Conductance | umhos /cm | 06/13/2011 | N001 | .5 | - | 5.5 | 2696 | | F | # | | |
| Temperature | C | 06/13/2011 | N001 | .5 | - | 5.5 | 18.35 | | F | # | | |
| Turbidity | NTU | 06/13/2011 | N001 | .5 | - | 5.5 | 2.48 | | F | # | | |
| Uranium | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 0.065 | | F | # | 0.00058 | |
| Vanadium | mg/L | 06/13/2011 | N001 | .5 | - | 5.5 | 38 | | F | # | 0.003 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0659 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 214 | | F | # | | |
| Ammonia Total as N | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 44 | | F | # | 1 | |
| Arsenic | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 0.0083 | | F | # | 0.00015 | |
| Molybdenum | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 1.7 | | F | # | 0.00032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 3.7 | | F | # | 0.02 | |
| Oxidation Reduction Potential | mV | 06/13/2011 | N001 | .5 | - | 10.5 | 159.3 | | F | # | | |
| pH | s.u. | 06/13/2011 | N001 | .5 | - | 10.5 | 6.96 | | F | # | | |
| Selenium | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 0.038 | | F | # | 0.00032 | |
| Specific Conductance | umhos /cm | 06/13/2011 | N001 | .5 | - | 10.5 | 3370 | | F | # | | |
| Temperature | C | 06/13/2011 | N001 | .5 | - | 10.5 | 15.45 | | F | # | | |
| Turbidity | NTU | 06/13/2011 | N001 | .5 | - | 10.5 | 2.4 | | F | # | | |
| Uranium | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 0.089 | | F | # | 0.000029 | |
| Vanadium | mg/L | 06/13/2011 | N001 | .5 | - | 10.5 | 0.65 | | F | # | 0.00015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0664 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 436 | | F | # | | |
| Ammonia Total as N | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 35 | | F | # | 1 | |
| Arsenic | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 0.0048 | | F | # | 0.00015 | |
| Molybdenum | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 0.24 | | F | # | 0.00032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 8.7 | | F | # | 0.05 | |
| Oxidation Reduction Potential | mV | 06/13/2011 | N001 | 7.7 | - | 14.7 | 116.8 | | F | # | | |
| pH | s.u. | 06/13/2011 | N001 | 7.7 | - | 14.7 | 6.82 | | F | # | | |
| Selenium | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 0.19 | | F | # | 0.00032 | |
| Specific Conductance | umhos /cm | 06/13/2011 | N001 | 7.7 | - | 14.7 | 2530 | | F | # | | |
| Temperature | C | 06/13/2011 | N001 | 7.7 | - | 14.7 | 14.56 | | F | # | | |
| Turbidity | NTU | 06/13/2011 | N001 | 7.7 | - | 14.7 | 7.2 | | F | # | | |
| Uranium | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 0.069 | | F | # | 0.000029 | |
| Vanadium | mg/L | 06/13/2011 | N001 | 7.7 | - | 14.7 | 2.8 | | F | # | 0.00015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0669 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 328 | | FQ | # | | |
| Ammonia Total as N | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 130 | | FQ | # | 5 | |
| Arsenic | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 0.0029 | | FQ | # | 0.00015 | |
| Molybdenum | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 1.5 | | FQ | # | 0.00032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 0.019 | | FQ | # | 0.01 | |
| Oxidation Reduction Potential | mV | 06/13/2011 | N001 | 4 | - | 10.6 | 162.6 | | FQ | # | | |
| pH | s.u. | 06/13/2011 | N001 | 4 | - | 10.6 | 6.87 | | FQ | # | | |
| Selenium | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 0.0046 | | FQ | # | 0.00032 | |
| Specific Conductance | umhos /cm | 06/13/2011 | N001 | 4 | - | 10.6 | 4069 | | FQ | # | | |
| Temperature | C | 06/13/2011 | N001 | 4 | - | 10.6 | 18.24 | | FQ | # | | |
| Turbidity | NTU | 06/13/2011 | N001 | 4 | - | 10.6 | 6.73 | | FQ | # | | |
| Uranium | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 0.13 | | FQ | # | 0.000029 | |
| Vanadium | mg/L | 06/13/2011 | N001 | 4 | - | 10.6 | 0.73 | | FQ | # | 0.00015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0670 WELL For Organics Study.

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 314 | | FQ | # | | |
| Ammonia Total as N | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 9.5 | | FQ | # | 0.2 | |
| Arsenic | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 0.0039 | | FQ | # | 0.00015 | |
| Molybdenum | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 0.28 | | FQ | # | 0.00032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 9 | | FQ | # | 0.05 | |
| Oxidation Reduction Potential | mV | 06/13/2011 | N001 | 5.2 | - | 12.2 | 112.5 | | FQ | # | | |
| pH | s.u. | 06/13/2011 | N001 | 5.2 | - | 12.2 | 6.89 | | FQ | # | | |
| Selenium | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 0.28 | | FQ | # | 0.00032 | |
| Specific Conductance | umhos /cm | 06/13/2011 | N001 | 5.2 | - | 12.2 | 2366 | | FQ | # | | |
| Temperature | C | 06/13/2011 | N001 | 5.2 | - | 12.2 | 15.02 | | FQ | # | | |
| Turbidity | NTU | 06/13/2011 | N001 | 5.2 | - | 12.2 | 5.23 | | FQ | # | | |
| Uranium | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 0.19 | | FQ | # | 0.000029 | |
| Vanadium | mg/L | 06/13/2011 | N001 | 5.2 | - | 12.2 | 1.7 | | FQ | # | 0.00015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0855 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 245 | | F | # | | |
| Ammonia Total as N | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 41 | | F | # | 1 | |
| Arsenic | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 0.52 | | F | # | 0.003 | |
| Molybdenum | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 1.1 | | F | # | 0.0064 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 2.9 | | F | # | 0.02 | |
| Oxidation Reduction Potential | mV | 06/13/2011 | N001 | 6 | - | 11 | 145.6 | | F | # | | |
| pH | s.u. | 06/13/2011 | N001 | 6 | - | 11 | 6.68 | | F | # | | |
| Selenium | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 1.1 | | F | # | 0.0065 | |
| Specific Conductance | umhos /cm | 06/13/2011 | N001 | 6 | - | 11 | 2515 | | F | # | | |
| Temperature | C | 06/13/2011 | N001 | 6 | - | 11 | 15.57 | | F | # | | |
| Turbidity | NTU | 06/13/2011 | N001 | 6 | - | 11 | 5.33 | | F | # | | |
| Uranium | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 0.054 | | F | # | 0.00058 | |
| Vanadium | mg/L | 06/13/2011 | N001 | 6 | - | 11 | 28 | | F | # | 0.003 | |

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: 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 |
| N | Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC). |
| P | > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. |
| U | Analytical result below detection limit. |
| W | Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. |
| X,Y,Z | Laboratory defined 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. | 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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# Old Rifle
# Groundwater Quality Data

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**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0292A WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 10.5 | - | 20.5 | 488 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 10.5 | - | 20.5 | 68.3 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 10.5 | - | 20.5 | 6.99 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 10.5 | - | 20.5 | 0.027 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 10.5 | - | 20.5 | 2142 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 10.5 | - | 20.5 | 13.1 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 10.5 | - | 20.5 | 3.1 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 10.5 | - | 20.5 | 0.03 | | F | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 10.5 | - | 20.5 | 0.00074 | | UF | # | 0.000015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0304 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 13.2 | - | 18.2 | 261 | | F | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | 13.2 | - | 18.2 | -117.81 | | F | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | 13.2 | - | 18.2 | -15.48 | | F | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | 13.2 | - | 18.2 | -4.04 | | F | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 13.2 | - | 18.2 | 13.7 | | F | # | | |
| pH | s.u. | 06/15/2011 | N001 | 13.2 | - | 18.2 | 7.12 | | F | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 13.2 | - | 18.2 | 0.0022 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/15/2011 | N001 | 13.2 | - | 18.2 | 2212 | | F | # | | |
| Temperature | C | 06/15/2011 | N001 | 13.2 | - | 18.2 | 11.83 | | F | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 13.2 | - | 18.2 | 1.31 | | F | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 13.2 | - | 18.2 | 0.044 | | F | # | 0.0000029 | |
| Uranium-234 | pCi/L | 06/15/2011 | N001 | 13.2 | - | 18.2 | 15.7 | | F | # | 0.048 | 2.72 |
| Uranium-235 | pCi/L | 06/15/2011 | N001 | 13.2 | - | 18.2 | 0.591 | | F | # | 0.039 | 0.172 |
| Uranium-238 | pCi/L | 06/15/2011 | N001 | 13.2 | - | 18.2 | 13.8 | | F | # | 0.051 | 2.4 |
| Vanadium | mg/L | 06/15/2011 | N001 | 13.2 | - | 18.2 | 0.022 | | F | # | 0.000015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0305 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 13.76 | - | 18.76 | 352 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 13.76 | - | 18.76 | 122.4 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 13.76 | - | 18.76 | 7.15 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 13.76 | - | 18.76 | 0.031 | | F | # | 0.00016 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 13.76 | - | 18.76 | 2156 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 13.76 | - | 18.76 | 12.82 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 13.76 | - | 18.76 | 1.3 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 13.76 | - | 18.76 | 0.057 | | F | # | 0.000015 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 13.76 | - | 18.76 | 0.34 | | F | # | 0.000076 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0309 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 16.93 | - | 21.93 | 388 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 16.93 | - | 21.93 | 12.7 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 16.93 | - | 21.93 | 7 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 16.93 | - | 21.93 | 0.00017 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 16.93 | - | 21.93 | 2351 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 16.93 | - | 21.93 | 14.02 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 16.93 | - | 21.93 | 1.67 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 16.93 | - | 21.93 | 0.022 | | F | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 16.93 | - | 21.93 | 0.00048 | | UF | # | 0.000015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0310 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 17.93 | - | 22.93 | 504 | | F | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | 17.93 | - | 22.93 | -112.3 | | F | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | 17.93 | - | 22.93 | -15.03 | | F | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | 17.93 | - | 22.93 | -7.06 | | F | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 17.93 | - | 22.93 | 6.3 | | F | # | | |
| pH | s.u. | 06/15/2011 | N001 | 17.93 | - | 22.93 | 6.97 | | F | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 17.93 | - | 22.93 | 0.0027 | | F | # | 0.00016 | |
| Selenium | mg/L | 06/15/2011 | N002 | 17.93 | - | 22.93 | 0.0026 | | F | # | 0.00016 | |
| Specific Conductance | umhos /cm | 06/15/2011 | N001 | 17.93 | - | 22.93 | 2627 | | F | # | | |
| Temperature | C | 06/15/2011 | N001 | 17.93 | - | 22.93 | 13.68 | | F | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 17.93 | - | 22.93 | 1.28 | | F | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 17.93 | - | 22.93 | 0.2 | | F | # | 0.000015 | |
| Uranium | mg/L | 06/15/2011 | N002 | 17.93 | - | 22.93 | 0.2 | | F | # | 0.000015 | |
| Uranium-234 | pCi/L | 06/15/2011 | N001 | 17.93 | - | 22.93 | 70.5 | | F | # | 0.078 | 13 |
| Uranium-235 | pCi/L | 06/15/2011 | N001 | 17.93 | - | 22.93 | 3.06 | | F | # | 0.07 | 0.7 |
| Uranium-238 | pCi/L | 06/15/2011 | N001 | 17.93 | - | 22.93 | 65.6 | | F | # | 0.059 | 12.1 |
| Vanadium | mg/L | 06/15/2011 | N001 | 17.93 | - | 22.93 | 0.011 | | F | # | 0.000076 | |
| Vanadium | mg/L | 06/15/2011 | N002 | 17.93 | - | 22.93 | 0.012 | | F | # | 0.000076 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0655 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 13.6 | - | 23.6 | 446 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 13.6 | - | 23.6 | 123 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 13.6 | - | 23.6 | 6.97 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 13.6 | - | 23.6 | 0.076 | | F | # | 0.00016 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 13.6 | - | 23.6 | 2512 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 13.6 | - | 23.6 | 13.47 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 13.6 | - | 23.6 | 1.72 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 13.6 | - | 23.6 | 0.14 | | F | # | 0.000015 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 13.6 | - | 23.6 | 0.37 | | F | # | 0.000076 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0656 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 6.35 | - | 21.35 | 467 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 6.35 | - | 21.35 | 108.8 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 6.35 | - | 21.35 | 7.01 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 6.35 | - | 21.35 | 0.00094 | | F | # | 0.00016 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 6.35 | - | 21.35 | 2107 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 6.35 | - | 21.35 | 14.06 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 6.35 | - | 21.35 | 1.01 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 6.35 | - | 21.35 | 0.17 | | F | # | 0.000015 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 6.35 | - | 21.35 | 0.021 | | F | # | 0.000076 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0658 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 2.3 | - | 17.3 | 448 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 2.3 | - | 17.3 | 93.6 | | F | # | | |
| pH | s.u. | 06/14/2011 | N001 | 2.3 | - | 17.3 | 6.98 | | F | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 2.3 | - | 17.3 | 0.013 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/14/2011 | N001 | 2.3 | - | 17.3 | 1734 | | F | # | | |
| Temperature | C | 06/14/2011 | N001 | 2.3 | - | 17.3 | 10.27 | | F | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 2.3 | - | 17.3 | 1.69 | | F | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 2.3 | - | 17.3 | 0.02 | | F | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 2.3 | - | 17.3 | 0.0016 | | F | # | 0.000015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: B-04 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 5 | - | 20 | 506 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 5 | - | 20 | 149 | | F | # | | |
| pH | s.u. | 06/15/2011 | N001 | 5 | - | 20 | 6.98 | | F | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 5 | - | 20 | 0.14 | | F | # | 0.0032 | |
| Specific Conductance | umhos /cm | 06/15/2011 | N001 | 5 | - | 20 | 2676 | | F | # | | |
| Temperature | C | 06/15/2011 | N001 | 5 | - | 20 | 14.42 | | F | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 5 | - | 20 | 6.15 | | F | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 5 | - | 20 | 0.27 | | F | # | 0.00029 | |
| Vanadium | mg/L | 06/15/2011 | N001 | 5 | - | 20 | 2.6 | | F | # | 0.0015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: LQ-107 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 9.67 | - | 19.67 | 379 | | F | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | 9.67 | - | 19.67 | -116.66 | | F | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | 9.67 | - | 19.67 | -15.36 | | F | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | 9.67 | - | 19.67 | -5.84 | | F | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 9.67 | - | 19.67 | -105.8 | | F | # | | |
| pH | s.u. | 06/15/2011 | N001 | 9.67 | - | 19.67 | 7.2 | | F | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 9.67 | - | 19.67 | 0.00063 | | F | # | 0.00016 | |
| Specific Conductance | umhos /cm | 06/15/2011 | N001 | 9.67 | - | 19.67 | 2052 | | F | # | | |
| Temperature | C | 06/15/2011 | N001 | 9.67 | - | 19.67 | 13.71 | | F | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 9.67 | - | 19.67 | 6.94 | | F | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 9.67 | - | 19.67 | 0.21 | | F | # | 0.000015 | |
| Uranium-234 | pCi/L | 06/15/2011 | N001 | 9.67 | - | 19.67 | 68.9 | | F | # | 0.086 | 12.3 |
| Uranium-235 | pCi/L | 06/15/2011 | N001 | 9.67 | - | 19.67 | 3.27 | | F | # | 0.07 | 0.707 |
| Uranium-238 | pCi/L | 06/15/2011 | N001 | 9.67 | - | 19.67 | 66.4 | | F | # | 0.1 | 11.9 |
| Vanadium | mg/L | 06/15/2011 | N001 | 9.67 | - | 19.67 | 0.26 | | F | # | 0.000076 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: LQ-108 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | - | 474 | | F | # | | |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | - | 183.1 | | F | # | | |
| pH | s.u. | 06/15/2011 | N001 | - | 6.91 | | F | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | - | 0.063 | | F | # | 0.0032 | |
| Specific Conductance | umhos /cm | 06/15/2011 | N001 | - | 2773 | | F | # | | |
| Temperature | C | 06/15/2011 | N001 | - | 18.75 | | F | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | - | 7.3 | | F | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | - | 0.16 | | F | # | 0.00029 | |
| Vanadium | mg/L | 06/15/2011 | N001 | - | 2.6 | | F | # | 0.0015 | |

**Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: LQ-109 WELL

| Parameter | Units | Sample Date | Sample ID | Depth Range (Ft BLS) | | | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 9.6 | - | 19.6 | 435 | | F | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | 9.6 | - | 19.6 | -115.06 | | F | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | 9.6 | - | 19.6 | -15.14 | | F | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | 9.6 | - | 19.6 | -3.5 | | F | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 9.6 | - | 19.6 | 39.7 | | F | # | | |
| pH | s.u. | 06/15/2011 | N001 | 9.6 | - | 19.6 | 6.85 | | F | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 9.6 | - | 19.6 | 0.0018 | | F | # | 0.000032 | |
| Specific Conductance | umhos /cm | 06/15/2011 | N001 | 9.6 | - | 19.6 | 1809 | | F | # | | |
| Temperature | C | 06/15/2011 | N001 | 9.6 | - | 19.6 | 13.64 | | F | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 9.6 | - | 19.6 | 0.55 | | F | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 9.6 | - | 19.6 | 0.091 | | F | # | 0.0000029 | |
| Uranium-234 | pCi/L | 06/15/2011 | N001 | 9.6 | - | 19.6 | 34 | | F | # | 0.052 | 5.79 |
| Uranium-235 | pCi/L | 06/15/2011 | N001 | 9.6 | - | 19.6 | 1.48 | | F | # | 0.04 | 0.334 |
| Uranium-238 | pCi/L | 06/15/2011 | N001 | 9.6 | - | 19.6 | 29.9 | | F | # | 0.044 | 5.1 |
| Vanadium | mg/L | 06/15/2011 | N001 | 9.6 | - | 19.6 | 0.0049 | | F | # | 0.000015 | |

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

| | |
|---|---|
| * | Replicate analysis not within control limits. |
| > | Result above upper detection limit. |
| A | TIC is a suspected aldol-condensation product. |
| B | Inorganic: Result is between the IDL and CRDL. Organic: 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 |
| N | Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC). |
| P | > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. |
| U | Analytical result below detection limit. |
| W | Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. |
| X,Y,Z | Laboratory defined 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. | 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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# New Rifle
# Surface Water Quality Data

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**Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0322 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 08/09/2011 | N001 | 220 | | | # | | |
| Ammonia Total as N | mg/L | 08/09/2011 | N001 | 0.1 | U | | # | 0.1 | |
| Arsenic | mg/L | 08/09/2011 | N001 | 0.00052 | | | # | 0.000015 | |
| Molybdenum | mg/L | 08/09/2011 | N001 | 0.0042 | | | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 08/09/2011 | N001 | 0.018 | | | # | 0.01 | |
| Oxidation Reduction Potential | mV | 08/09/2011 | N001 | 47.6 | | | # | | |
| pH | s.u. | 08/09/2011 | N001 | 8.68 | | | # | | |
| Selenium | mg/L | 08/09/2011 | N001 | 0.00037 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 08/09/2011 | N001 | 562 | | | # | | |
| Temperature | C | 08/09/2011 | N001 | 18.7 | | | # | | |
| Turbidity | NTU | 08/09/2011 | N001 | 5.23 | | | # | | |
| Uranium | mg/L | 08/09/2011 | N001 | 0.0014 | | | # | 0.0000029 | |
| Vanadium | mg/L | 08/09/2011 | N001 | 0.0013 | | | # | 0.000015 | |
| Ammonia Total as N | mg/L | 08/09/2011 | N002 | 0.1 | U | | # | 0.1 | |
| Arsenic | mg/L | 08/09/2011 | N002 | 0.0005 | | | # | 0.000015 | |
| Molybdenum | mg/L | 08/09/2011 | N002 | 0.0043 | | | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 08/09/2011 | N002 | 0.011 | | | # | 0.01 | |
| Selenium | mg/L | 08/09/2011 | N002 | 0.00034 | | | # | 0.000032 | |
| Uranium | mg/L | 08/09/2011 | N002 | 0.0014 | | | # | 0.0000029 | |
| Vanadium | mg/L | 08/09/2011 | N002 | 0.0012 | | | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0323 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 183 | | | # | | |
| Ammonia Total as N | mg/L | 06/14/2011 | N001 | 24 | | | # | 0.5 | |
| Arsenic | mg/L | 06/14/2011 | N001 | 0.0011 | | | # | 0.000074 | |
| Molybdenum | mg/L | 06/14/2011 | N001 | 2.6 | | | # | 0.00032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | N001 | 76 | | | # | 0.5 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 178.7 | | | # | | |
| pH | s.u. | 06/14/2011 | N001 | 7.73 | | | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 0.012 | | | # | 0.00032 | |
| Specific Conductance | umhos/cm | 06/14/2011 | N001 | 8171 | | | # | | |
| Temperature | C | 06/14/2011 | N001 | 22.45 | | | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 3.44 | | | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 0.32 | | | # | 0.000029 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 0.0049 | | | # | 0.000076 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0324 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | 0001 | 175 | | | # | | |
| Ammonia Total as N | mg/L | 06/14/2011 | 0001 | 0.1 | U | | # | 0.1 | |
| Arsenic | mg/L | 06/14/2011 | 0001 | 0.00043 | | | # | 0.000015 | |
| Molybdenum | mg/L | 06/14/2011 | 0001 | 0.0021 | | | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | 0001 | 0.1 | | | # | 0.01 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | -63.1 | | | # | | |
| pH | s.u. | 06/14/2011 | N001 | 8.08 | | | # | | |
| Selenium | mg/L | 06/14/2011 | 0001 | 0.00028 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 06/14/2011 | N001 | 293 | | | # | | |
| Temperature | C | 06/14/2011 | N001 | 14.92 | | | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 74.1 | | | # | | |
| Uranium | mg/L | 06/14/2011 | 0001 | 0.00076 | | | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | 0001 | 0.00069 | | U | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site**
REPORT DATE: 10/11/2011
Location: 0575 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 220 | | | # | | |
| Ammonia Total as N | mg/L | 06/14/2011 | N001 | 0.1 | U | | # | 0.1 | |
| Arsenic | mg/L | 06/14/2011 | N001 | 0.0025 | | | # | 0.000015 | |
| Molybdenum | mg/L | 06/14/2011 | N001 | 0.034 | | | # | 0.000032 | |
| Nitrate + Nitrite as Nitrogen | mg/L | 06/14/2011 | N001 | 0.01 | U | | # | 0.01 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | -1.3 | | | # | | |
| pH | s.u. | 06/14/2011 | N001 | 8.8 | | | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 0.00049 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 06/14/2011 | N001 | 1544 | | | # | | |
| Temperature | C | 06/14/2011 | N001 | 21.23 | | | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 7.41 | | | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 0.017 | | | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 0.0027 | | | # | 0.000015 | |

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: 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 |
| N | Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC). |
| P | > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. |
| U | Analytical result below detection limit. |
| W | Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. |
| X,Y,Z | Laboratory defined 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. | 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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# Old Rifle
# Surface Water Quality Data

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**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0294 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | 0001 | 171 | | | # | | |
| Selenium | mg/L | 06/14/2011 | 0001 | 0.00039 | | | # | 0.000032 | |
| Uranium | mg/L | 06/14/2011 | 0001 | 0.00072 | | | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | 0001 | 0.00074 | | U | # | 0.000015 | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 59 | | | # | | |
| pH | s.u. | 06/14/2011 | N001 | 7.96 | | | # | | |
| Specific Conductance | umhos/cm | 06/14/2011 | N001 | 273 | | | # | | |
| Temperature | C | 06/14/2011 | N001 | 14.91 | | | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 73.9 | | | # | | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0387 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 362 | | | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | -112.6 | | | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | -14.55 | | | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | -7.68 | | | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | -26.5 | | | # | | |
| pH | s.u. | 06/15/2011 | N001 | 7.87 | | | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 0.0034 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 06/15/2011 | N001 | 1875 | | | # | | |
| Temperature | C | 06/15/2011 | N001 | 23.74 | | | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 5.63 | | | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 0.033 | | | # | 0.0000029 | |
| Uranium-234 | pCi/L | 06/15/2011 | N001 | 14.1 | | | # | 0.05 | 2.39 |
| Uranium-235 | pCi/L | 06/15/2011 | N001 | 0.528 | | | # | 0.033 | 0.149 |
| Uranium-238 | pCi/L | 06/15/2011 | N001 | 10.1 | | | # | 0.033 | 1.74 |
| Vanadium | mg/L | 06/15/2011 | N001 | 0.0063 | | | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0388 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 354 | | | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | -113.46 | | | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | -14.8 | | | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | -10.38 | | | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | -52.4 | | | # | | |
| pH | s.u. | 06/15/2011 | N001 | 7.8 | | | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 0.0081 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 06/15/2011 | N001 | 2006 | | | # | | |
| Temperature | C | 06/15/2011 | N001 | 22 | | | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 4.42 | | | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 0.042 | | | # | 0.0000029 | |
| Uranium-234 | pCi/L | 06/15/2011 | N001 | 18.1 | | | # | 0.049 | 3.06 |
| Uranium-235 | pCi/L | 06/15/2011 | N001 | 0.613 | | | # | 0.049 | 0.168 |
| Uranium-238 | pCi/L | 06/15/2011 | N001 | 13.1 | | | # | 0.044 | 2.24 |
| Vanadium | mg/L | 06/15/2011 | N001 | 0.0048 | | | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0394 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 220 | | | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | -119.08 | | | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | -15.54 | | | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | 3.61 | | | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 140.4 | | | # | | |
| pH | s.u. | 06/15/2011 | N001 | 7.33 | | | # | | |
| Selenium | mg/L | 06/15/2011 | N001 | 0.00042 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 06/15/2011 | N001 | 1296 | | | # | | |
| Temperature | C | 06/15/2011 | N001 | 18.36 | | | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 3.64 | | | # | | |
| Uranium | mg/L | 06/15/2011 | N001 | 0.0077 | | | # | 0.0000029 | |
| Uranium-234 | pCi/L | 06/15/2011 | N001 | 3.04 | | | # | 0.064 | 0.583 |
| Uranium-235 | pCi/L | 06/15/2011 | N001 | 0.0852 | | U | # | 0.054 | 0.0572 |
| Uranium-238 | pCi/L | 06/15/2011 | N001 | 2.2 | | | # | 0.057 | 0.44 |
| Vanadium | mg/L | 06/15/2011 | N001 | 0.0011 | | U | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0395 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 394 | | | # | | |
| Isotope ratio H2/H1 in Water | ‰ | 06/15/2011 | 0001 | -114.32 | | | # | | 2 |
| Isotope ratio O18/O16 in Water | ‰ | 06/15/2011 | 0001 | -14.83 | | | # | | 0.2 |
| Isotope ratio S34/S32 in SO4 | ‰ | 06/15/2011 | 0001 | -3.69 | | | # | | 0.4 |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 33 | | | # | | |
| pH | s.u. | 06/15/2011 | N001 | 7.71 | | | # | | |
| Selenium | mg/L | 06/15/2011 | 0001 | 0.0052 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 06/15/2011 | N001 | 1382 | | | # | | |
| Temperature | C | 06/15/2011 | N001 | 20.76 | | | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 36.7 | | | # | | |
| Uranium | mg/L | 06/15/2011 | 0001 | 0.03 | | | # | 0.0000029 | |
| Uranium-234 | pCi/L | 06/15/2011 | 0001 | 12.4 | | | # | 0.075 | 2.13 |
| Uranium-235 | pCi/L | 06/15/2011 | 0001 | 0.422 | | | # | 0.045 | 0.131 |
| Uranium-238 | pCi/L | 06/15/2011 | 0001 | 8.97 | | | # | 0.052 | 1.55 |
| Vanadium | mg/L | 06/15/2011 | 0001 | 0.0018 | | | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0396 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/15/2011 | N001 | 127 | | | # | | |
| Oxidation Reduction Potential | mV | 06/15/2011 | N001 | 78 | | | # | | |
| pH | s.u. | 06/15/2011 | N001 | 8.46 | | | # | | |
| Specific Conductance | umhos/cm | 06/15/2011 | N001 | 281 | | | # | | |
| Selenium | mg/L | 06/15/2011 | 0001 | 0.00036 | | | # | 0.000032 | |
| Temperature | C | 06/15/2011 | N001 | 18.09 | | | # | | |
| Turbidity | NTU | 06/15/2011 | N001 | 51.4 | | | # | | |
| Uranium | mg/L | 06/15/2011 | 0001 | 0.0008 | | | # | 0.0000029 | |
| Vanadium | mg/L | 06/15/2011 | 0001 | 0.00086 | | U | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0398 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 299 | | | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | 107.9 | | | # | | |
| pH | s.u. | 06/14/2011 | N001 | 8.09 | | | # | | |
| Selenium | mg/L | 06/14/2011 | N001 | 0.0023 | | | # | 0.000032 | |
| Specific Conductance | umhos/cm | 06/14/2011 | N001 | 1400 | | | # | | |
| Temperature | C | 06/14/2011 | N001 | 18.81 | | | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 8.69 | | | # | | |
| Uranium | mg/L | 06/14/2011 | N001 | 0.014 | | | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | N001 | 0.0045 | | | # | 0.000015 | |

**Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site**
REPORT DATE: 10/11/2011
Location: 0741 SURFACE LOCATION

| Parameter | Units | Sample Date | Sample ID | Result | Qualifiers Lab | Qualifiers Data | Qualifiers QA | Detection Limit | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as $CaCO_3$) | mg/L | 06/14/2011 | N001 | 82 | | | # | | |
| Oxidation Reduction Potential | mV | 06/14/2011 | N001 | -58.1 | | | # | | |
| pH | s.u. | 06/14/2011 | N001 | 8.22 | | | # | | |
| Specific Conductance | umhos/cm | 06/14/2011 | N001 | 270 | | | # | | |
| Selenium | mg/L | 06/14/2011 | 0001 | 0.00032 | | | # | 0.000032 | |
| Temperature | C | 06/14/2011 | N001 | 16.75 | | | # | | |
| Turbidity | NTU | 06/14/2011 | N001 | 78.1 | | | # | | |
| Uranium | mg/L | 06/14/2011 | 0001 | 0.00077 | | | # | 0.0000029 | |
| Vanadium | mg/L | 06/14/2011 | 0001 | 0.00074 | | U | # | 0.000015 | |

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

| | |
|---|---|
| * | Replicate analysis not within control limits. |
| > | Result above upper detection limit. |
| A | TIC is a suspected aldol-condensation product. |
| B | Inorganic: Result is between the IDL and CRDL. Organic: 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 |
| N | Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC). |
| P | > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. |
| U | Analytical result below detection limit. |
| W | Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. |
| X,Y,Z | Laboratory defined 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. | 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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# Equipment Blank Data

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**BLANKS REPORT**
LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)
RIN: 11063854
Report Date: 10/11/2011

| Parameter | Site Code | Location ID | Sample Date | ID | Units | Result | Qualifiers Lab | Qualifiers Data | Detection Limit | Uncertainty | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ammonia Total as N | RFO01 | 0999 | 06/14/2011 | N001 | mg/L | 0.1 | U | | 0.1 | | E |
| Arsenic | RFO01 | 0999 | 06/14/2011 | N001 | mg/L | 0.000026 | B | | 0.000015 | | E |
| Molybdenum | RFO01 | 0999 | 06/14/2011 | N001 | mg/L | 0.00021 | | | 0.000032 | | E |
| Nitrate + Nitrite as Nitrogen | RFO01 | 0999 | 06/14/2011 | N001 | mg/L | 0.01 | U | | 0.01 | | E |
| Selenium | RFO01 | 0999 | 06/14/2011 | N001 | mg/L | 0.000032 | U | | 0.000032 | | E |
| Uranium | RFO01 | 0999 | 06/14/2011 | N001 | mg/L | 0.000017 | | | 0.0000029 | | E |
| Vanadium | RFO01 | 0999 | 06/14/2011 | N001 | mg/L | 0.00029 | B | U | 0.000015 | | E |

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: 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
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.

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

SAMPLE TYPES:
- E Equipment Blank.

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# Static Water Level Data

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**STATIC WATER LEVELS (USEE700) FOR SITE RFN01, Rifle New Processing Site**
**REPORT DATE: 10/11/2011**

| Location Code | Flow Code | Top of Casing Elevation (Ft) | Measurement Date | Measurement Time | Depth From Top of Casing (Ft) | Water Elevation (Ft) |
|---|---|---|---|---|---|---|
| 0169 | U | 5275.47 | 08/09/2011 | 11:15:47 | 7.08 | 5268.39 |
| 0170 | D | 5332.97 | 06/14/2011 | 11:50:17 | 93.84 | 5239.13 |
| 0172 | D | 5229.45 | 06/14/2011 | 10:30:19 | 13.5 | 5215.95 |
| 0172 | D | 5229.45 | 08/09/2011 | 09:35:20 | 13.92 | 5215.53 |
| 0195 | D | 5253.1 | 08/09/2011 | 13:45:02 | 7.94 | 5245.16 |
| 0201 | D | 5261.07 | 06/14/2011 | 13:05:33 | 11.91 | 5249.16 |
| 0215 | O | 5271.42 | 06/13/2011 | 17:20:37 | 6.92 | 5264.5 |
| 0216 | O | 5265.41 | 08/09/2011 | 11:50:51 | 5.95 | 5259.46 |
| 0217 | D | 5256.98 | 08/09/2011 | 12:50:13 | 3.63 | 5253.35 |
| 0620 | D | 5231.22 | 06/14/2011 | 11:00:15 | 6.25 | 5224.97 |
| 0620 | D | 5231.22 | 08/09/2011 | 10:10:53 | 7.74 | 5223.48 |
| 0635 | D | 5253.12 | 08/11/2011 | 11:40:46 | 3.71 | 5249.41 |
| 0658 | O | 5265.91 | 06/13/2011 | 13:00:45 | 4.16 | 5261.75 |
| 0659 | O | 5261.33 | 06/13/2011 | 15:30:38 | 5.4 | 5255.93 |
| 0664 | O | 5270.17 | 06/13/2011 | 11:55:15 | 11.99 | 5258.18 |
| 0669 | O | 5266.56 | 06/13/2011 | 15:00:15 | 8.2 | 5258.36 |
| 0670 | O | 5270.94 | 06/13/2011 | 12:15:11 | 11.23 | 5259.71 |
| 0855 | O | 5267.24 | 06/13/2011 | 16:15:22 | 5.31 | 5261.93 |

**STATIC WATER LEVELS (USEE700) FOR SITE RFO01, Rifle Old Processing Site**
**REPORT DATE: 10/11/2011**

| Location Code | Flow Code | Top of Casing Elevation (Ft) | Measurement Date | Measurement Time | Depth From Top of Casing (Ft) | Water Elevation (Ft) |
|---|---|---|---|---|---|---|
| 0292A | | 5323.08 | 06/14/2011 | 15:00:50 | 9.14 | 5313.94 |
| 0304 | O | 5310.63 | 06/15/2011 | 15:15:22 | 4.6 | 5306.03 |
| 0305 | O | 5312.08 | 06/14/2011 | 16:20:44 | 6.71 | 5305.37 |
| 0309 | O | 5313.37 | 06/14/2011 | 17:00:25 | 9.74 | 5303.63 |
| 0310 | O | 5311.64 | 06/15/2011 | 14:40:14 | 6.87 | 5304.77 |
| 0655 | O | 5312.87 | 06/14/2011 | 16:40:05 | 7.83 | 5305.04 |
| 0656 | O | 5313.28 | 06/14/2011 | 15:50:30 | 6.65 | 5306.63 |
| 0658 | U | 5323.07 | 06/14/2011 | 14:30:25 | 6.8 | 5316.27 |
| B-04 | | 5311.23 | 06/15/2011 | 12:20:18 | 6.83 | 5304.4 |
| LQ-107 | | 5307.95 | 06/15/2011 | 15:35:47 | 3.27 | 5304.68 |
| LQ-108 | | 5309.4 | 06/15/2011 | 12:55:45 | 4.86 | 5304.54 |
| LQ-109 | | 5312.33 | 06/15/2011 | 14:10:39 | 7.78 | 5304.55 |

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

WATER LEVEL FLAGS: D Dry F FLOWING

# New Rifle Hydrographs

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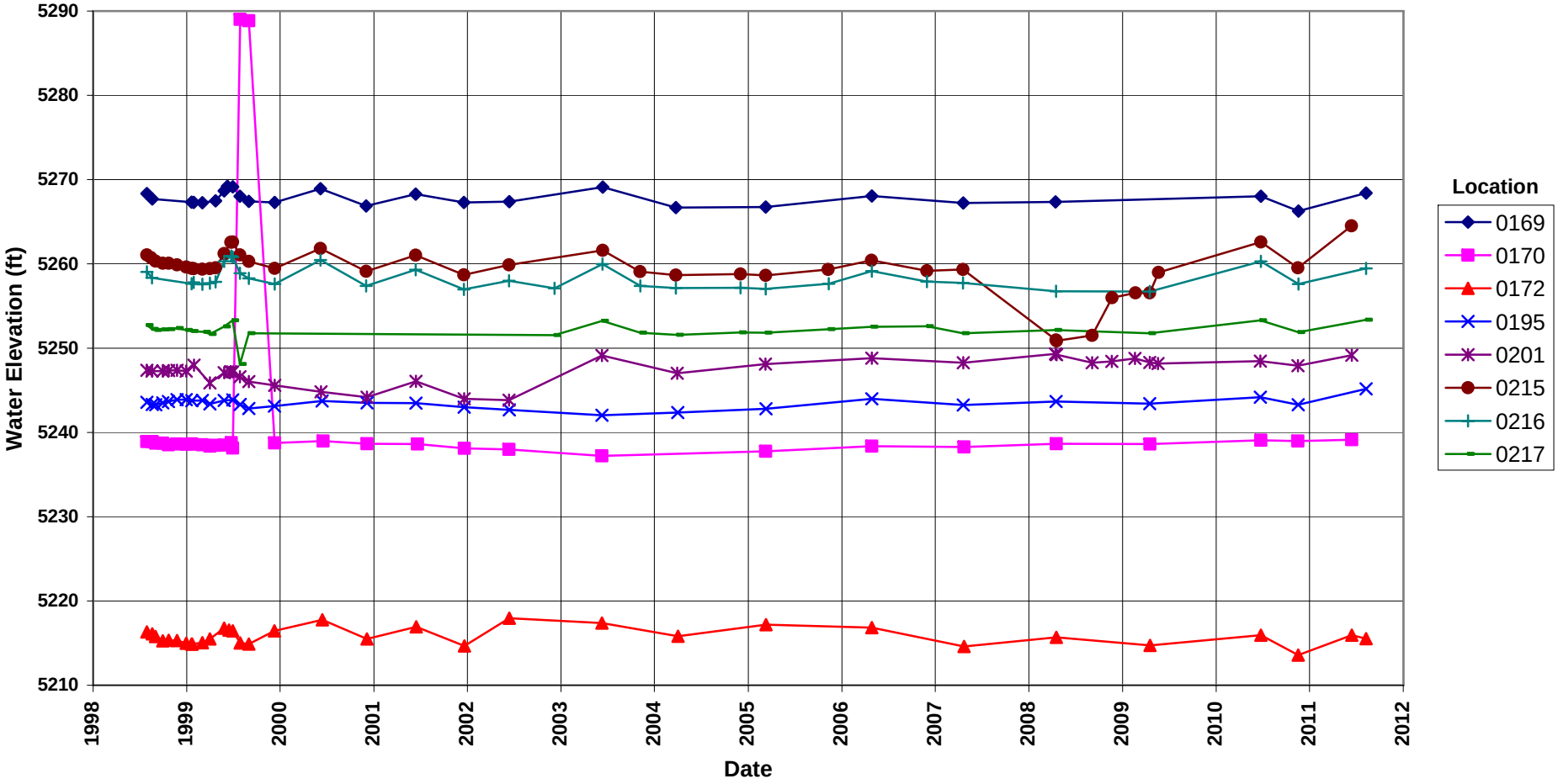
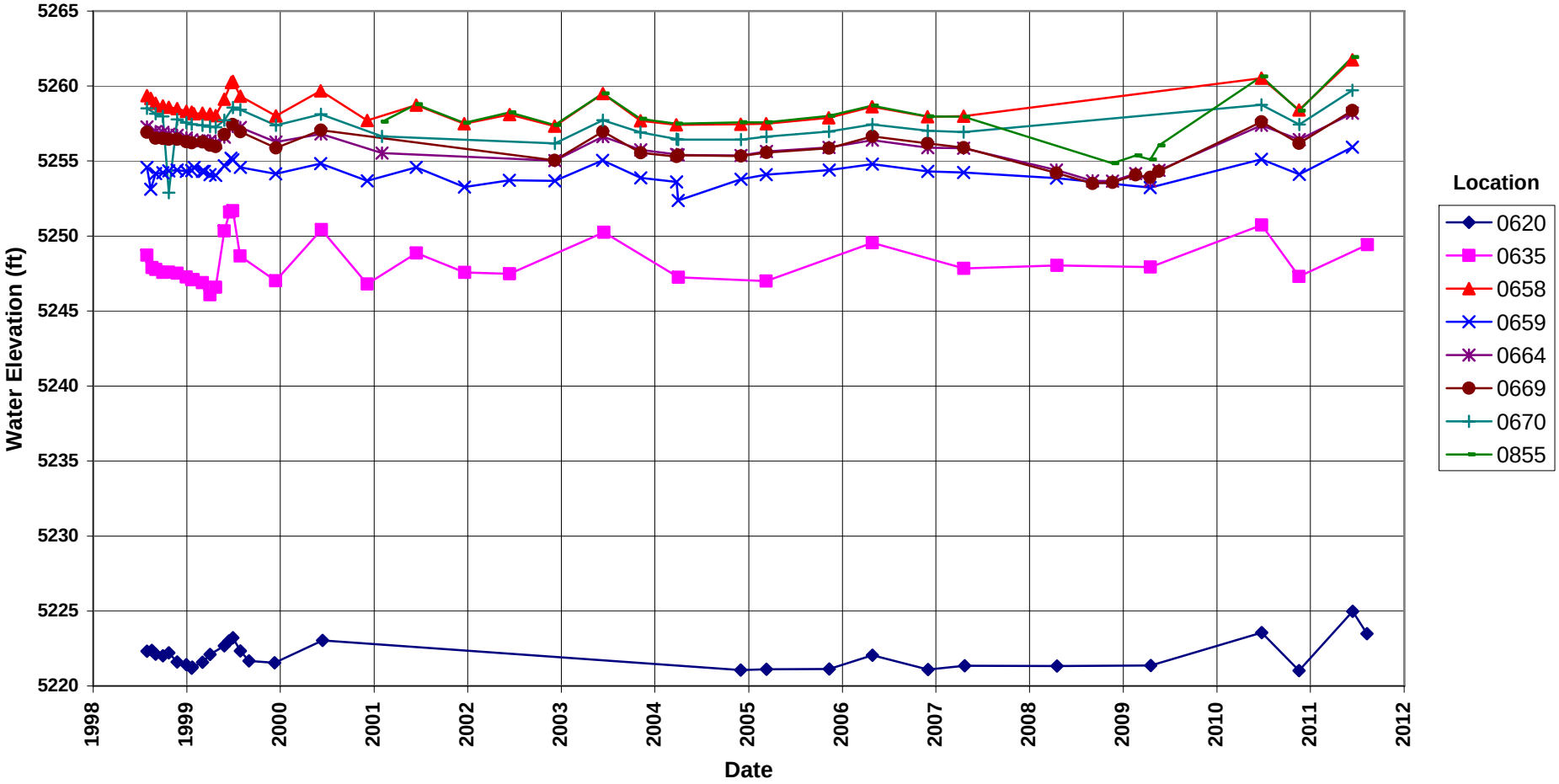
## Rifle New Processing Site
## Hydrograph



## Rifle New Processing Site
## Hydrograph



# Old Rifle Hydrographs

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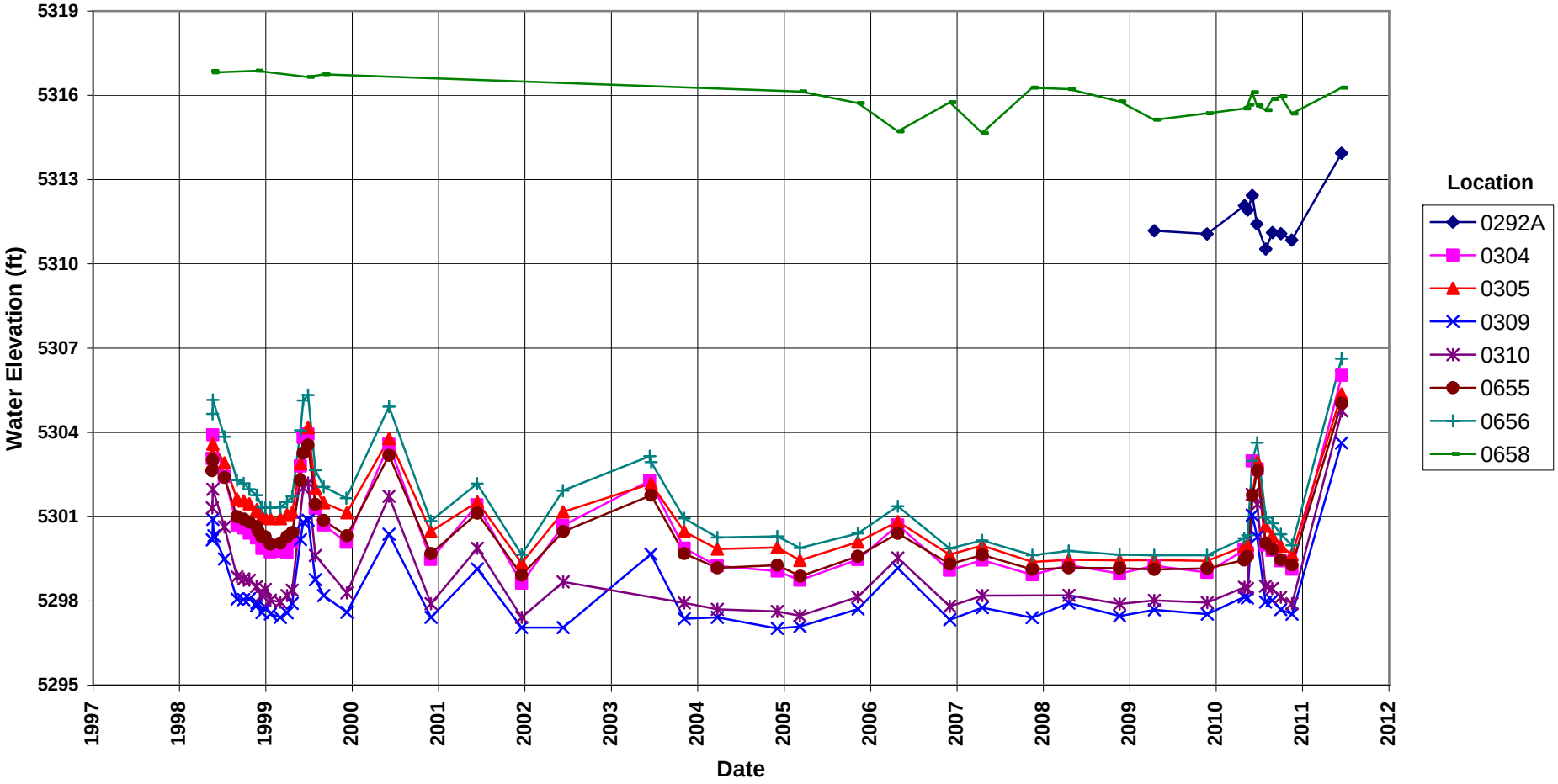
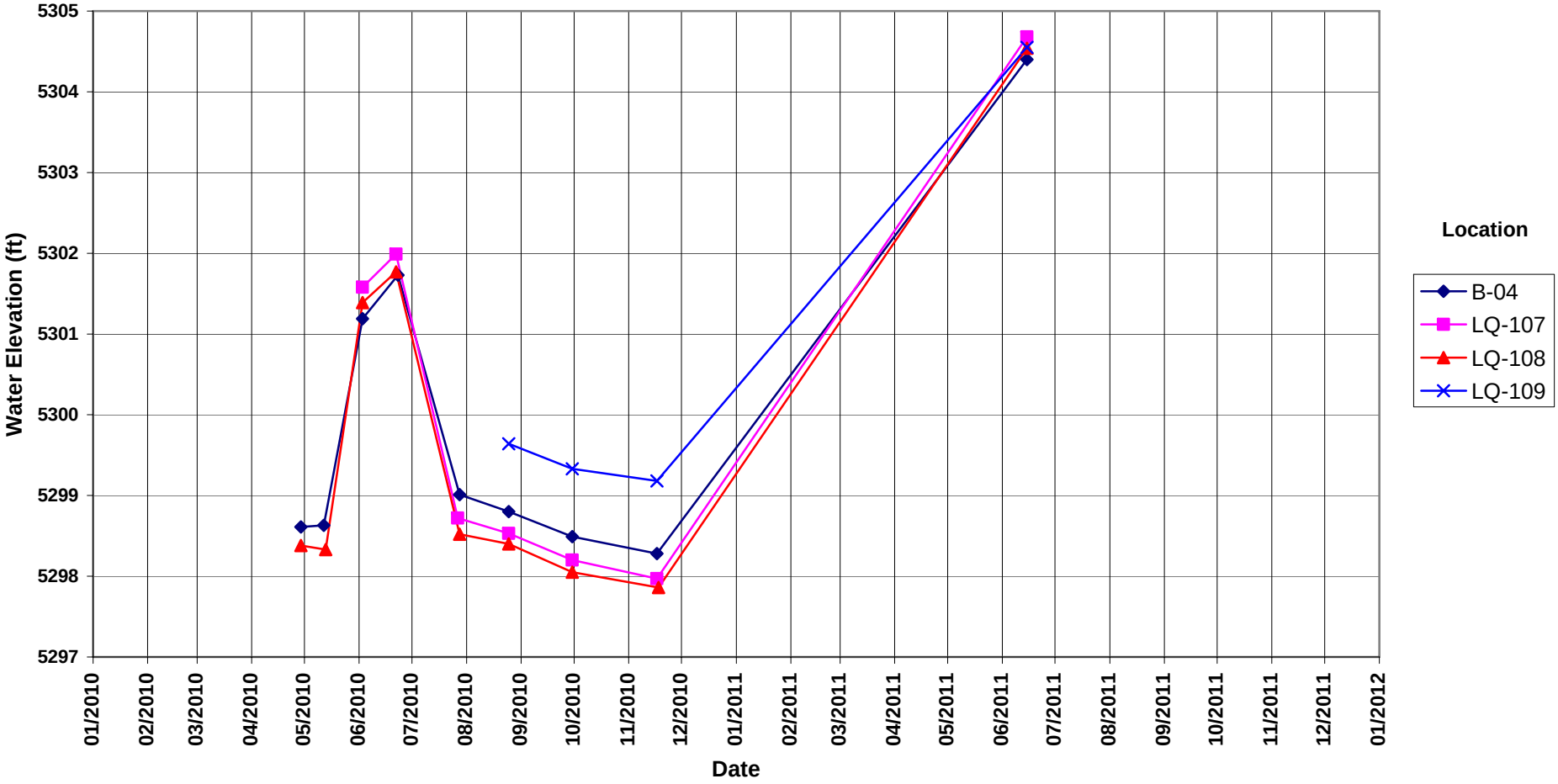
## Rifle Old Processing Site
## Hydrograph



## Rifle Old Processing Site
## Hydrograph



# New Rifle Groundwater
# Time-Concentration Graphs

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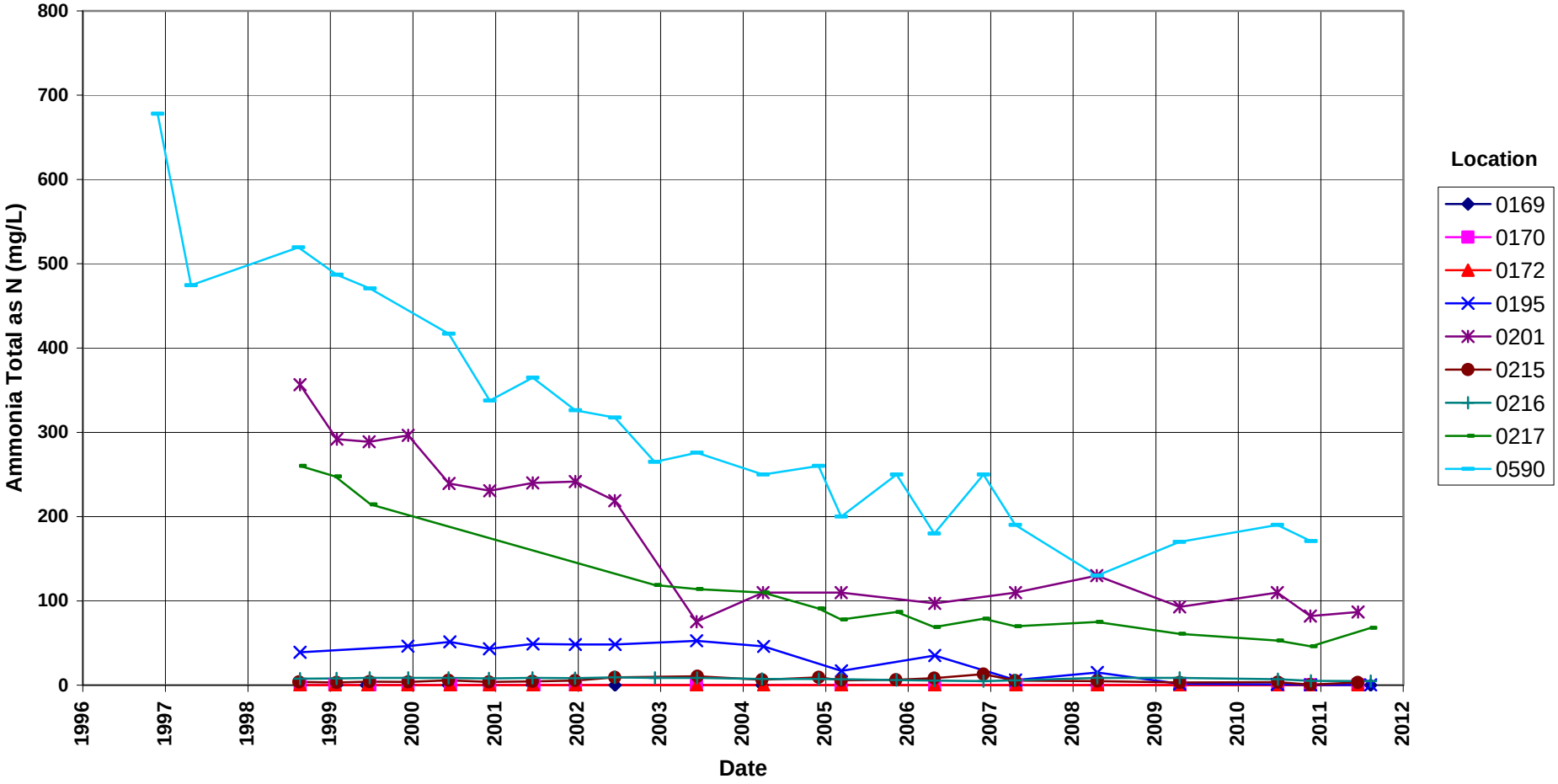
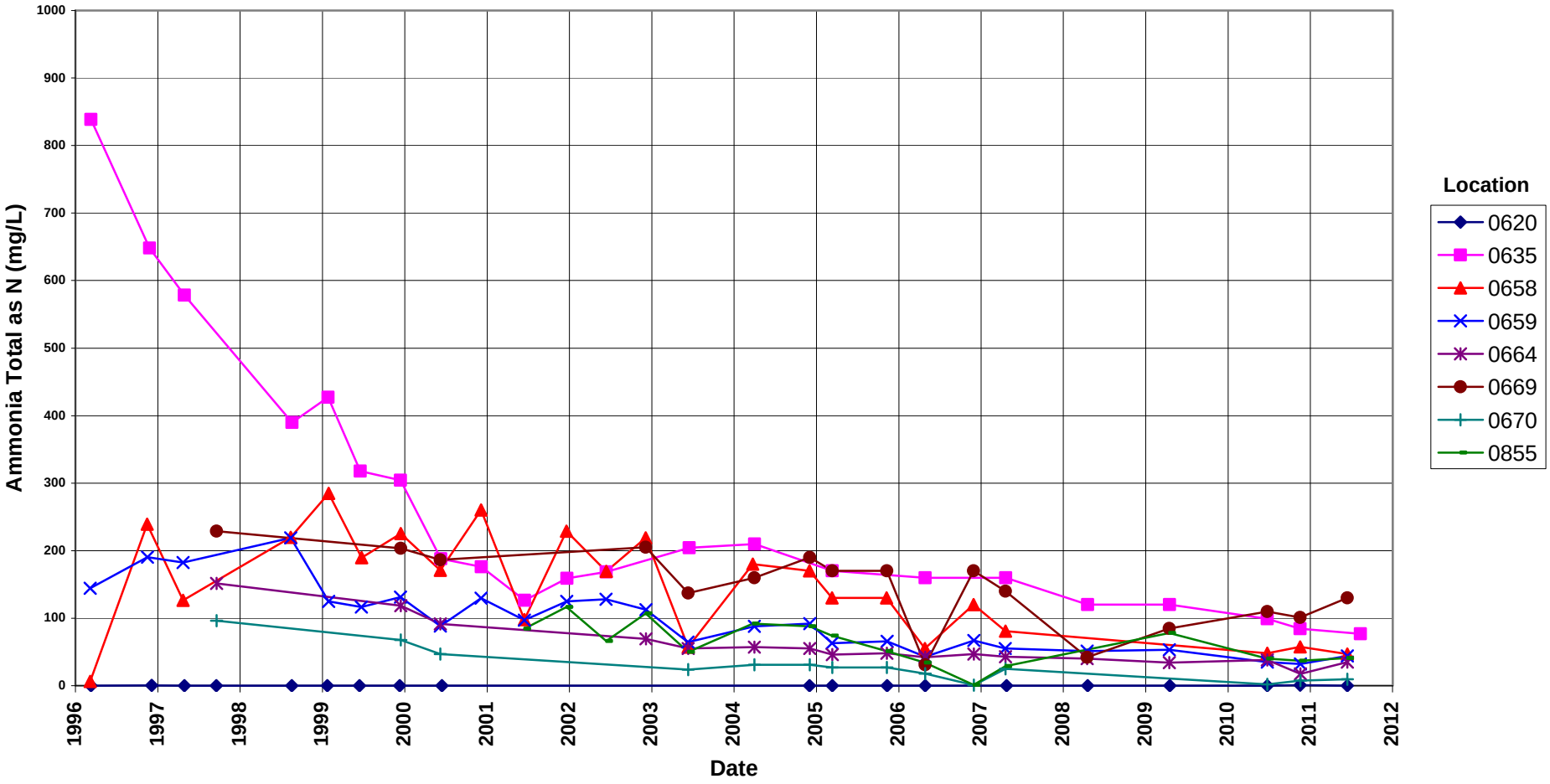
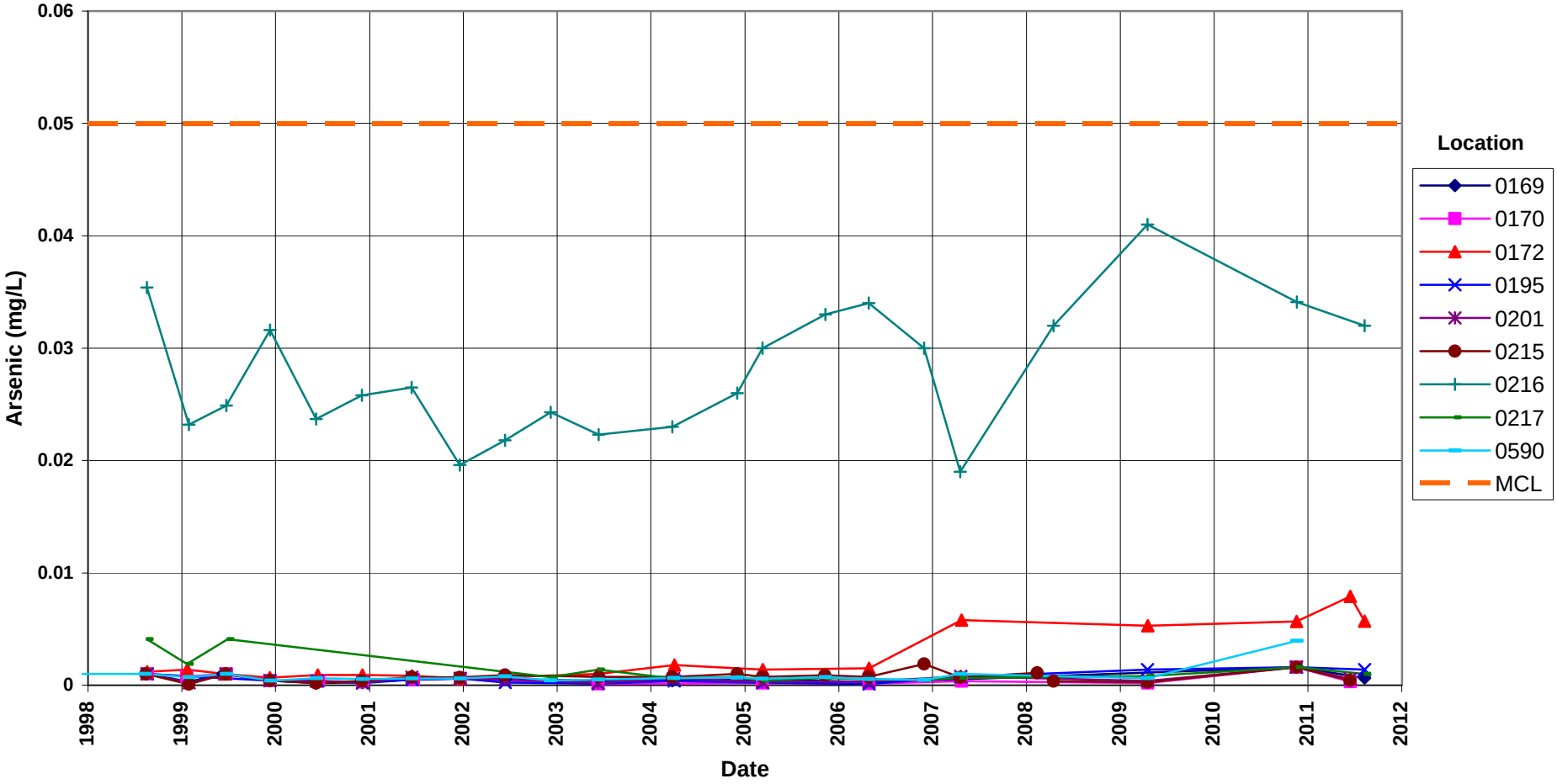
## Rifle New Processing Site
## Ammonia Total as N Concentration



## Rifle New Processing Site
## Ammonia Total as N Concentration

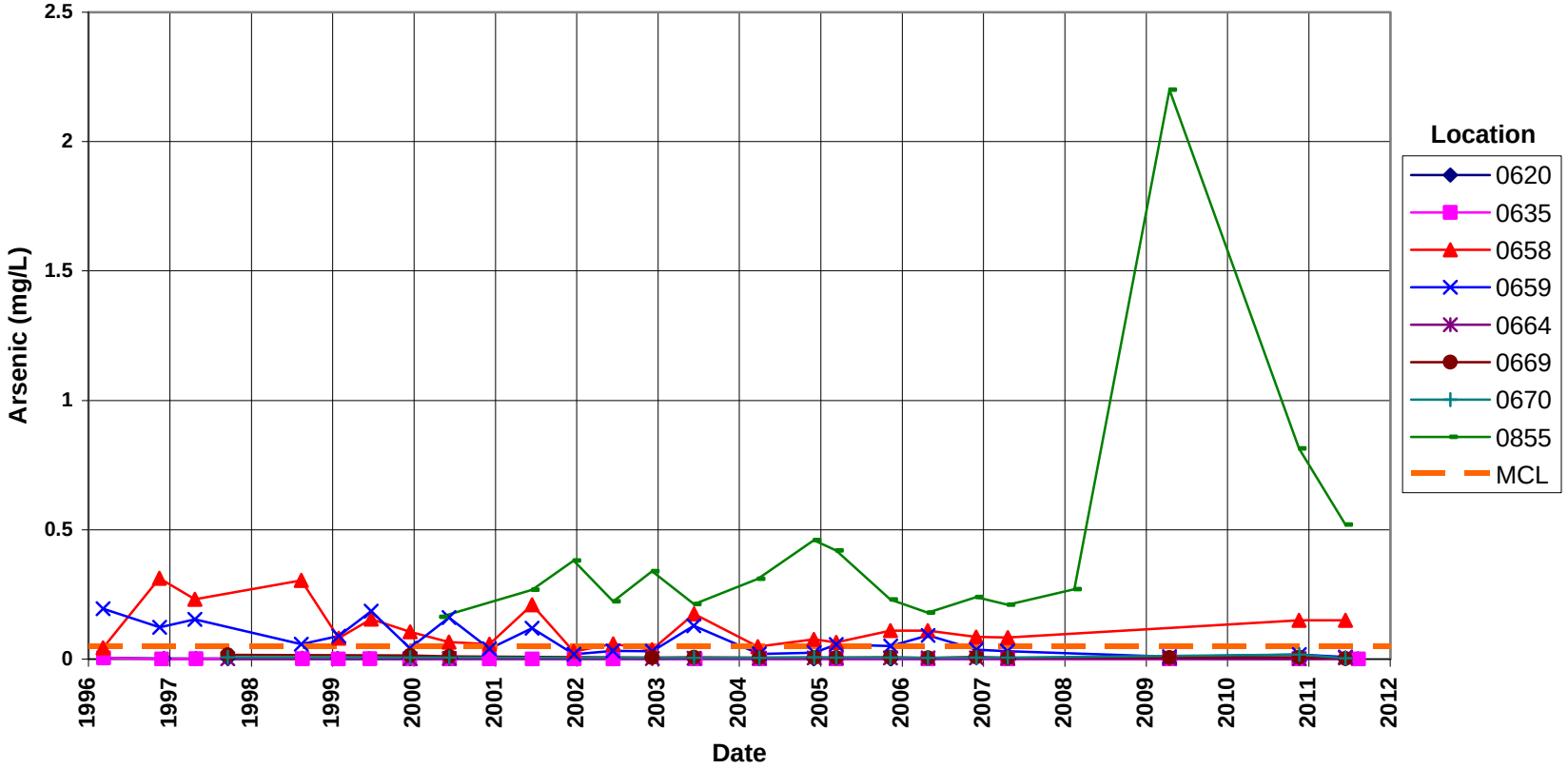


## Rifle New Processing Site
## Arsenic Concentration
Maximum Concentration Limit (MCL) = 0.05 mg/L

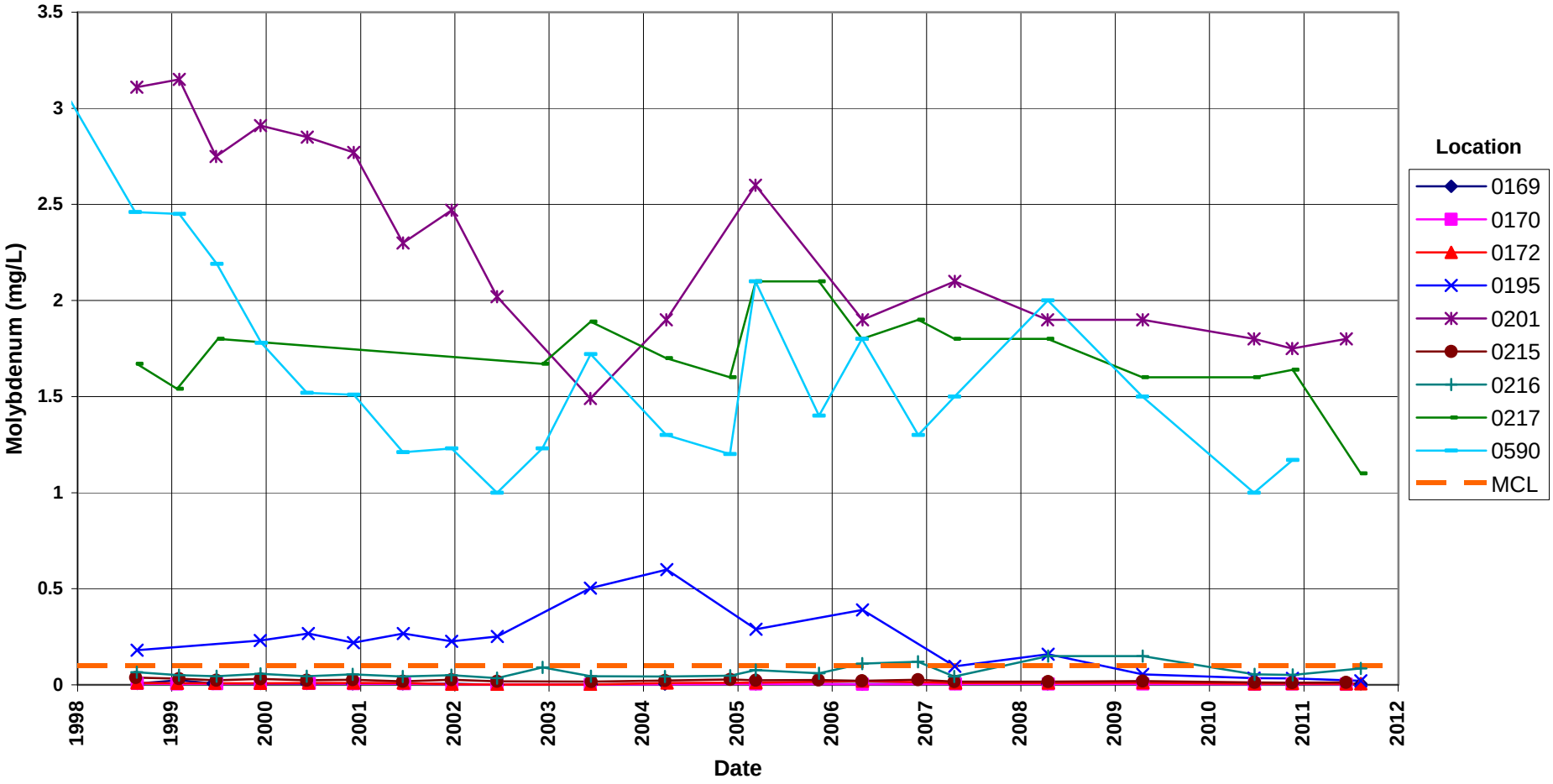


## Rifle New Processing Site
## Arsenic Concentration

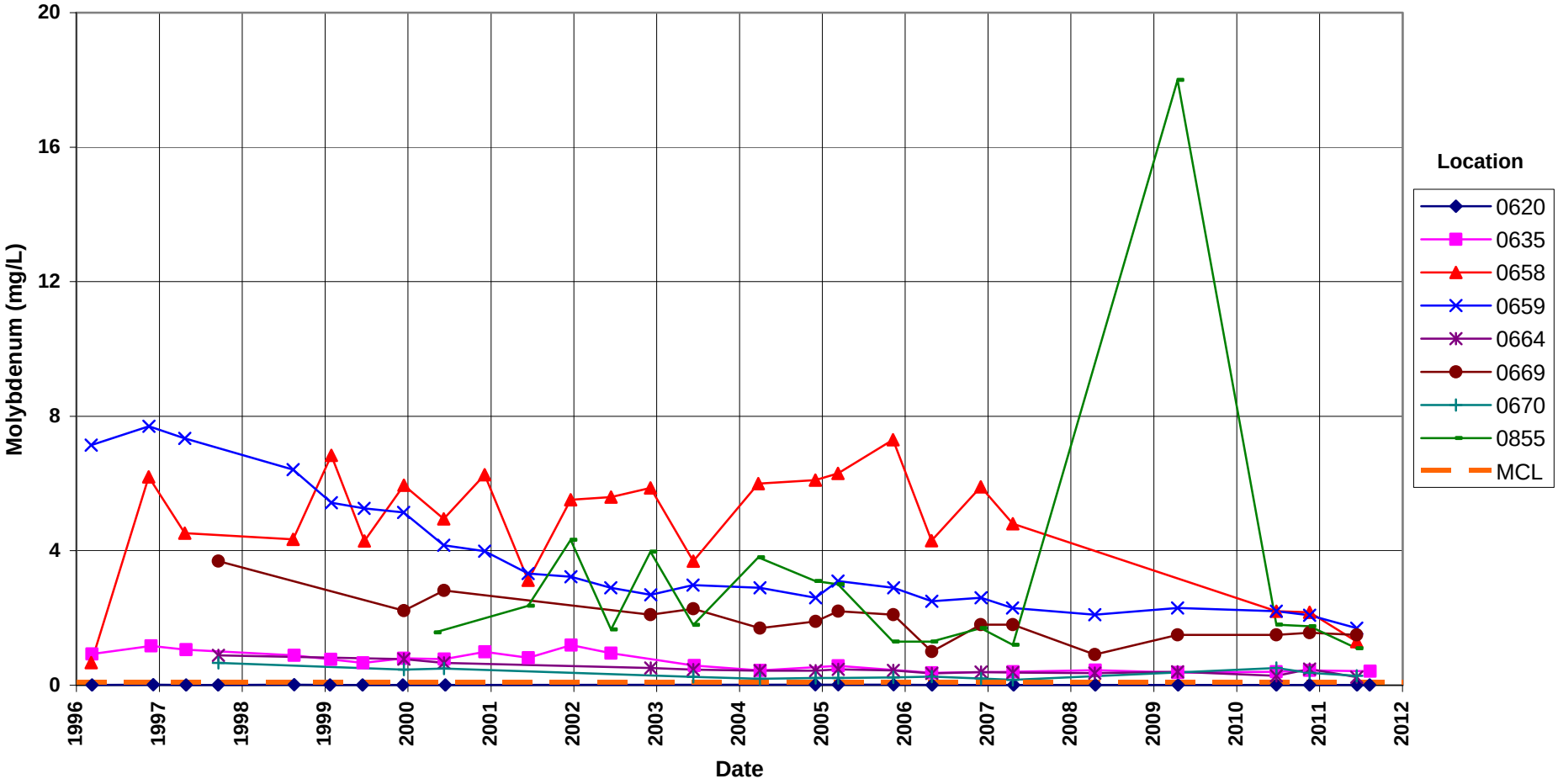
Maximum Concentration Limit (MCL) = 0.05 mg/L



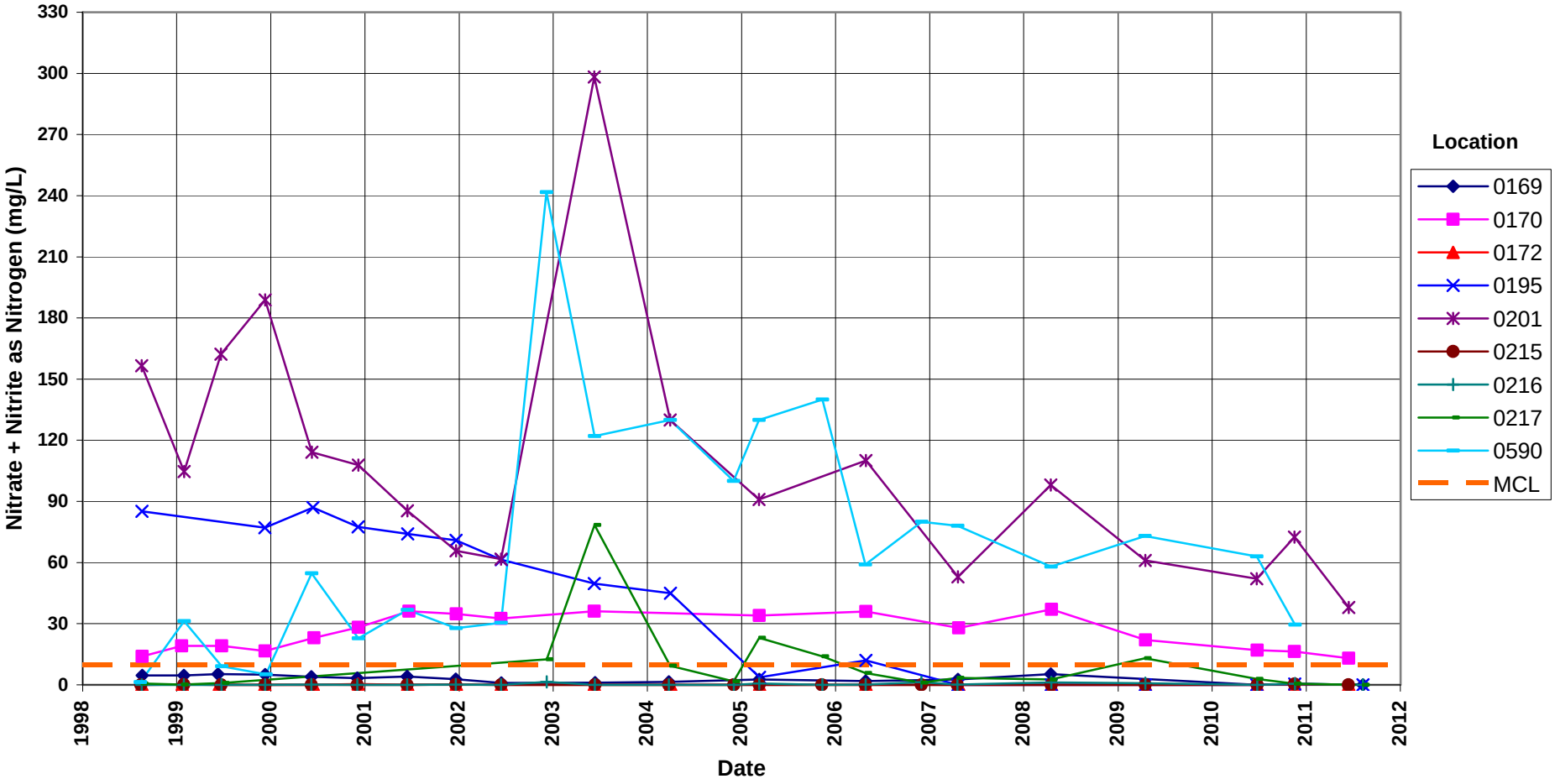
**Rifle New Processing Site**
**Molybdenum Concentration**
Maximum Concentration Limit (MCL) = 0.1 mg/L



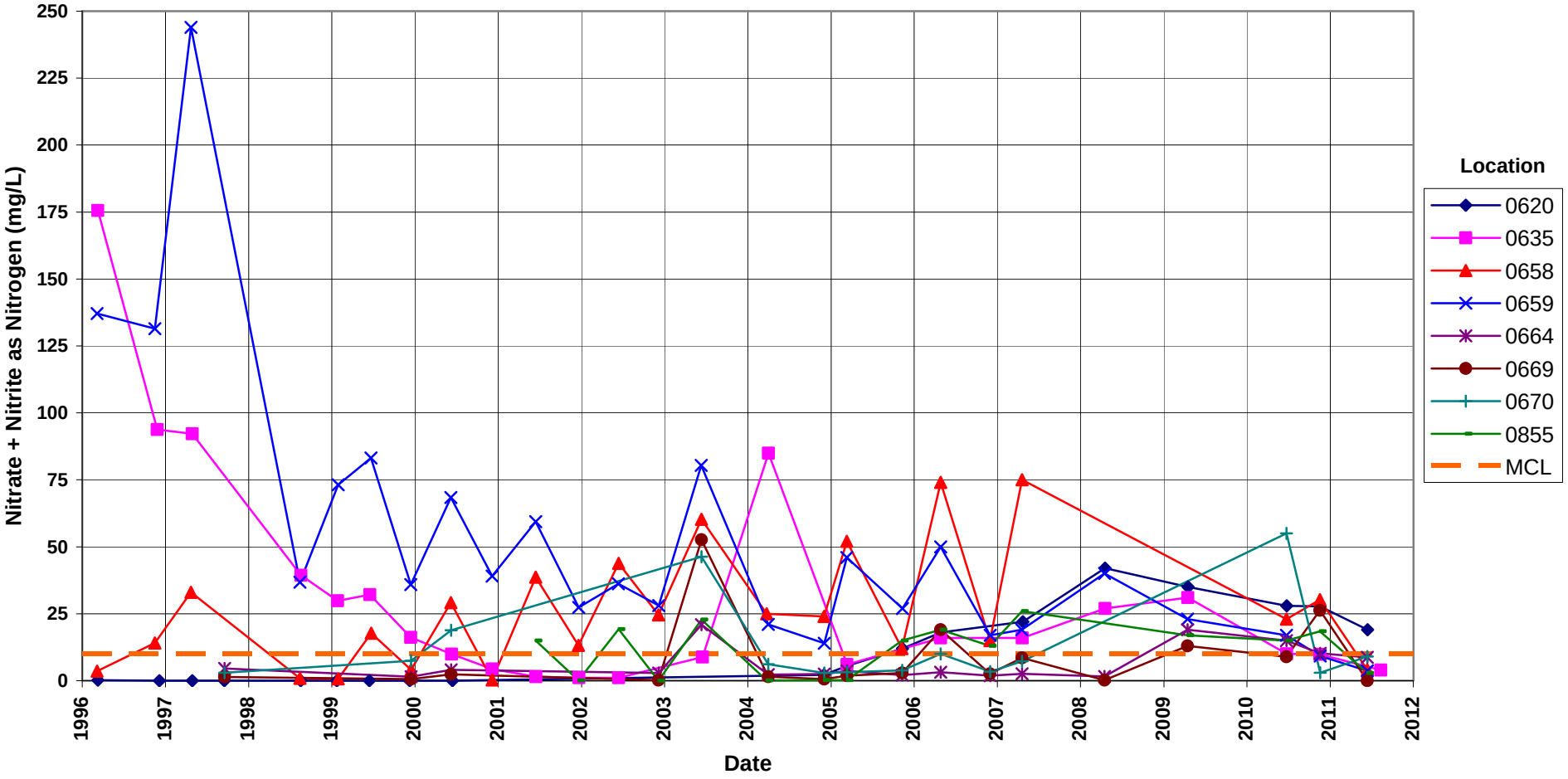
**Rifle New Processing Site**
**Molybdenum Concentration**
Maximum Concentration Limit (MCL) = 0.1 mg/L



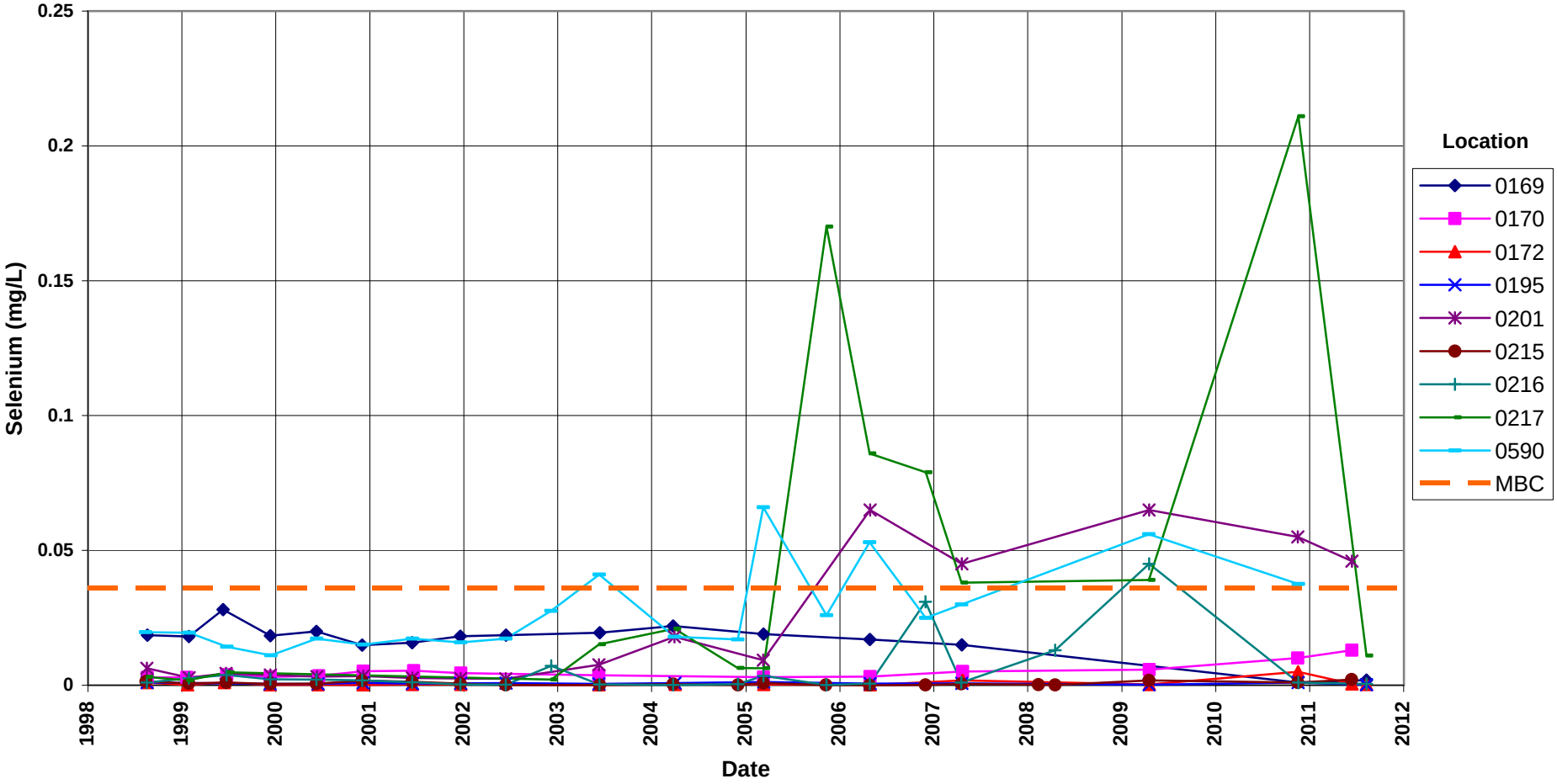
**Rifle New Processing Site**
**Nitrate + Nitrite as Nitrogen Concentration**
Maximum Concentration Limit (MCL) = 10.0 mg/L



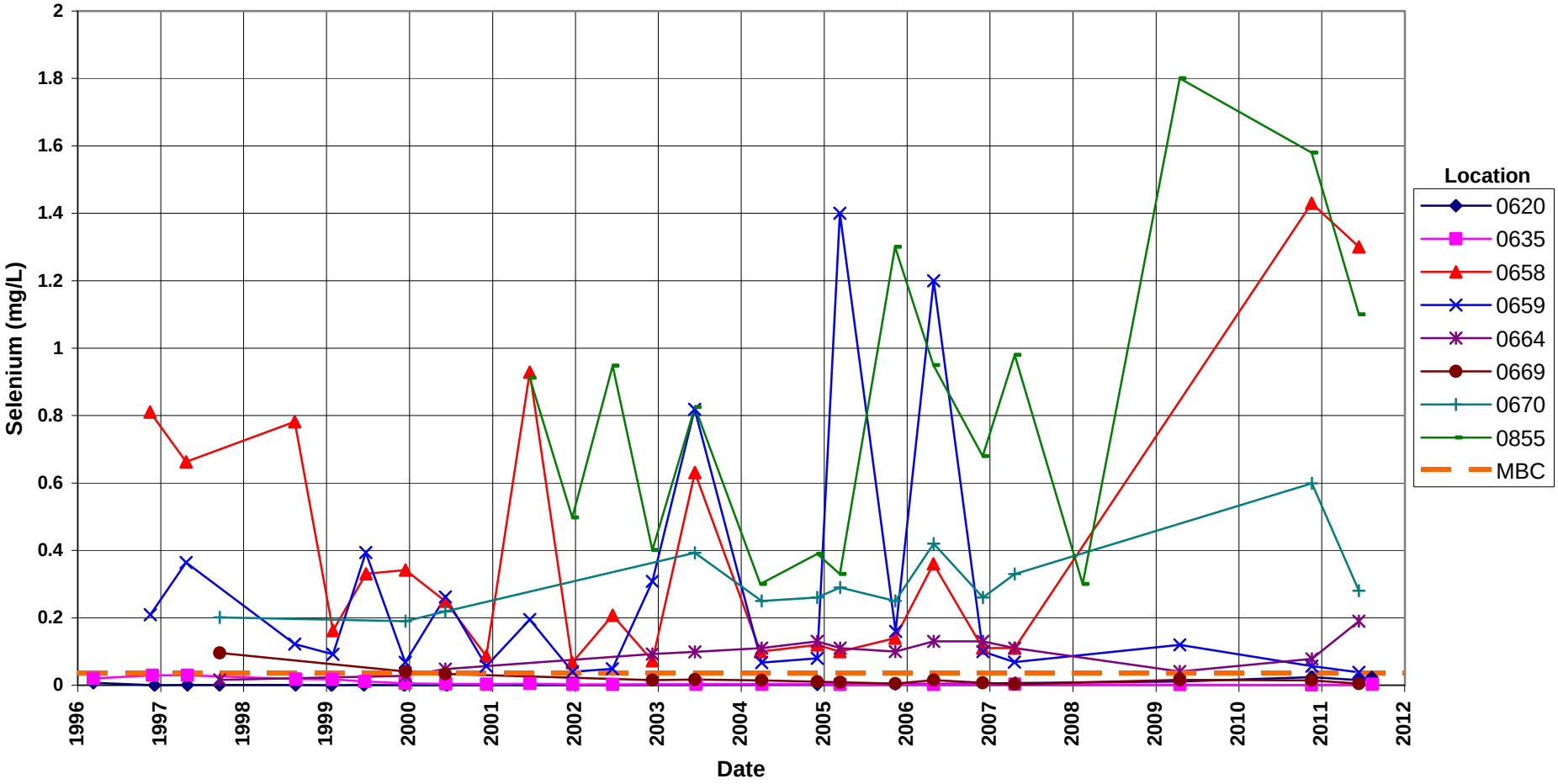
**Rifle New Processing Site**
**Nitrate + Nitrite as Nitrogen Concentration**
Maximum Concentration Limit (MCL) = 10.0 mg/L



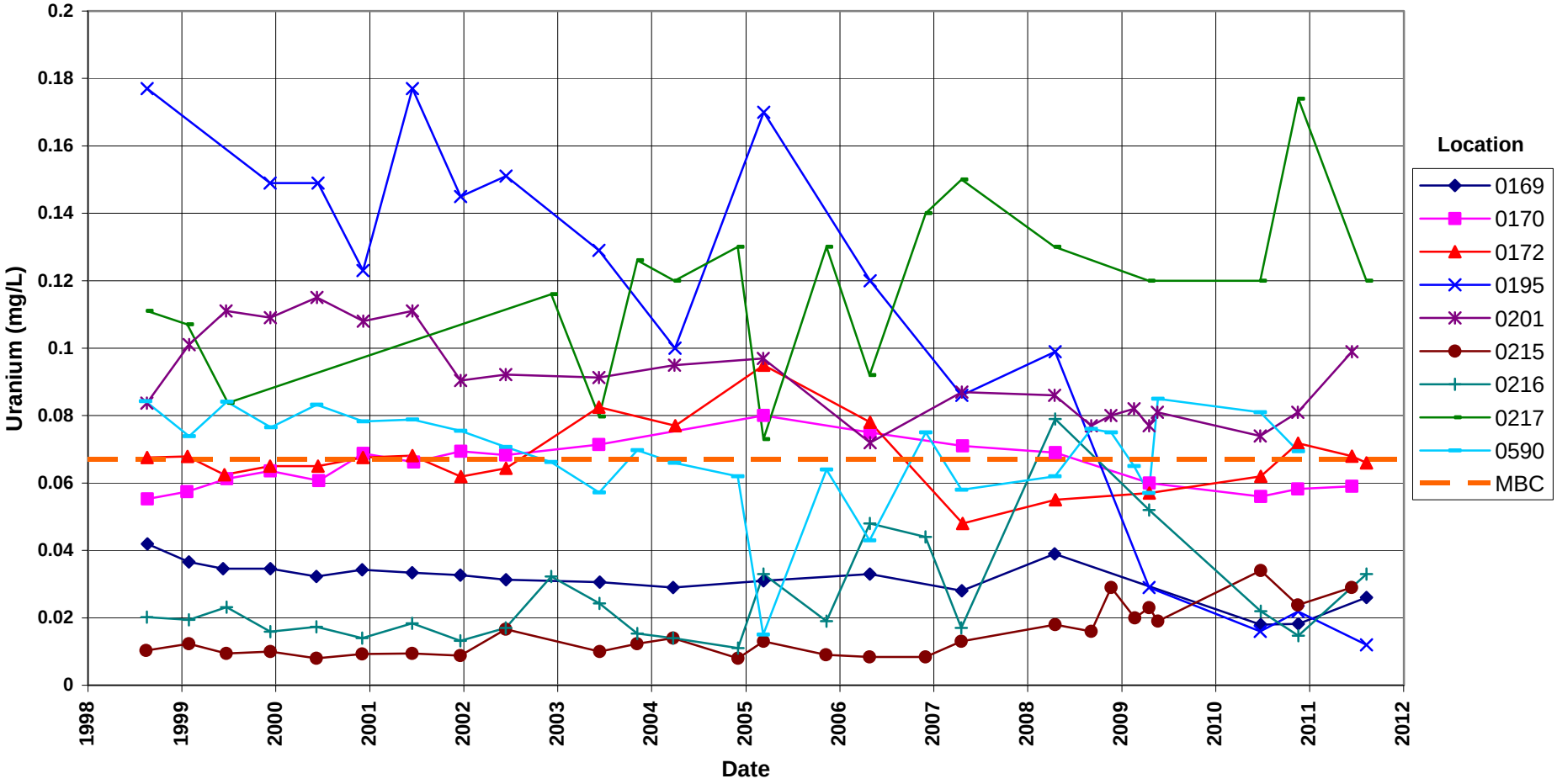
**Rifle New Processing Site**
**Selenium Concentration**
Maximum Background Concentration (MBC) = 0.036 mg/L



**Rifle New Processing Site**
**Selenium Concentration**
Maximum Background Concentration (MBC) = 0.036 mg/L

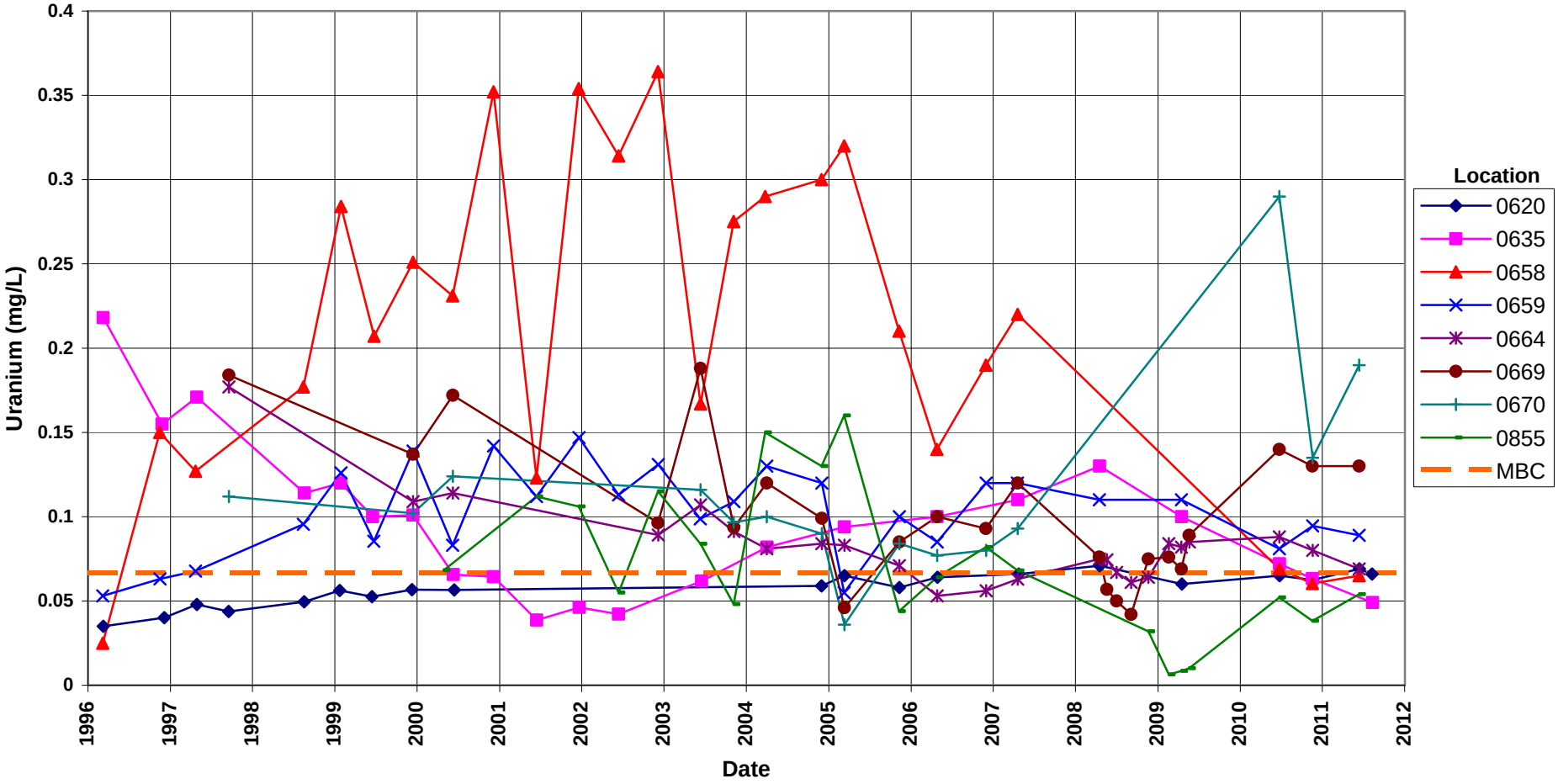


**Rifle New Processing Site**
**Uranium Concentration**
Maximum Background Concentration (MBC) = 0.067 mg/L

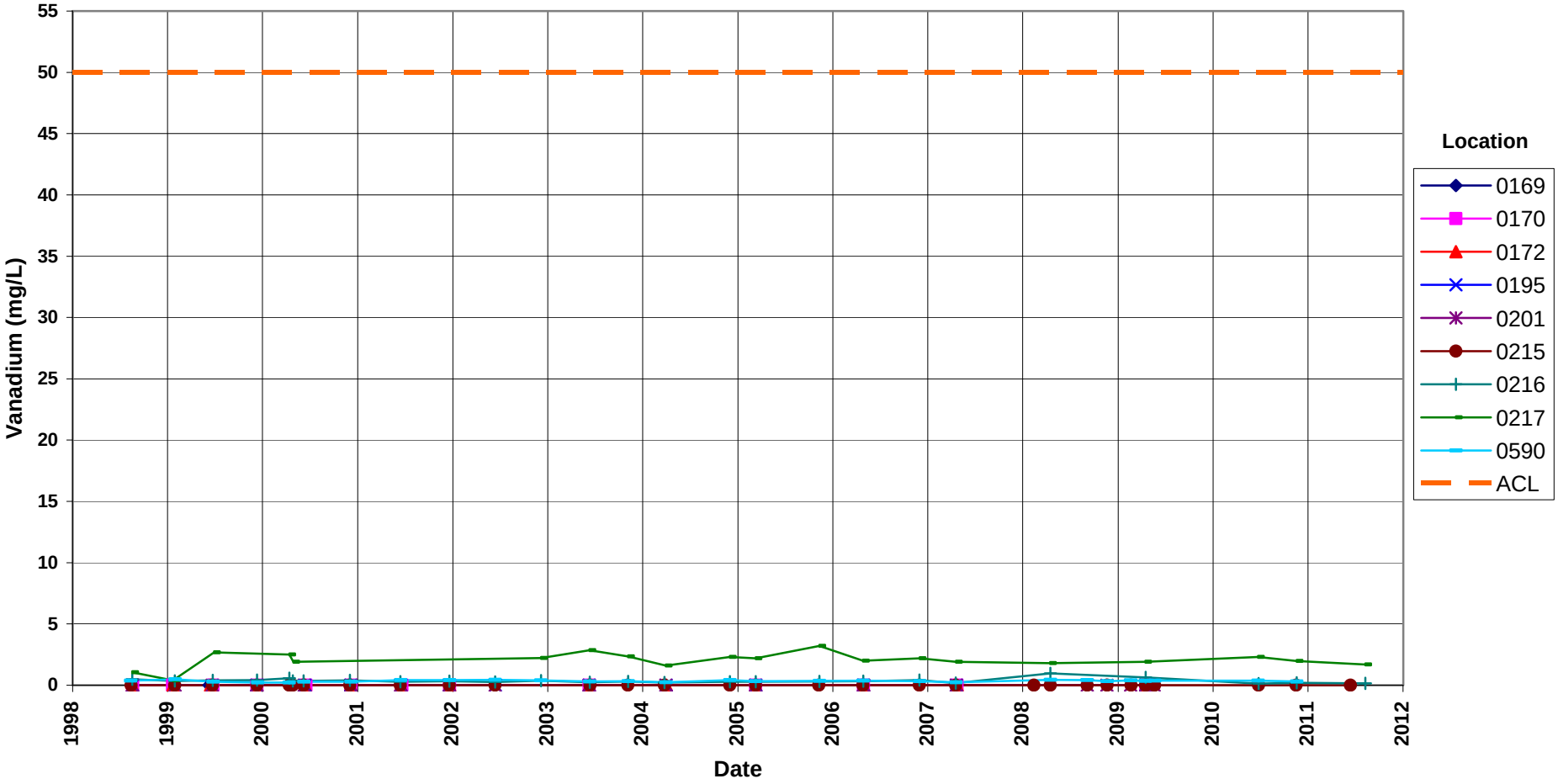


## Rifle New Processing Site
## Uranium Concentration

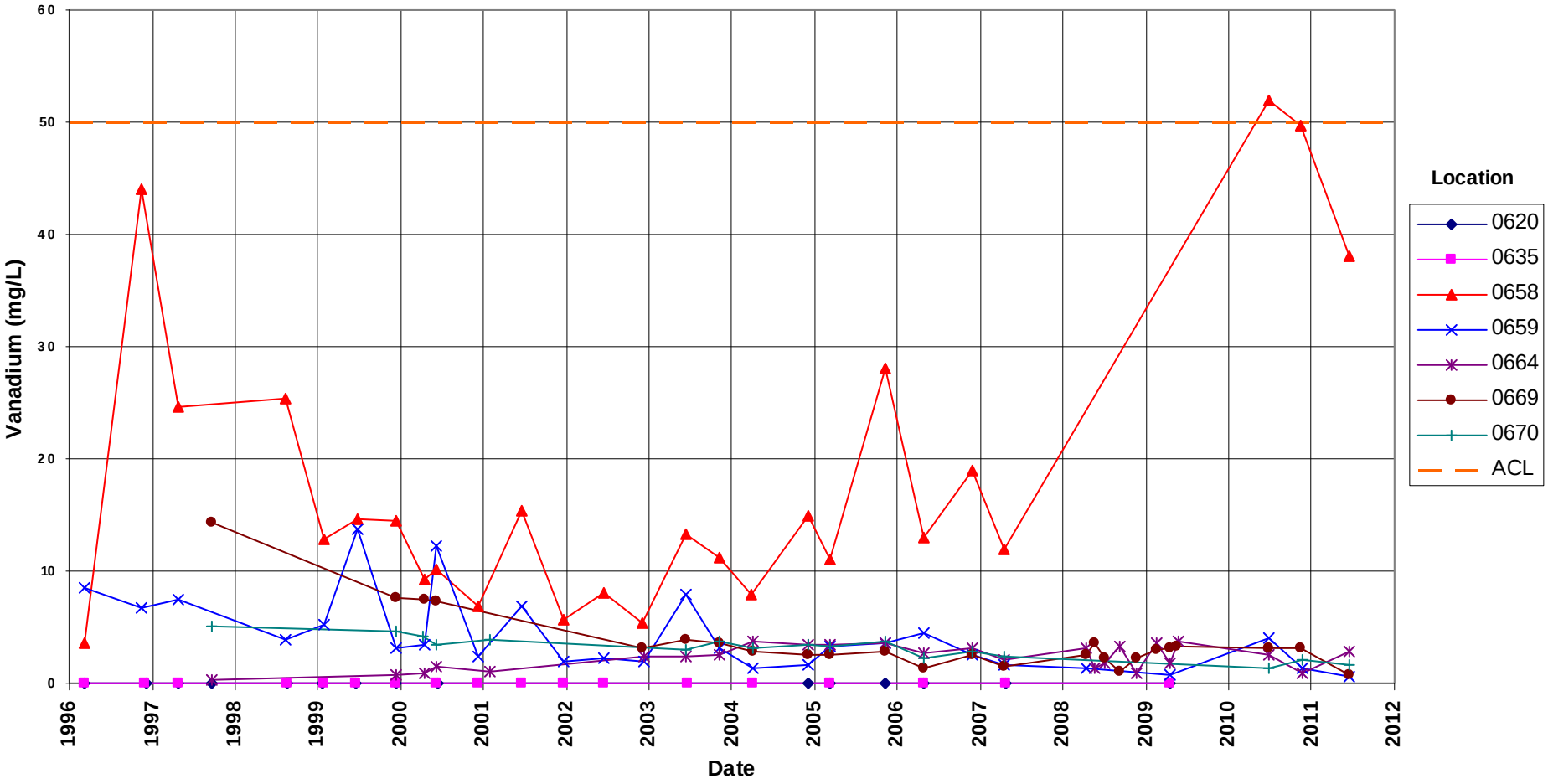
Maximum Background Concentration (MBC) = 0.067 mg/L



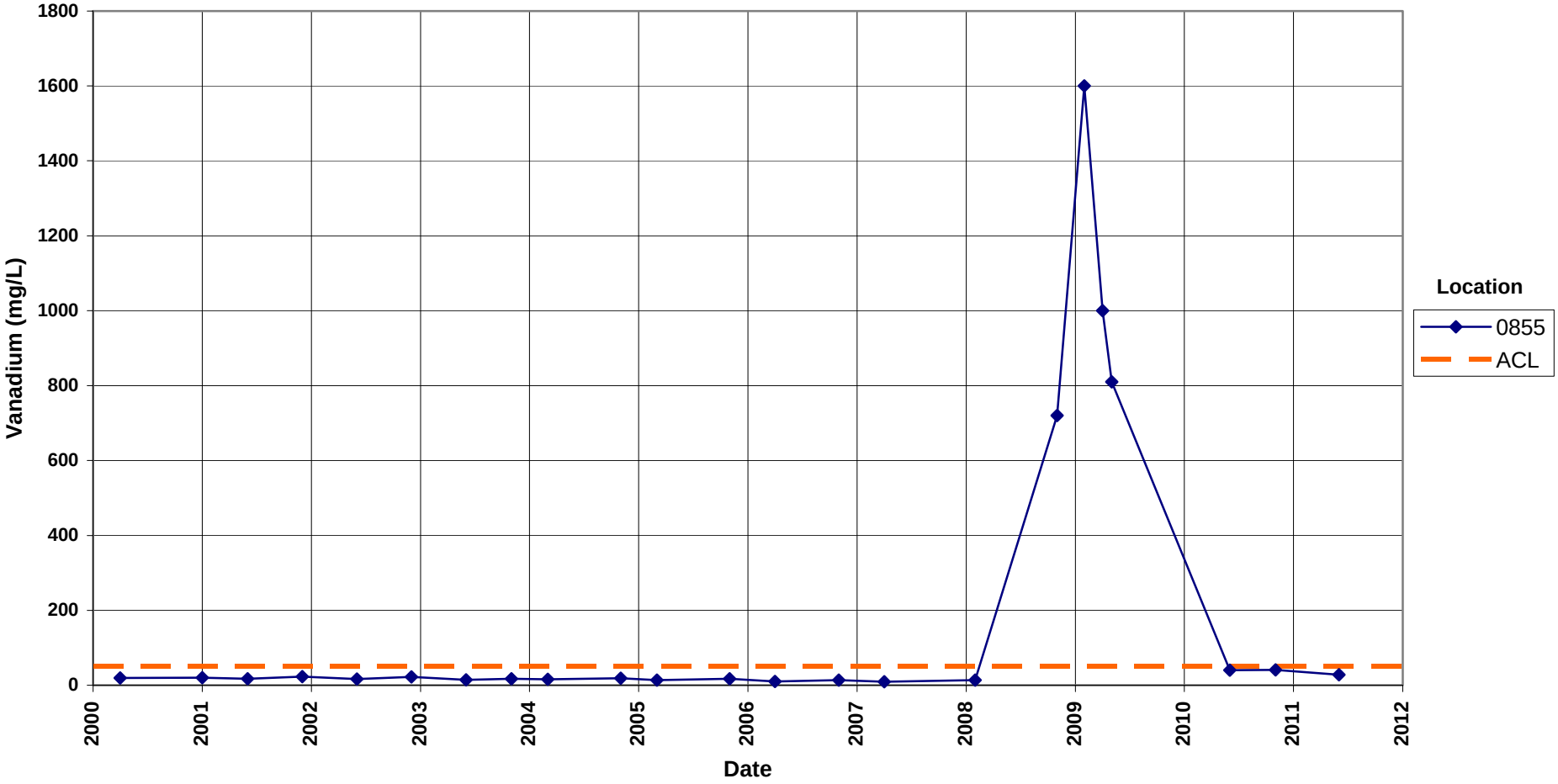
**Rifle New Processing Site**
**Vanadium Concentration**
Proposed Alternate Concentration Limit (ACL) = 50 mg/L



**Rifle New Processing Site**
**Vanadium Concentration**
Proposed Alternate Concentration Limit (ACL) = 50 mg/L



**Rifle New Processing Site**
**Vanadium Concentration**
Proposed Alternate Concentration Limit (ACL) = 50 mg/L



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# New Rifle Surface Water
# Time-Concentration Graphs

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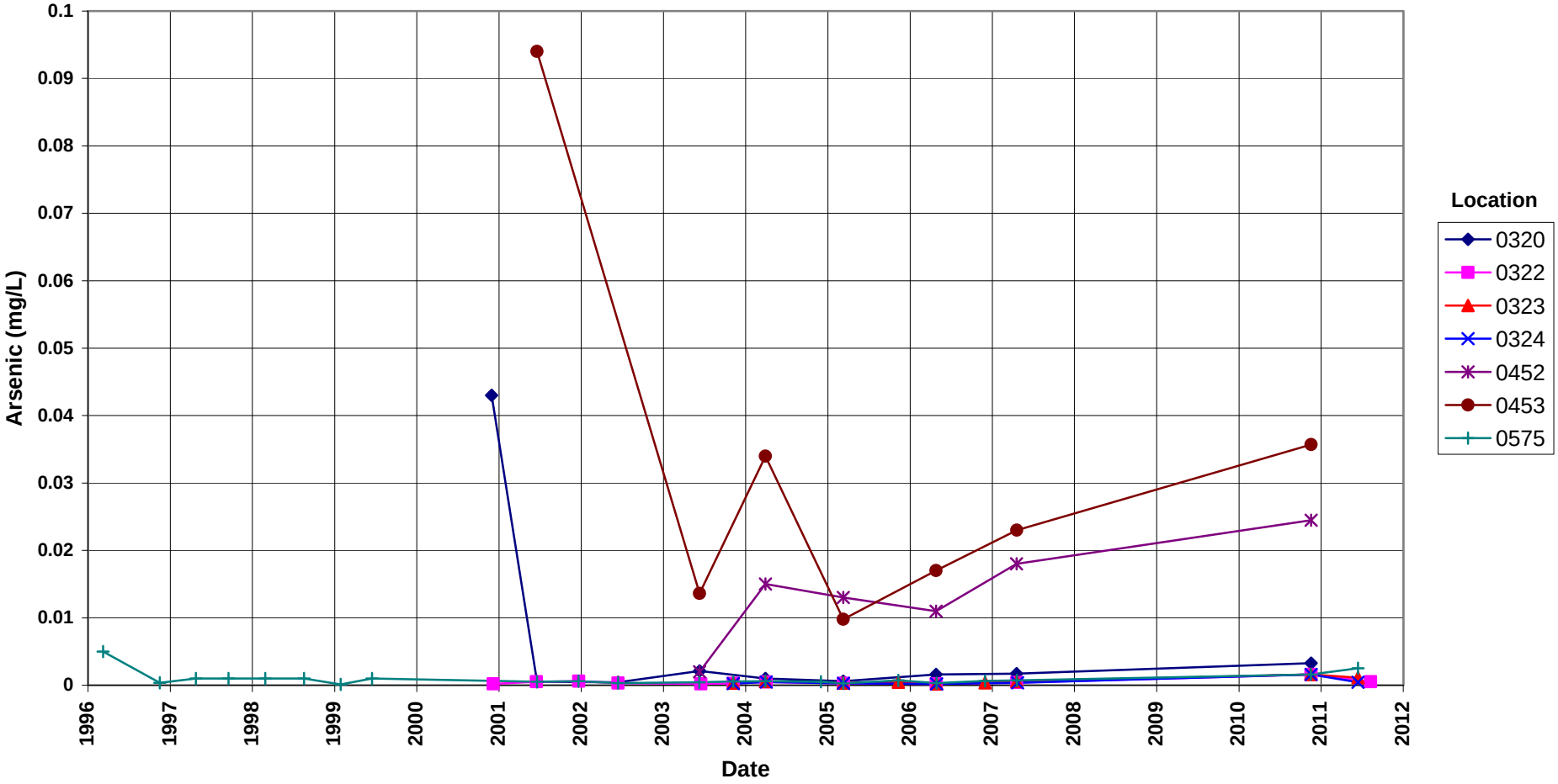
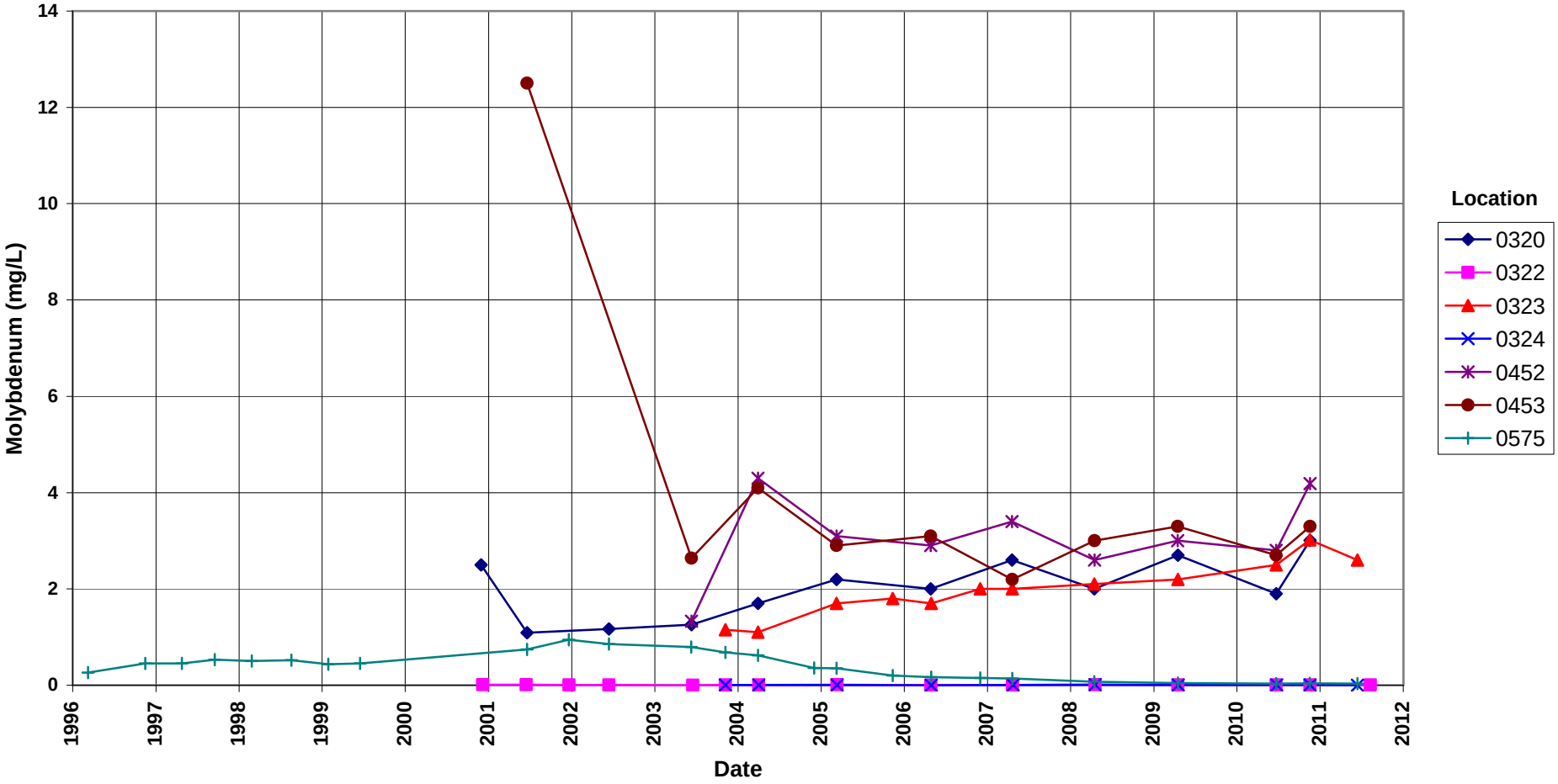
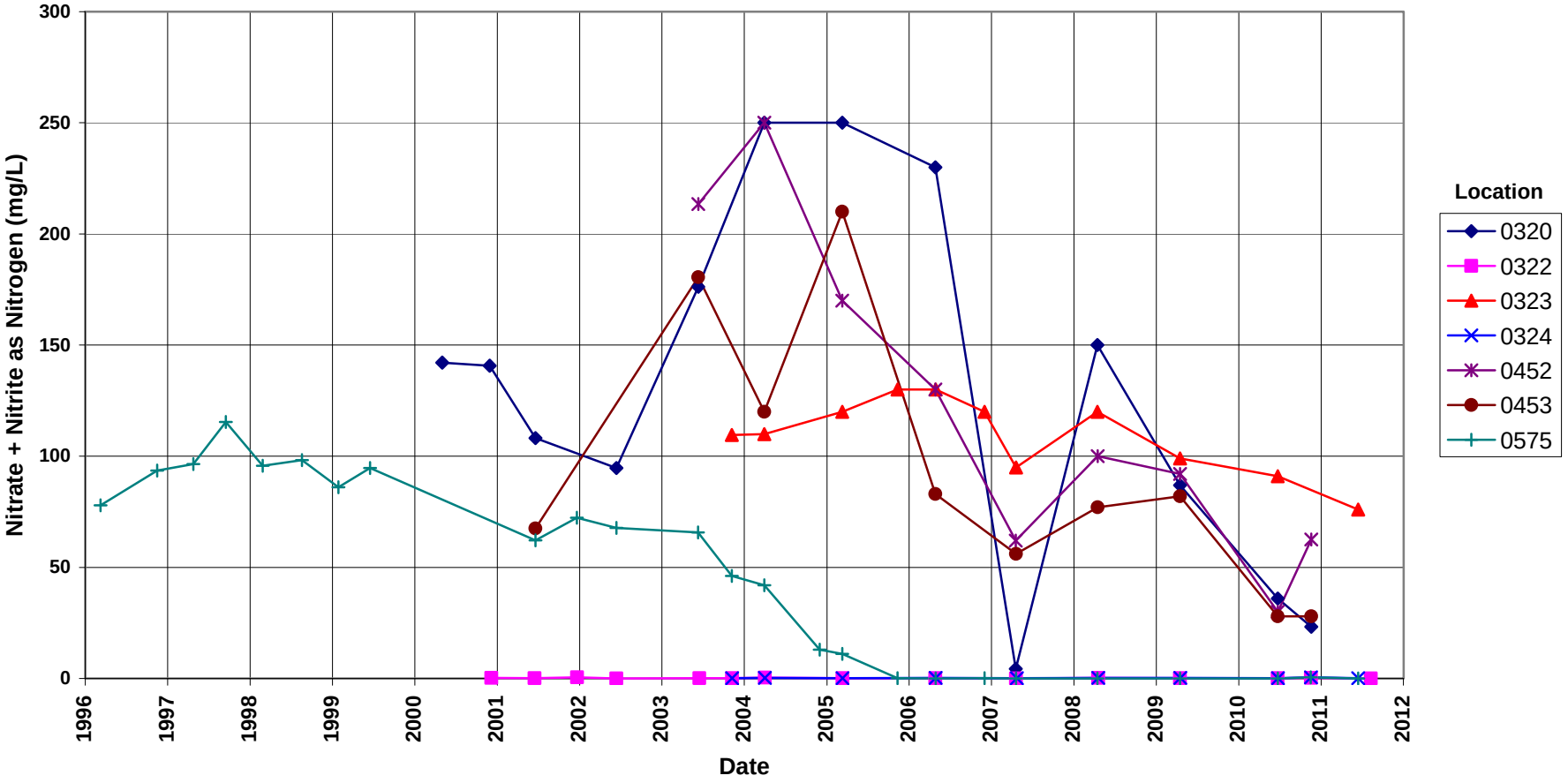
**Rifle New Processing Site**
**Arsenic Concentration**
Surface Water Locations



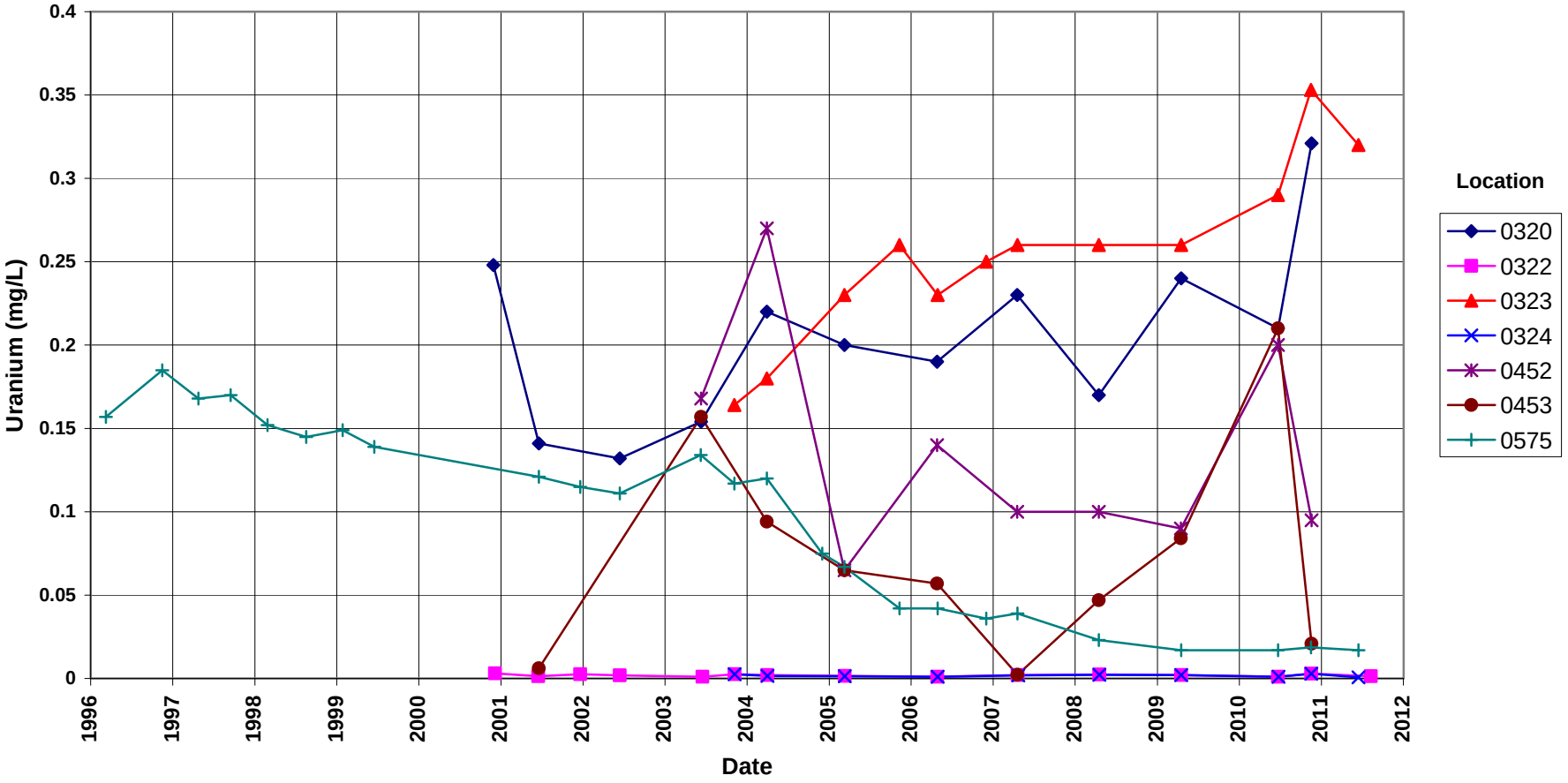
**Rifle New Processing Site**
**Molybdenum Concentration**
Surface Water Locations



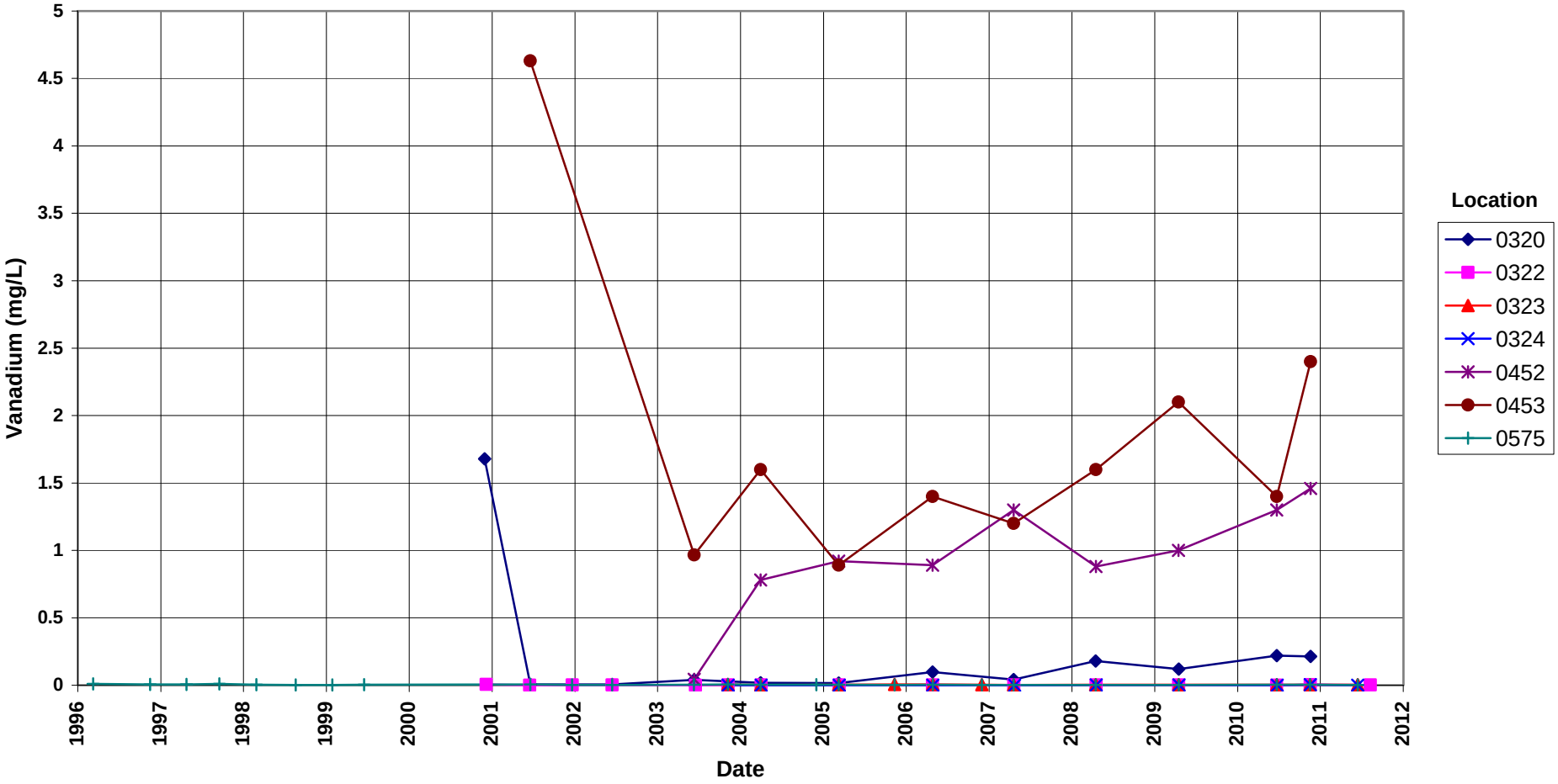
**Rifle New Processing Site**
**Nitrate + Nitrite as Nitrogen Concentration**
Surface Water Locations



**Rifle New Processing Site**
**Uranium Concentration**
Surface Water Locations



**Rifle New Processing Site**
**Vanadium Concentration**
Surface Water Locations



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# Old Rifle Groundwater
# Time-Concentration Graphs

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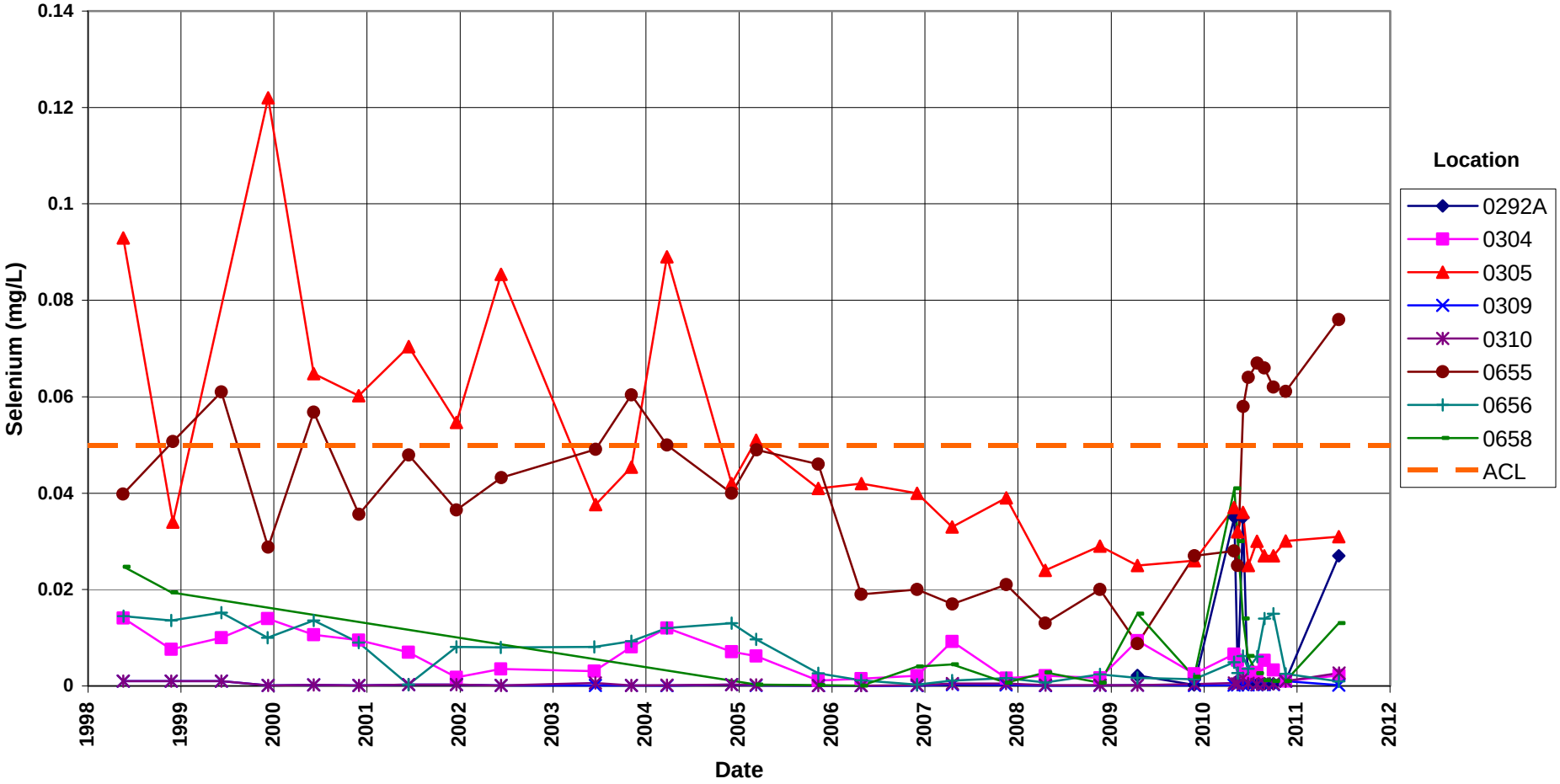
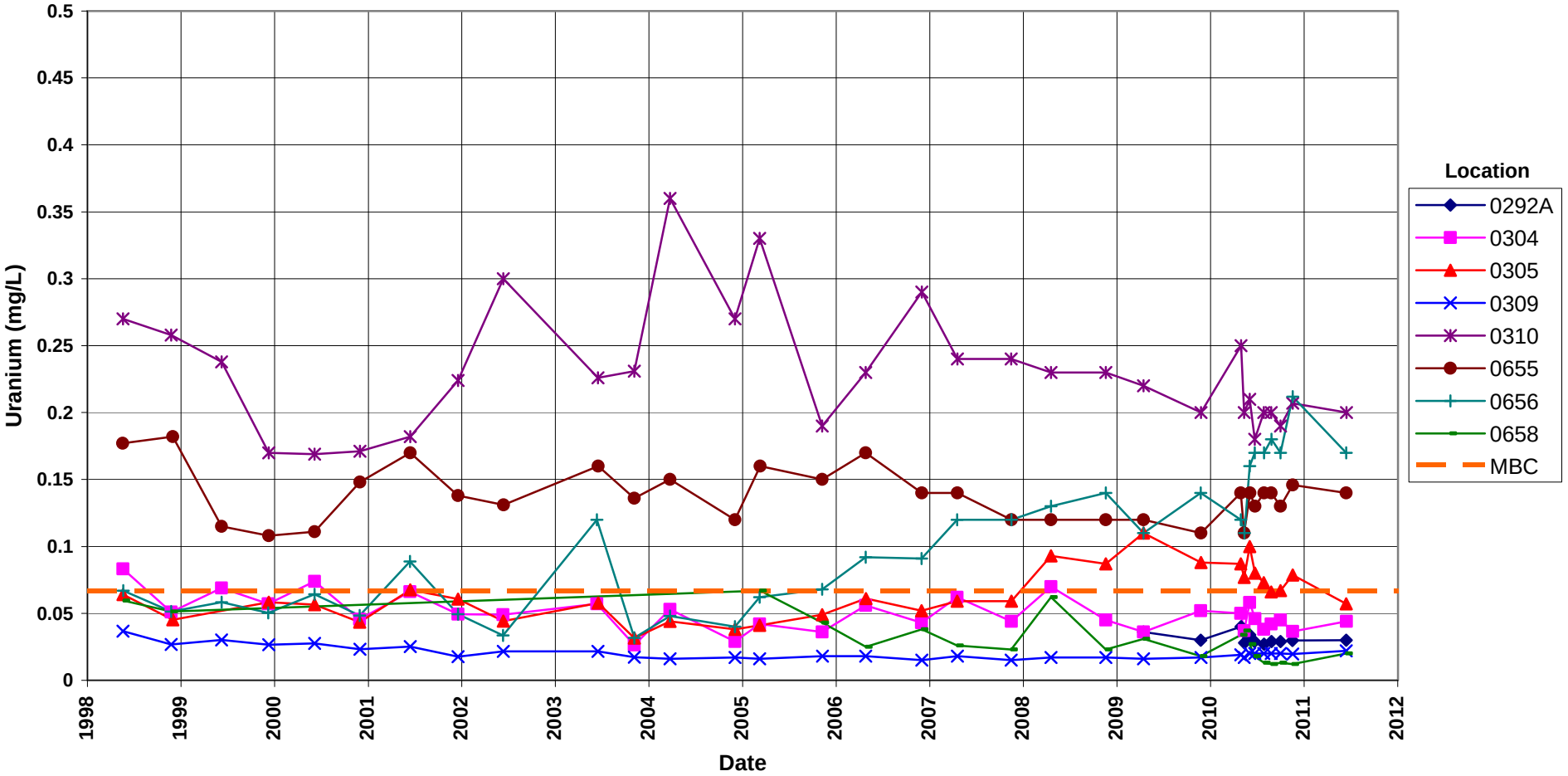
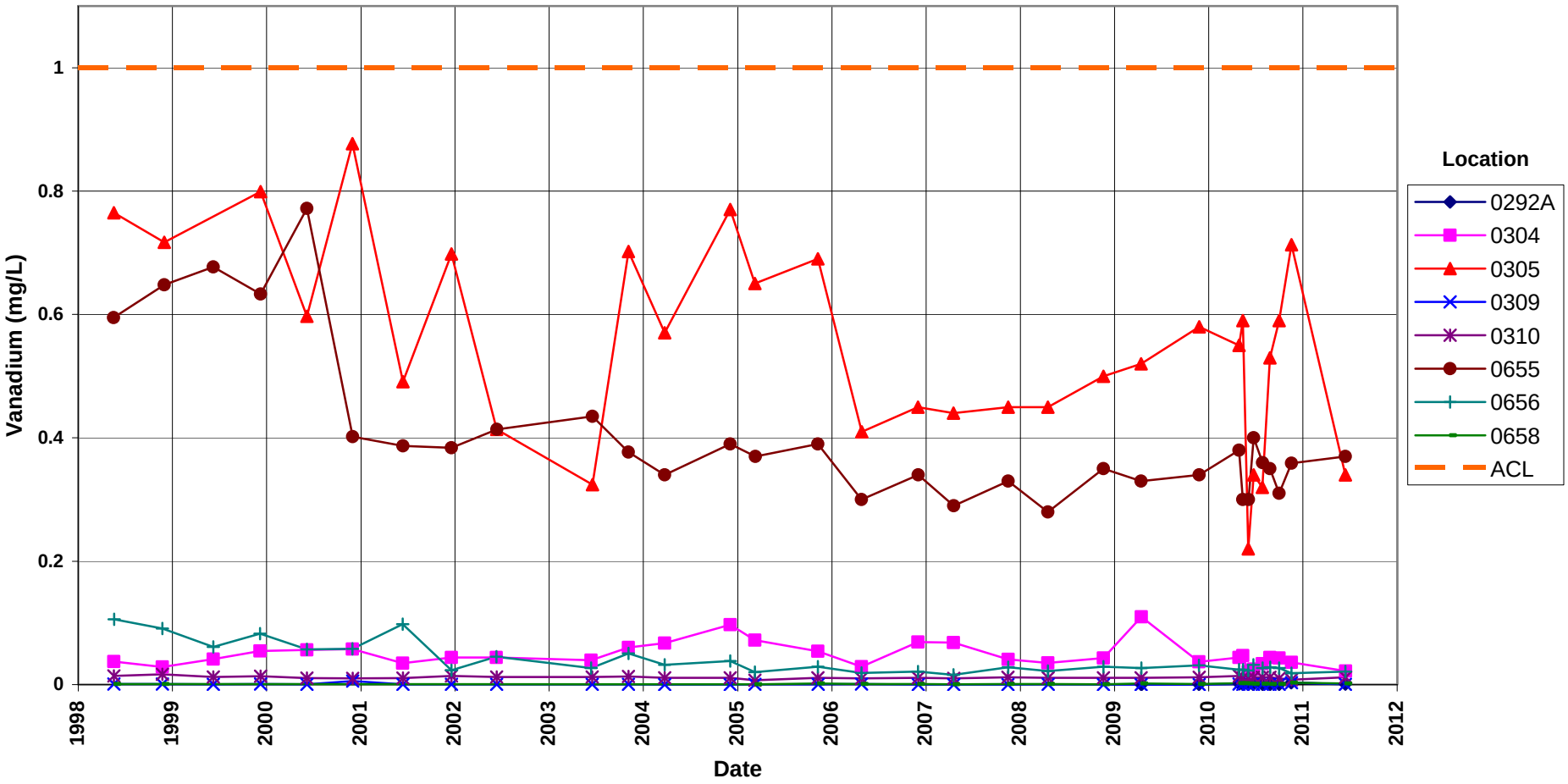
**Rifle Old Processing Site**
**Selenium Concentration**
Alternate Concentration Limit (ACL) = 0.05 mg/L



**Rifle Old Processing Site**
**Uranium Concentration**
Maximum Background Concentration (MBC) = 0.067 mg/L



**Rifle Old Processing Site**
**Vanadium Concentration**
Alternate Concentration Limit (ACL) = 1.0 mg/L



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# Old Rifle Surface Water
# Time-Concentration Graphs

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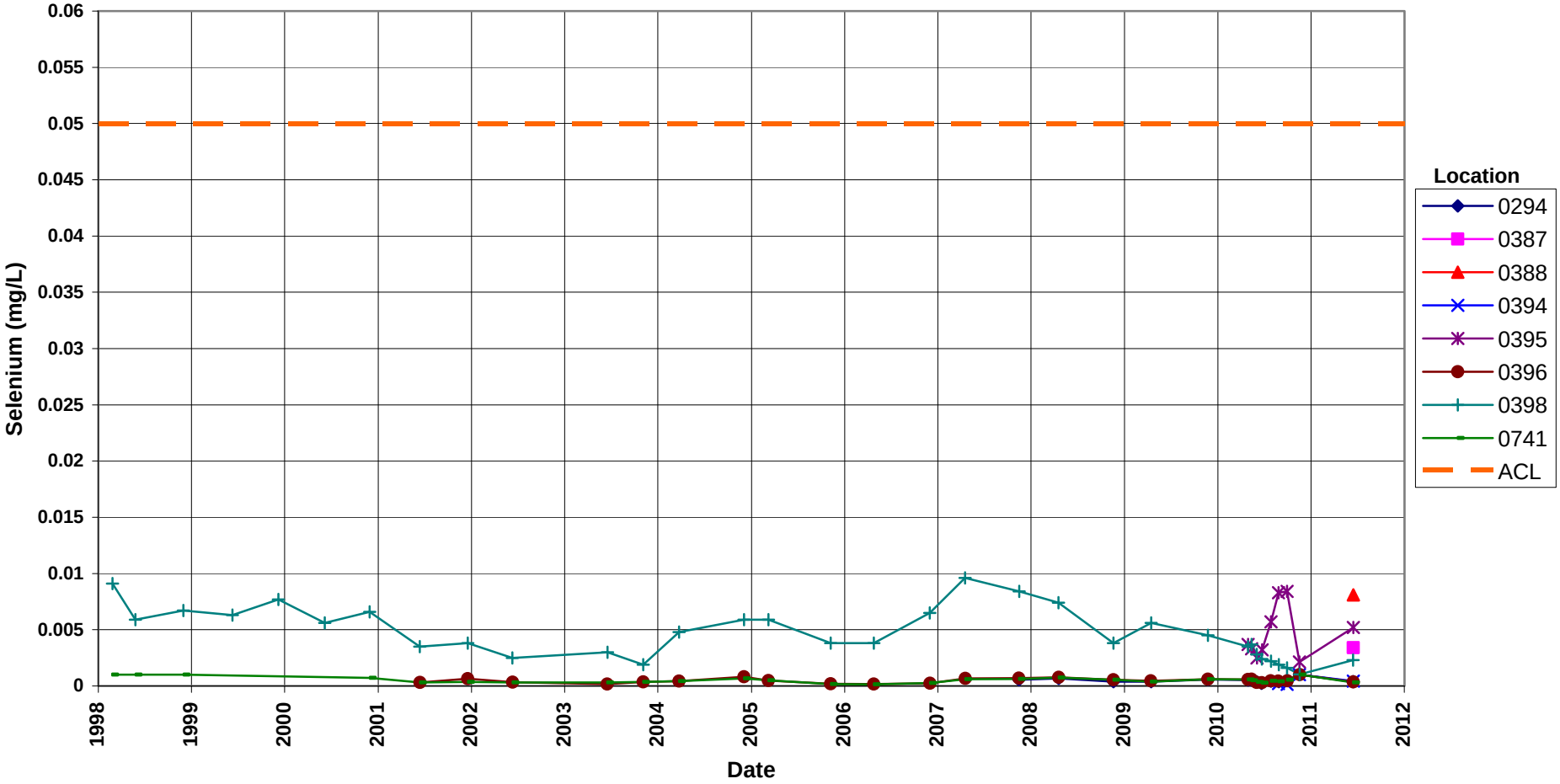
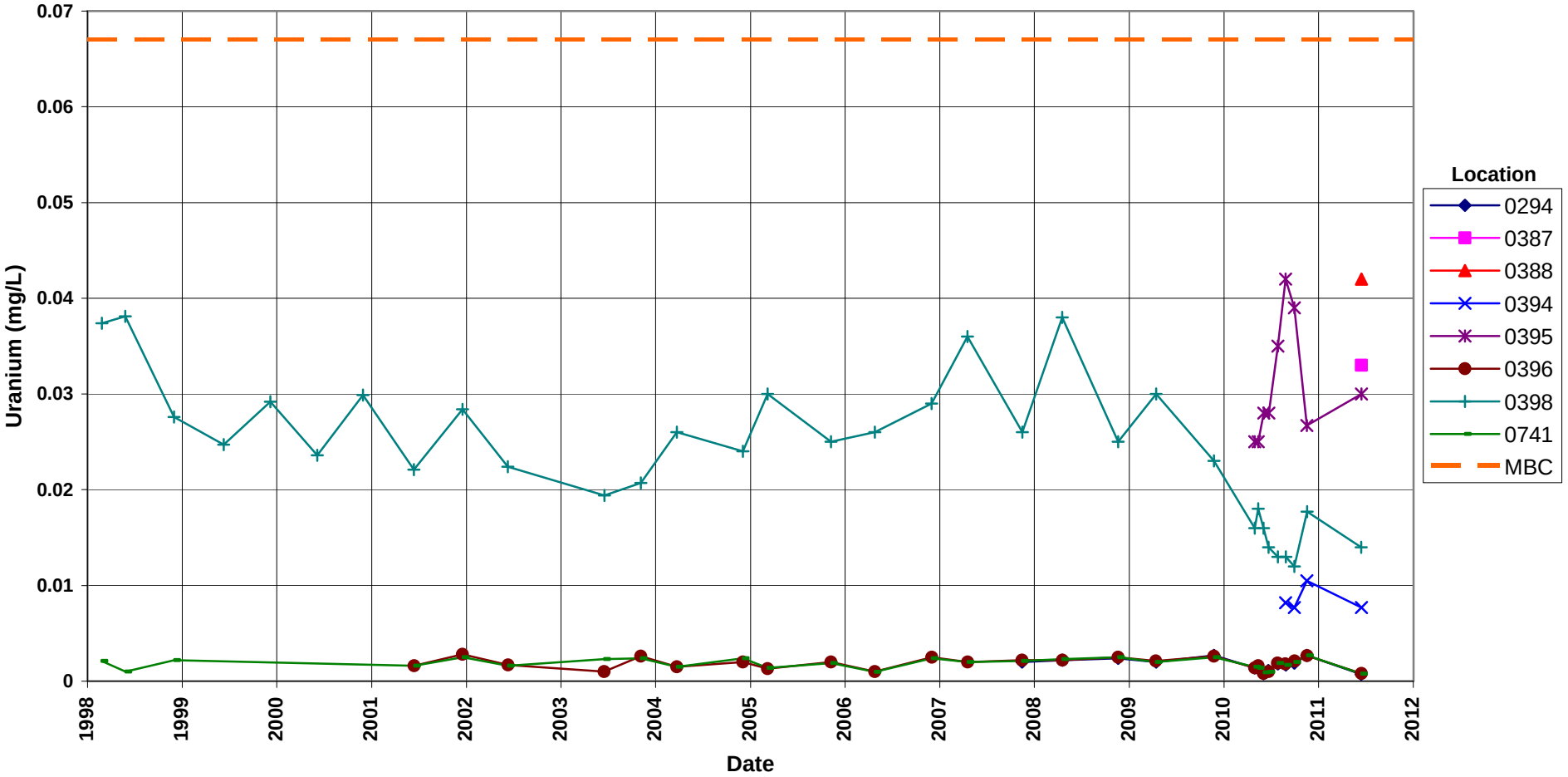
## Rifle Old Processing Site
## Selenium Concentration

Alternate Concentration Limit (ACL) = 0.05 mg/L

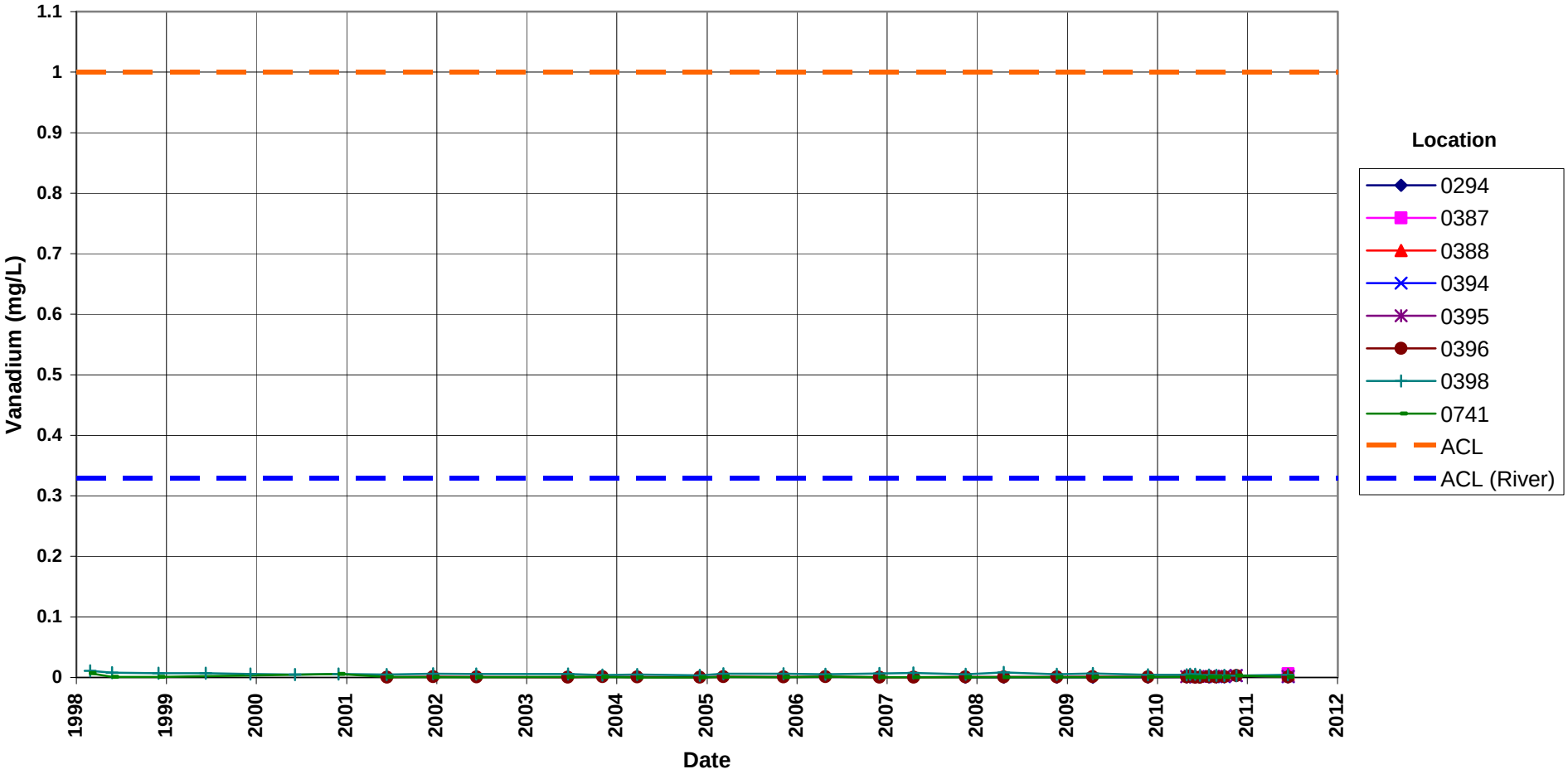


**Rifle Old Processing Site**
**Uranium Concentration**
Maximum Background Concentration (MBC) = 0.067 mg/L



## Rifle Old Processing Site
## Vanadium Concentration

Alternate Concentration Limit (ACL) = 1.0 mg/L
(0.33 mg/L for River Locations)



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# Attachment 3
# Sampling and Analysis Work Order

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Task Order LM00-501
Control Number 11-0614

May 24, 2011

U.S. Department of Energy
Office of Legacy Management
ATTN: Richard Bush
Site Manager
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
June 2011 Environmental Sampling at Rifle, Colorado

REFERENCE: Task Order LM00-501-02-116-402, Rifle (New and Old), CO, Processing Sites

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Rifle, CO. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Rifle New and Old Processing Sites. Water quality data will be collected from this site as part of the environmental sampling currently scheduled to begin the week of June 13, 2011.

The following lists show the monitoring wells and surface water locations scheduled to be sampled during this event.

**Monitoring Wells***

*New Rifle*

| | | | | | | |
|---|---|---|---|---|---|---|
| 169 | 195 Al | 216 Al | 620 Al | 658 Al | 664 AL | 670 Al |
| 170 Al | 201 Al | 217 Al | 635 Al | 659 Al | 669 Al | 855 Al |
| 172 Al | 215 Al | 590 Al | | | | |

*Old Rifle*

| | | | | | | |
|---|---|---|---|---|---|---|
| 292A Al | 305 Al | 309 Al | 310 Al | 655 Al | 656 Al | 658 Al |
| 304 Al | B-04 | LQ-107 | LQ-108 | LQ-109 | | |

*NOTE: Al = alluvium

**Surface Locations**

*New Rifle*

| | | | | | | |
|---|---|---|---|---|---|---|
| 320 | 322 | 323 | 324 | 452 | 453 | 575 |

*Old Rifle*

| | | | | | | |
|---|---|---|---|---|---|---|
| 294 | 387 | 388 | 395 | 396 | 398 | 741 |

The S.M. Stoller Corporation 2597 Legacy Way Grand Junction, CO 81503 (970) 248-6000 Fax (970) 248-6040

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Access agreements are being reviewed and are expected to be complete by the beginning of fieldwork.

Please contact me at (970) 248-6375 if you have any questions.

Sincerely,

Richard Dayvault
Site Lead

RD/lcg/lb

Enclosures (3)

cc: (electronic)
Richard Dayvault, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
EDD Delivery
rc-grand.junction
File: RFN 410.02(A)
RFO 410.02(A)

# Sampling Frequencies for Locations at Rifle, Colorado

| Location ID | Quarterly | Semiannually | Annually | Biennially | Not Sampled | Notes |
|---|---|---|---|---|---|---|
| ***Monitoring Wells*** | | | | | | |
| ***New Rifle*** | | | | | | |
| 169 | | X | | | | |
| 170 | | X | | | | |
| 172 | | X | | | | |
| 195 | | X | | | | |
| 201 | | X | | | | Data logger |
| 215 | | X | | | | |
| 216 | | X | | | | |
| 217 | | X | | | | |
| 590 | | X | | | | Data logger |
| 620 | | X | | | | |
| 635 | | X | | | | |
| 658 | | X | | | | |
| 659 | | X | | | | |
| 664 | | X | | | | |
| 669 | | X | | | | |
| 670 | | X | | | | |
| 855 | | X | | | | |
| ***Old Rifle*** | | | | | | |
| 292A | | X | | | | GCAP |
| 304 | | X | | | | GCAP |
| 305 | | X | | | | GCAP |
| 309 | | X | | | | GCAP |
| 310 | | X | | | | GCAP; data logger |
| 655 | | X | | | | GCAP; data logger |
| 656 | | X | | | | GCAP |
| 658 | | X | | | | Background well |
| ***ERSP*** | | | | | | |
| B-04 | | X | | | | |
| LQ-107 | | X | | | | |
| LQ-108 | | X | | | | |
| LQ-109 | | X | | | | |
| ***Surface Locations*** | | | | | | |
| ***New Rifle*** | | | | | | |
| 320 | | X | | | | Wetland Pond |
| 322 | | X | | | | Colorado River |
| 323 | | X | | | | Gravel pit pond |
| 324 | | X | | | | Colorado River downgradient |
| 452 | | X | | | | Wetland Pond |
| 453 | | X | | | | Wetland Pond |
| 575 | | X | | | | Gravel pit pond |
| ***Old Rifle*** | | | | | | |
| 294 | | X | | | | |
| 387 | | X | | | | New |
| 388 | | X | | | | New |
| 395 | | X | | | | |
| 396 | | X | | | | GCAP |
| 398 | | X | | | | GCAP |
| 741 | | X | | | | |

Semi-annual sampling conducted in June and November; annual sampling conducted for Rifle Disposal Cell in July

# Constituent Sampling Breakdown

| Site | Rifle | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Analyte** | **Groundwater** | | **Surface Water** | | | **Required Detection Limit (mg/L)** | **Analytical Method** | **Line Item Code** |
| **Approx. No. Samples/yr** | 35 | | 15 | | | | | |
| *Field Measurements* | | | | | | | | |
| Alkalinity | | | | | | | | |
| Dissolved Oxygen | | | | | | | | |
| Redox Potential | X | | X | | | | | |
| pH | X | | X | | | | | |
| Specific Conductance | X | | X | | | | | |
| Turbidity | X | | | | | | | |
| Temperature | X | | X | | | | | |
| *Laboratory Measurements* | **RFO* | **RFN* | *RFO* | *RFN* | *RFL* | | | |
| Aluminum | | | | | | | | |
| Ammonia as N (NH3-N) | | X | | X | | 0.1 | EPA 350.1 | WCH-A-005 |
| Arsenic | | X | | X | | 0.0001 | SW-846 6020 | LMM-02 |
| Molybdenum | | X | | X | | 0.003 | SW-846 6020 | LMM-02 |
| Nitrate + Nitrite as N ($NO_3$+$NO_2$)-N | | X | | X | | 0.05 | EPA 353.1 | WCH-A-022 |
| Delta Oxygen 18/Deuterium | 0387, 0388, 0395, 0394, LQ-109, LQ-107, 0310, 0304 ONLY | | | | | N/A | Mass Spec. | LMW-08 |
| Selenium | X | X | X | X | | 0.0001 | SW-846 6020 | LMM-02 |
| Delta Sulfur 34 | 0387, 0388, 0395, 0394, LQ-109, LQ-107, 0310, 0304 ONLY | | | | | N/A | Mass Spec. | LMW-08 |
| U234/238 | 0387, 0388, 0395, 0394, LQ-109, LQ-107, 0310, 0304 ONLY | | | | | 0.1 | Alpa Spec | LMR-02 |
| Uranium | X | X | X | X | X | 0.0001 | SW-846 6020 | LMM-02 |
| Vanadium | X | 0215, 0216, 0217, 0590, 0658, 0659, 0664, 0669, 0670, and 0855 only | X | X | X | 0.0003 | SW-846 6020 | LMM-02 |
| **Total No. of Analytes** | 6 | 7 | 3 | 7 | 2 | | | |

*RFN = New Rifle; *RFO = Old Rifle

Note: All private well samples are to be unfiltered. The total number of analytes does not include field parameters.

# Attachment 4
# Trip Reports

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Stoller

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Memorandum

DATE: July 6, 2010

TO: Richard Dayvault

FROM: Daniel Sellers

SUBJECT: Sampling Trip Report

**Site:** New Rifle and Old Rifle, Colorado, Processing Sites, including some Integrated Field Research Challenge Program (IFRCP) locations.

**Dates of Sampling Event**: June, 13–15, 2010.

**Team Members:** Joe Treviño and Dan Sellers

**Number of Locations Sampled:** A total of 34 locations were sampled.

| Site ID | Site | Number of Monitoring Wells | Number of Surface Water Locations | Analytes | Field Measurements |
|---|---|---|---|---|---|
| RFN01 | New Rifle | 4 | 3 | As, Mo, Se, U<br>Nitrate plus Nitrite as N,<br>Ammonia as N | ORP, pH, Conductivity, Turbidity, Temperature, Alkalinity |
| RFN01 | New Rifle | 7 | ------- | As, Mo, Se, U<br>Nitrate plus Nitrite as N,<br>Ammonia as N, **including V** | ORP, pH, Conductivity, Turbidity, Temperature, Alkalinity |
| RFO01 | Old Rifle | 6 | 4 | Se, U, V | ORP, pH, Conductivity, Turbidity, Temperature, and Alkalinity |
| RFO01 | Old Rifle | 2 | 4 | Se, U, V, **and *Oxygen- 18/ Deuterium, Sulfur-34,** and U-234,-238 | ORP, pH, Conductivity, Turbidity, Temperature, and Alkalinity |
| RFO01 | IFRCP | 2 | -------- | Se, U, V | ORP, pH, Conductivity, Turbidity, Temperature, and Alkalinity |
| RFO01 | IFRCP | 2 | -------- | Se, U, V **and *Oxygen-18/ Deuterium, Sulfur-34,** and U-234,-238 | ORP, pH, Conductivity, Turbidity, Temperature, and Alkalinity |

* **Oxygen-18/ Deuterium and Sulfur-34 were filtered.** U-234, U-238 were not filtered, which had been noted on field data collection field sheets relevant to identified locations requiring these specific analytes.

**Locations Not Sampled/Reason:** A total 10 New Rifle (RFN01) locations were not sampled.

| Well Locations IDs | Reason |
|---|---|
| 0169 | Inaccessible due to river flooding. |
| 0195 | Inaccessible due to irrigation flooding |
| 0216 | Inaccessible due to river flooding. |
| 0217 | Inaccessible due to river flooding. |
| 0590 | Inaccessible due to river flooding. |
| 0635 | Inaccessible due to river flooding. |
| **Surface Locations IDs** | **Reason** |
| 0320 | Flooded by river |
| 0322 | Flooded by river |
| 0452 | Flooded by river |
| 0453 | Flooded by river |

**Location Specific Information/Field Variance:** The following New Rifle wells are locations where Jim Duke of Caca Loco co-collected groundwater samples: RFN01-0664, -0669, -0855, and -0215. These samples were coordinated with Jeff Simonson of SGM and approved by Richard P. Bush (Site Manager, DOE Office of Legacy Management) and Richard Dayvault (Geosciences, S.M. Stoller Corporation – Contractor for the U.S. Department of Energy).

The following listed locations are noted with specific information.

| Site ID | Location IDs | Comments |
|---|---|---|
| RFN01 | 0172 | Strong petroleum odor. |
| RFN01 | 0669, 0670 | Cat II based on WL drop at slow purge rate. |
| RFN01 | 0855 | Alkalinity turns orange |
| RFN01 | 0324 | Filtered River samples |
| RFO01 | 0294, 0396 and 0741 | Filtered River samples |
| RFO01 | 0395 | Filtered Seep/Surface water |
| RFO01 | 0310 | Removed data logger to sample. Replaced logger immediately after sampling. |
| | All surface water locations | Although not requested, turbidity was measured to determine whether filtration was required. |

**Quality Control Sample Cross Reference:** The following are the false identifications assigned to the quality control samples:

| False ID | True ID | Ticket Number | Sample Type | Associated Matrix |
|---|---|---|---|---|
| 2927 | RFO01-0310 | JHS 797 | Duplicate | Groundwater |
| 2948 | RFN01-0201 | JHS 784 | Duplicate | Groundwater |
| 2949 | RFN01-0323 | JHS 785 | Equipment Blank | Surface water |

**RIN Number Assigned:** 11063854 was assigned to all collected samples excluding the Oxygen-18/ Deuterium and Sulfur-34 samples. RIN# 11063855 was assigned to the Oxygen-18/Deuterium and Sulfur-34 samples.

**Sample Shipment:** Samples with RIN# 11063854 were shipped from Grand Junction to ALS Laboratory Group, 225 Commerce Dr., Ft. Collins, CO 80524, on 06/16/2011.

Samples with RIN# 11063855 were shipped from Grand Junction to Reston Stable Isotope Laboratory, 431 National Center, 12201 Sunrise Valley Dr., Reston, VA 20192, on 06/16/2011.

**Well Inspection Summary:** Well inspections were conducted at all sampled wells, which were all in good condition.

**Equipment:** All wells were sampled using the low-flow procedure. All wells were sampled using a peristaltic pump and dedicated down hole tubing except well RFN01-0170, which had a dedicated bladder pump. Surface water locations were sampled using a peristaltic pump and tubing reel or by container immersion. An equipment blank was collected after decontamination of the tubing reel. All other equipment was dedicated or disposable. All equipment functioned properly.

**Water Level Measurements:** Water levels were collected at all sampled wells.

**Institutional Controls:** All gates were appropriately closed and locked during the sampling event.

**Fences, Gates, Locks:** All were in good condition.
**Signs**: No missing or vandalized signs were observed.
**Trespassing/Site Disturbances:** None observed.

**Site Issues:**

**Disposal Cell/Drainage Structure Integrity:** N/A.
**Vegetation/Noxious Weed Concerns:** None observed.
**Maintenance Requirements:** None observed.
**Safety Issues:** River flooding has occurred over a large area at the New Rifle site.
**Access:** Vehicle access to RFN01 locations 0620 and 0324 is blocked by a locked gate owned by Williams Production. The combination to the lock was provided by Bryan Hotard of Williams (970-361-2006 & 970-263-2754). The combination is 2-0-0-6.

**Corrective Action Required/Taken:** Locations not sampled due to both river and irrigation flooding needs to be sampled.

(SC/lb)

cc: (electronic)
Richard Bush, DOE
Steve Donivan, Stoller
Keith Miller, Stoller
EDD Delivery
File: RFL410.02(A)

Stoller established 1959

*Memorandum*

DATE: September 7, 2011

TO: Richard Dayvault

FROM: Gretchen Baer

SUBJECT: Trip Report

**Site:** New Rifle, Colorado, Processing Site

**Dates of Sampling Event:** August 9 and 11, 2011

**Team Members:** Kent Moe, Gretchen Baer, and David Atkinson. Two wells were sampled with Jarrod Kent and Tim Dobransky of Olsson. A copy of the JSA signed by Olsson personnel is available in Condor\sms\11073976.

**Number of Locations Sampled:** Samples were collected from 8 locations as described in the following table.

| Location ID | Location Type | Comment |
|---|---|---|
| 0169 | Groundwater | Collected in August because location was inaccessible due to river flooding during the June sampling event. |
| 0195 | Groundwater | |
| 0216 | Groundwater | |
| 0217 | Groundwater | |
| 0322 | Surface Water | |
| 0635 | Groundwater | |
| 0172 | Groundwater | Co-sampled with Olsson samplers. Collected metals only. Olsson collected multiple analytes. |
| 0620 | Groundwater | |
| 0590 | Groundwater | Could not sample: Inaccessible due to flooding. Photo attached below. |
| 0320 | Surface Water | Did not sample. These surface water locations were distinct in the past, but they are now flooded by one large pond. |
| 0452 | Surface Water | |
| 0453 | Surface Water | |

**Locations Not Sampled/Reason:** 0320, 0452, 0453, and 0590 were not sampled. See previous table.

**Location Specific Information:**

- Well 0635: Well was covered over with mud from recent river flooding. Well was moderately dirty on the inside but otherwise in good condition. Re-developed well prior to sampling, pumped approximately 2 gallons out of well during development, turbidity quickly dropped to below 10 NTUs. The casing was extended to be above ground level.

- Surface water location 0322: Although not requested, turbidity was measured to determine whether filtration was required.

**Quality Control Sample Cross Reference:** The following is the false identification assigned to the quality control sample.

| False ID | True ID | Ticket Number | Sample Type | Associated Matrix |
|---|---|---|---|---|
| 2187 | 0322 | JIX 343 | Duplicate | Groundwater |

**Report Identification Number (RIN) Assigned:** 11073976. Field data sheets can be found in Condor\sms\11073976 in the FieldData folder.

**Sample Shipment:** Samples were shipped from Grand Junction to ALS Laboratory Group on August 10 and 12, 2011.

**Water Level Measurements:** Water levels were measured in all sampled wells.

**Well Inspection Summary:** The flush-mount style for well 0635 (close to the river) caused the well to be covered by flood water through early summer. On August 11, the casing was extended to be above ground level. All other wells were in good condition. The recent flood waters caused no apparent detrimental effects at wells 0169, 0195, 0216, and 0217.

**Field Variance:** None. Samples were collected according to the *Sampling and Analysis Plan for U. S. Department of Energy Office of Legacy Management Sites*.

**Equipment:** All equipment functioned properly. Wells were sampled with a peristaltic pump and dedicated tubing. Surface waters were sampled by container immersion. All sampling equipment was dedicated or disposable.

**Regulatory:** Nothing to note.

**Institutional Controls:**

**Fences, Gates, and Locks:** Nothing to note.
**Signs**: Nothing to note.
**Trespassing/Site Disturbances:** None observed.

**Site Issues:**

**Disposal Cell/Drainage Structure Integrity:** N/A
**Vegetation/Noxious Weed Concerns:** None observed.
**Maintenance Requirements:** None observed.
**Safety Issues:** The water surrounding well 0590 appears to be too deep to safely wade into. It is too deep to see the bottom. It appears to be >3 feet deep and the ground is probably very soft.

**Access Issues:**

- The areas surrounding wells 0169, 0195, 0216, 0217, and 0635 were flooded in June 2011. The water in these areas had receded by August 2011 and these wells could be reached by vehicle or by foot.
- The area surrounding well 0590 is still flooded and cannot be reached on foot:

***Well 0590 on August 9, 2011***

**Corrective Action Required/Taken:** The casing for well 0635 was extended above ground level. Two items remain to be completed at well 0635:

1. Measure the extension and notify Keith Miller so that the database can be updated.
2. Install protective casing.

(GB/lg)

cc: (electronic)
Rich Bush, DOE
Steve Donivan, Stoller
EDD Delivery