

Data Validation Package for the Old and New Rifle, Colorado, Processing Sites, November 2015

The U.S. Department of Energy (DOE) has prepared a Data Validation Package containing the groundwater and surface water monitoring data generated from the November 2015 sampling event at the Old and New Rifle, Colorado, Processing Sites. This package includes worksheets and reports that document the sampling activities and validation procedures conducted. **At your request, you are receiving a hard copy of the report.**

The report is also available for your review on the Internet at the DOE Office of Legacy Management (LM) website – <http://energy.gov/lm>. From the LM website home page, select the LM SITES MAP. Then select Rifle Sites from the LM SITES list in the right column. The report will be available on both the Rifle New Processing Site and Rifle Old Processing Site pages under Site Documents and Links.



U.S. DEPARTMENT OF
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Data Validation Package

WM-0006Z

November 2015
Groundwater and Surface Water
Sampling at the
Old and New Rifle, Colorado,
Processing Sites

February 2016



U.S. DEPARTMENT OF
ENERGY

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Contents

Sampling Event Summary	1
New Rifle, Colorado, Processing Site, Planned Sampling Map	3
Old Rifle, Colorado, Processing Site, Planned Sampling Map	4
Data Assessment Summary	5
Water Sampling Field Activities Verification Checklist	7
Laboratory Performance Assessment	9
Sampling Quality Control Assessment	29
Certification	33

Attachment 1—Assessment of Anomalous Data

Potential Outliers Report

Attachment 2—Data Presentation

New Rifle Groundwater Quality Data
New Rifle Surface Water Quality Data
Old Rifle Groundwater Quality Data
Old Rifle Surface Water Quality Data
Equipment Blank Data
Static Water Level Data
New Rifle Hydrographs
Old Rifle Hydrograph
New Rifle Groundwater Time-Concentration Graphs
Old Rifle Groundwater Time-Concentration Graphs
New Rifle Pond Locations Time-Concentration Graphs
New and Old Rifle River Locations Time-Concentration Graphs

Attachment 3—Sampling and Analysis Work Order

Attachment 4—Trip Report

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Sampling Event Summary

Site: Old and New Rifle, Colorado, Processing Sites

Sampling Period: November 3, 5, and 6, 2015

Water samples were collected from 36 locations at New Rifle and Old Rifle, Colorado, Processing Sites. Duplicate samples were collected from New Rifle locations 0659 and 0855, and Old Rifle location 0304. One equipment blank was collected after decontamination of non-dedicated equipment used to collect one surface water sample. Sampling and analyses were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated).

New Rifle Site

Samples were collected at the New Rifle site from 16 monitoring wells and 7 surface locations in compliance with the December 2008 *Groundwater Compliance Action Plan [GCAP] for the New Rifle, Colorado, Processing Site* (LMS/RFN/S01920), with one exception: New Rifle location 0635 could not be sampled because it was inaccessible; a fence installed by the Colorado Department of Transportation prevents access to this location. DOE is currently negotiating access with the Colorado Department of Transportation.

Analytes measured at the New Rifle site included contaminants of concern (COCs) (arsenic, molybdenum, nitrate + nitrite as nitrogen, selenium, uranium, and vanadium) ammonia as nitrogen, major cations, and major anions. Field measurements of total alkalinity, oxidation-reduction potential, pH, specific conductance, turbidity, and temperature were made at each location, and the water level was measured at each sampled well. A proposed alternate concentration limit (ACL) for vanadium of 50 milligrams per liter (mg/L), specific to the compliance (POC) wells (RFN-0217, -0659, -0664, and -0669) is included in the New Rifle GCAP. Vanadium concentrations in the POC wells were below the proposed ACL as shown in the time-concentration graphs in the Data Presentation section (Attachment 2). Time-concentration graphs from all other locations sampled are also included in Attachment 2.

Sampling location RFN-0195 was misidentified for the June/August 2014 and November 2014 sampling events. (Well RFN-0609 was inadvertently sampled instead of RFN-0195 in 2014.) The results for RFN-0195 have been corrected, and are included in associated time-concentration graphs for this location. Recent results for RFN-0195 are consistent with established trends with the possible exception of vanadium. The most recent result for vanadium showed an increase over recent values. Vanadium concentrations at RFN-0195 and other locations will continue to be evaluated in the future to determine the potential for deviations from established trends.

The surface water locations were sampled to monitor the impact of groundwater discharge. COC concentrations at Colorado River surface water locations RFN-0324 and RFN-0326, downgradient of the site, remained low and were consistent with historical results, as shown in the time-concentration graphs. COC concentrations did not indicate there are any impacts related to groundwater discharge to the river. In many cases, elevated COC concentrations at the

New Rifle site pond locations were observed, as shown in the time-versus concentration graphs. As noted in the GCAP, this indicates impacts from groundwater discharge to the ponds.

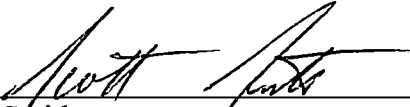
Old Rifle Site

Samples were collected at the Old Rifle site from eight monitoring wells and five surface locations in compliance with the December 2001 *Groundwater Compliance Action Plan for the Old Rifle, Colorado, UMTRA Project Site* (GJO-2000-177-TAR).

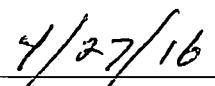
Analytes measured at the Old Rifle site included COCs (selenium, uranium, and vanadium), major cations, and major anions. Field measurements of total alkalinity, oxidation-reduction potential, pH, specific conductance, turbidity, temperature, were made at each location, and the water level was measured at each sampled well.

The monitoring strategy described in the GCAP is designed to determine progress of the natural flushing process in meeting compliance standards for site COCs. Standards for selenium and vanadium are the proposed ACLs of 0.05 mg/L and 1.0 mg/L, respectively. For uranium the cleanup goal is the UMTRA standard of 0.044 mg/L or background, whichever is higher. As shown in the time concentration graphs, the uranium concentration exceeds the cleanup goal at groundwater monitoring locations RFO-0304, -0305, -0310, -0655, and -0656.

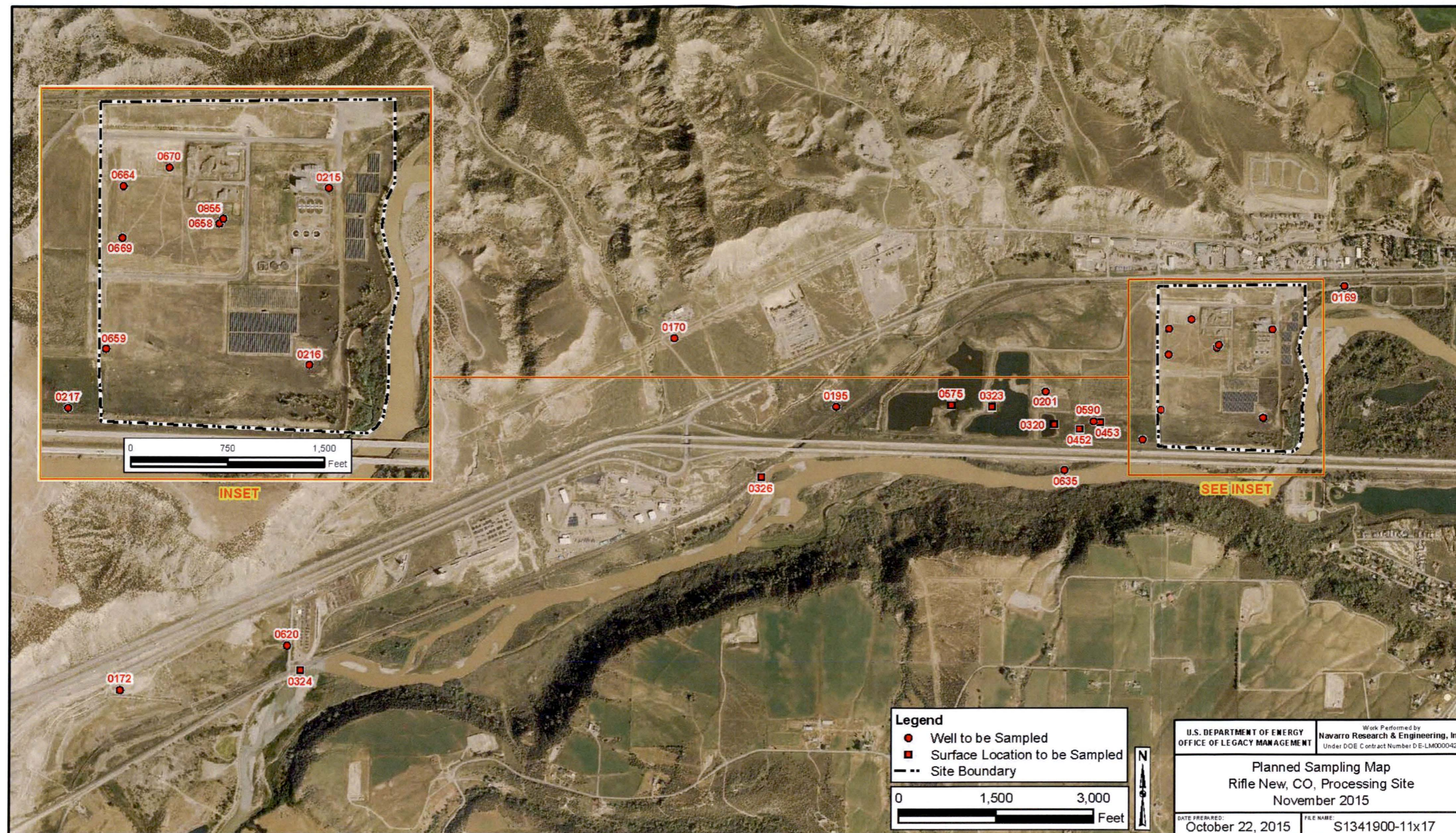
The surface water locations were sampled to monitor the impact of groundwater discharge at Colorado River surface water locations adjacent to (RFO-0396) and downgradient of the site (RFO-0741). COC concentrations remain low and consistent with historical concentrations as shown in the time-concentration graphs (Attachment 2), which indicate no impacts from groundwater discharge to the river.



Scott Smith
Navarro Research and Engineering, Inc.



Date



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New Rifle, Colorado, Processing Site, Planned Sampling Map



Old Rifle, Colorado, Processing Site, Planned Sampling Map

Data Assessment Summary

Water Sampling Field Activities Verification Checklist

Project	<u>Rifle, Colorado</u>	Date(s) of Water Sampling	<u>November 3, 5, and 6, 2015</u>
Date(s) of Verification	<u>January 30, 2016</u>	Name of Verifier	<u>Gretchen Baer</u>

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		<u>Work Order letter dated October 23, 2015.</u>
2. Were the sampling locations specified in the planning documents sampled?	No	<u>Monitoring well RFN 0635 was not sampled due to access issues.</u>
3. Were field equipment calibrations conducted as specified in the above-named documents?	Yes	<u>Calibrations were performed October 29, 2015.</u>
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. Were wells categorized correctly?	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 meet criteria prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

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 0659 and 0855, and Old Rifle location 0304.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	Yes	One equipment blank was collected for the one location that was sampled using non-dedicated equipment.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	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. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	No	The presence of ice was inadvertently not documented at a location.
19. Were water levels measured at the locations specified in the planning documents?	Yes	Water levels were measured at each sampled monitoring well.

Laboratory Performance Assessment

General Information

Report Number (RIN): 15107463
Sample Event: November 3, 5, and 6, 2015
Site(s): New Rifle Processing Site, Colorado
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1511165
Analysis: Metals and Wet Chemistry
Validator: Gretchen Baer
Review Date: January 30, 2016

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), "Standard Practice for Validation of Environmental 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 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as N	WCH-A-005	EPA 350.1	EPA 350.1
Arsenic, Molybdenum, Selenium, Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020
Calcium, Magnesium, Potassium, Sodium	LMM-01	SW-846 3005A	SW-846 6010
Chloride, Sulfate	MIS-A-045	SW-846 9056	SW-846 9056
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1511165-1	0169	Arsenic	U	Less than 5 times the method blank
1511165-1	0169	Molybdenum	J	Reporting limit verification > 130%
1511165-1	0169	Selenium	J	Reporting limit verification > 130%
1511165-1	0169	Vanadium	U	Less than 5 times the method blank
1511165-2	0170	Arsenic	U	Less than 5 times the method blank
1511165-2	0170	Molybdenum	J	Reporting limit verification > 130%
1511165-2	0170	Vanadium	U	Less than 5 times the method blank

Table 2 (continued). Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1511165-3	0172	Vanadium	U	Less than 5 times the method blank
1511165-4	0195	Arsenic	J	Reporting limit verification > 130%
1511165-4	0195	Selenium	U	Less than 5 times the calibration blank
1511165-4	0195	Vanadium	U	Less than 5 times the method blank
1511165-5	0201	Arsenic	U	Less than 5 times the method blank
1511165-5	0201	Vanadium	U	Less than 5 times the method blank
1511165-5	0201	Chloride	J	Exceeded holding time
1511165-5	0201	Sulfate	J	Exceeded holding time
1511165-6	0215	Arsenic	U	Less than 5 times the method blank
1511165-6	0215	Selenium	U	Less than 5 times the calibration blank
1511165-6	0215	Vanadium	U	Less than 5 times the method blank
1511165-7	0216	Selenium	U	Less than 5 times the calibration blank
1511165-8	0217	Arsenic	U	Less than 5 times the method blank
1511165-8	0217	Selenium	J	Reporting limit verification > 130%
1511165-9	0320	Arsenic	J	Reporting limit verification > 130%
1511165-9	0320	Selenium	J	Reporting limit verification > 130%
1511165-10	0323	Arsenic	J	Reporting limit verification > 130%
1511165-10	0323	Vanadium	U	Less than 5 times the method blank
1511165-10	0323	Chloride	J	Exceeded holding time
1511165-10	0323	Sulfate	J	Exceeded holding time
1511165-11	0324	Arsenic	U	Less than 5 times the method blank
1511165-11	0324	Selenium	J	Reporting limit verification > 130%
1511165-11	0324	Vanadium	U	Less than 5 times the method blank
1511165-12	0326	Arsenic	U	Less than 5 times the method blank
1511165-12	0326	Molybdenum	J	Reporting limit verification > 130%
1511165-12	0326	Vanadium	U	Less than 5 times the method blank
1511165-12	0326	Chloride	J	Exceeded holding time
1511165-12	0326	Sulfate	J	Exceeded holding time
1511165-13	0452	Selenium	J	Reporting limit verification > 130%
1511165-13	0452	Chloride	J	Exceeded holding time
1511165-13	0452	Sulfate	J	Exceeded holding time
1511165-14	0453	Selenium	J	Reporting limit verification > 130%
1511165-14	0453	Chloride	J	Exceeded holding time
1511165-14	0453	Sulfate	J	Exceeded holding time
1511165-15	0575	Arsenic	J	Reporting limit verification > 130%
1511165-15	0575	Selenium	J	Reporting limit verification > 130%
1511165-15	0575	Vanadium	U	Less than 5 times the method blank
1511165-16	0590	Arsenic	U	Less than 5 times the method blank
1511165-17	0620	Arsenic	U	Less than 5 times the method blank
1511165-17	0620	Vanadium	U	Less than 5 times the method blank
1511165-25	Equip Blank	Calcium	U	Less than 5 times the calibration blank
1511165-25	Equip Blank	Vanadium	U	Less than 5 times the method blank

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 26 water samples on November 10, 2015, accompanied by 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 receiving documentation included copies of the air bills. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 2.6 °C, which complies with requirements. All samples were analyzed within the applicable holding times, with the exception of five locations for chloride and sulfate analyses. These samples were initially analyzed within holding time but were reanalyzed out of holding time in response to a request for information, which was issued to correct a laboratory error. Chloride and sulfate results for these samples are qualified with a "J" flag as estimated values. All samples were received in the correct container types and had been preserved correctly for the requested analyses.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL. The reported MDLs for all analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory 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. 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 correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Method EPA 350.1 Ammonia as N

Calibrations for ammonia as N were performed using six calibration standards on November 16 and 17, 2015. 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. All calibration check results were within the acceptance criteria.

Method EPA 353.2 Nitrite + Nitrate as N

Calibrations for nitrate + nitrite as N were performed using seven calibration standards on November 13, 2015. 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. All calibration check results were within the acceptance criteria.

Method SW-846 6010 Ca, Mg, K, Na

Calibrations were performed on November 12, 2015, using three calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than or only slightly above 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results 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.

Method SW-846 6020 As, Mo, Se, U, V

Calibrations were performed on November 12, 2015, using three calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than or only slightly above 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. 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 exception of arsenic, molybdenum, selenium, and vanadium. This indicates a higher degree of uncertainty in these measurements at low concentrations and the associated sample detects that are less than 5 times the PQL are qualified with a "J" flag as estimated values. 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 SW-846 9056 Chloride, Sulfate

Calibrations for chloride and sulfate were performed using six calibration standards on November 13, 2015, and January 4, 2016. 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. All calibration check results were within the acceptance criteria.

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. Method blank and calibration blank results associated with the samples were below the PQLs with the exception of sulfate. Some blank results for sulfate were slightly above the PQL. The samples associated with these blanks had sulfate concentrations greater than 10 times the blank, so no qualification is necessary. 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.

Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples were analyzed at the required frequency to verify the instrumental interference 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. For results that are less than 5 times the PQL, the range should be no greater than the PQL. All replicate results met these criteria, demonstrating acceptable 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. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable.

Completeness

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

Electronic Data Deliverable (EDD) File

The original EDD file arrived on December 1, 2015. A revised EDD file arrived on January 22, 2016, in response to a request for information. The revision included corrections to some chloride and sulfate results. The data were loaded into the environmental database on January 26, 2016. The Sample Management System EDD validation module was used to verify that the EDD files were 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.

Anion/Cation Balance

Environmental water should be electrically neutral. Expressed in milliequivalents per liter (meq/L), the sum of the anions should equal the sum of the cations. The anion/cation balance is calculated as the difference between the anions and cations, divided by the sum of the anions and cations. The anion/cation balance can be used to identify potential errors in the analytical results. Typically, a charge balance of less than 10 percent is considered acceptable. When a charge balance is greater than 10 percent, the associated data are closely examined for error. If no errors are found, the results are considered to be acceptable. Table 3 shows the total anion and cation results from this event and the charge balance.

Table 3. Comparison of Major Anions and Cations

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0169	26.1	26.7	1.2
0170	34.1	36.4	3.2
0172	141.7	155.8	4.8
0195	13.6	13.3	1.0
0201	50.0	49.2	0.8
0215	10.5	10.7	0.7
0216	7.7	8.3	3.3
0217	45.0	43.8	1.3
0320	49.9	54.5	4.4
0323	81.5	81.9	0.3
0324	9.5	10.9	6.6
0326	10.0	9.9	0.8
0452	54.6	57.2	2.3
0453	51.2	52.4	1.2
0575	91.5	97.7	3.3
0590	61.2	61.8	0.5
0620	86.5	95.0	4.7
0658	38.9	40.0	1.4
0659	44.0	45.5	1.6
0664	24.4	24.6	0.3
0669	28.5	27.6	1.6
0670	24.7	25.0	0.7
0855	24.8	25.5	1.5

All charge balance values were below 10 percent.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 15107463 Lab Code: PAR Validator: Gretchen Baer Validation Date: 1/30/2016
Project: Rifle Disposal/Processing Site (old/new) Analysis Type: ☒ Metals ☒ General Chem ☐ Rad ☐ Organics
of Samples: 26 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
- ☒ Detection Limits
- ☒ Field/Trip Blanks
- ☒ Field Duplicates

There are 10 holding time failures.

The reported detection limits are equal to or below contract requirements.

There was 1 trip/equipment blank evaluated.

There were 2 duplicates evaluated.

SAMPLE MANAGEMENT SYSTEM

Page 1 of 1

RIN: 15107463 Lab Code: PAR

Non-Compliance Report: Holding Times

Project: Rifle Disposal/Processing Site (old/new)

Validation Date: 1/30/2016

Ticket	Location	Lab Sample ID	Method Code	Holding Times			Criteria			Reported Dates		
				Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection Date	Preparation Date	Analysis Date
NLW 982	0201	1511165-5	MIS-A-045			74			28	11/06/2015	01/19/2016	01/19/2016
NLW 982	0201	1511165-5	MIS-A-045			74			28	11/06/2015	01/19/2016	01/19/2016
NLW 994	0323	1511165-10	MIS-A-045			74			28	11/06/2015	01/19/2016	01/19/2016
NLW 994	0323	1511165-10	MIS-A-045			74			28	11/06/2015	01/19/2016	01/19/2016
NLW 996	0452	1511165-13	MIS-A-045			77			28	11/03/2015	01/19/2016	01/19/2016
NLW 996	0452	1511165-13	MIS-A-045			77			28	11/03/2015	01/19/2016	01/19/2016
NLW 997	0453	1511165-14	MIS-A-045			77			28	11/03/2015	01/19/2016	01/19/2016
NLW 997	0453	1511165-14	MIS-A-045			77			28	11/03/2015	01/19/2016	01/19/2016
NLX 000	0326	1511165-12	MIS-A-045			77			28	11/03/2015	01/19/2016	01/19/2016
NLX 000	0326	1511165-12	MIS-A-045			77			28	11/03/2015	01/19/2016	01/19/2016

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

Page 1 of 2

RIN: 15107463

Lab Code: PAR

Date Due: 12/8/2015

Matrix: Water

Site Code: RFL01

Date Completed: 12/2/2015

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	CCV	CCB								
Calcium	ICP/ES	11/12/2015	-9.0000	0.9996	OK	OK	OK	103.0	101.0	101.0	0.0	99.0	4.0	104.0
Calcium	ICP/ES	11/12/2015					OK	103.0	101.0	102.0	0.0		2.0	110.0
Magnesium	ICP/ES	11/12/2015	8.0000	0.9999	OK	OK	OK	101.0	102.0	102.0	0.0	102.0	2.0	102.0
Magnesium	ICP/ES	11/12/2015					OK	102.0	101.0	102.0	0.0		2.0	103.0
Potassium	ICP/ES	11/12/2015					OK	100.0	104.0	104.0	0.0		2.0	93.0
Potassium	ICP/ES	11/12/2015	78.0000	0.9999	OK	OK	OK	100.0	103.0	102.0	0.0		5.0	91.0
Sodium	ICP/ES	11/12/2015	21.0000	1.0000	OK	OK	OK	101.0	102.0	106.0	1.0		3.0	95.0
Sodium	ICP/ES	11/12/2015					OK	102.0	100.0	101.0	0.0		0.0	101.0
Arsenic	ICP/MS	11/12/2015					OK	100.0	86.0	101.0	6.0			111.0
Arsenic	ICP/MS	11/12/2015	0.0000	1.0000	OK	OK	OK	101.0	97.0	100.0	3.0	88.0	1.0	136.0
Molybdenum	ICP/MS	11/12/2015					OK	103.0	87.0	95.0	2.0	104.0	2.0	163.0
Molybdenum	ICP/MS	11/12/2015	-0.0180	1.0000	OK	OK	OK	102.0	98.0	97.0	1.0	96.0	2.0	104.0
Selenium	ICP/MS	11/12/2015					OK	100.0	102.0	100.0	2.0			228.0
Selenium	ICP/MS	11/12/2015	-0.0150	1.0000	OK	OK	OK	106.0			1.0	100.0	2.0	138.0
Uranium	ICP/MS	11/12/2015	0.0000	1.0000	OK	OK	OK	95.0	101.0	109.0	3.0	99.0	3.0	120.0
Uranium	ICP/MS	11/12/2015					OK	96.0	105.0	110.0	1.0		3.0	130.0
Vanadium	ICP/MS	11/12/2015	-0.1300	1.0000	OK	OK	OK	97.0	95.0	99.0	4.0			50.0

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 15107463Lab Code: PARDate Due: 12/8/2015Matrix: WaterSite Code: RFL01Date Completed: 12/2/2015

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	CCV	CCB								
Vanadium	ICP/MS	11/12/2015					OK	99.0				98.0		309.0
Vanadium	ICP/MS	11/13/2015	-0.1840	1.0000	OK	OK					2.0	92.0	4.0	111.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

Page 1 of 1

RIN: 15107463

Lab Code: PAR

Date Due: 12/8/2015

Matrix: Water

Site Code: RFL01

Date Completed: 12/2/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
Ammonia as N	11/16/2015	-0.117	0.9993	OK	OK	OK	106				
Ammonia as N	11/17/2015	-0.075	0.9999	OK	OK	OK	108	95	98	1	
Chloride	11/13/2015	0.003	1.0000								
Chloride	11/17/2015			OK	OK	OK	98				
Chloride	11/17/2015			OK	OK	OK	102	94	90	2	
Chloride	01/04/2016	0.000	1.0000								
Chloride	01/19/2016			OK	OK	OK	97.00				
NITRATE/NITRITE AS N	11/13/2015	-0.001	0.9995	OK	OK	OK	96	93	99	4	
NITRATE/NITRITE AS N	11/13/2015			OK	OK	OK	96				
Sulfate	11/13/2015	0.200	0.9999								
Sulfate	11/17/2015			OK	OK	OK	96	103	99	2	
Sulfate	11/17/2015			OK	OK	OK	101				
Sulfate	01/04/2016	0.000	1.0000								
Sulfate	01/19/2016			OK	OK	OK	94.00				

General Information

Report Number (RIN): 15107464
Sample Event: November 3 and 5, 2015
Site(s): Old Rifle Processing Site, Colorado
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1511166
Analysis: Metals and Wet Chemistry
Validator: Gretchen Baer
Review Date: January 18, 2016

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), "Standard Practice for Validation of Environmental 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 4.

Table 4. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Selenium, Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020
Calcium, Magnesium, Potassium, Sodium	LMM-01	SW-846 3005A	SW-846 6010
Chloride, Sulfate	MIS-A-045	SW-846 9056	SW-846 9056
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2

Data Qualifier Summary

Analytical results were qualified as listed in Table 5. Refer to the sections below for an explanation of the data qualifiers applied.

Table 5. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1511166-1	0292A	Selenium	J	Reporting limit verification > 130%
1511166-1	0292A	Vanadium	U	Less than 5 times the method blank
1511166-2	0294	Vanadium	U	Less than 5 times the method blank
1511166-3	0304	Selenium	J	Reporting limit verification > 130%
1511166-5	0309	Vanadium	U	Less than 5 times the method blank
1511166-8	0396	Selenium	U	Less than 5 times the calibration blank
1511166-8	0396	Vanadium	U	Less than 5 times the method blank
1511166-9	0398	Selenium	U	Less than 5 times the calibration blank
1511166-9	0398	Vanadium	U	Less than 5 times the method blank
1511166-11	0656	Selenium	J	Reporting limit verification > 130%

Table 5 (continued). Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1511166-12	0658	Selenium	J	Reporting limit verification > 130%
1511166-12	0658	Vanadium	U	Less than 5 times the method blank
1511166-13	0741	Selenium	J	Reporting limit verification > 130%
1511166-13	0741	Vanadium	U	Less than 5 times the method blank
1511166-14	0304 Dup	Selenium	J	Reporting limit verification > 130%
All	All	Chloride	J	Exceeded holding time
All	All	Sulfate	J	Exceeded holding time

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 14 water samples on November 10, 2015, 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 receiving documentation included copies of the air bills. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 1.2 °C, which complies with requirements. All samples were analyzed within the applicable holding times, with the exception of the chloride and sulfate samples. Due to laboratory error, all chloride and sulfate samples were analyzed outside the 28-day holding time. All chloride and sulfate samples are qualified with a "J" flag as estimated values. All samples were received in the correct container types and had been preserved correctly for the requested analyses.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL. The reported MDLs for all analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory 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. 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 correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Method EPA 353.2 Nitrate + Nitrite as N

Calibrations for nitrate + nitrite as N were performed using seven calibration standards on November 13, 2015. 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 not made at the required frequency: 11 samples were analyzed between a set of checks. However, all affected results were for another client; no qualification is required. All calibration check results were within the acceptance criteria.

Method SW-846 6010 Ca, Mg, K, Na

Calibrations were performed on November 17, 2015, using three calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than or only slightly above 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results 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.

Method SW-846 6020 Se, U, V

Calibrations were performed on November 17, 2015, using three calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than or only slightly above 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. 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 exception of selenium and vanadium. This indicates a higher degree of uncertainty in these measurements at low concentrations and the associated sample detects that are less than 5 times the PQL are qualified with a “J” flag as estimated values. 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 SW-846 9056 Chloride, Sulfate

Calibrations for chloride and sulfate were performed using six calibration standards on January 4, 2016. 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. All calibration check results were within the acceptance criteria.

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. 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.

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. For results that are less than 5 times the PQL, the range should be no greater than the PQL. All replicate results met these criteria, demonstrating acceptable 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. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable.

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 January 12, 2016. The data were loaded into the environmental database on January 20, 2016. The Sample Management System EDD validation module was used to verify that the EDD files were 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.

Anion/Cation Balance

Environmental water should be electrically neutral. Expressed in milliequivalents per liter (meq/L), the sum of the anions should equal the sum of the cations. The anion/cation balance is calculated as the difference between the anions and cations, divided by the sum of the anions and cations. The anion/cation balance can be used to identify potential errors in the analytical results. Typically, a charge balance of less than 10 percent is considered acceptable. When a charge balance is greater than 10 percent, the associated data are closely examined for error. If no errors are found, the results are considered to be acceptable. Table 6 shows the total anion and cation results from this event and the charge balance.

Table 6. Comparison of Major Anions and Cations

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0292A	30.0	29.3	1.2
0294	10.0	9.6	2.3
0304	22.3	23.1	1.7
0305	22.8	23.6	1.8
0309	26.9	26.9	0.2
0310	29.4	29.3	0.2
0395	17.0	16.0	3.0
0396	9.9	9.6	1.8
0398	14.0	10.9	12.5
0655	25.9	26.3	0.7
0656	23.8	24.6	1.7
0658	22.9	21.9	2.3
0741	10.0	9.1	4.6

Location 0398 had a charge balance greater than 10 percent. There were no analytical errors identified during the review of the laboratory data. All other charge balances were below 10 percent.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 15107464 Lab Code: PAR Validator: Gretchen Baer Validation Date: 1/18/2016
Project: Rifle Disposal/Processing Site (old/new) Analysis Type: ☒ Metals ☒ General Chem ☐ Rad ☐ Organics
of Samples: 14 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

There are 28 holding time failures.

☒ 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

Page 1 of 1

RIN: 15107464 Lab Code: PAR

Non-Compliance Report: Holding Times

Project: Rifle Disposal/Processing Site (old/new)

Validation Date: 1/18/2016

Ticket	Location	Lab Sample ID	Method Code	Holding Times			Criteria			Reported Dates		
				Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection Date	Preparation Date	Analysis Date
NLX 006	0292A	1511166-1	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 006	0292A	1511166-1	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 007	0304	1511166-3	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 007	0304	1511166-3	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 008	0305	1511166-4	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 008	0305	1511166-4	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 009	0309	1511166-5	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 009	0309	1511166-5	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 010	0310	1511166-6	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 010	0310	1511166-6	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 011	0655	1511166-10	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 011	0655	1511166-10	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 012	0656	1511166-11	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 012	0656	1511166-11	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 013	0658	1511166-12	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 013	0658	1511166-12	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 014	0294	1511166-2	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 014	0294	1511166-2	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 015	0395	1511166-7	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 015	0395	1511166-7	MIS-A-045			65			28	11/03/2015	01/07/2016	01/07/2016
NLX 016	0396	1511166-8	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 016	0396	1511166-8	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 017	0398	1511166-9	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 017	0398	1511166-9	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 018	0741	1511166-13	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 018	0741	1511166-13	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 019	2551	1511166-14	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016
NLX 019	2551	1511166-14	MIS-A-045			63			28	11/05/2015	01/07/2016	01/07/2016

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

Page 1 of 1

RIN: 15107464

Lab Code: PAR

Date Due: 12/8/2015

Matrix: Water

Site Code: RFL01

Date Completed: 1/13/2016

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	CCV	CCB								
Calcium	ICP/ES	11/17/2015	57.0000	0.9999	OK	OK	OK	102.0	101.0	93.0	2.0	97.0	2.0	93.0
Magnesium	ICP/ES	11/17/2015	11.0000	0.9999	OK	OK	OK	101.0	103.0	100.0	1.0	102.0	1.0	101.0
Potassium	ICP/ES	11/17/2015	2.0000	0.9994	OK	OK	OK	103.0	106.0	106.0	0.0		4.0	89.0
Sodium	ICP/ES	11/17/2015	13.0000	0.9999	OK	OK	OK	103.0	102.0	103.0	0.0		3.0	95.0
Selenium	ICP/MS	11/17/2015	-0.0300	1.0000	OK	OK	OK	106.0	103.0	111.0	7.0	96.0		183.0
Uranium	ICP/MS	11/17/2015	-0.0020	1.0000	OK	OK	OK	102.0	99.0	106.0	2.0	103.0	2.0	110.0
Vanadium	ICP/MS	11/17/2015	-0.1500	1.0000	OK	OK	OK	97.0	99.0	99.0	1.0	100.0		138.0

SAMPLE MANAGEMENT SYSTEM **Wet Chemistry Data Validation Worksheet**

RIN: 15107464

Lab Code: PARDate Due: 12/8/2015Matrix: WaterSite Code: RFL01Date Completed: 1/13/2016

Analyte	Date Analyzed	CALIBRATION				Method	LCS	MS	MSD	DUP	Serial Dil.
		Int.	R^2	CCV	CCB	Blank	%R	%R	%R	RPD	%R
CHLORIDE	01/04/2016	-0.079	0.9999	OK	OK						
CHLORIDE	01/07/2016					OK	97	106	104	1	
Nitrate+Nitrite as N	11/13/2015	0.000	0.9995	OK	OK	OK	96	101	103	2	
Sulfate	01/04/2016	0.229	0.9998	OK	OK						
SULFATE	01/07/2016					OK	95	106	104	1	

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, indicating the wells were purged and sampled using the low-flow method. At all monitoring well locations, purging and sampling met the Category I criteria with the following exceptions: wells RFN01-0669 and RFN01-0670 were classified as Category II because they produced water at a rate less than the minimum low-flow purging rate. The sample results for these wells were qualified with a “Q” flag (qualitative), indicating the samples were not collected under the optimal conditions of the Category I stability criteria.

Equipment Blank Assessment

Equipment blanks are prepared and analyzed to document contamination attributable to the sample collection process. An equipment blank (field ID 2804) was collected after decontamination of the non-dedicated tubing reel used to collect one surface water sample at the New Rifle site. (An equipment blank was not required at the Old Rifle site because all samples were collected using dedicated equipment.) Magnesium and uranium were detected in the equipment blank. All magnesium and uranium results in the associated sample were greater than 5 times the equipment blank, so no further qualification is required. Calcium and vanadium were also detected in the equipment blank by the laboratory but these results were qualified during data validation with a “U” flag as not detected.

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. A duplicate sample was collected from locations RFN01-0659, RFN01-0855, and RFO-0304. 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 5 times the PQL, the range should be no greater than the PQL. The duplicate results met the criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Equipment/Trip Blanks

Page 1 of 1

RIN: 15107463 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 1/18/2016

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1511165-25	SW6010	Magnesium	31	J	30	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1511165-11	NLW 995	0324	14000	1		

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1511165-25	SW6020	Uranium	0.03	J	0.029	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1511165-11	NLW 995	0324	2.3	10		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

Page 1 of 1

RIN: 15107463 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 1/18/2016

Duplicate: 2548

Sample: 0659

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Ammonia as N	4			1	4.4			1	9.52		MG/L
Arsenic	49			10	49			10	0		UG/L
Calcium	660000			5	650000			5	1.53		UG/L
Chloride	200			20	210			20	4.88		MG/L
Magnesium	33000			1	32000			1	3.08		UG/L
Molybdenum	1100			10	1100			10	0		UG/L
NITRATE/NITRITE AS N	15			50	15			50	0		MG/L
Potassium	11000			1	11000			1	0		UG/L
Selenium	110			10	120			10	8.70		UG/L
Sodium	180000			1	180000			1	0		UG/L
Sulfate	1700			20	1700			20	0		MG/L
Uranium	88			10	86			10	2.30		UG/L
Vanadium	2900			10	2800			10	3.51		UG/L

Duplicate: 2805

Sample: 0855

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Ammonia as N	29			25	34			25	15.87		MG/L
Arsenic	160			10	150			10	6.45		UG/L
Calcium	200000			1	200000			1	0		UG/L
Chloride	190			10	180			10	5.41		MG/L
Magnesium	40000			1	40000			1	0		UG/L
Molybdenum	390			10	380			10	2.60		UG/L
NITRATE/NITRITE AS N	11			50	11			50	0		MG/L
Potassium	11000			1	11000			1	0		UG/L
Selenium	880			10	870			10	1.14		UG/L
Sodium	210000			1	210000			1	0		UG/L
Sulfate	690			10	680			10	1.46		MG/L
Uranium	33			10	33			10	0		UG/L
Vanadium	10000			100	10000			10	0		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

Page 1 of 1

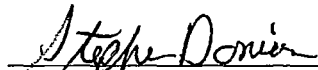
RIN: 15107464 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 1/18/2016

Duplicate: 2551		Sample: 0304										
		Sample		Duplicate								
Analyte	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution	RPD	RER	Units	
Calcium	190000			1	190000			1	0		UG/L	
CHLORIDE	250			20	240			20	4.08		MG/L	
Magnesium	74000			1	74000			1	0		UG/L	
Nitrate+Nitrite as N	0.01	U		1	0.01	U		1			MG/L	
Potassium	6600			1	6800			1	2.99		UG/L	
Selenium	1.8			10	1.3			10			UG/L	
Sodium	150000			1	150000			1	0		UG/L	
SULFATE	480			20	480			20	0		MG/L	
Uranium	58			10	60			10	3.39		UG/L	
Vanadium	35			10	34			10	2.90		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:


Stephen Donovan

2-26-2016
Date

Data Validation Lead:


Gretchen Baer

2/26/2016
Date

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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 can result from transcription errors, data-coding errors, or measurement system problems. However, outliers can also represent true extreme values of a distribution and can 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.** Do this by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made as to whether the data are normally distributed using the Shapiro-Wilk Test.
2. **Apply the appropriate statistical test.** Dixon's Test for extreme values 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.** The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

One laboratory result from the New Rifle site sampling event was identified as a potential outlier (see the Data Validation Outliers Report, below). The data associated with this result were reviewed in detail with no errors noted. Results for uranium since 2012 at this location indicate downward trending. The results for the New Rifle site sampling event are acceptable as qualified.

Three laboratory results from the Old Rifle site sampling event were identified as potential outliers. The data associated with these results were reviewed in detail with no errors noted. For these results, the historical ranges are narrow because of low variability and/or a small number of available data points. The results for the Old Rifle site sampling event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 1/1/2006

Laboratory: ALS Laboratory Group

RIN: 15107463

Report Date: 1/30/2016

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
RFN01	0169	N001	11/06/2015	Chloride	81.0		F	80.0		F	50.0		F	6	0	No
RFN01	0170	N001	11/06/2015	Ammonia Total as N	0.770		F	0.630		F	0.1000	U	F	15	2	No
RFN01	0170	N001	11/06/2015	Chloride	170		F	160		F	150		F	6	0	NA
RFN01	0170	N001	11/06/2015	Sodium	420		F	490		F	430		F	6	0	No
RFN01	0172	N001	11/05/2015	Ammonia Total as N	0.560		F	0.166		F	0.0160	U	F	17	13	NA
RFN01	0172	N001	11/05/2015	Chloride	1200		F	3000		F	1300		F	7	0	No
RFN01	0172	N001	11/05/2015	Magnesium	300		F	710		F	350		F	7	0	No
RFN01	0172	N001	11/05/2015	Sodium	2200		F	3600		F	2400		F	7	0	No
RFN01	0172	N001	11/05/2015	Uranium	0.0400		F	0.0780		F	0.0480		F	26	0	Yes
RFN01	0195	N001	11/03/2015	Molybdenum	0.0120		F	0.390		FQ	0.0130		F	13	0	No
RFN01	0201	N001	11/06/2015	Nitrate + Nitrite as Nitrogen	20.0		F	110		F	22.0		F	18	0	No
RFN01	0215	N001	11/06/2015	Magnesium	29.0		F	46.0		F	35.0		F	8	0	No
RFN01	0215	N001	11/06/2015	Potassium	3.70		F	6.40		F	4.10		F	8	0	No
RFN01	0320	N001	11/03/2015	Molybdenum	0.450			3.01			0.500			14	0	No
RFN01	0320	N001	11/03/2015	Vanadium	0.0150			0.250			0.0260			14	0	No
RFN01	0323	N001	11/06/2015	Ammonia Total as N	15.0			42.0			18.0			19	0	NA
RFN01	0323	N001	11/06/2015	Nitrate + Nitrite as Nitrogen	15.0			130			27.0			18	0	No

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 1/1/2006

Laboratory: ALS Laboratory Group

RIN: 15107463

Report Date: 1/30/2016

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
RFN01	0323	N001	11/06/2015	Uranium	0.220			0.353			0.230			19	0	No
RFN01	0324	0001	11/05/2015	Sulfate	130			100.0			30.0			6	0	No
RFN01	0453	N001	11/03/2015	Selenium	0.00760		J	0.0827	N		0.0130			10	0	No
RFN01	0575	N001	11/06/2015	Chloride	570			550			320			6	0	No
RFN01	0590	N001	11/03/2015	Magnesium	50.0		F	60.0		F	54.0		F	6	0	No
RFN01	0590	N001	11/03/2015	Nitrate + Nitrite as Nitrogen	3.60		F	80.0		F	9.60		F	16	0	No
RFN01	0590	N001	11/03/2015	Selenium	0.0240		F	0.0700		F	0.0250		F	14	0	No
RFN01	0590	N001	11/03/2015	Sodium	380		F	530		F	410		F	6	0	No
RFN01	0620	N001	11/05/2015	Chloride	1400		F	1200		F	550		F	8	0	No
RFN01	0658	N001	11/06/2015	Calcium	490		F	480		F	370		F	5	0	No
RFN01	0658	N001	11/06/2015	Sulfate	1400		F	1300		F	1000		F	5	0	No
RFN01	0659	N002	11/06/2015	Ammonia Total as N	4.40		F	67.0		F	7.60		F	18	0	No
RFN01	0659	N001	11/06/2015	Ammonia Total as N	4.00		F	67.0		F	7.60		F	18	0	No
RFN01	0659	N002	11/06/2015	Molybdenum	1.10		F	2.60		F	1.20		F	18	0	No
RFN01	0659	N001	11/06/2015	Molybdenum	1.10		F	2.60		F	1.20		F	18	0	No
RFN01	0669	0001	11/06/2015	Sulfate	810		FQ	1700		FQ	830		FQ	6	0	No
RFN01	0855	N001	11/06/2015	Arsenic	0.160		F	2.20		FQ	0.180		F	17	0	NA

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 1/1/2006

Laboratory: ALS Laboratory Group

RIN: 15107463

Report Date: 1/30/2016

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
RFN01	0855	N002	11/06/2015	Arsenic	0.150		F	2.20		FQ	0.180		F	17	0	NA
RFN01	0855	N002	11/06/2015	Calcium	200		F	780		FQ	220		F	8	0	No
RFN01	0855	N001	11/06/2015	Calcium	200		F	780		FQ	220		F	8	0	No
RFN01	0855	N001	11/06/2015	Magnesium	40.0		F	39.0		F	25.0		FQ	8	0	No
RFN01	0855	N002	11/06/2015	Magnesium	40.0		F	39.0		F	25.0		FQ	8	0	No
RFN01	0855	N001	11/06/2015	Molybdenum	0.390		F	18.0		FQ	0.470		F	17	0	NA
RFN01	0855	N002	11/06/2015	Molybdenum	0.380		F	18.0		FQ	0.470		F	17	0	NA

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.

NA: Data are not normally or lognormally distributed.

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 1/1/2006

Laboratory: ALS Laboratory Group

RIN: 15107464

Report Date: 1/30/2016

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
RFO01	0292A	N001	11/03/2015	Calcium	190		F	170		F	130		F	14	0	Yes
RFO01	0292A	N001	11/03/2015	Magnesium	110		F	100.0		F	78.0		F	14	0	No
RFO01	0292A	N001	11/03/2015	Sodium	260		F	250		F	160		F	14	0	No
RFO01	0292A	N001	11/03/2015	Sulfate	820		JF	760		F	480		F	14	0	No
RFO01	0305	N001	11/05/2015	Selenium	0.00930		F	0.0420		F	0.0150		F	27	0	No
RFO01	0395	N001	11/03/2015	Selenium	0.01000			0.00840			0.00093			17	0	No
RFO01	0395	N001	11/03/2015	Vanadium	0.00510			0.00300	U		0.00098			17	1	Yes
RFO01	0396	N001	11/05/2015	Calcium	69.0			66.0			25.0			13	0	No
RFO01	0396	N001	11/05/2015	Sodium	120			110			13.0			13	0	No
RFO01	0398	N001	11/05/2015	Magnesium	39.0			99.0			40.0			14	0	NA
RFO01	0656	N001	11/05/2015	Nitrate + Nitrite as Nitrogen	1.30		F	0.420		F	0.01000	U	F	13	1	Yes
RFO01	0741	N001	11/05/2015	Calcium	70.0			66.0			25.0			14	0	No
RFO01	0741	N001	11/05/2015	Sodium	120			110			13.0			13	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.

NA: Data are not normally or lognormally distributed

Attachment 2

Data Presentation

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New Rifle Groundwater Quality Data

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0169 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	3.13 - 18.13	480		F	#		
Ammonia Total as N	mg/L	11/06/2015	N001	3.13 - 18.13	0.1	U	F	#	0.1	
Arsenic	mg/L	11/06/2015	N001	3.13 - 18.13	0.00045	J	UF	#	0.00015	
Calcium	mg/L	11/06/2015	N001	3.13 - 18.13	190		F	#	0.024	
Chloride	mg/L	11/06/2015	N001	3.13 - 18.13	81		F	#	2	
Magnesium	mg/L	11/06/2015	N001	3.13 - 18.13	110		F	#	0.03	
Molybdenum	mg/L	11/06/2015	N001	3.13 - 18.13	0.0035		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	3.13 - 18.13	0.29		F	#	0.01	
Oxidation Reduction Potential	mV	11/06/2015	N001	3.13 - 18.13	86.7		F	#		
pH	s.u.	11/06/2015	N001	3.13 - 18.13	7.04		F	#		
Potassium	mg/L	11/06/2015	N001	3.13 - 18.13	6		F	#	0.052	
Selenium	mg/L	11/06/2015	N001	3.13 - 18.13	0.007		JF	#	0.00032	
Sodium	mg/L	11/06/2015	N001	3.13 - 18.13	170		F	#	0.047	
Specific Conductance	umhos /cm	11/06/2015	N001	3.13 - 18.13	2152		F	#		
Sulfate	mg/L	11/06/2015	N001	3.13 - 18.13	710		F	#	5	
Temperature	C	11/06/2015	N001	3.13 - 18.13	15.55		F	#		
Turbidity	NTU	11/06/2015	N001	3.13 - 18.13	1.94		F	#		
Uranium	mg/L	11/06/2015	N001	3.13 - 18.13	0.02		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	3.13 - 18.13	0.0019	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0170 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	92.23 - 112.23	514		F	#		
Ammonia Total as N	mg/L	11/06/2015	N001	92.23 - 112.23	0.77		F	#	0.1	
Arsenic	mg/L	11/06/2015	N001	92.23 - 112.23	0.00049	J	UF	#	0.00015	
Calcium	mg/L	11/06/2015	N001	92.23 - 112.23	160		F	#	0.024	
Chloride	mg/L	11/06/2015	N001	92.23 - 112.23	170		F	#	4	
Magnesium	mg/L	11/06/2015	N001	92.23 - 112.23	93		F	#	0.03	
Molybdenum	mg/L	11/06/2015	N001	92.23 - 112.23	0.003		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	92.23 - 112.23	9.4		F	#	0.5	
Oxidation Reduction Potential	mV	11/06/2015	N001	92.23 - 112.23	94.3		F	#		
pH	s.u.	11/06/2015	N001	92.23 - 112.23	7.05		F	#		
Potassium	mg/L	11/06/2015	N001	92.23 - 112.23	6		F	#	0.052	
Selenium	mg/L	11/06/2015	N001	92.23 - 112.23	0.02		F	#	0.00032	
Sodium	mg/L	11/06/2015	N001	92.23 - 112.23	420		F	#	0.047	
Specific Conductance	umhos/cm	11/06/2015	N001	92.23 - 112.23	3027		F	#		
Sulfate	mg/L	11/06/2015	N001	92.23 - 112.23	990		F	#	10	
Temperature	C	11/06/2015	N001	92.23 - 112.23	13.46		F	#		
Turbidity	NTU	11/06/2015	N001	92.23 - 112.23	3.85		F	#		
Uranium	mg/L	11/06/2015	N001	92.23 - 112.23	0.056		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	92.23 - 112.23	0.0017	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0172 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	6.98	-	31.98	580		F	#		
Ammonia Total as N	mg/L	11/05/2015	N001	6.98	-	31.98	0.56		F	#	0.1	
Arsenic	mg/L	11/05/2015	N001	6.98	-	31.98	0.0043		F	#	0.00015	
Calcium	mg/L	11/05/2015	N001	6.98	-	31.98	420		F	#	0.12	
Chloride	mg/L	11/05/2015	N001	6.98	-	31.98	1200		F	#	20	
Magnesium	mg/L	11/05/2015	N001	6.98	-	31.98	300		F	#	0.15	
Molybdenum	mg/L	11/05/2015	N001	6.98	-	31.98	0.0085		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	6.98	-	31.98	0.025		F	#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	6.98	-	31.98	-91.4		F	#		
pH	s.u.	11/05/2015	N001	6.98	-	31.98	7.22		F	#		
Potassium	mg/L	11/05/2015	N001	6.98	-	31.98	12		F	#	0.26	
Selenium	mg/L	11/05/2015	N001	6.98	-	31.98	0.00032	U	F	#	0.00032	
Sodium	mg/L	11/05/2015	N001	6.98	-	31.98	2200		F	#	0.23	
Specific Conductance	umhos /cm	11/05/2015	N001	6.98	-	31.98	11741		F	#		
Sulfate	mg/L	11/05/2015	N001	6.98	-	31.98	5300		F	#	50	
Temperature	C	11/05/2015	N001	6.98	-	31.98	13.92		F	#		
Turbidity	NTU	11/05/2015	N001	6.98	-	31.98	2.86		F	#		
Uranium	mg/L	11/05/2015	N001	6.98	-	31.98	0.04		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	6.98	-	31.98	0.00098	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0195 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	5.29	-	25.29	460		F	#		
Ammonia Total as N	mg/L	11/03/2015	N001	5.29	-	25.29	0.24		F	#	0.1	
Arsenic	mg/L	11/03/2015	N001	5.29	-	25.29	0.00091	J	JF	#	0.00015	
Calcium	mg/L	11/03/2015	N001	5.29	-	25.29	92		F	#	0.024	
Chloride	mg/L	11/03/2015	N001	5.29	-	25.29	21		F	#	0.4	
Magnesium	mg/L	11/03/2015	N001	5.29	-	25.29	49		F	#	0.03	
Molybdenum	mg/L	11/03/2015	N001	5.29	-	25.29	0.012		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	5.29	-	25.29	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	5.29	-	25.29	-38		F	#		
pH	s.u.	11/03/2015	N001	5.29	-	25.29	7.12		F	#		
Potassium	mg/L	11/03/2015	N001	5.29	-	25.29	7.1		F	#	0.052	
Selenium	mg/L	11/03/2015	N001	5.29	-	25.29	0.00034	J	UF	#	0.00032	
Sodium	mg/L	11/03/2015	N001	5.29	-	25.29	110		F	#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	5.29	-	25.29	1176		F	#		
Sulfate	mg/L	11/03/2015	N001	5.29	-	25.29	170		F	#	1	
Temperature	C	11/03/2015	N001	5.29	-	25.29	14.85		F	#		
Turbidity	NTU	11/03/2015	N001	5.29	-	25.29	6.52		F	#		
Uranium	mg/L	11/03/2015	N001	5.29	-	25.29	0.011		F	#	0.000029	
Vanadium	mg/L	11/03/2015	N001	5.29	-	25.29	0.0021	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0201 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	7.35 - 22.35	260		F	#		
Ammonia Total as N	mg/L	11/06/2015	N001	7.35 - 22.35	71		F	#	2.5	
Arsenic	mg/L	11/06/2015	N001	7.35 - 22.35	0.00045	J	UF	#	0.00015	
Calcium	mg/L	11/06/2015	N001	7.35 - 22.35	580		F	#	0.12	
Chloride	mg/L	11/06/2015	N001	7.35 - 22.35	180		JF	#	10	
Magnesium	mg/L	11/06/2015	N001	7.35 - 22.35	48		F	#	0.15	
Molybdenum	mg/L	11/06/2015	N001	7.35 - 22.35	1.7		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	7.35 - 22.35	20		F	#	0.5	
Oxidation Reduction Potential	mV	11/06/2015	N001	7.35 - 22.35	210.6		F	#		
pH	s.u.	11/06/2015	N001	7.35 - 22.35	6.93		F	#		
Potassium	mg/L	11/06/2015	N001	7.35 - 22.35	10		F	#	0.26	
Selenium	mg/L	11/06/2015	N001	7.35 - 22.35	0.045		F	#	0.00032	
Sodium	mg/L	11/06/2015	N001	7.35 - 22.35	270		F	#	0.23	
Specific Conductance	umhos/cm	11/06/2015	N001	7.35 - 22.35	3900		F	#		
Sulfate	mg/L	11/06/2015	N001	7.35 - 22.35	1800		JF	#	25	
Temperature	C	11/06/2015	N001	7.35 - 22.35	14.13		F	#		
Turbidity	NTU	11/06/2015	N001	7.35 - 22.35	1.92		F	#		
Uranium	mg/L	11/06/2015	N001	7.35 - 22.35	0.095		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	7.35 - 22.35	0.0019	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0215 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	6.84 - 21.84	210		F	#		
Ammonia Total as N	mg/L	11/06/2015	N001	6.84 - 21.84	1.8		F	#	0.1	
Arsenic	mg/L	11/06/2015	N001	6.84 - 21.84	0.00041	J	UF	#	0.00015	
Calcium	mg/L	11/06/2015	N001	6.84 - 21.84	71		F	#	0.024	
Chloride	mg/L	11/06/2015	N001	6.84 - 21.84	96		F	#	2	
Magnesium	mg/L	11/06/2015	N001	6.84 - 21.84	29		F	#	0.03	
Molybdenum	mg/L	11/06/2015	N001	6.84 - 21.84	0.016		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	6.84 - 21.84	0.016		F	#	0.01	
Oxidation Reduction Potential	mV	11/06/2015	N001	6.84 - 21.84	50.4		F	#		
pH	s.u.	11/06/2015	N001	6.84 - 21.84	7.47		F	#		
Potassium	mg/L	11/06/2015	N001	6.84 - 21.84	3.7		F	#	0.052	
Selenium	mg/L	11/06/2015	N001	6.84 - 21.84	0.002		UF	#	0.00032	
Sodium	mg/L	11/06/2015	N001	6.84 - 21.84	100		F	#	0.047	
Specific Conductance	umhos/cm	11/06/2015	N001	6.84 - 21.84	1027		F	#		
Sulfate	mg/L	11/06/2015	N001	6.84 - 21.84	180		F	#	5	
Temperature	C	11/06/2015	N001	6.84 - 21.84	14.68		F	#		
Turbidity	NTU	11/06/2015	N001	6.84 - 21.84	1.22		F	#		
Uranium	mg/L	11/06/2015	N001	6.84 - 21.84	0.012		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	6.84 - 21.84	0.0026	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0216 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	5.5 - 20.5	180		F	#		
Ammonia Total as N	mg/L	11/03/2015	N001	5.5 - 20.5	5.6		F	#	1	
Arsenic	mg/L	11/03/2015	N001	5.5 - 20.5	0.021		F	#	0.00015	
Calcium	mg/L	11/03/2015	N001	5.5 - 20.5	59		F	#	0.024	
Chloride	mg/L	11/03/2015	N001	5.5 - 20.5	84		F	#	2	
Magnesium	mg/L	11/03/2015	N001	5.5 - 20.5	12		F	#	0.03	
Molybdenum	mg/L	11/03/2015	N001	5.5 - 20.5	0.04		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	5.5 - 20.5	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	5.5 - 20.5	-31.1		F	#		
pH	s.u.	11/03/2015	N001	5.5 - 20.5	7.72		F	#		
Potassium	mg/L	11/03/2015	N001	5.5 - 20.5	5.7		F	#	0.052	
Selenium	mg/L	11/03/2015	N001	5.5 - 20.5	0.00098	J	UF	#	0.00032	
Sodium	mg/L	11/03/2015	N001	5.5 - 20.5	75		F	#	0.047	
Specific Conductance	umhos /cm	11/03/2015	N001	5.5 - 20.5	770		F	#		
Sulfate	mg/L	11/03/2015	N001	5.5 - 20.5	110		F	#	5	
Temperature	C	11/03/2015	N001	5.5 - 20.5	15.57		F	#		
Turbidity	NTU	11/03/2015	N001	5.5 - 20.5	3.6		F	#		
Uranium	mg/L	11/03/2015	N001	5.5 - 20.5	0.01		F	#	0.000029	
Vanadium	mg/L	11/03/2015	N001	5.5 - 20.5	0.15		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0217 WELL Ground elevation was calculated as surveyed TOC elevation minus stick up height reported in the Borehole Summary

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	7.4	-	22.4	240		F	#		
Ammonia Total as N	mg/L	11/03/2015	N001	7.4	-	22.4	44		F	#	2.5	
Arsenic	mg/L	11/03/2015	N001	7.4	-	22.4	0.00068	J	UF	#	0.00015	
Calcium	mg/L	11/03/2015	N001	7.4	-	22.4	620		F	#	0.12	
Chloride	mg/L	11/03/2015	N001	7.4	-	22.4	200		F	#	4	
Magnesium	mg/L	11/03/2015	N001	7.4	-	22.4	21		F	#	0.03	
Molybdenum	mg/L	11/03/2015	N001	7.4	-	22.4	1.6		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	7.4	-	22.4	0.016		F	#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	7.4	-	22.4	92.7		F	#		
pH	s.u.	11/03/2015	N001	7.4	-	22.4	6.96		F	#		
Potassium	mg/L	11/03/2015	N001	7.4	-	22.4	17		F	#	0.052	
Selenium	mg/L	11/03/2015	N001	7.4	-	22.4	0.0063		JF	#	0.00032	
Sodium	mg/L	11/03/2015	N001	7.4	-	22.4	200		F	#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	7.4	-	22.4	3443		F	#		
Sulfate	mg/L	11/03/2015	N001	7.4	-	22.4	1600		F	#	10	
Temperature	C	11/03/2015	N001	7.4	-	22.4	13.27		F	#		
Turbidity	NTU	11/03/2015	N001	7.4	-	22.4	1.38		F	#		
Uranium	mg/L	11/03/2015	N001	7.4	-	22.4	0.13		F	#	0.000029	
Vanadium	mg/L	11/03/2015	N001	7.4	-	22.4	2.1		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0590 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	5.21	- 19.21	260		F	#		
Ammonia Total as N	mg/L	11/03/2015	N001	5.21	- 19.21	160		F	#	5.5	
Arsenic	mg/L	11/03/2015	N001	5.21	- 19.21	0.00053	J	UF	#	0.00015	
Calcium	mg/L	11/03/2015	N001	5.21	- 19.21	570		F	#	0.12	
Chloride	mg/L	11/03/2015	N001	5.21	- 19.21	300		F	#	10	
Magnesium	mg/L	11/03/2015	N001	5.21	- 19.21	50		F	#	0.03	
Molybdenum	mg/L	11/03/2015	N001	5.21	- 19.21	1.3		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	5.21	- 19.21	3.6		F	#	0.1	
Oxidation Reduction Potential	mV	11/03/2015	N001	5.21	- 19.21	110.9		F	#		
pH	s.u.	11/03/2015	N001	5.21	- 19.21	6.93		F	#		
Potassium	mg/L	11/03/2015	N001	5.21	- 19.21	25		F	#	0.052	
Selenium	mg/L	11/03/2015	N001	5.21	- 19.21	0.024		F	#	0.00032	
Sodium	mg/L	11/03/2015	N001	5.21	- 19.21	380		F	#	0.047	
Specific Conductance	umhos /cm	11/03/2015	N001	5.21	- 19.21	4918		F	#		
Sulfate	mg/L	11/03/2015	N001	5.21	- 19.21	2300		F	#	25	
Temperature	C	11/03/2015	N001	5.21	- 19.21	15.24		F	#		
Turbidity	NTU	11/03/2015	N001	5.21	- 19.21	2.05		F	#		
Uranium	mg/L	11/03/2015	N001	5.21	- 19.21	0.068		F	#	0.000029	
Vanadium	mg/L	11/03/2015	N001	5.21	- 19.21	0.37		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0620 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	6.7	-	10.7	545		F	#		
Ammonia Total as N	mg/L	11/05/2015	N001	6.7	-	10.7	0.1	U	F	#	0.1	
Arsenic	mg/L	11/05/2015	N001	6.7	-	10.7	0.00055	J	UF	#	0.00015	
Calcium	mg/L	11/05/2015	N001	6.7	-	10.7	390		F	#	0.12	
Chloride	mg/L	11/05/2015	N001	6.7	-	10.7	1400		F	#	20	
Magnesium	mg/L	11/05/2015	N001	6.7	-	10.7	230		F	#	0.15	
Molybdenum	mg/L	11/05/2015	N001	6.7	-	10.7	0.0094		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	6.7	-	10.7	12		F	#	0.5	
Oxidation Reduction Potential	mV	11/05/2015	N001	6.7	-	10.7	197.3		F	#		
pH	s.u.	11/05/2015	N001	6.7	-	10.7	7.3		F	#		
Potassium	mg/L	11/05/2015	N001	6.7	-	10.7	9.8		F	#	0.26	
Selenium	mg/L	11/05/2015	N001	6.7	-	10.7	0.031		F	#	0.00032	
Sodium	mg/L	11/05/2015	N001	6.7	-	10.7	1100		F	#	0.23	
Specific Conductance	umhos /cm	11/05/2015	N001	6.7	-	10.7	7700		F	#		
Sulfate	mg/L	11/05/2015	N001	6.7	-	10.7	2100		F	#	50	
Temperature	C	11/05/2015	N001	6.7	-	10.7	14.22		F	#		
Turbidity	NTU	11/05/2015	N001	6.7	-	10.7	2.42		F	#		
Uranium	mg/L	11/05/2015	N001	6.7	-	10.7	0.06		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	6.7	-	10.7	0.0016	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0658 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	.5 - 5.5	280		F	#		
Ammonia Total as N	mg/L	11/06/2015	N001	.5 - 5.5	51		F	#	2.5	
Arsenic	mg/L	11/06/2015	N001	.5 - 5.5	0.095		F	#	0.00015	
Calcium	mg/L	11/06/2015	N001	.5 - 5.5	490		F	#	0.024	
Chloride	mg/L	11/06/2015	N001	.5 - 5.5	180		F	#	4	
Magnesium	mg/L	11/06/2015	N001	.5 - 5.5	33		F	#	0.03	
Molybdenum	mg/L	11/06/2015	N001	.5 - 5.5	2		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	.5 - 5.5	2.3		F	#	0.1	
Oxidation Reduction Potential	mV	11/06/2015	N001	.5 - 5.5	130.2		F	#		
pH	s.u.	11/06/2015	N001	.5 - 5.5	6.92		F	#		
Potassium	mg/L	11/06/2015	N001	.5 - 5.5	8.3		F	#	0.052	
Selenium	mg/L	11/06/2015	N001	.5 - 5.5	1		F	#	0.00032	
Sodium	mg/L	11/06/2015	N001	.5 - 5.5	180		F	#	0.047	
Specific Conductance	umhos /cm	11/06/2015	N001	.5 - 5.5	3185		F	#		
Sulfate	mg/L	11/06/2015	N001	.5 - 5.5	1400		F	#	10	
Temperature	C	11/06/2015	N001	.5 - 5.5	13.82		F	#		
Turbidity	NTU	11/06/2015	N001	.5 - 5.5	9.78		F	#		
Uranium	mg/L	11/06/2015	N001	.5 - 5.5	0.056		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	.5 - 5.5	28		F	#	0.0015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0659 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	.5	-	10.5	168		F	#		
Ammonia Total as N	mg/L	11/06/2015	N001	.5	-	10.5	4		F	#	0.1	
Ammonia Total as N	mg/L	11/06/2015	N002	.5	-	10.5	4.4		F	#	0.1	
Arsenic	mg/L	11/06/2015	N001	.5	-	10.5	0.049		F	#	0.00015	
Arsenic	mg/L	11/06/2015	N002	.5	-	10.5	0.049		F	#	0.00015	
Calcium	mg/L	11/06/2015	N001	.5	-	10.5	660		F	#	0.12	
Calcium	mg/L	11/06/2015	N002	.5	-	10.5	650		F	#	0.12	
Chloride	mg/L	11/06/2015	N001	.5	-	10.5	200		F	#	4	
Chloride	mg/L	11/06/2015	N002	.5	-	10.5	210		F	#	4	
Magnesium	mg/L	11/06/2015	N001	.5	-	10.5	33		F	#	0.03	
Magnesium	mg/L	11/06/2015	N002	.5	-	10.5	32		F	#	0.03	
Molybdenum	mg/L	11/06/2015	N001	.5	-	10.5	1.1		F	#	0.00032	
Molybdenum	mg/L	11/06/2015	N002	.5	-	10.5	1.1		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	.5	-	10.5	15		F	#	0.5	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N002	.5	-	10.5	15		F	#	0.5	
Oxidation Reduction Potential	mV	11/06/2015	N001	.5	-	10.5	61.6		F	#		
pH	s.u.	11/06/2015	N001	.5	-	10.5	7.07		F	#		
Potassium	mg/L	11/06/2015	N001	.5	-	10.5	11		F	#	0.052	
Potassium	mg/L	11/06/2015	N002	.5	-	10.5	11		F	#	0.052	
Selenium	mg/L	11/06/2015	N001	.5	-	10.5	0.11		F	#	0.00032	
Selenium	mg/L	11/06/2015	N002	.5	-	10.5	0.12		F	#	0.00032	
Sodium	mg/L	11/06/2015	N001	.5	-	10.5	180		F	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0659 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Sodium	mg/L	11/06/2015	N002	.5 - 10.5	180		F	#	0.047	
Specific Conductance	umhos /cm	11/06/2015	N001	.5 - 10.5	3312		F	#		
Sulfate	mg/L	11/06/2015	N001	.5 - 10.5	1700		F	#	10	
Sulfate	mg/L	11/06/2015	N002	.5 - 10.5	1700		F	#	10	
Temperature	C	11/06/2015	N001	.5 - 10.5	13.29		F	#		
Turbidity	NTU	11/06/2015	N001	.5 - 10.5	9.72		F	#		
Uranium	mg/L	11/06/2015	N001	.5 - 10.5	0.088		F	#	0.000029	
Uranium	mg/L	11/06/2015	N002	.5 - 10.5	0.086		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	.5 - 10.5	2.9		F	#	0.00015	
Vanadium	mg/L	11/06/2015	N002	.5 - 10.5	2.8		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0664 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	7.7 - 14.7	380		F	#		
Ammonia Total as N	mg/L	11/06/2015	N001	7.7 - 14.7	28		F	#	2.5	
Arsenic	mg/L	11/06/2015	N001	7.7 - 14.7	0.0041		F	#	0.00015	
Calcium	mg/L	11/06/2015	N001	7.7 - 14.7	150		F	#	0.024	
Chloride	mg/L	11/06/2015	N001	7.7 - 14.7	120		F	#	2	
Magnesium	mg/L	11/06/2015	N001	7.7 - 14.7	73		F	#	0.03	
Molybdenum	mg/L	11/06/2015	N001	7.7 - 14.7	0.24		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	7.7 - 14.7	3.8		F	#	0.1	
Oxidation Reduction Potential	mV	11/06/2015	N001	7.7 - 14.7	94.7		F	#		
pH	s.u.	11/06/2015	N001	7.7 - 14.7	7.09		F	#		
Potassium	mg/L	11/06/2015	N001	7.7 - 14.7	9.4		F	#	0.052	
Selenium	mg/L	11/06/2015	N001	7.7 - 14.7	0.17		F	#	0.00032	
Sodium	mg/L	11/06/2015	N001	7.7 - 14.7	200		F	#	0.047	
Specific Conductance	umhos /cm	11/06/2015	N001	7.7 - 14.7	2186		F	#		
Sulfate	mg/L	11/06/2015	N001	7.7 - 14.7	640		F	#	5	
Temperature	C	11/06/2015	N001	7.7 - 14.7	13.83		F	#		
Turbidity	NTU	11/06/2015	N001	7.7 - 14.7	7.37		F	#		
Uranium	mg/L	11/06/2015	N001	7.7 - 14.7	0.051		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	7.7 - 14.7	2.1		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0669 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	4	- 10.6	350		FQ	#		
Ammonia Total as N	mg/L	11/06/2015	0001	4	- 10.6	65		FQ	#	2.5	
Arsenic	mg/L	11/06/2015	0001	4	- 10.6	0.0082		FQ	#	0.00015	
Calcium	mg/L	11/06/2015	0001	4	- 10.6	250		FQ	#	0.024	
Chloride	mg/L	11/06/2015	0001	4	- 10.6	130		FQ	#	2	
Magnesium	mg/L	11/06/2015	0001	4	- 10.6	36		FQ	#	0.03	
Molybdenum	mg/L	11/06/2015	0001	4	- 10.6	0.71		FQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	0001	4	- 10.6	1.1		FQ	#	0.01	
Oxidation Reduction Potential	mV	11/06/2015	N001	4	- 10.6	73.8		FQ	#		
pH	s.u.	11/06/2015	N001	4	- 10.6	7.1		FQ	#		
Potassium	mg/L	11/06/2015	0001	4	- 10.6	7		FQ	#	0.052	
Selenium	mg/L	11/06/2015	0001	4	- 10.6	0.029		FQ	#	0.00032	
Sodium	mg/L	11/06/2015	0001	4	- 10.6	190		FQ	#	0.047	
Specific Conductance	umhos /cm	11/06/2015	N001	4	- 10.6	2477		FQ	#		
Sulfate	mg/L	11/06/2015	0001	4	- 10.6	810		FQ	#	5	
Temperature	C	11/06/2015	N001	4	- 10.6	13		FQ	#		
Turbidity	NTU	11/06/2015	N001	4	- 10.6	12.5		FQ	#		
Uranium	mg/L	11/06/2015	0001	4	- 10.6	0.086		FQ	#	0.000029	
Vanadium	mg/L	11/06/2015	0001	4	- 10.6	3.2		FQ	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0670 WELL For Organics Study.

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	5.2	-	12.2	380		FQ	#		
Ammonia Total as N	mg/L	11/06/2015	N001	5.2	-	12.2	15		FQ	#	2.5	
Arsenic	mg/L	11/06/2015	N001	5.2	-	12.2	0.0043		FQ	#	0.00015	
Calcium	mg/L	11/06/2015	N001	5.2	-	12.2	150		FQ	#	0.024	
Chloride	mg/L	11/06/2015	N001	5.2	-	12.2	130		FQ	#	2	
Magnesium	mg/L	11/06/2015	N001	5.2	-	12.2	82		FQ	#	0.03	
Molybdenum	mg/L	11/06/2015	N001	5.2	-	12.2	0.23		FQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	5.2	-	12.2	6.1		FQ	#	0.1	
Oxidation Reduction Potential	mV	11/06/2015	N001	5.2	-	12.2	127.9		FQ	#		
pH	s.u.	11/06/2015	N001	5.2	-	12.2	7.19		FQ	#		
Potassium	mg/L	11/06/2015	N001	5.2	-	12.2	9.8		FQ	#	0.052	
Selenium	mg/L	11/06/2015	N001	5.2	-	12.2	0.5		FQ	#	0.00032	
Sodium	mg/L	11/06/2015	N001	5.2	-	12.2	210		FQ	#	0.047	
Specific Conductance	umhos /cm	11/06/2015	N001	5.2	-	12.2	2125		FQ	#		
Sulfate	mg/L	11/06/2015	N001	5.2	-	12.2	640		FQ	#	5	
Temperature	C	11/06/2015	N001	5.2	-	12.2	10.76		FQ	#		
Turbidity	NTU	11/06/2015	N001	5.2	-	12.2	5.22		FQ	#		
Uranium	mg/L	11/06/2015	N001	5.2	-	12.2	0.077		FQ	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	5.2	-	12.2	1.8		FQ	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0855 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	6 - 11	250		F #		
Ammonia Total as N	mg/L	11/06/2015	N001	6 - 11	29		F #	2.5	
Ammonia Total as N	mg/L	11/06/2015	N002	6 - 11	34		F #	2.5	
Arsenic	mg/L	11/06/2015	N001	6 - 11	0.16		F #	0.00015	
Arsenic	mg/L	11/06/2015	N002	6 - 11	0.15		F #	0.00015	
Calcium	mg/L	11/06/2015	N001	6 - 11	200		F #	0.024	
Calcium	mg/L	11/06/2015	N002	6 - 11	200		F #	0.024	
Chloride	mg/L	11/06/2015	N001	6 - 11	190		F #	2	
Chloride	mg/L	11/06/2015	N002	6 - 11	180 "		F #	2	
Magnesium	mg/L	11/06/2015	N001	6 - 11	40		F #	0.03	
Magnesium	mg/L	11/06/2015	N002	6 - 11	40		F #	0.03	
Molybdenum	mg/L	11/06/2015	N001	6 - 11	0.39		F #	0.00032	
Molybdenum	mg/L	11/06/2015	N002	6 - 11	0.38		F #	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	6 - 11	11		F #	0.5	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N002	6 - 11	11		F #	0.5	
Oxidation Reduction Potential	mV	11/06/2015	N001	6 - 11	106		F #		
pH	s.u.	11/06/2015	N001	6 - 11	7.14		F #		
Potassium	mg/L	11/06/2015	N001	6 - 11	11		F #	0.052	
Potassium	mg/L	11/06/2015	N002	6 - 11	11		F #	0.052	
Selenium	mg/L	11/06/2015	N001	6 - 11	0.88		F #	0.00032	
Selenium	mg/L	11/06/2015	N002	6 - 11	0.87		F #	0.00032	
Sodium	mg/L	11/06/2015	N001	6 - 11	210		F #	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0855 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Sodium	mg/L	11/06/2015	N002	6	-	11	210		F	#	0.047	
Specific Conductance	umhos /cm	11/06/2015	N001	6	-	11	2233		F	#		
Sulfate	mg/L	11/06/2015	N001	6	-	11	690		F	#	5	
Sulfate	mg/L	11/06/2015	N002	6	-	11	680		F	#	5	
Temperature	C	11/06/2015	N001	6	-	11	14.61		F	#		
Turbidity	NTU	11/06/2015	N001	6	-	11	2.41		F	#		
Uranium	mg/L	11/06/2015	N001	6	-	11	0.033		F	#	0.000029	
Uranium	mg/L	11/06/2015	N002	6	-	11	0.033		F	#	0.000029	
Vanadium	mg/L	11/06/2015	N001	6	-	11	10		F	#	0.0015	
Vanadium	mg/L	11/06/2015	N002	6	-	11	10		F	#	0.00015	

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

Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0320 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	50			#		
Ammonia Total as N	mg/L	11/03/2015	N001	7.5			#	1	
Arsenic	mg/L	11/03/2015	N001	0.0032		J	#	0.00015	
Calcium	mg/L	11/03/2015	N001	450			#	0.024	
Chloride	mg/L	11/03/2015	N001	420			#	10	
Magnesium	mg/L	11/03/2015	N001	77			#	0.03	
Molybdenum	mg/L	11/03/2015	N001	0.45			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	0.16			#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	134.9			#		
pH	s.u.	11/03/2015	N001	8.7			#		
Potassium	mg/L	11/03/2015	N001	39			#	0.052	
Selenium	mg/L	11/03/2015	N001	0.0038		J	#	0.00032	
Sodium	mg/L	11/03/2015	N001	450			#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	4362			#		
Sulfate	mg/L	11/03/2015	N001	2000			#	25	
Temperature	C	11/03/2015	N001	11.47			#		
Turbidity	NTU	11/03/2015	N001	3.96			#		
Uranium	mg/L	11/03/2015	N001	0.062			#	0.000029	
Vanadium	mg/L	11/03/2015	N001	0.015			#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0323 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	90			#		
Ammonia Total as N	mg/L	11/06/2015	N001	15			#	2.5	
Arsenic	mg/L	11/06/2015	N001	0.00084	J	J	#	0.00015	
Calcium	mg/L	11/06/2015	N001	610			#	0.12	
Chloride	mg/L	11/06/2015	N001	440		J	#	20	
Magnesium	mg/L	11/06/2015	N001	140			#	0.15	
Molybdenum	mg/L	11/06/2015	N001	2			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	15			#	0.5	
Oxidation Reduction Potential	mV	11/06/2015	N001	258.6			#		
pH	s.u.	11/06/2015	N001	8.04			#		
Potassium	mg/L	11/06/2015	N001	57			#	0.26	
Selenium	mg/L	11/06/2015	N001	0.011			#	0.00032	
Sodium	mg/L	11/06/2015	N001	850			#	0.23	
Specific Conductance	umhos/cm	11/06/2015	N001	6287			#		
Sulfate	mg/L	11/06/2015	N001	3200		J	#	50	
Temperature	C	11/06/2015	N001	6.93			#		
Uranium	mg/L	11/06/2015	N001	0.22			#	0.000029	
Vanadium	mg/L	11/06/2015	N001	0.004		U	#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0324 SURFACE LOCATION

Parameter	Units	Sample		Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Data	QA		
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	0001	140			#		
Ammonia Total as N	mg/L	11/05/2015	0001	0.1	U		#	0.1	
Arsenic	mg/L	11/05/2015	0001	0.00028	J	U	#	0.00015	
Calcium	mg/L	11/05/2015	0001	70			#	0.024	
Chloride	mg/L	11/05/2015	0001	190			#	4	
Magnesium	mg/L	11/05/2015	0001	14			#	0.03	
Molybdenum	mg/L	11/05/2015	0001	0.0084			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	0001	0.01			#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	150.3			#		
pH	s.u.	11/05/2015	N001	8.44			#		
Potassium	mg/L	11/05/2015	0001	3.6			#	0.052	
Selenium	mg/L	11/05/2015	0001	0.00096	J	J	#	0.00032	
Sodium	mg/L	11/05/2015	0001	110			#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	1053			#		
Sulfate	mg/L	11/05/2015	0001	130			#	10	
Temperature	C	11/05/2015	N001	7.41			#		
Turbidity	NTU	11/05/2015	N001	37			#		
Uranium	mg/L	11/05/2015	0001	0.0023			#	0.000029	
Vanadium	mg/L	11/05/2015	0001	0.0013	J	U	#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0326 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	110			#		
Ammonia Total as N	mg/L	11/03/2015	N001	0.1	U		#	0.1	
Arsenic	mg/L	11/03/2015	N001	0.00025	J	U	#	0.00015	
Calcium	mg/L	11/03/2015	N001	71			#	0.024	
Chloride	mg/L	11/03/2015	N001	190		J	#	4	
Magnesium	mg/L	11/03/2015	N001	14			#	0.03	
Molybdenum	mg/L	11/03/2015	N001	0.0074		J	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	0.012			#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	91.2			#		
pH	s.u.	11/03/2015	N001	8.6			#		
Potassium	mg/L	11/03/2015	N001	3.7			#	0.052	
Selenium	mg/L	11/03/2015	N001	0.00032	U		#	0.00032	
Sodium	mg/L	11/03/2015	N001	120			#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	1033			#		
Sulfate	mg/L	11/03/2015	N001	110		J	#	10	
Temperature	C	11/03/2015	N001	10.94			#		
Turbidity	NTU	11/03/2015	N001	3.46			#		
Uranium	mg/L	11/03/2015	N001	0.0021			#	0.000029	
Vanadium	mg/L	11/03/2015	N001	0.0013	J	U	#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0452 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	90			#		
Ammonia Total as N	mg/L	11/03/2015	N001	9.2			#	1	
Arsenic	mg/L	11/03/2015	N001	0.0067			#	0.00015	
Calcium	mg/L	11/03/2015	N001	630			#	0.12	
Chloride	mg/L	11/03/2015	N001	390		J	#	10	
Magnesium	mg/L	11/03/2015	N001	57			#	0.03	
Molybdenum	mg/L	11/03/2015	N001	1.5			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	9.4			#	0.5	
Oxidation Reduction Potential	mV	11/03/2015	N001	136.8			#		
pH	s.u.	11/03/2015	N001	7.62			#		
Potassium	mg/L	11/03/2015	N001	35			#	0.052	
Selenium	mg/L	11/03/2015	N001	0.0076		J	#	0.00032	
Sodium	mg/L	11/03/2015	N001	390			#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	4451			#		
Sulfate	mg/L	11/03/2015	N001	2100		J	#	25	
Temperature	C	11/03/2015	N001	13.72			#		
Turbidity	NTU	11/03/2015	N001	1.73			#		
Uranium	mg/L	11/03/2015	N001	0.097			#	0.000029	
Vanadium	mg/L	11/03/2015	N001	0.33			#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0453 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	120			#		
Ammonia Total as N	mg/L	11/03/2015	N001	18			#	2.5	
Arsenic	mg/L	11/03/2015	N001	0.0086			#	0.00015	
Calcium	mg/L	11/03/2015	N001	610			#	0.12	
Chloride	mg/L	11/03/2015	N001	330		J	#	10	
Magnesium	mg/L	11/03/2015	N001	48			#	0.03	
Molybdenum	mg/L	11/03/2015	N001	1.6			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	16			#	0.5	
Oxidation Reduction Potential	mV	11/03/2015	N001	121.9			#		
pH	s.u.	11/03/2015	N001	7.28			#		
Potassium	mg/L	11/03/2015	N001	27			#	0.052	
Selenium	mg/L	11/03/2015	N001	0.0076		J	#	0.00032	
Sodium	mg/L	11/03/2015	N001	340			#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	4167			#		
Sulfate	mg/L	11/03/2015	N001	1900		J	#	25	
Temperature	C	11/03/2015	N001	12.75			#		
Turbidity	NTU	11/03/2015	N001	4.93			#		
Uranium	mg/L	11/03/2015	N001	0.11			#	0.000029	
Vanadium	mg/L	11/03/2015	N001	0.57			#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFN01, Rifle New Processing Site

REPORT DATE: 1/30/2016

Location: 0575 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/06/2015	N001	120			#		
Ammonia Total as N	mg/L	11/06/2015	N001	2.1			#	0.1	
Arsenic	mg/L	11/06/2015	N001	0.00093	J	J	#	0.00015	
Calcium	mg/L	11/06/2015	N001	410			#	0.12	
Chloride	mg/L	11/06/2015	N001	570			#	20	
Magnesium	mg/L	11/06/2015	N001	260			#	0.15	
Molybdenum	mg/L	11/06/2015	N001	0.74			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/06/2015	N001	1.1			#	0.01	
Oxidation Reduction Potential	mV	11/06/2015	N001	263.3			#		
pH	s.u.	11/06/2015	N001	7.37			#		
Potassium	mg/L	11/06/2015	N001	64			#	0.26	
Selenium	mg/L	11/06/2015	N001	0.0005	J	J	#	0.00032	
Sodium	mg/L	11/06/2015	N001	1100			#	0.23	
Specific Conductance	umhos/cm	11/06/2015	N001	7022			#		
Sulfate	mg/L	11/06/2015	N001	3800			#	50	
Temperature	C	11/06/2015	N001	6.53			#		
Turbidity	NTU	11/06/2015	N001	7.2			#		
Uranium	mg/L	11/06/2015	N001	0.13			#	0.000029	
Vanadium	mg/L	11/06/2015	N001	0.0022	J	U	#	0.00015	

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.

Old Rifle Groundwater Quality Data

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0292A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	10.5	-	20.5	470		F	#		
Calcium	mg/L	11/03/2015	N001	10.5	-	20.5	190		F	#	0.024	
Chloride	mg/L	11/03/2015	N001	10.5	-	20.5	100		JF	#	4	
Magnesium	mg/L	11/03/2015	N001	10.5	-	20.5	110		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	10.5	-	20.5	0.23		F	#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	10.5	-	20.5	28.3		F	#		
pH	s.u.	11/03/2015	N001	10.5	-	20.5	7.03		F	#		
Potassium	mg/L	11/03/2015	N001	10.5	-	20.5	6.7		F	#	0.052	
Selenium	mg/L	11/03/2015	N001	10.5	-	20.5	0.0073		JF	#	0.00032	
Sodium	mg/L	11/03/2015	N001	10.5	-	20.5	260		F	#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	10.5	-	20.5	2442		F	#		
Sulfate	mg/L	11/03/2015	N001	10.5	-	20.5	820		JF	#	10	
Temperature	C	11/03/2015	N001	10.5	-	20.5	14.69		F	#		
Turbidity	NTU	11/03/2015	N001	10.5	-	20.5	5.46		F	#		
Uranium	mg/L	11/03/2015	N001	10.5	-	20.5	0.038		F	#	0.000029	
Vanadium	mg/L	11/03/2015	N001	10.5	-	20.5	0.0014	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0304 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	13.2	-	18.2	300		F	#		
Calcium	mg/L	11/05/2015	N001	13.2	-	18.2	190		F	#	0.024	
Calcium	mg/L	11/05/2015	N002	13.2	-	18.2	190		F	#	0.024	
Chloride	mg/L	11/05/2015	N001	13.2	-	18.2	250		JF	#	4	
Chloride	mg/L	11/05/2015	N002	13.2	-	18.2	240		JF	#	4	
Magnesium	mg/L	11/05/2015	N001	13.2	-	18.2	74		F	#	0.03	
Magnesium	mg/L	11/05/2015	N002	13.2	-	18.2	74		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	13.2	-	18.2	0.01	U	F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N002	13.2	-	18.2	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	13.2	-	18.2	30.6		F	#		
pH	s.u.	11/05/2015	N001	13.2	-	18.2	7.26		F	#		
Potassium	mg/L	11/05/2015	N001	13.2	-	18.2	6.6		F	#	0.052	
Potassium	mg/L	11/05/2015	N002	13.2	-	18.2	6.8		F	#	0.052	
Selenium	mg/L	11/05/2015	N001	13.2	-	18.2	0.0018		JF	#	0.00032	
Selenium	mg/L	11/05/2015	N002	13.2	-	18.2	0.0013		JF	#	0.00032	
Sodium	mg/L	11/05/2015	N001	13.2	-	18.2	150		F	#	0.047	
Sodium	mg/L	11/05/2015	N002	13.2	-	18.2	150		F	#	0.047	
Specific Conductance	umhos /cm	11/05/2015	N001	13.2	-	18.2	2059		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0304 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/05/2015	N001	13.2 - 18.2	480		JF	#	10	
Sulfate	mg/L	11/05/2015	N002	13.2 - 18.2	480		JF	#	10	
Temperature	C	11/05/2015	N001	13.2 - 18.2	13.88		F	#		
Turbidity	NTU	11/05/2015	N001	13.2 - 18.2	8.5		F	#		
Uranium	mg/L	11/05/2015	N001	13.2 - 18.2	0.058		F	#	0.000029	
Uranium	mg/L	11/05/2015	N002	13.2 - 18.2	0.06		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	13.2 - 18.2	0.035		F	#	0.00015	
Vanadium	mg/L	11/05/2015	N002	13.2 - 18.2	0.034		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0305 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	13.76 - 18.76	376		F	#		
Calcium	mg/L	11/05/2015	N001	13.76 - 18.76	180		F	#	0.024	
Chloride	mg/L	11/05/2015	N001	13.76 - 18.76	230		JF	#	4	
Magnesium	mg/L	11/05/2015	N001	13.76 - 18.76	75		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	13.76 - 18.76	0.016		F	#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	13.76 - 18.76	1.8		F	#		
pH	s.u.	11/05/2015	N001	13.76 - 18.76	7.15		F	#		
Potassium	mg/L	11/05/2015	N001	13.76 - 18.76	8.3		F	#	0.052	
Selenium	mg/L	11/05/2015	N001	13.76 - 18.76	0.0093		F	#	0.00032	
Sodium	mg/L	11/05/2015	N001	13.76 - 18.76	170		F	#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	13.76 - 18.76	2047		F	#		
Sulfate	mg/L	11/05/2015	N001	13.76 - 18.76	460		JF	#	10	
Temperature	C	11/05/2015	N001	13.76 - 18.76	14.51		F	#		
Turbidity	NTU	11/05/2015	N001	13.76 - 18.76	1.61		F	#		
Uranium	mg/L	11/05/2015	N001	13.76 - 18.76	0.069		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	13.76 - 18.76	0.32		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0309 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	16.93 - 21.93	372		F	#		
Calcium	mg/L	11/05/2015	N001	16.93 - 21.93	170		F	#	0.024	
Chloride	mg/L	11/05/2015	N001	16.93 - 21.93	130		JF	#	4	
Magnesium	mg/L	11/05/2015	N001	16.93 - 21.93	110		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	16.93 - 21.93	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	16.93 - 21.93	-46.8		F	#		
pH	s.u.	11/05/2015	N001	16.93 - 21.93	7.27		F	#		
Potassium	mg/L	11/05/2015	N001	16.93 - 21.93	7.4		F	#	0.052	
Selenium	mg/L	11/05/2015	N001	16.93 - 21.93	0.00032	U	F	#	0.00032	
Sodium	mg/L	11/05/2015	N001	16.93 - 21.93	210		F	#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	16.93 - 21.93	2306		F	#		
Sulfate	mg/L	11/05/2015	N001	16.93 - 21.93	760		JF	#	10	
Temperature	C	11/05/2015	N001	16.93 - 21.93	14		F	#		
Turbidity	NTU	11/05/2015	N001	16.93 - 21.93	2.72		F	#		
Uranium	mg/L	11/05/2015	N001	16.93 - 21.93	0.019		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	16.93 - 21.93	0.0017	J	UF	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0310 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	17.93	-	22.93	448		F	#		
Calcium	mg/L	11/05/2015	N001	17.93	-	22.93	220		F	#	0.024	
Chloride	mg/L	11/05/2015	N001	17.93	-	22.93	160		JF	#	4	
Magnesium	mg/L	11/05/2015	N001	17.93	-	22.93	110		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	17.93	-	22.93	0.017		F	#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	17.93	-	22.93	-38.9		F	#		
pH	s.u.	11/05/2015	N001	17.93	-	22.93	7.23		F	#		
Potassium	mg/L	11/05/2015	N001	17.93	-	22.93	9.3		F	#	0.052	
Selenium	mg/L	11/05/2015	N001	17.93	-	22.93	0.00032	U	F	#	0.00032	
Sodium	mg/L	11/05/2015	N001	17.93	-	22.93	210		F	#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	17.93	-	22.93	2486		F	#		
Sulfate	mg/L	11/05/2015	N001	17.93	-	22.93	760		JF	#	10	
Temperature	C	11/05/2015	N001	17.93	-	22.93	13.62		F	#		
Turbidity	NTU	11/05/2015	N001	17.93	-	22.93	1.66		F	#		
Uranium	mg/L	11/05/2015	N001	17.93	-	22.93	0.16		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	17.93	-	22.93	0.01		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0655 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	13.6 - 23.6	480		F	#		
Calcium	mg/L	11/05/2015	N001	13.6 - 23.6	170		F	#	0.024	
Chloride	mg/L	11/05/2015	N001	13.6 - 23.6	110		JF	#	4	
Magnesium	mg/L	11/05/2015	N001	13.6 - 23.6	120		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	13.6 - 23.6	0.71		F	#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	13.6 - 23.6	-64.6		F	#		
pH	s.u.	11/05/2015	N001	13.6 - 23.6	7.13		F	#		
Potassium	mg/L	11/05/2015	N001	13.6 - 23.6	7.6		F	#	0.052	
Selenium	mg/L	11/05/2015	N001	13.6 - 23.6	0.026		F	#	0.00032	
Sodium	mg/L	11/05/2015	N001	13.6 - 23.6	170		F	#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	13.6 - 23.6	2137		F	#		
Sulfate	mg/L	11/05/2015	N001	13.6 - 23.6	650		JF	#	10	
Temperature	C	11/05/2015	N001	13.6 - 23.6	13.71		F	#		
Turbidity	NTU	11/05/2015	N001	13.6 - 23.6	1.55		F	#		
Uranium	mg/L	11/05/2015	N001	13.6 - 23.6	0.085		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	13.6 - 23.6	0.29		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0656 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	6.35 - 21.35	350		F	#		
Calcium	mg/L	11/05/2015	N001	6.35 - 21.35	130		F	#	0.024	
Chloride	mg/L	11/05/2015	N001	6.35 - 21.35	340		JF	#	4	
Magnesium	mg/L	11/05/2015	N001	6.35 - 21.35	65		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	6.35 - 21.35	1.3		F	#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	6.35 - 21.35	111.6		F	#		
pH	s.u.	11/05/2015	N001	6.35 - 21.35	7.27		F	#		
Potassium	mg/L	11/05/2015	N001	6.35 - 21.35	8		F	#	0.052	
Selenium	mg/L	11/05/2015	N001	6.35 - 21.35	0.0051		JF	#	0.00032	
Sodium	mg/L	11/05/2015	N001	6.35 - 21.35	270		F	#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	6.35 - 21.35	2291		F	#		
Sulfate	mg/L	11/05/2015	N001	6.35 - 21.35	380		JF	#	10	
Temperature	C	11/05/2015	N001	6.35 - 21.35	17.4		F	#		
Turbidity	NTU	11/05/2015	N001	6.35 - 21.35	3.61		F	#		
Uranium	mg/L	11/05/2015	N001	6.35 - 21.35	0.19		F	#	0.000029	
Vanadium	mg/L	11/05/2015	N001	6.35 - 21.35	0.023		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0658 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	0001	2.3 - 17.3	506		F	#		
Calcium	mg/L	11/03/2015	0001	2.3 - 17.3	190		F	#	0.024	
Chloride	mg/L	11/03/2015	0001	2.3 - 17.3	33		JF	#	4	
Magnesium	mg/L	11/03/2015	0001	2.3 - 17.3	110		F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	0001	2.3 - 17.3	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	2.3 - 17.3	47.2		F	#		
pH	s.u.	11/03/2015	N001	2.3 - 17.3	7.13		F	#		
Potassium	mg/L	11/03/2015	0001	2.3 - 17.3	3.7		F	#	0.052	
Selenium	mg/L	11/03/2015	0001	2.3 - 17.3	0.0015		JF	#	0.00032	
Sodium	mg/L	11/03/2015	0001	2.3 - 17.3	99		F	#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	2.3 - 17.3	1815		F	#		
Sulfate	mg/L	11/03/2015	0001	2.3 - 17.3	520		JF	#	10	
Temperature	C	11/03/2015	N001	2.3 - 17.3	11.38		F	#		
Turbidity	NTU	11/03/2015	N001	2.3 - 17.3	18.5		F	#		
Uranium	mg/L	11/03/2015	0001	2.3 - 17.3	0.018		F	#	0.000029	
Vanadium	mg/L	11/03/2015	0001	2.3 - 17.3	0.0017	J	UF	#	0.00015	

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.

Old Rifle
Surface Water Quality Data

Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0294 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	96			#		
Calcium	mg/L	11/03/2015	N001	71			#	0.024	
Chloride	mg/L	11/03/2015	N001	190		J	#	4	
Magnesium	mg/L	11/03/2015	N001	14			#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	40.4			#		
pH	s.u.	11/03/2015	N001	8.41			#		
Potassium	mg/L	11/03/2015	N001	3.9			#	0.052	
Selenium	mg/L	11/03/2015	N001	0.00032	U		#	0.00032	
Sodium	mg/L	11/03/2015	N001	120			#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	1062			#		
Sulfate	mg/L	11/03/2015	N001	110		J	#	10	
Temperature	C	11/03/2015	N001	8.07			#		
Turbidity	NTU	11/03/2015	N001	2.79			#		
Uranium	mg/L	11/03/2015	N001	0.0021			#	0.000029	
Vanadium	mg/L	11/03/2015	N001	0.0015	J	U	#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0395 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/03/2015	N001	270			#		
Calcium	mg/L	11/03/2015	N001	130			#	0.024	
Chloride	mg/L	11/03/2015	N001	56		J	#	4	
Magnesium	mg/L	11/03/2015	N001	90			#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/03/2015	N001	0.41			#	0.01	
Oxidation Reduction Potential	mV	11/03/2015	N001	130.5			#		
pH	s.u.	11/03/2015	N001	8.11			#		
Potassium	mg/L	11/03/2015	N001	2.9			#	0.052	
Selenium	mg/L	11/03/2015	N001	0.01			#	0.00032	
Sodium	mg/L	11/03/2015	N001	69			#	0.047	
Specific Conductance	umhos/cm	11/03/2015	N001	804			#		
Sulfate	mg/L	11/03/2015	N001	430		J	#	10	
Temperature	C	11/03/2015	N001	17.74			#		
Turbidity	NTU	11/03/2015	N001	7.57			#		
Uranium	mg/L	11/03/2015	N001	0.033			#	0.000029	
Vanadium	mg/L	11/03/2015	N001	0.0051			#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0396 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	110			#		
Calcium	mg/L	11/05/2015	N001	69			#	0.024	
Chloride	mg/L	11/05/2015	N001	180		J	#	4	
Magnesium	mg/L	11/05/2015	N001	14			#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	-5.1			#		
pH	s.u.	11/05/2015	N001	8.61			#		
Potassium	mg/L	11/05/2015	N001	3.8			#	0.052	
Selenium	mg/L	11/05/2015	N001	0.00096	J	U	#	0.00032	
Sodium	mg/L	11/05/2015	N001	120			#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	1284			#		
Sulfate	mg/L	11/05/2015	N001	110		J	#	10	
Temperature	C	11/05/2015	N001	7.06			#		
Turbidity	NTU	11/05/2015	N001	6.81			#		
Uranium	mg/L	11/05/2015	N001	0.0022			#	0.000029	
Vanadium	mg/L	11/05/2015	N001	0.0017	J	U	#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 1/30/2016
Location: 0398 SURFACE LOCATION

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	104			#		
Calcium	mg/L	11/05/2015	N001	110			#	0.024	
Chloride	mg/L	11/05/2015	N001	120		J	#	4	
Magnesium	mg/L	11/05/2015	N001	39			#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	0.21			#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	120.4			#		
pH	s.u.	11/05/2015	N001	8.3			#		
Potassium	mg/L	11/05/2015	N001	3.5			#	0.052	
Selenium	mg/L	11/05/2015	N001	0.0021		U	#	0.00032	
Sodium	mg/L	11/05/2015	N001	120			#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	1335			#		
Sulfate	mg/L	11/05/2015	N001	260		J	#	10	
Temperature	C	11/05/2015	N001	10.26			#		
Turbidity	NTU	11/05/2015	N001	4.67			#		
Uranium	mg/L	11/05/2015	N001	0.012			#	0.000029	
Vanadium	mg/L	11/05/2015	N001	0.003		U	#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RFO01, Rifle Old Processing Site

REPORT DATE: 1/30/2016

Location: 0741 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	11/05/2015	N001	110			#		
Calcium	mg/L	11/05/2015	N001	70			#	0.024	
Chloride	mg/L	11/05/2015	N001	170		J	#	4	
Magnesium	mg/L	11/05/2015	N001	14			#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	11/05/2015	N001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	11/05/2015	N001	34			#		
pH	s.u.	11/05/2015	N001	8.66			#		
Potassium	mg/L	11/05/2015	N001	3.7			#	0.052	
Selenium	mg/L	11/05/2015	N001	0.00079	J	J	#	0.00032	
Sodium	mg/L	11/05/2015	N001	120			#	0.047	
Specific Conductance	umhos/cm	11/05/2015	N001	1044			#		
Sulfate	mg/L	11/05/2015	N001	100		J	#	10	
Temperature	C	11/05/2015	N001	6.85			#		
Turbidity	NTU	11/05/2015	N001	8.02			#		
Uranium	mg/L	11/05/2015	N001	0.0024			#	0.000029	
Vanadium	mg/L	11/05/2015	N001	0.0018	J	U	#	0.00015	

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.

Equipment Blank Data

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BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)

RIN: 15107463

Report Date: 1/30/2016

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Data	Detection Limit	Uncertainty	Sample Type
Ammonia Total as N	RFN01	0999	11/05/2015	N001	mg/L	0.1	U		0.1		E
Arsenic	RFN01	0999	11/05/2015	N001	mg/L	0.00015	U		0.00015		E
Calcium	RFN01	0999	11/05/2015	N001	mg/L	0.08	J	U	0.024		E
Chloride	RFN01	0999	11/05/2015	N001	mg/L	0.2	U		0.2		E
Magnesium	RFN01	0999	11/05/2015	N001	mg/L	0.031	J		0.03		E
Molybdenum	RFN01	0999	11/05/2015	N001	mg/L	0.00032	U		0.00032		E
Nitrate + Nitrite as Nitrogen	RFN01	0999	11/05/2015	N001	mg/L	0.01	U		0.01		E
Potassium	RFN01	0999	11/05/2015	N001	mg/L	0.052	U		0.052		E
Selenium	RFN01	0999	11/05/2015	N001	mg/L	0.00032	U		0.00032		E
Sodium	RFN01	0999	11/05/2015	N001	mg/L	0.047	U		0.047		E
Sulfate	RFN01	0999	11/05/2015	N001	mg/L	0.5	U		0.5		E
Uranium	RFN01	0999	11/05/2015	N001	mg/L	0.00003	J		0.000029		E
Vanadium	RFN01	0999	11/05/2015	N001	mg/L	0.002	J	U	0.00015		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.
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.		

SAMPLE TYPES:

E Equipment Blank.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 1/30/2016

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0169	U	5275.47	11/06/2015	14:05:55	9.1	5266.37	
0170	D	5332.97	11/06/2015	15:15:49	94.39	5238.58	
0172	D	5229.45	11/05/2015	15:40:54	16.5	5212.95	
0195	D	5253.1	11/03/2015	15:55:07	10.13	5242.97	
0215	O	5271.42	11/06/2015	13:40:20	10.84	5260.58	
0216	O	5265.41	11/03/2015	13:00:18	6.54	5258.87	
0217	D	5256.98	11/03/2015	14:50:59	4.4	5252.58	
0590	D	5256.37	11/03/2015	13:40:56	6.74	5249.63	
0620	D	5231.22	11/05/2015	09:10:22	10.58	5220.64	
0658	O	5265.91	11/06/2015	13:00:22	6.62	5259.29	
0659	O	5261.33	11/06/2015	10:10:16	6.48	5254.85	
0664	O	5270.17	11/06/2015	10:50:58	13.12	5257.05	
0669	O	5266.56	11/06/2015	10:25:33	9.8	5256.76	
0670	O	5270.94	11/06/2015	13:15:39	12.64	5258.3	
0855	O	5267.24	11/06/2015	12:25:52	7.86	5259.38	

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWNGRADIENT F OFFSITE
N UNKNOWN O ONSITE U UPGRADIENT

WATER LEVEL FLAGS: D Dry F Flowing B Below top of pump

STATIC WATER LEVELS (USEE700) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 1/30/2016

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0292A		5323.08	11/03/2015	10:10:04	11.68	5311.4	
0304	O	5310.63	11/05/2015	12:25:23	11.48	5299.15	
0305	O	5312.08	11/05/2015	12:45:40	12.56	5299.52	
0309	O	5313.37	11/05/2015	13:55:28	16.01	5297.36	
0310	O	5311.64	11/05/2015	13:30:44	13.75	5297.89	
0655	O	5312.87	11/05/2015	13:05:15	13.7	5299.17	
0656	O	5313.28	11/05/2015	11:45:50	13.5	5299.78	
0658	U	5323.07	11/03/2015	09:35:43	7.59	5315.48	

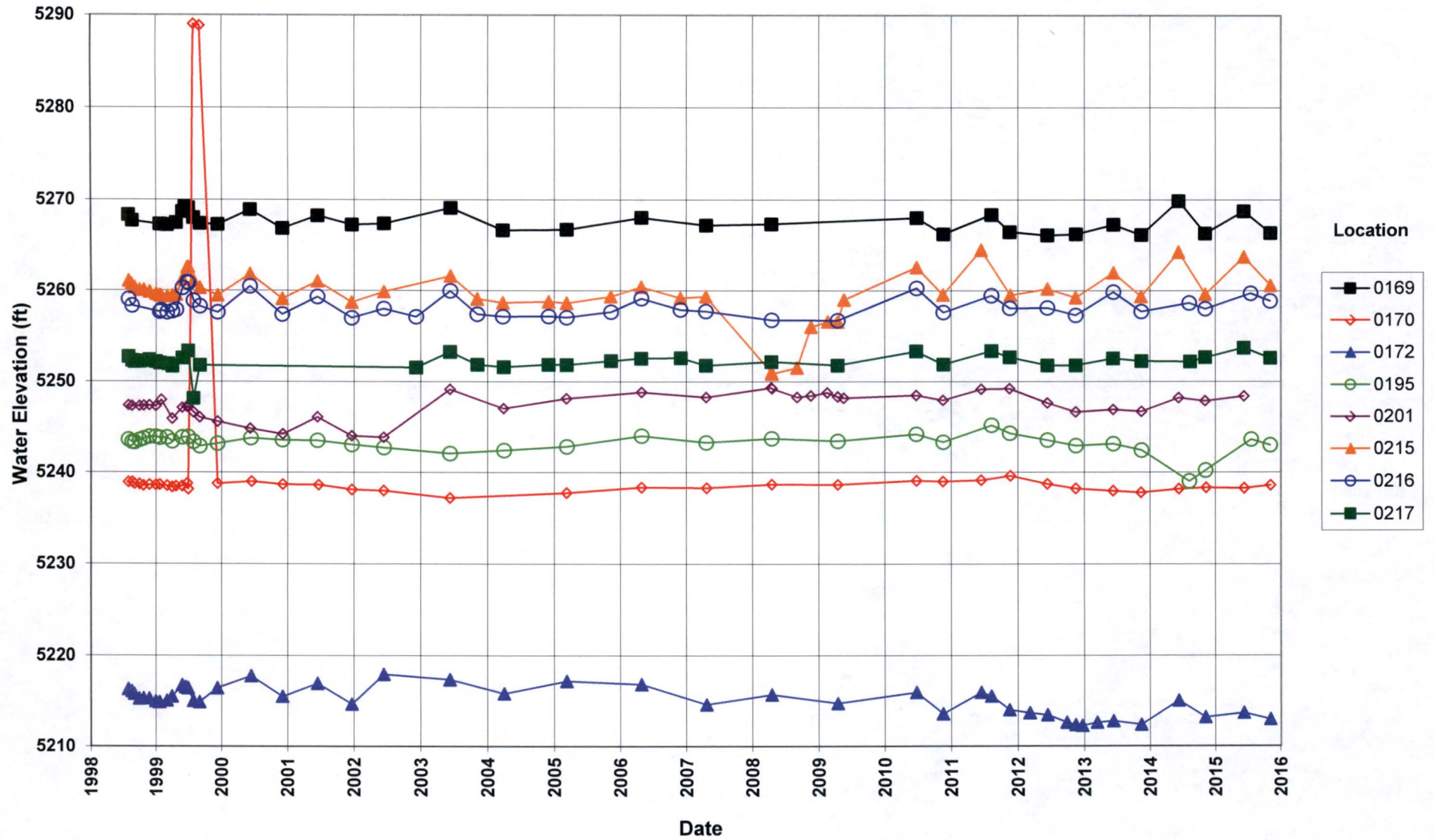
FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWNGRADIENT F OFFSITE
N UNKNOWN O ONSITE U UPGRADIENT

WATER LEVEL FLAGS: D Dry F Flowing B Below top of pump

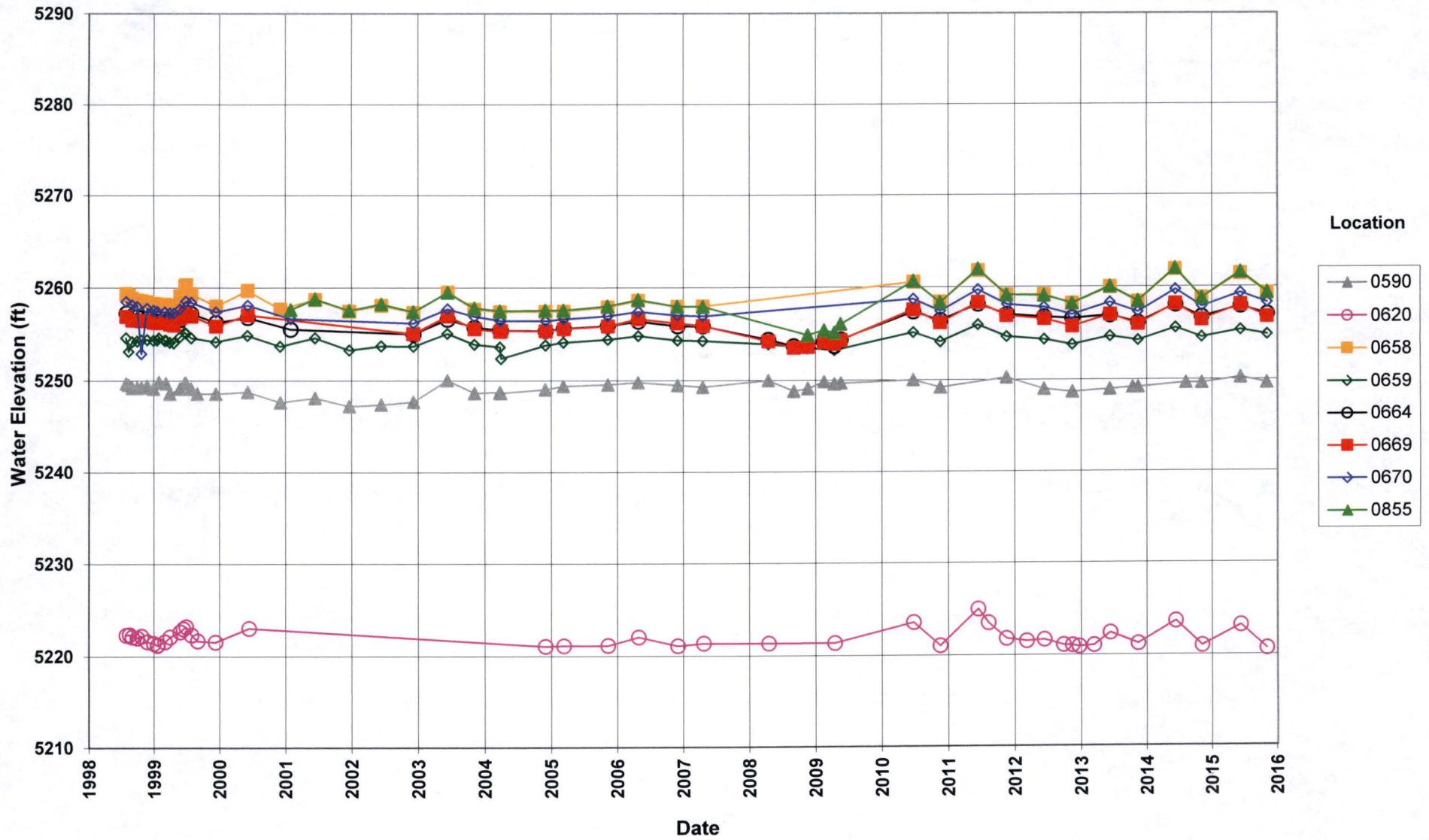
New Rifle Hydrographs

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Rifle New Processing Site Hydrograph



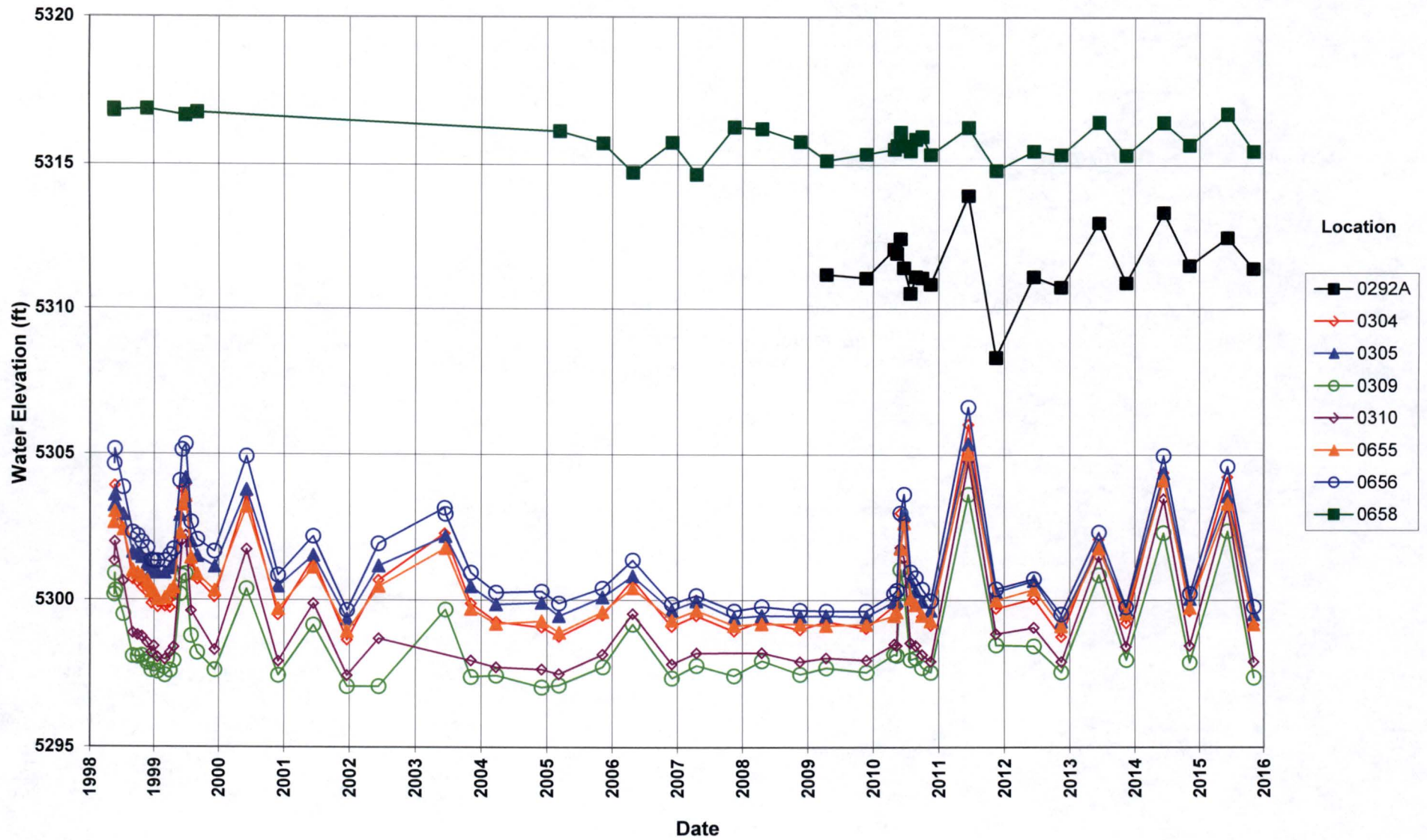
Rifle New Processing Site Hydrograph



Old Rifle Hydrograph

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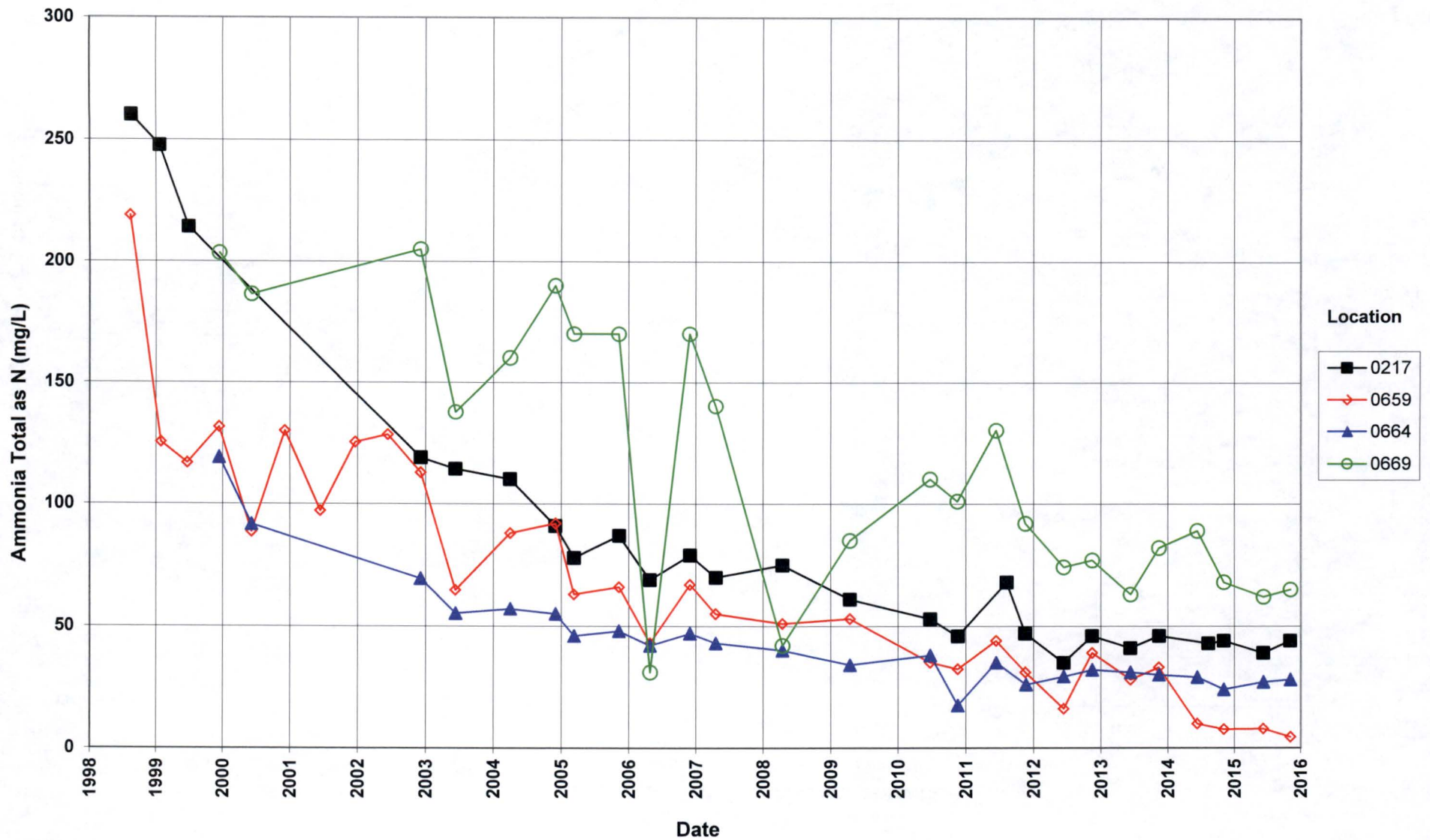
Rifle Old Processing Site Hydrograph



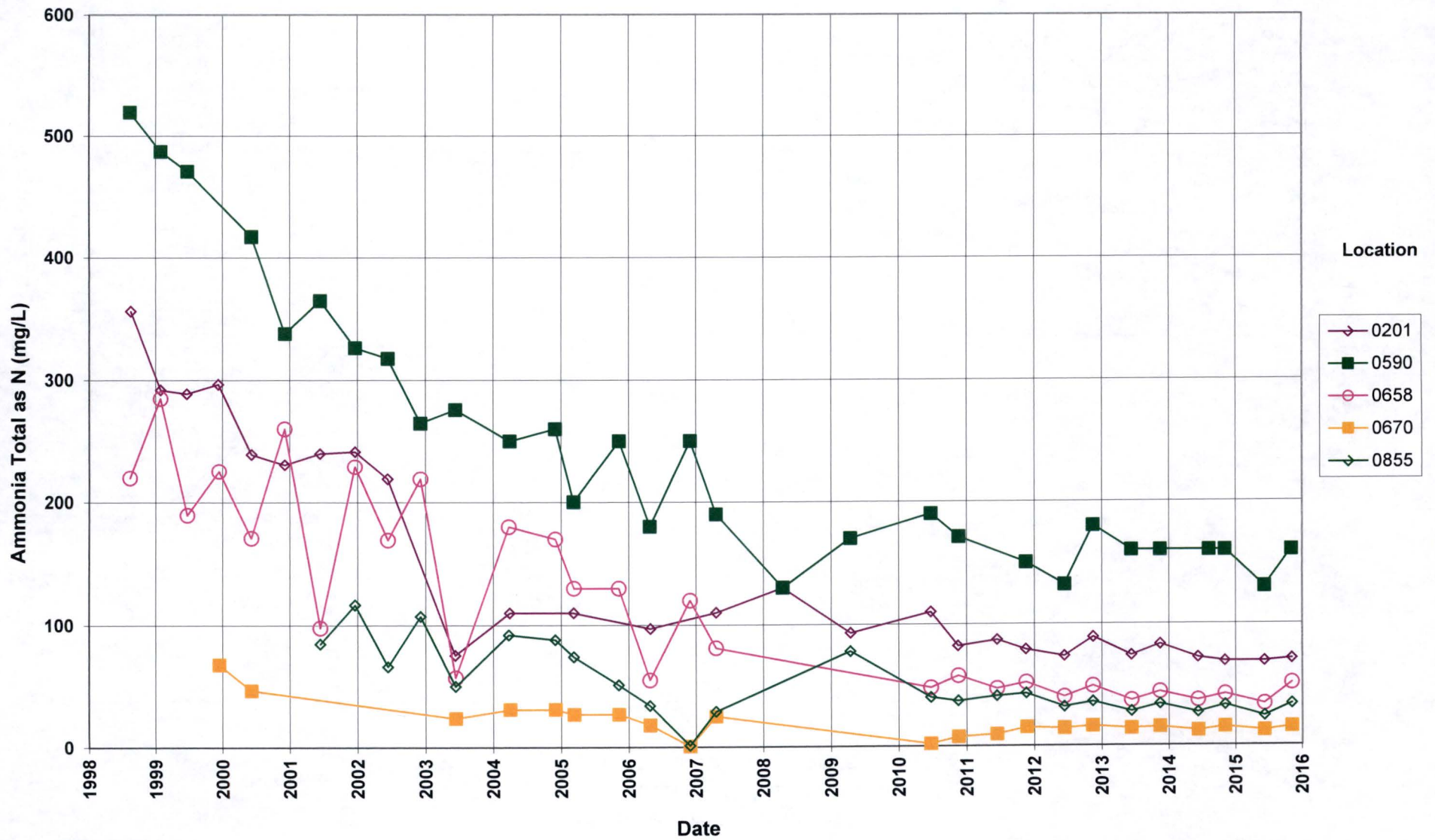
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New Rifle
Groundwater Time-Concentration Graphs

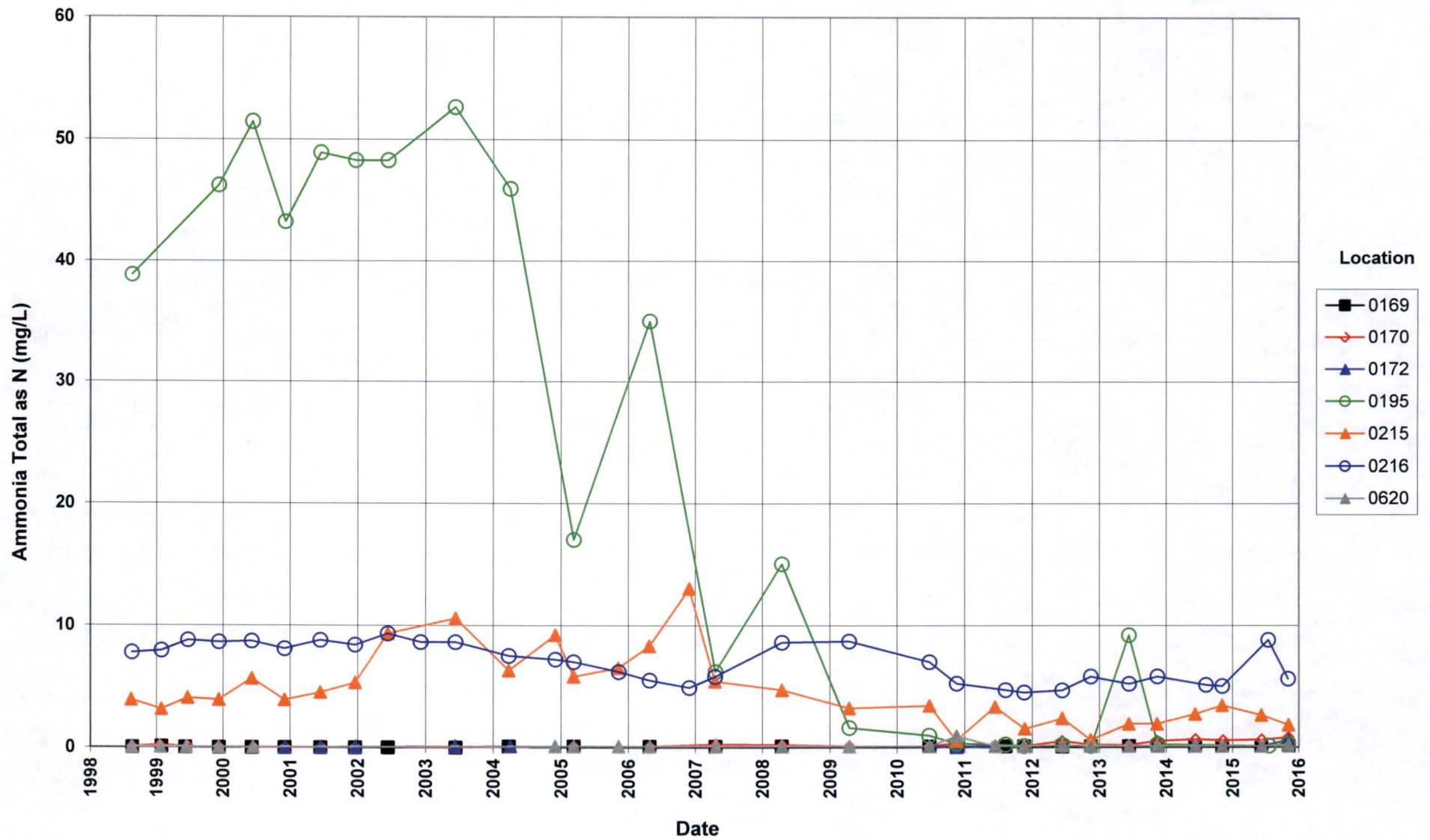
**Rifle New Processing Site
Ammonia Total as N Concentration
Point of Compliance Wells**



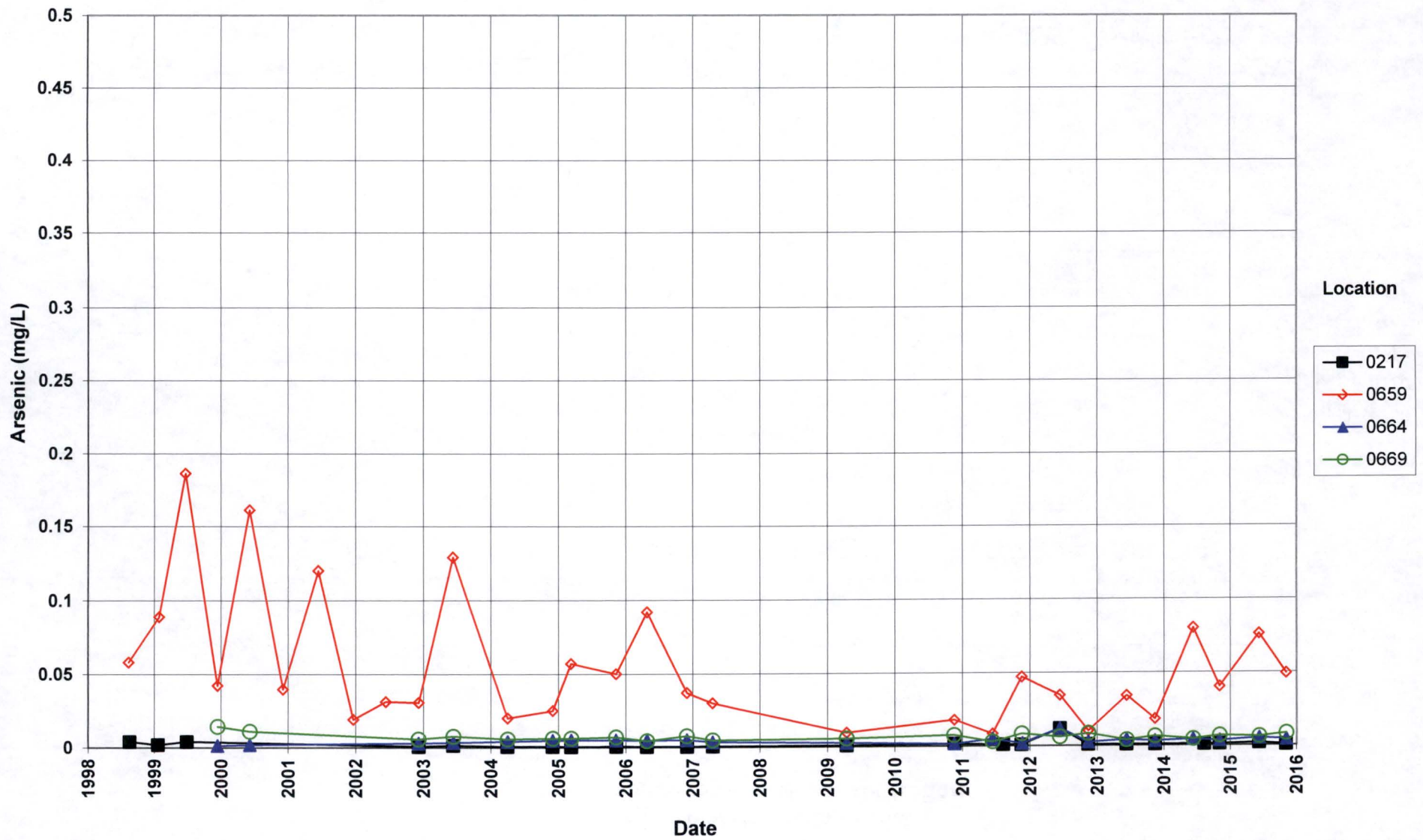
Rifle New Processing Site Ammonia Total as N Concentration



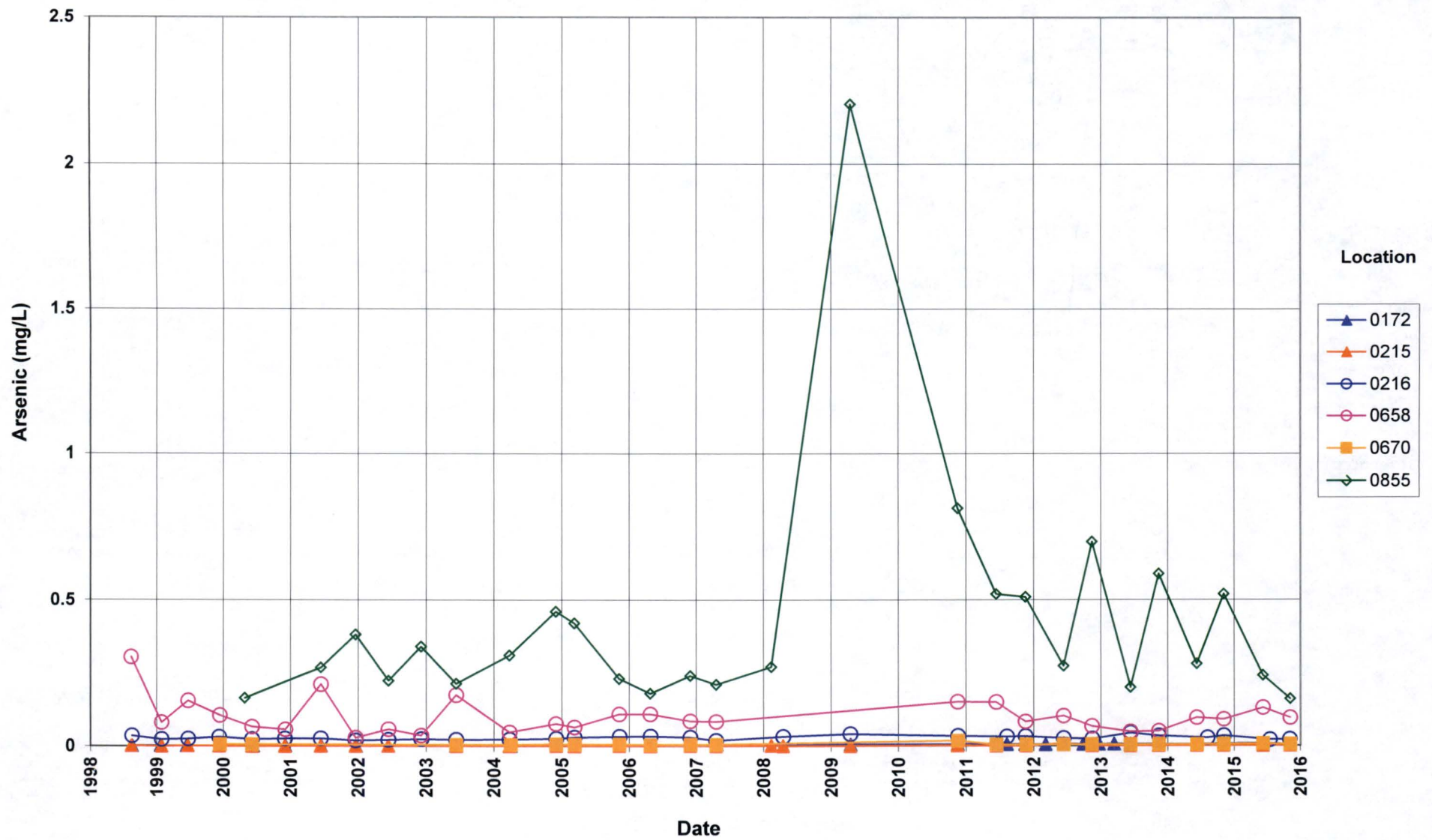
Rifle New Processing Site
Ammonia Total as N Concentration



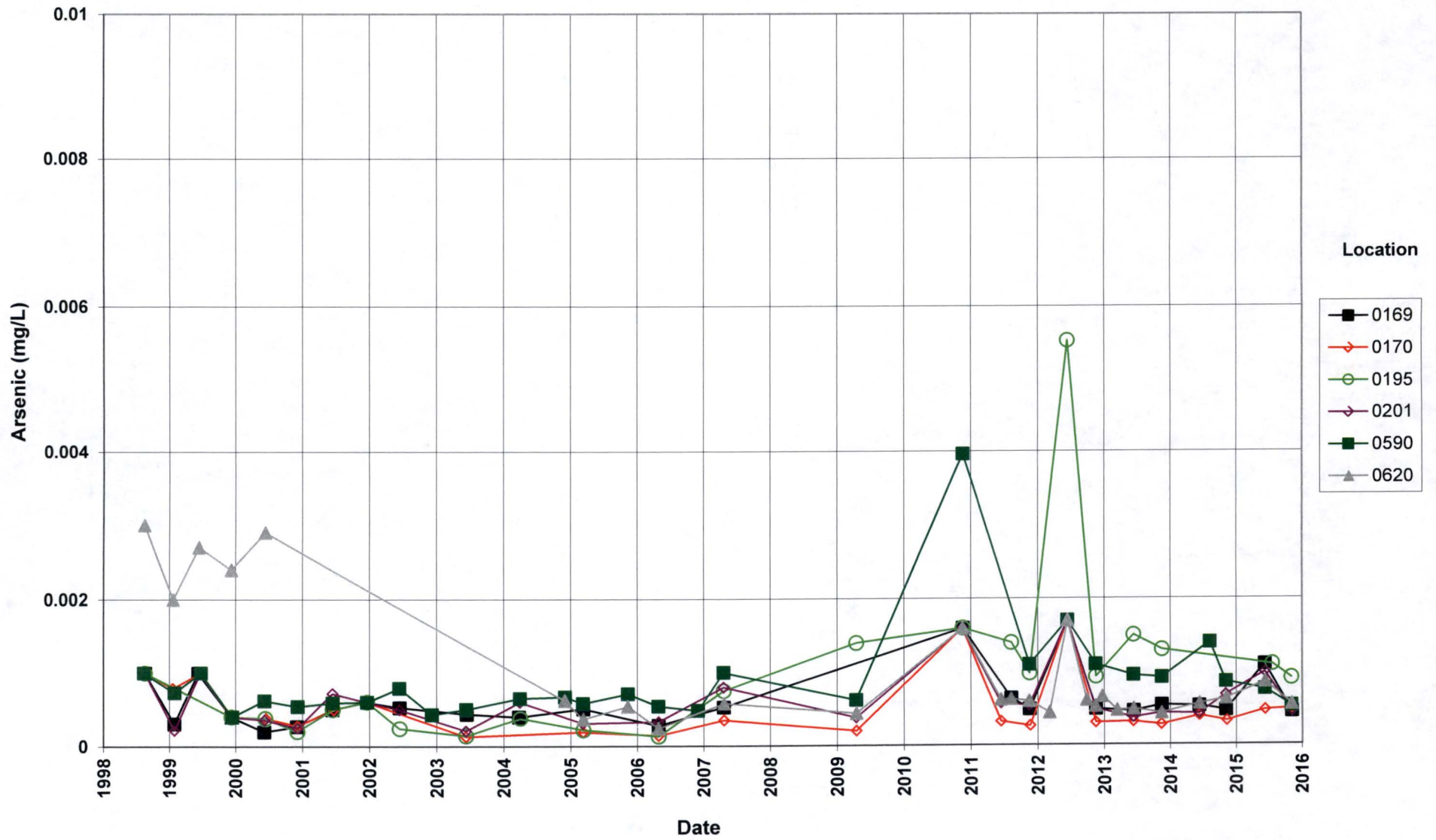
Rifle New Processing Site
Arsenic Concentration
Point of Compliance Wells



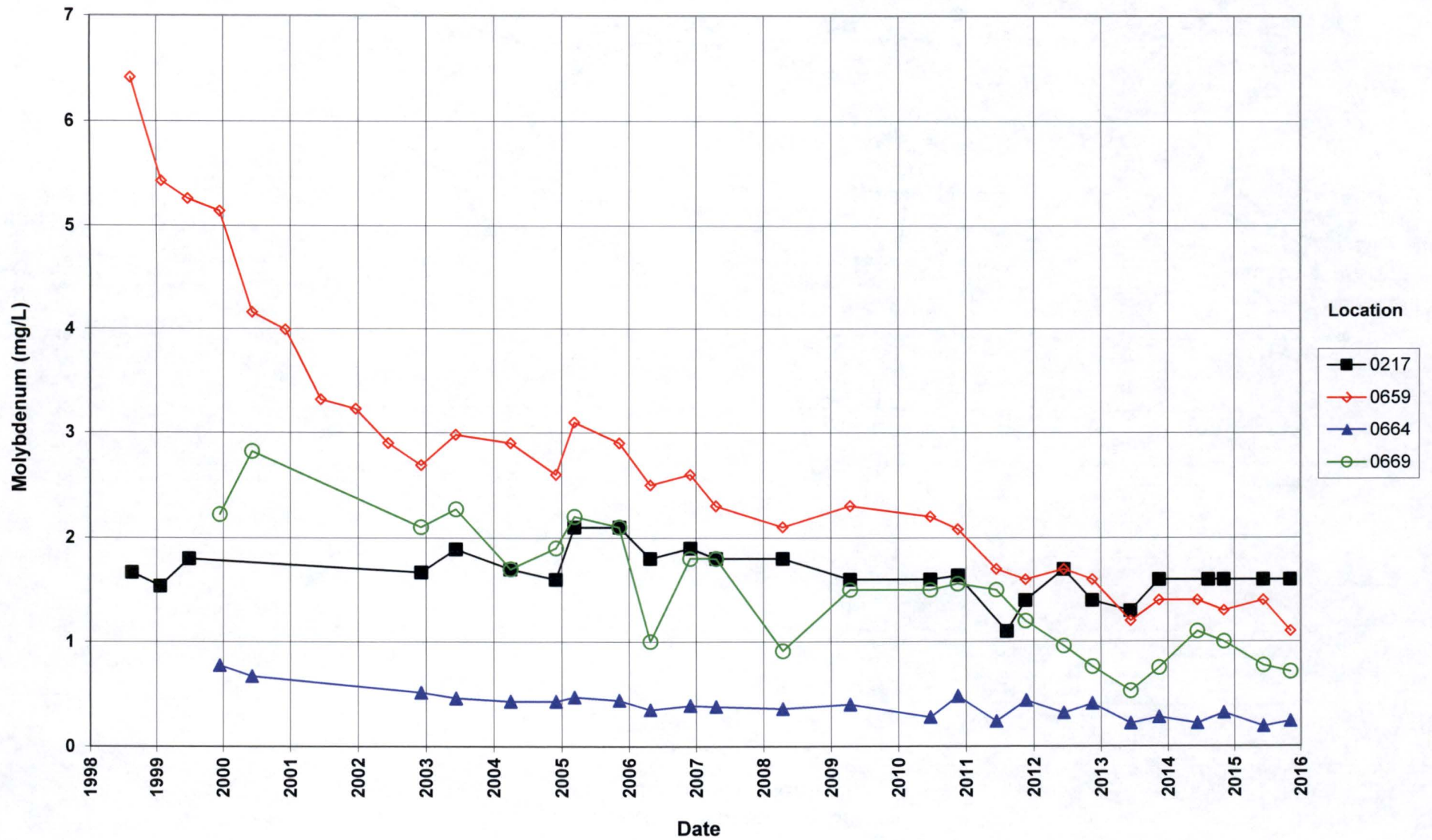
Rifle New Processing Site Arsenic Concentration



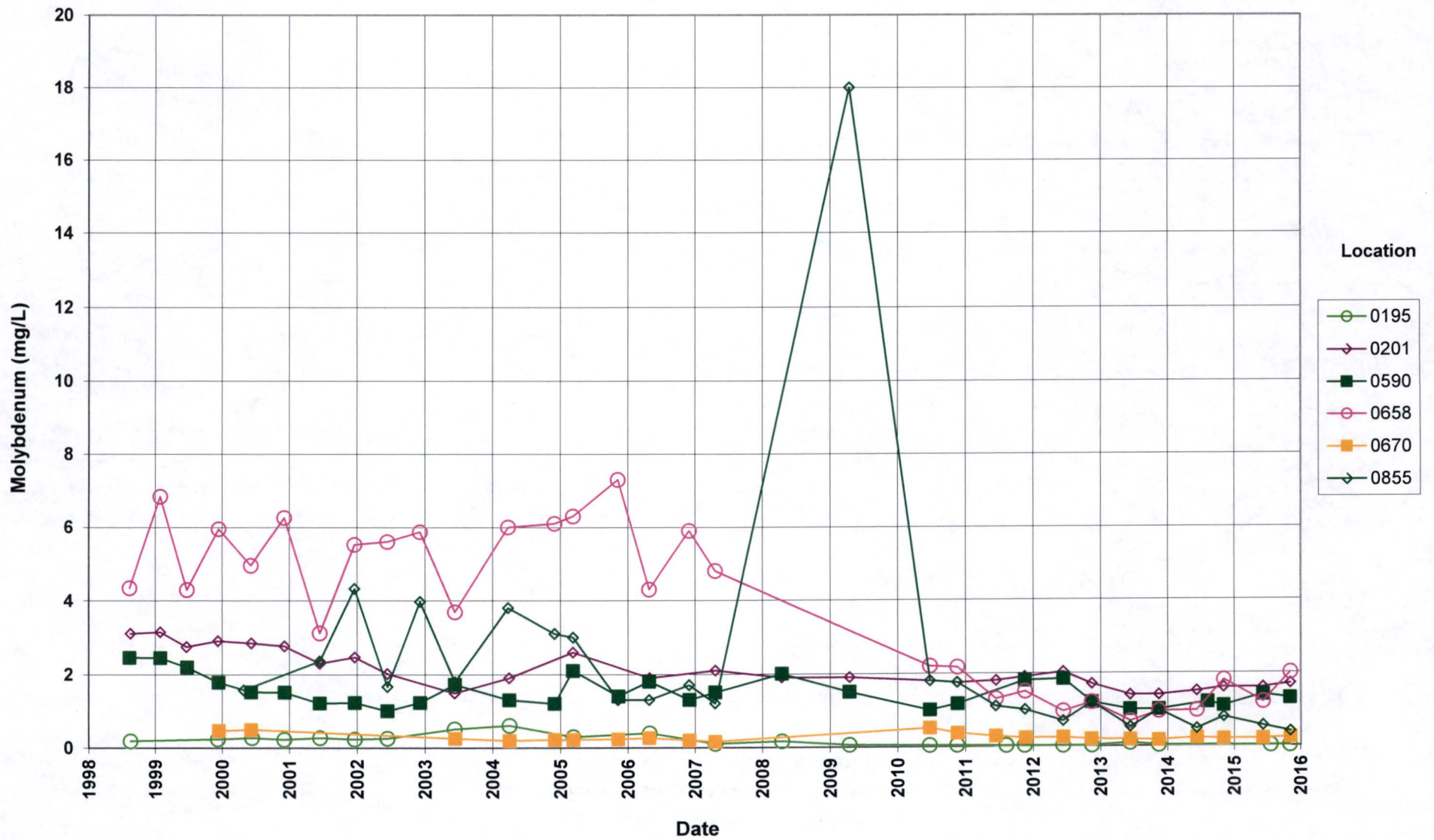
Rifle New Processing Site Arsenic Concentration



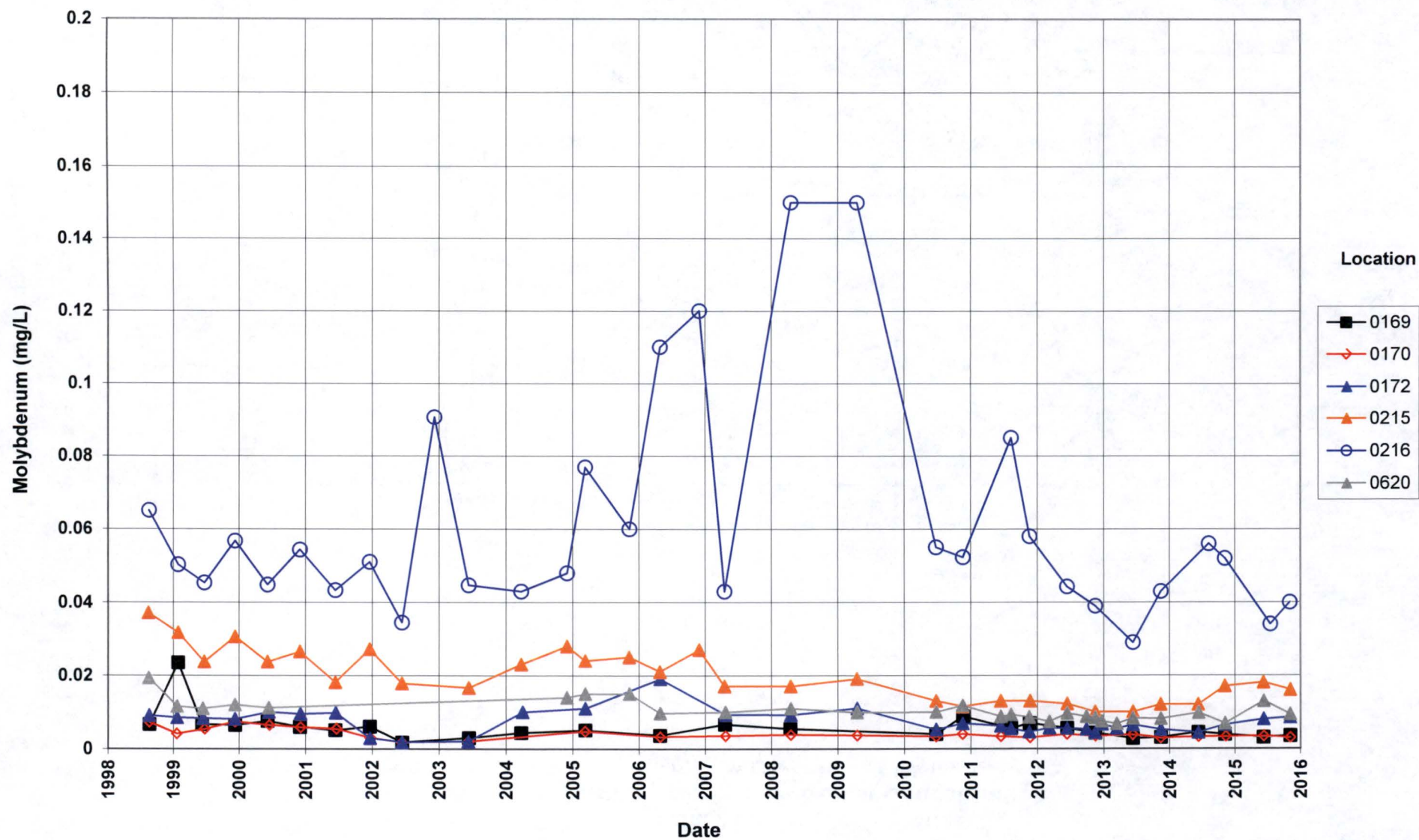
**Rifle New Processing Site
Molybdenum Concentration
Point of Compliance Wells**



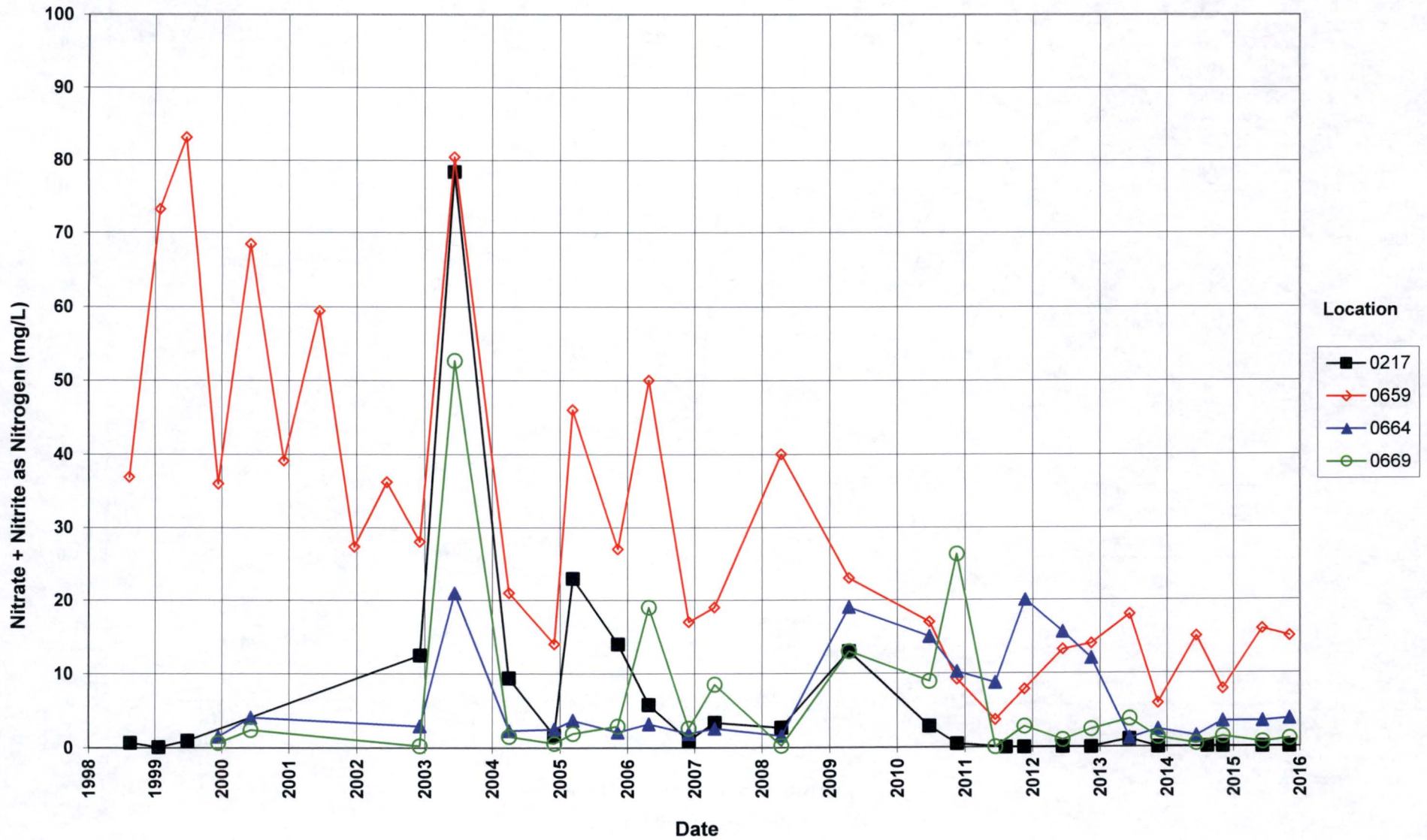
Rifle New Processing Site Molybdenum Concentration



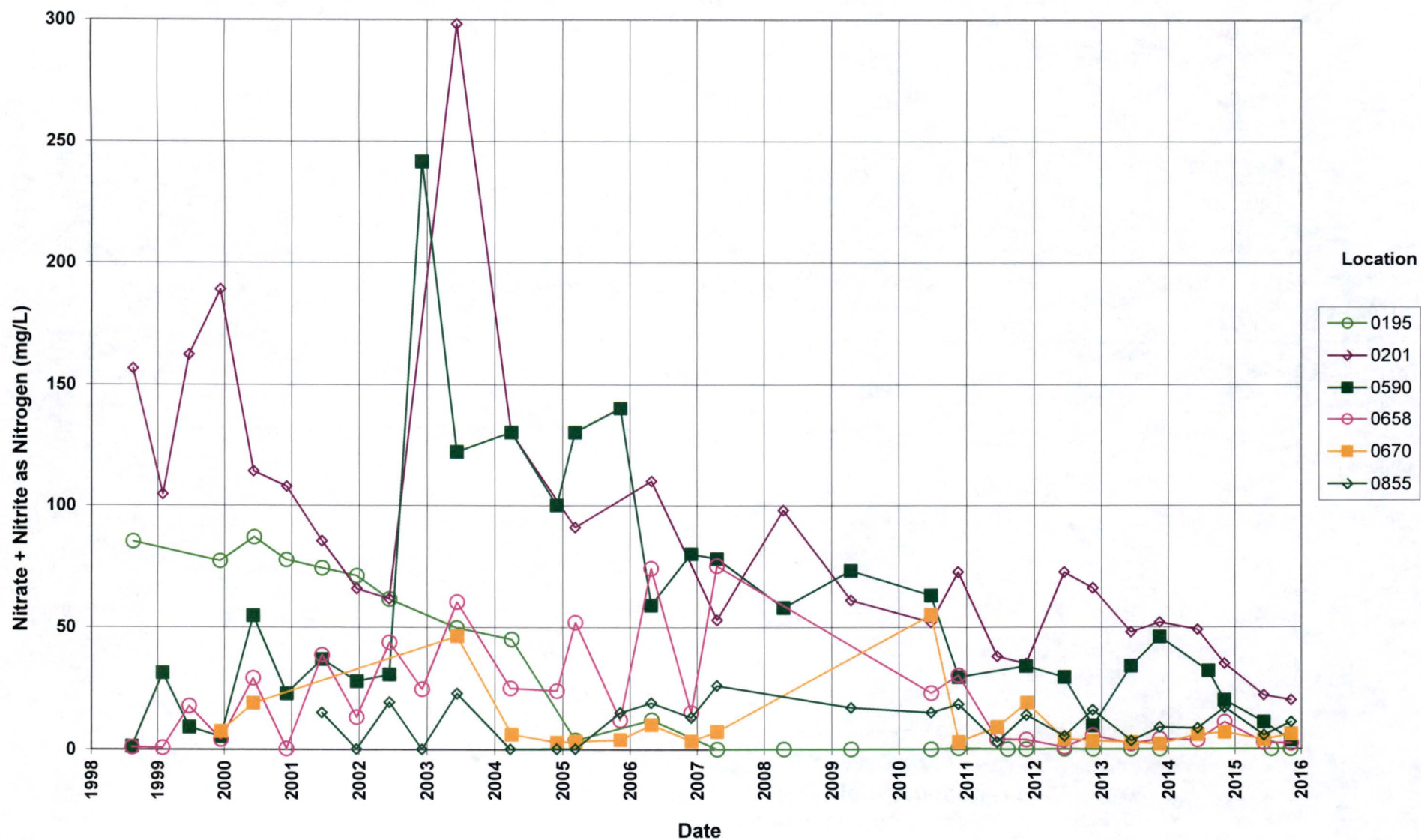
Rifle New Processing Site Molybdenum Concentration



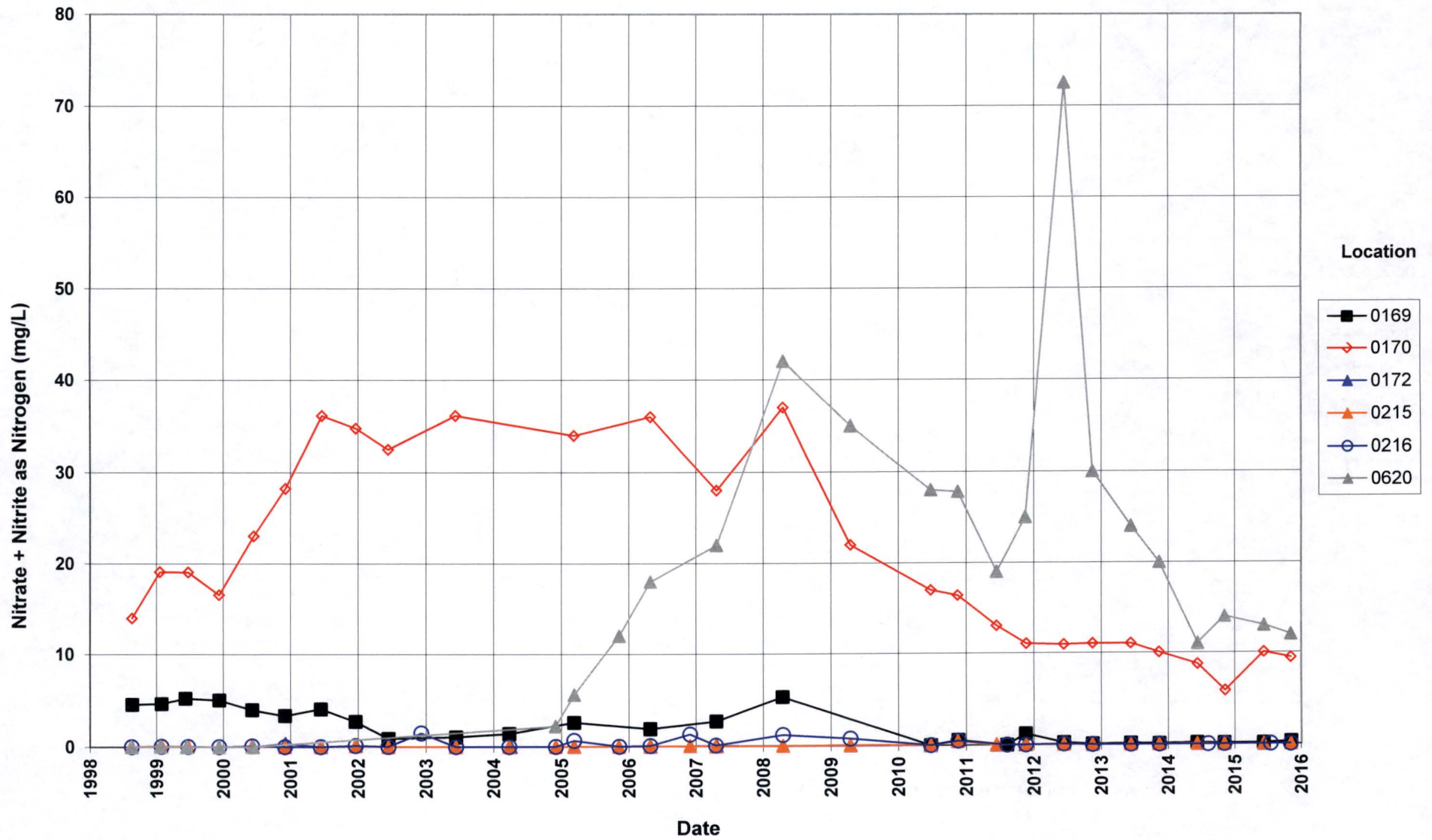
**Rifle New Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Point of Compliance Wells**



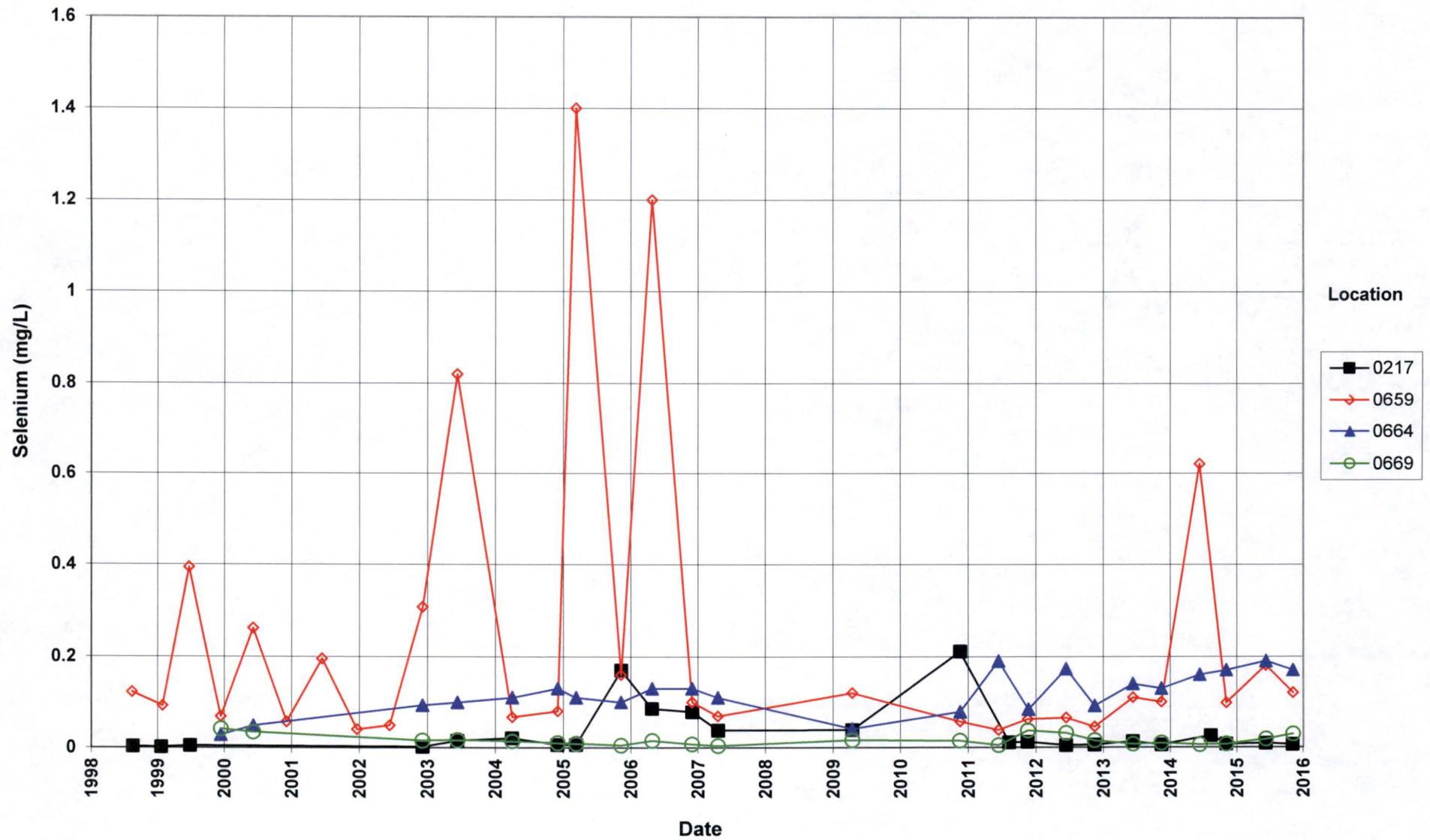
Rifle New Processing Site Nitrate + Nitrite as Nitrogen Concentration



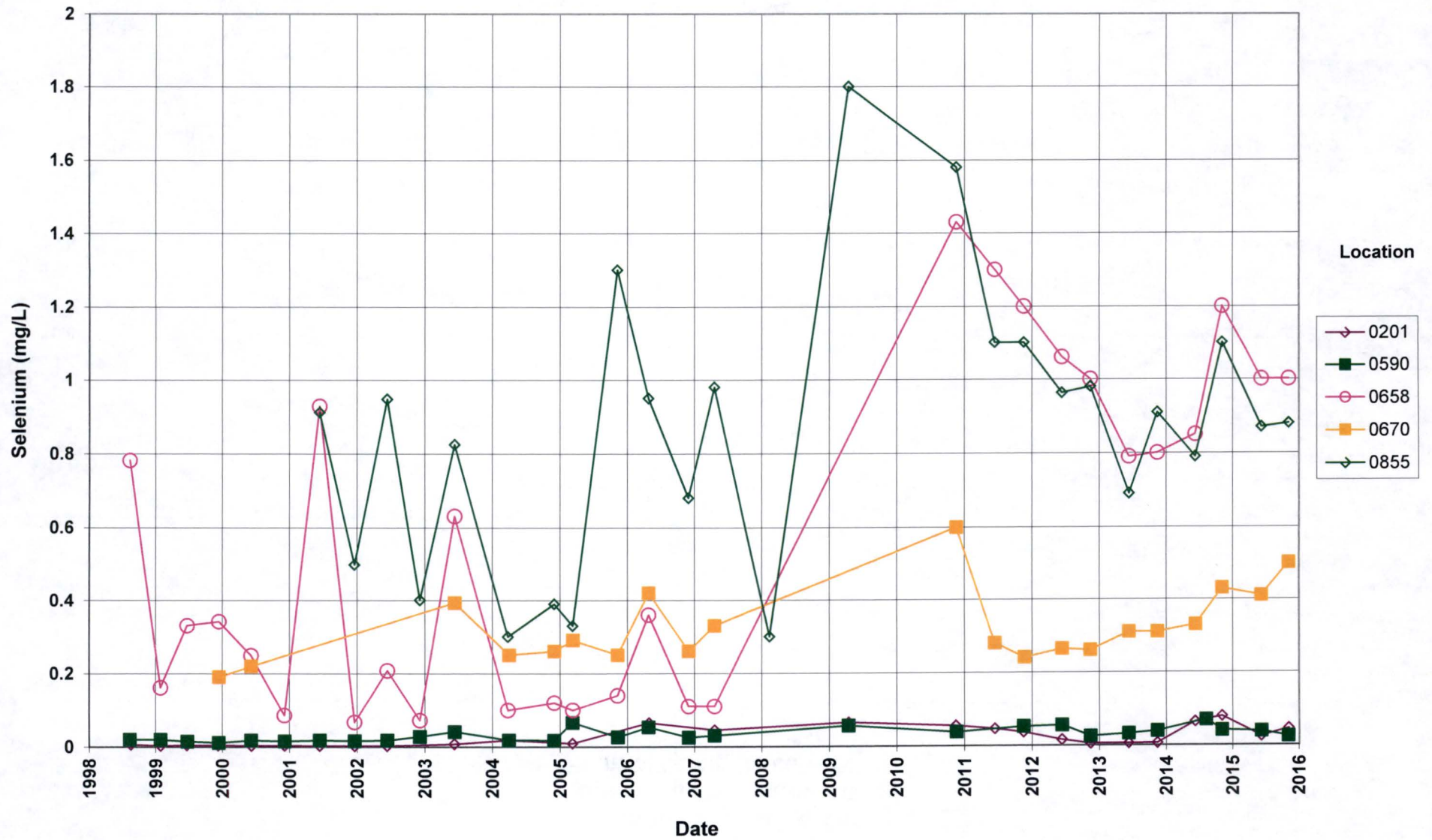
Rifle New Processing Site
Nitrate + Nitrite as Nitrogen Concentration



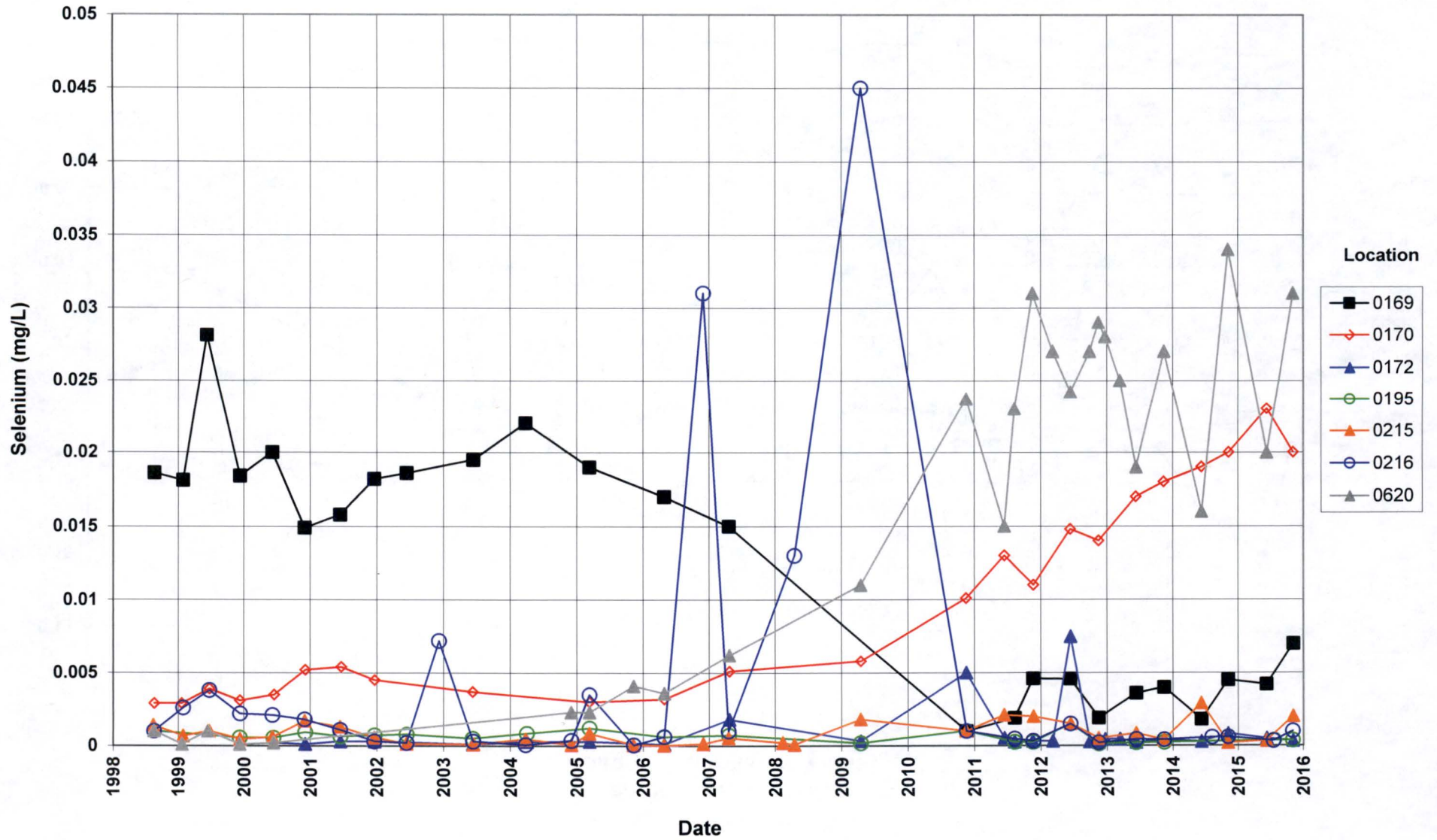
Rifle New Processing Site
Selenium Concentration
Point of Compliance Wells



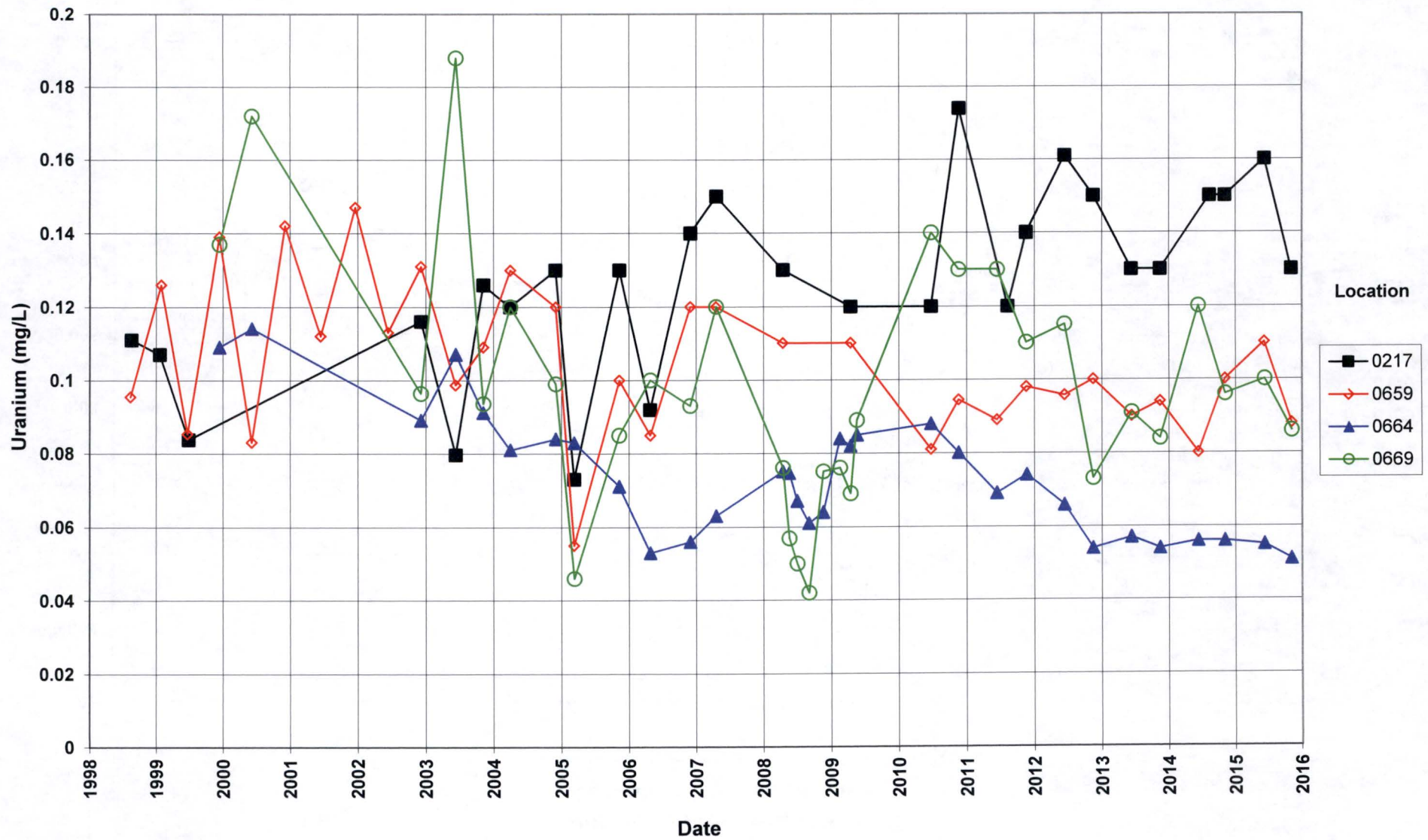
Rifle New Processing Site Selenium Concentration



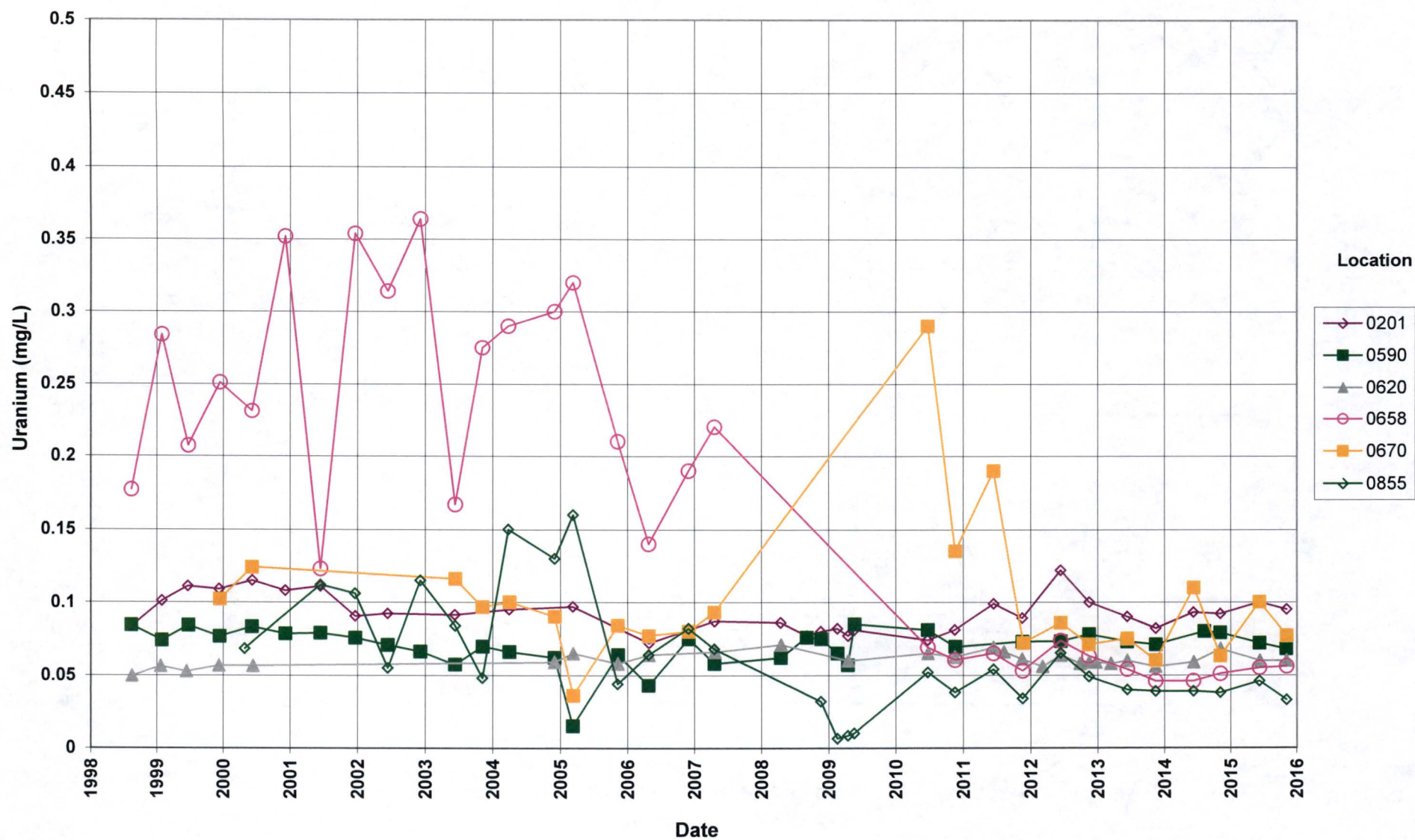
Rifle New Processing Site Selenium Concentration



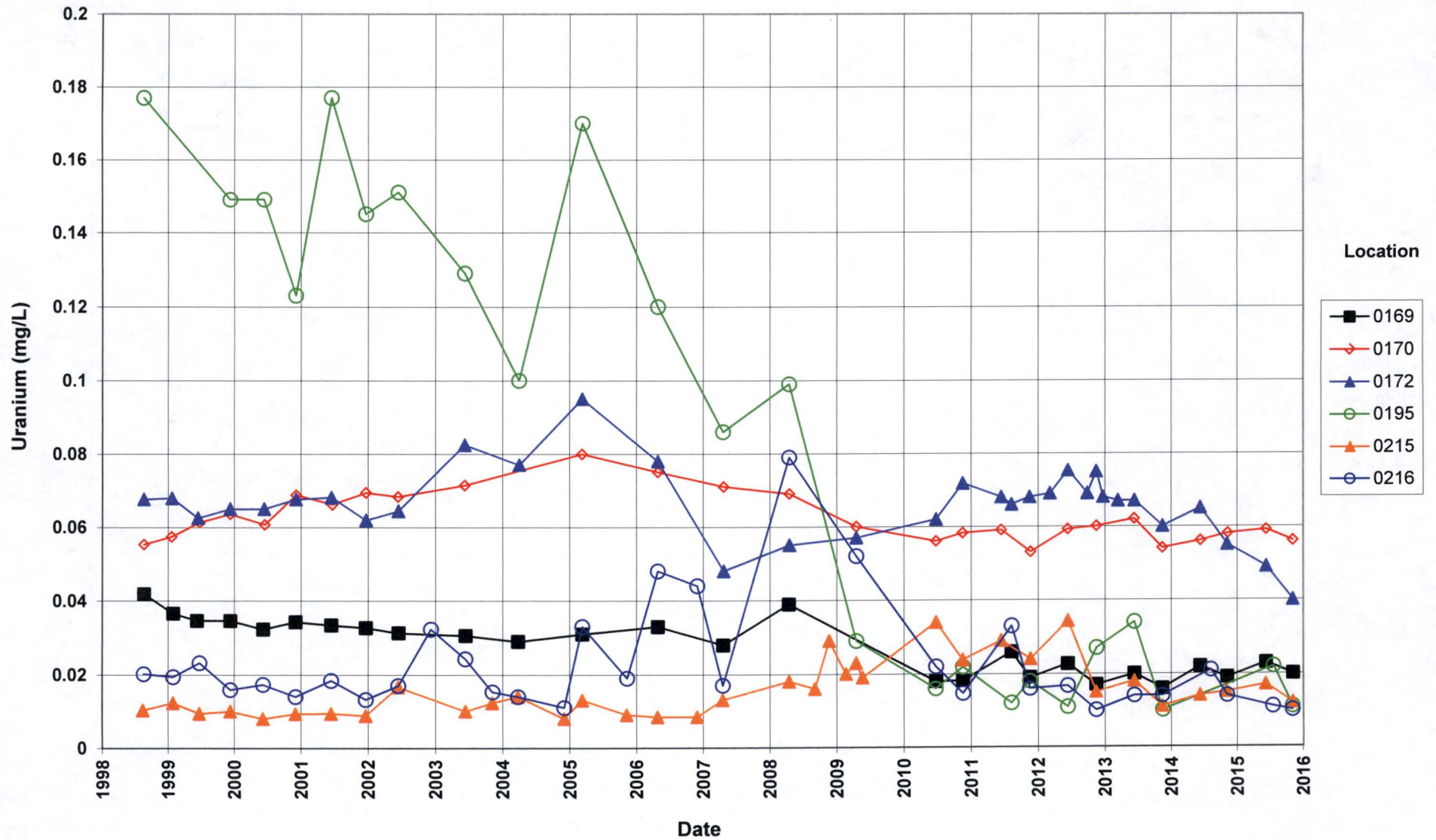
Rifle New Processing Site
Uranium Concentration
Point of Compliance Wells



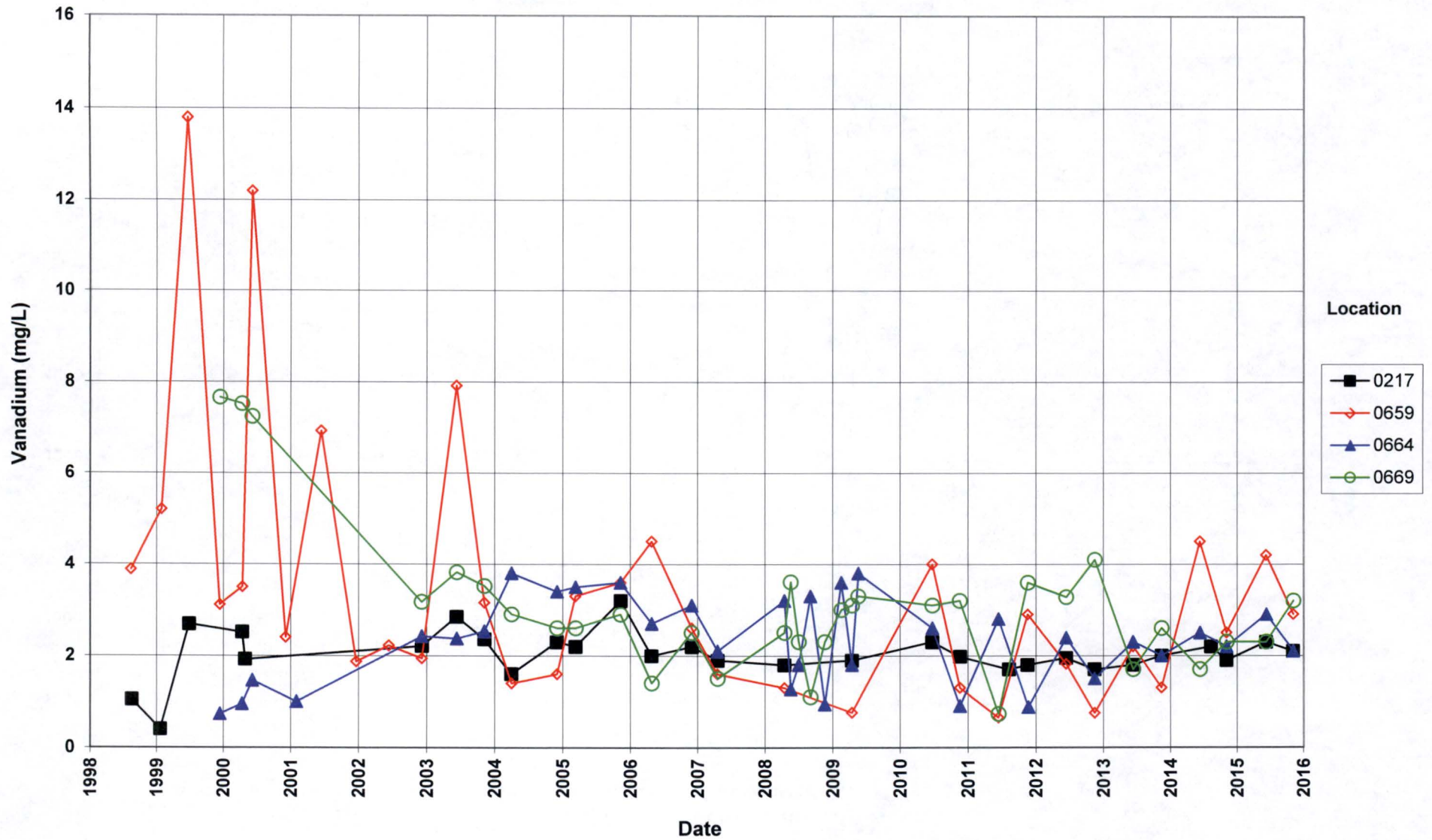
Rifle New Processing Site Uranium Concentration



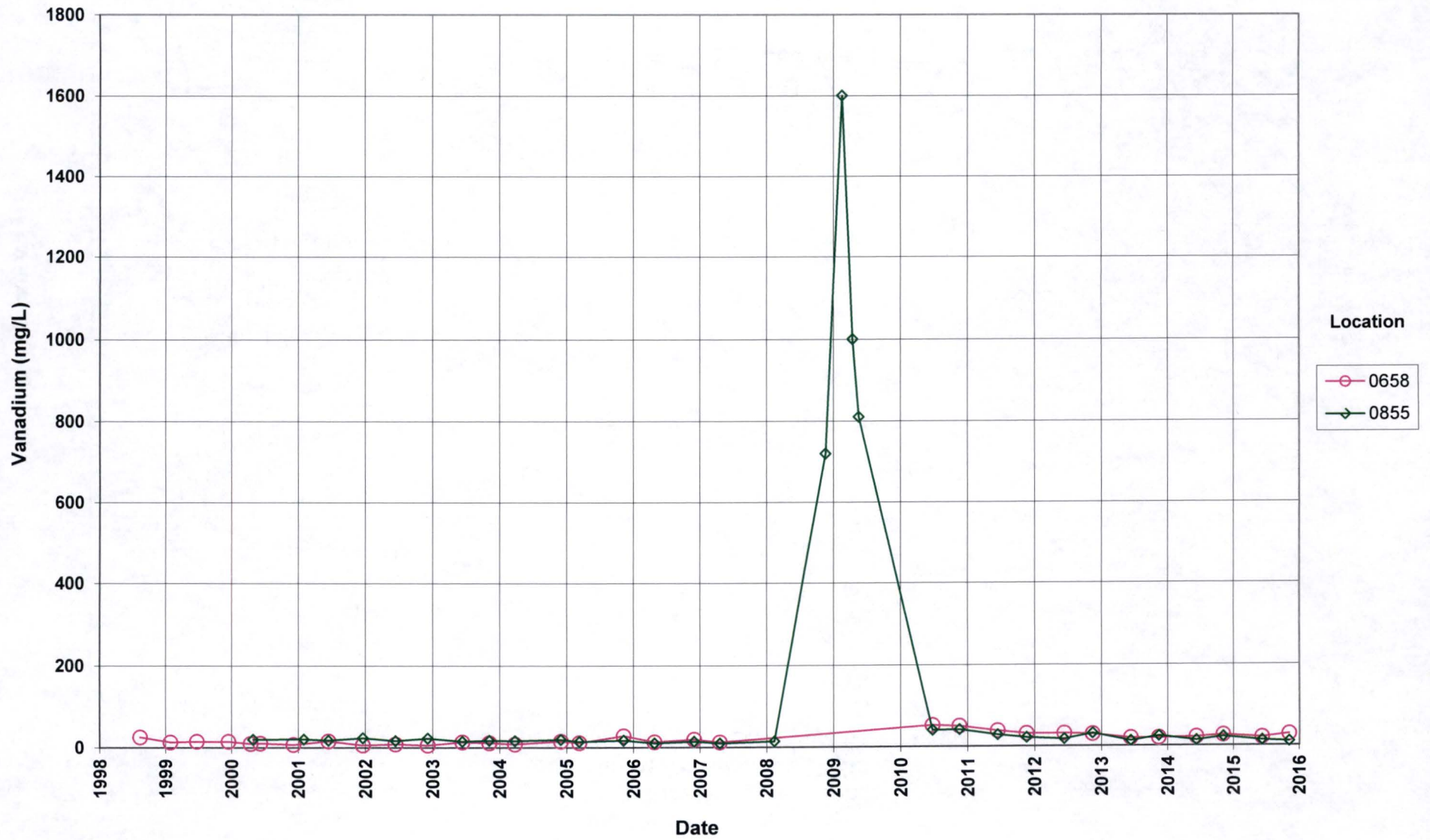
Rifle New Processing Site Uranium Concentration



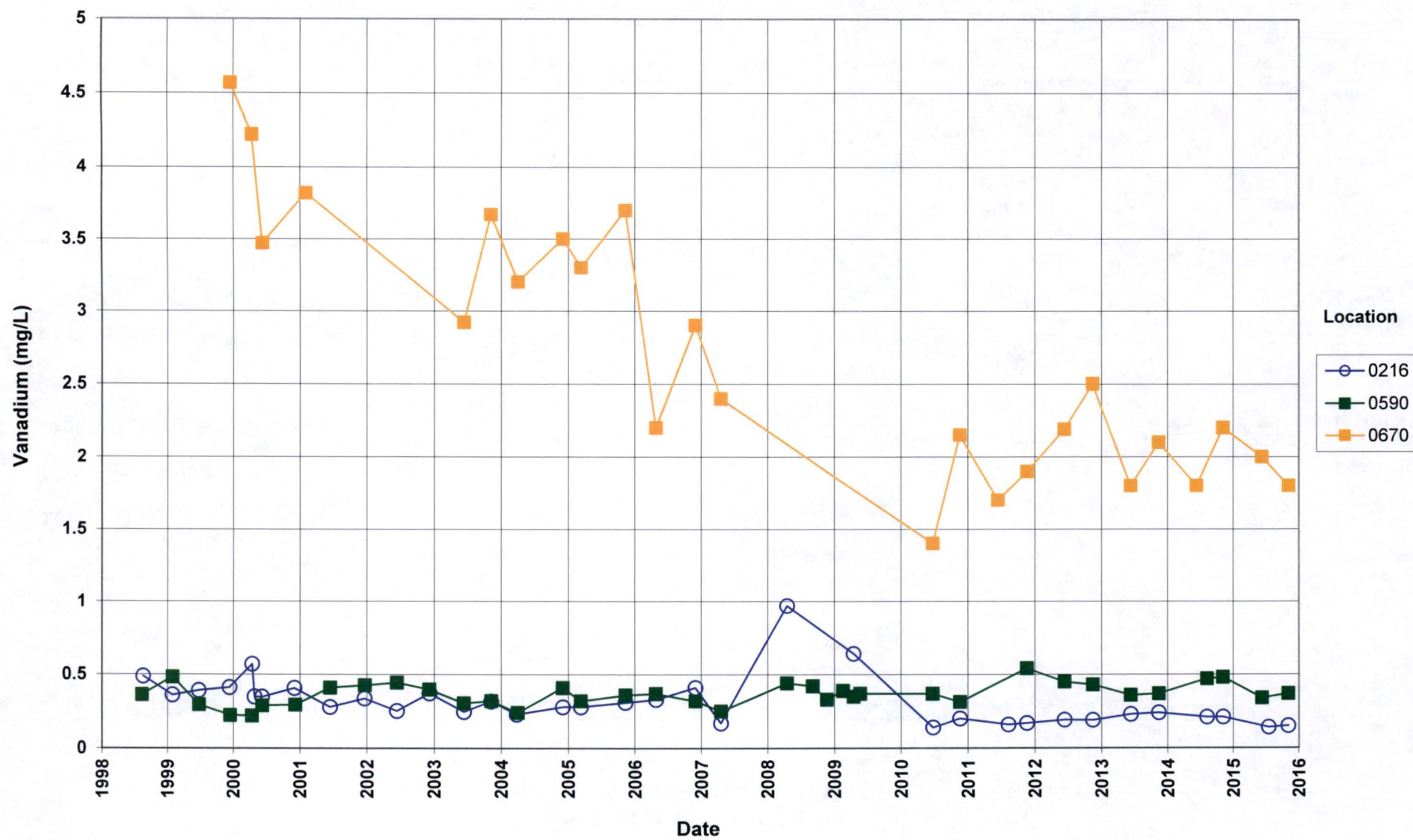
Rifle New Processing Site
Vanadium Concentration
Point of Compliance Wells
Alternate Concentration Limit (ACL) = 50 mg/L



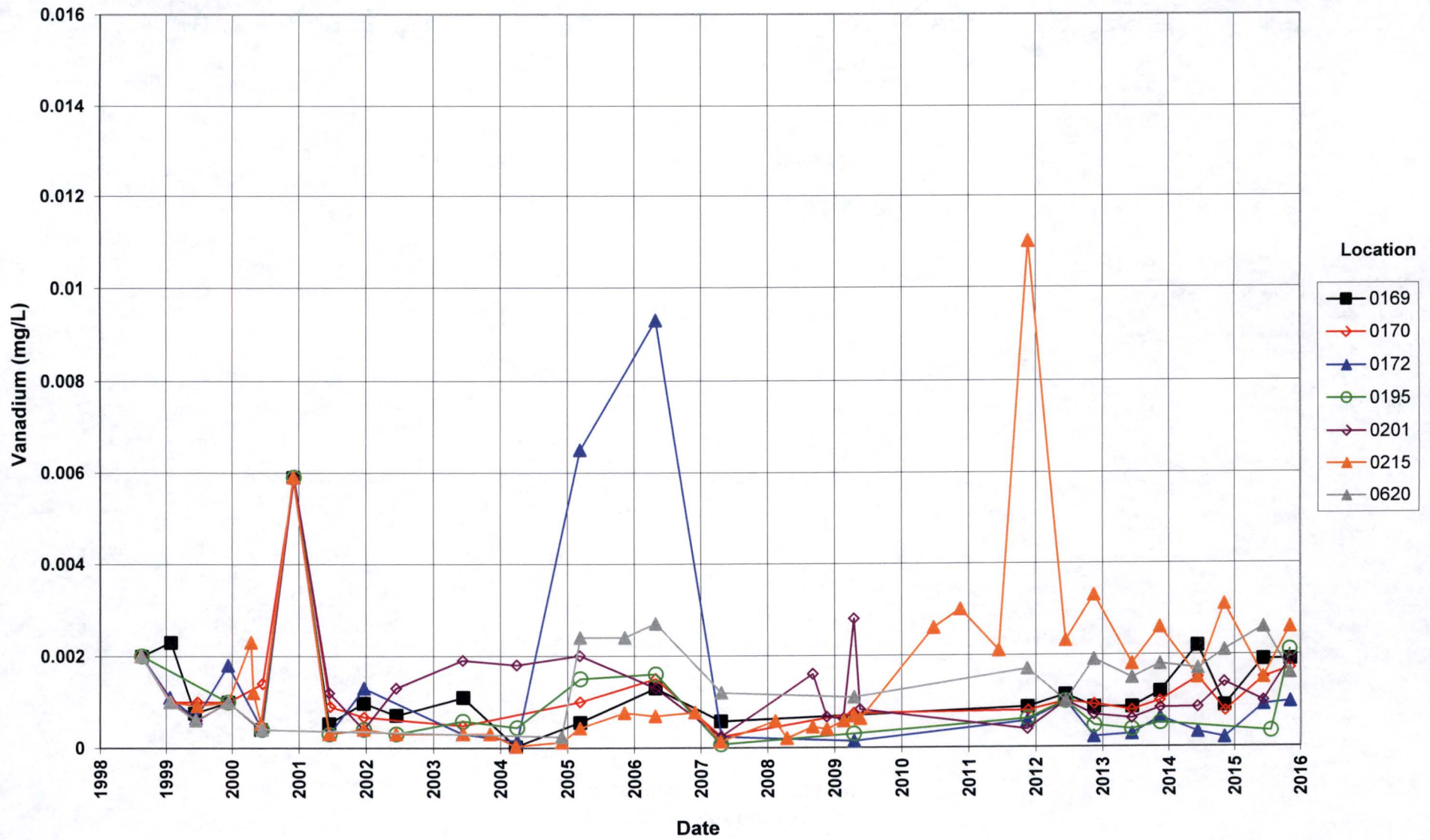
Rifle New Processing Site Vanadium Concentration



Rifle New Processing Site Vanadium Concentration



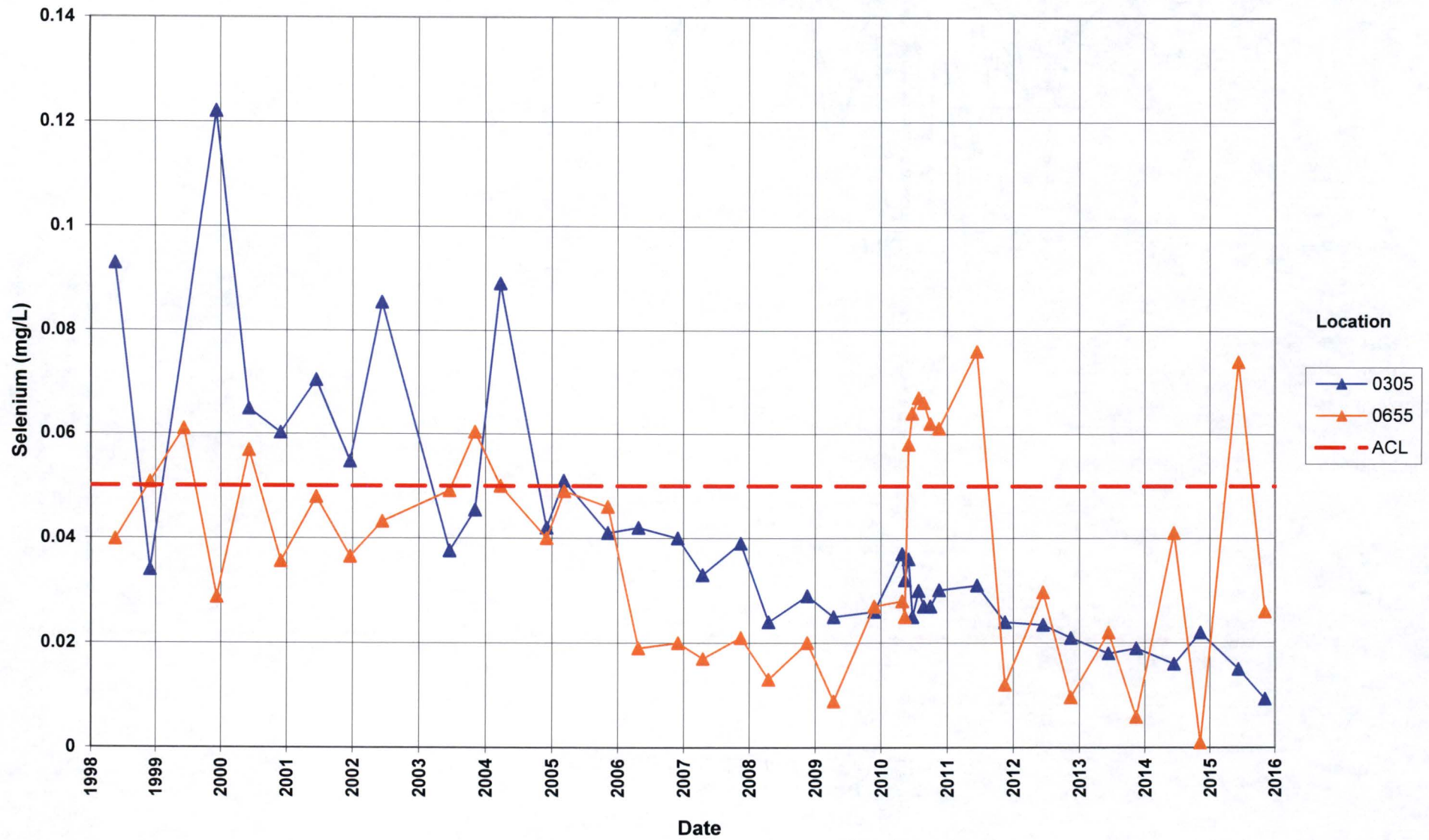
Rifle New Processing Site Vanadium Concentration



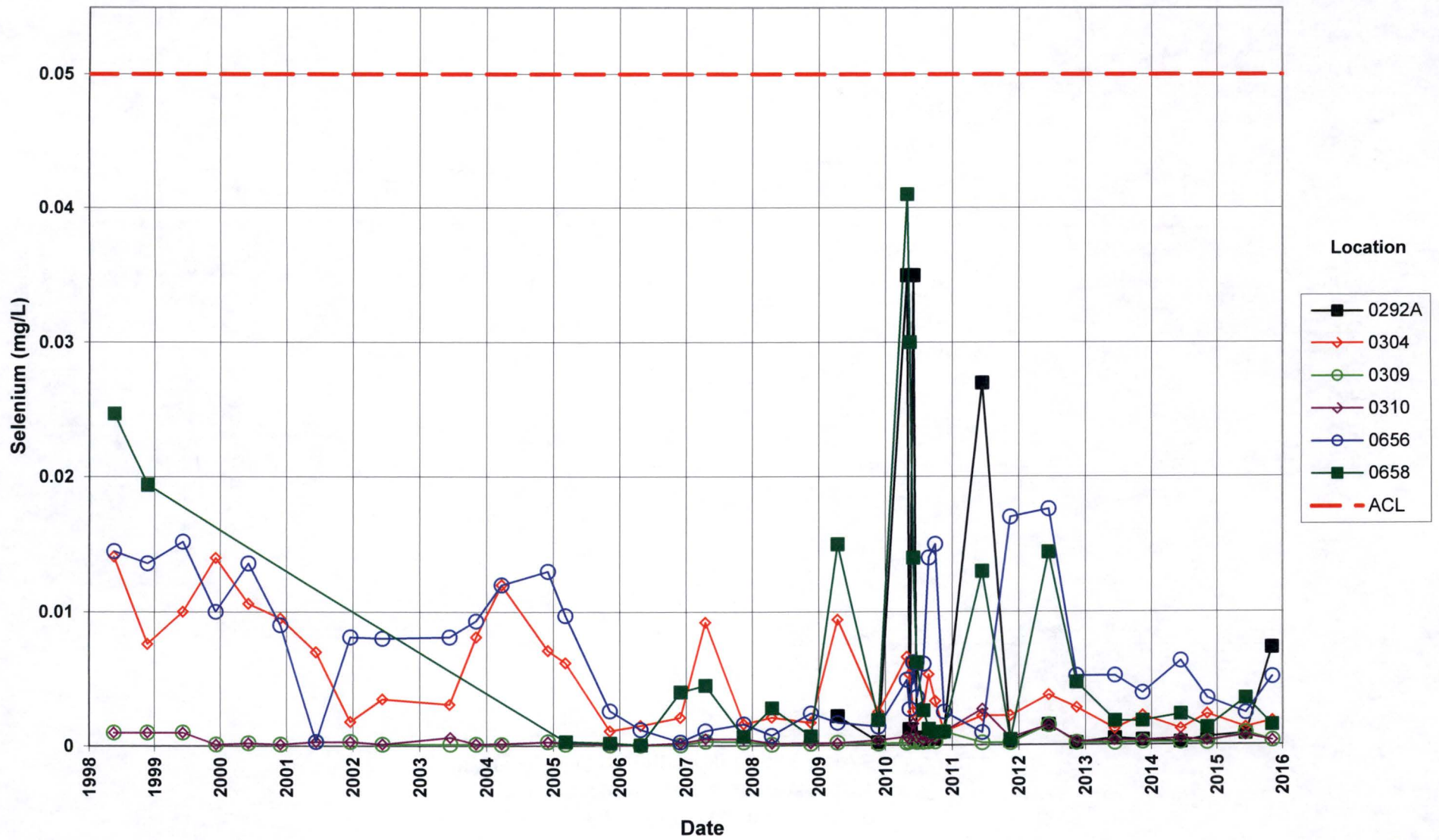
**Old Rifle
Groundwater Time-Concentration Graphs**

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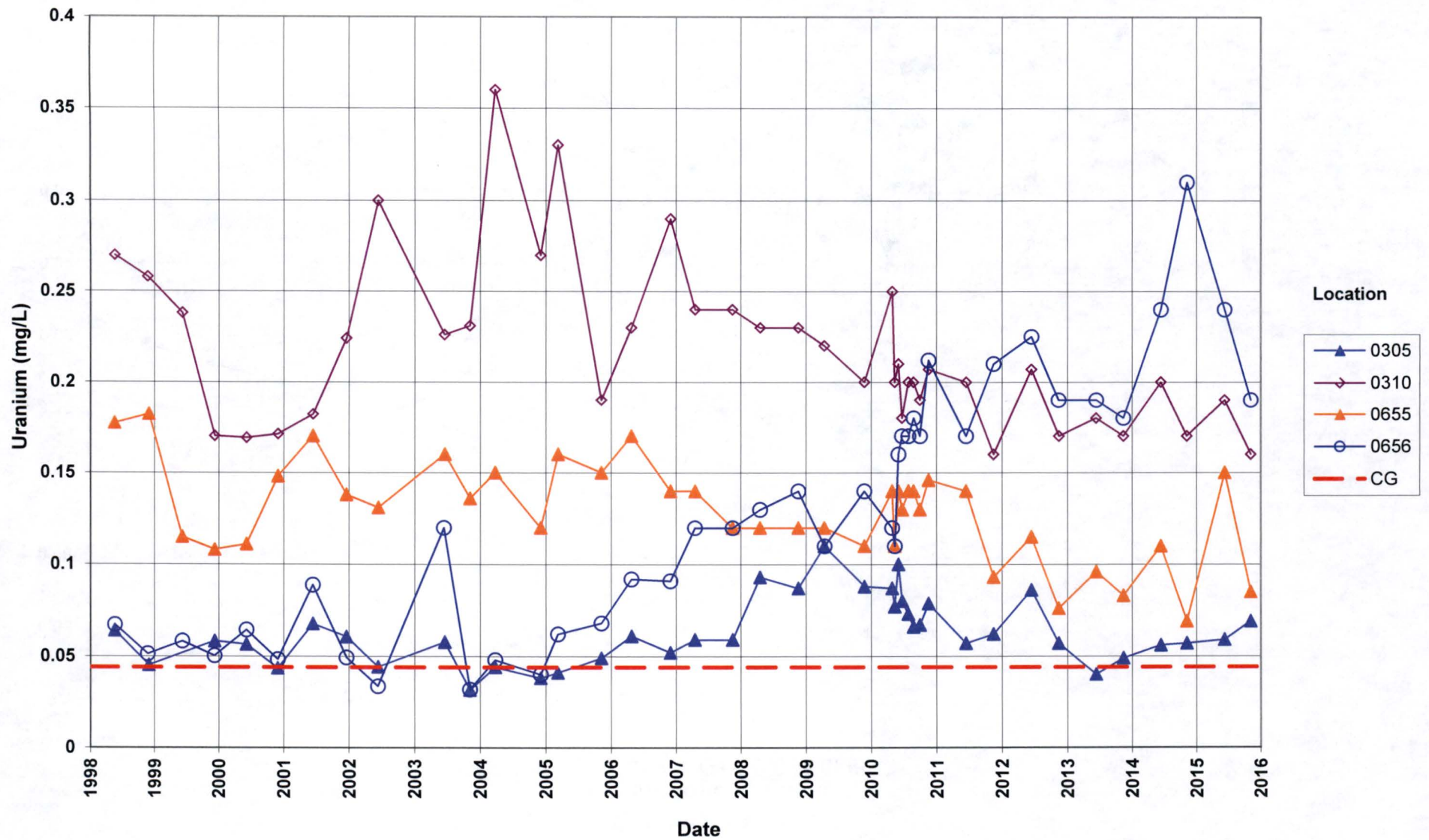
Rifle Old Processing Site
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



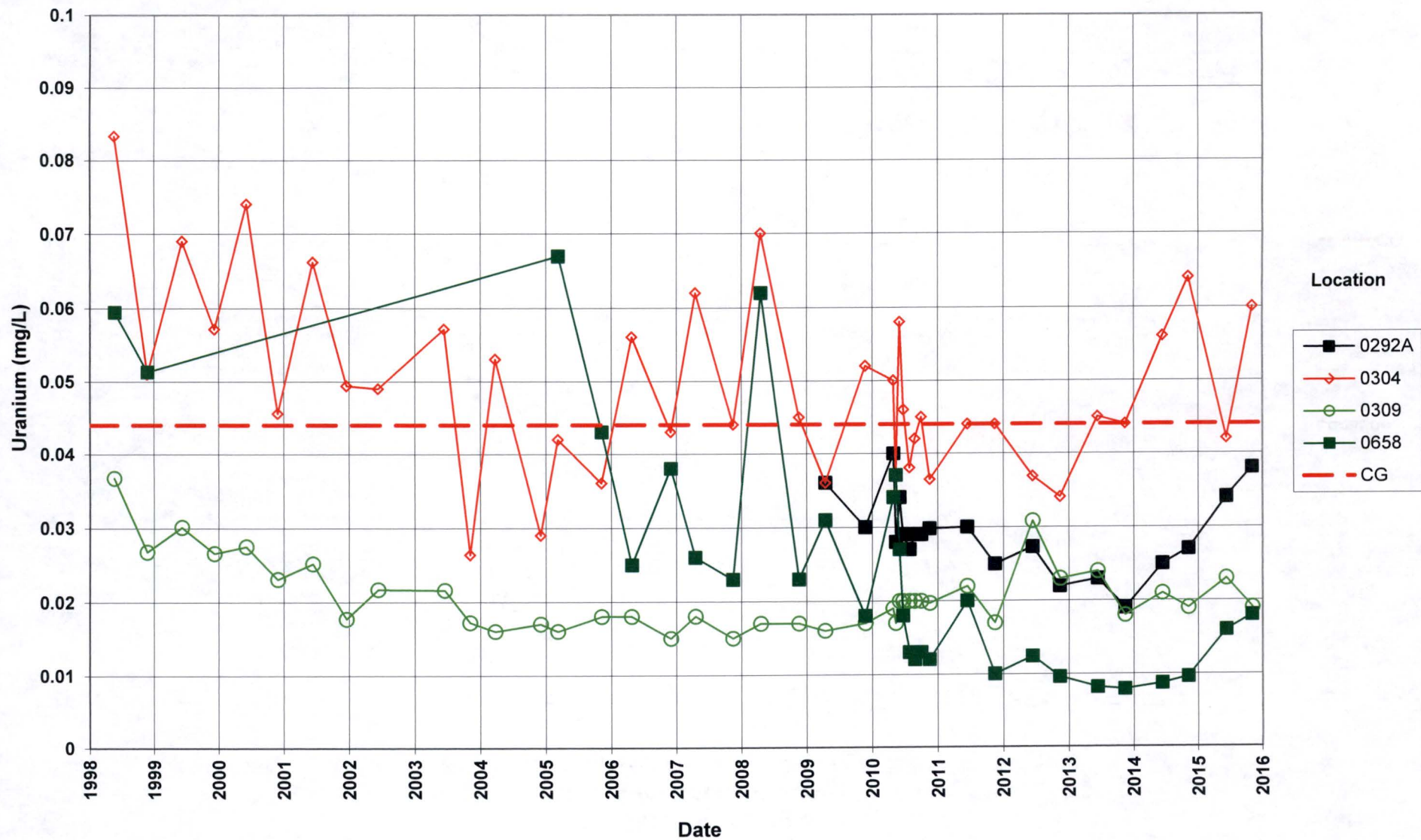
**Rifle Old Processing Site
Selenium Concentration**
Alternate Concentration Limit (ACL) = 0.05 mg/L



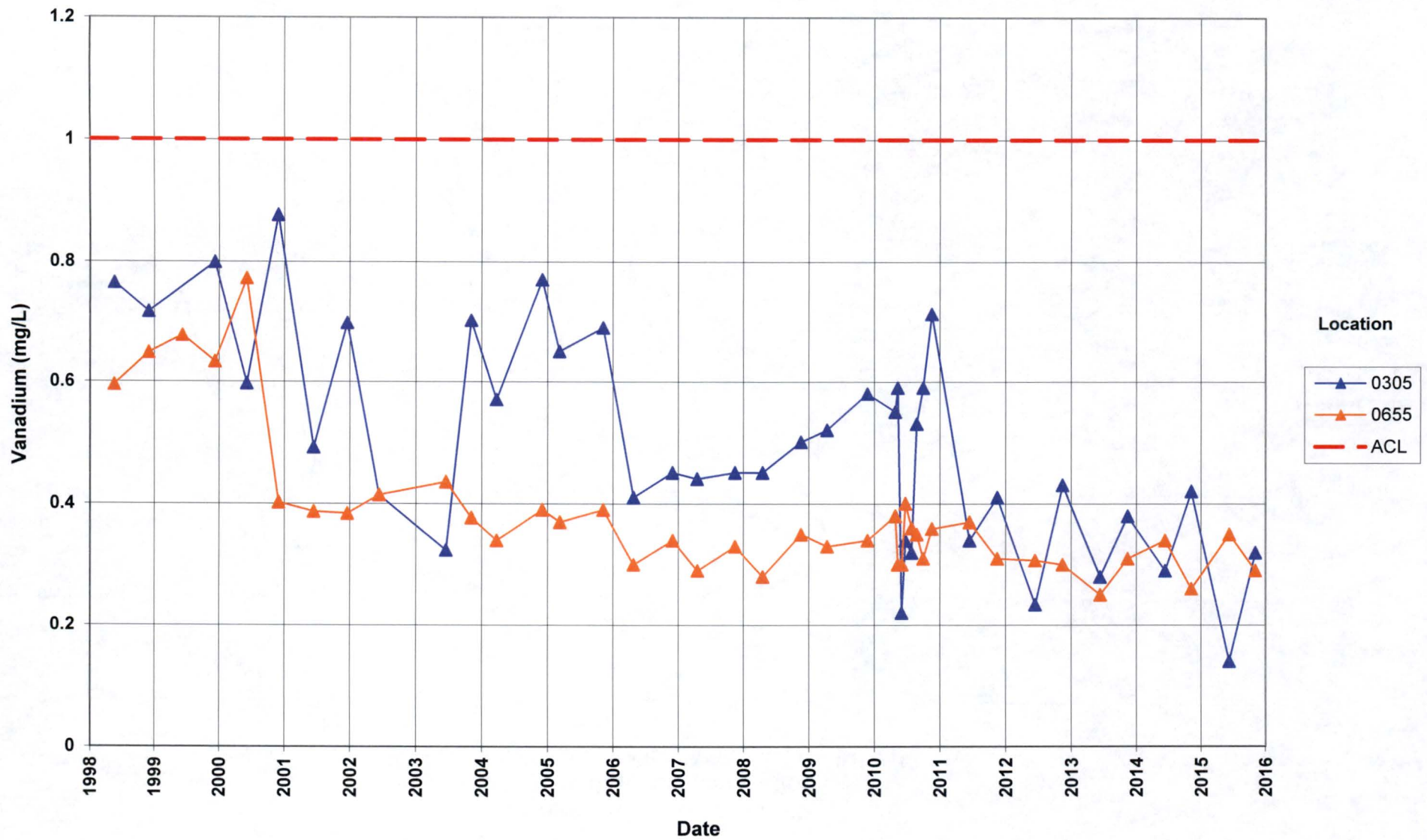
**Rifle Old Processing Site
Uranium Concentration**
Cleanup Goal (CG) = 0.044 mg/L



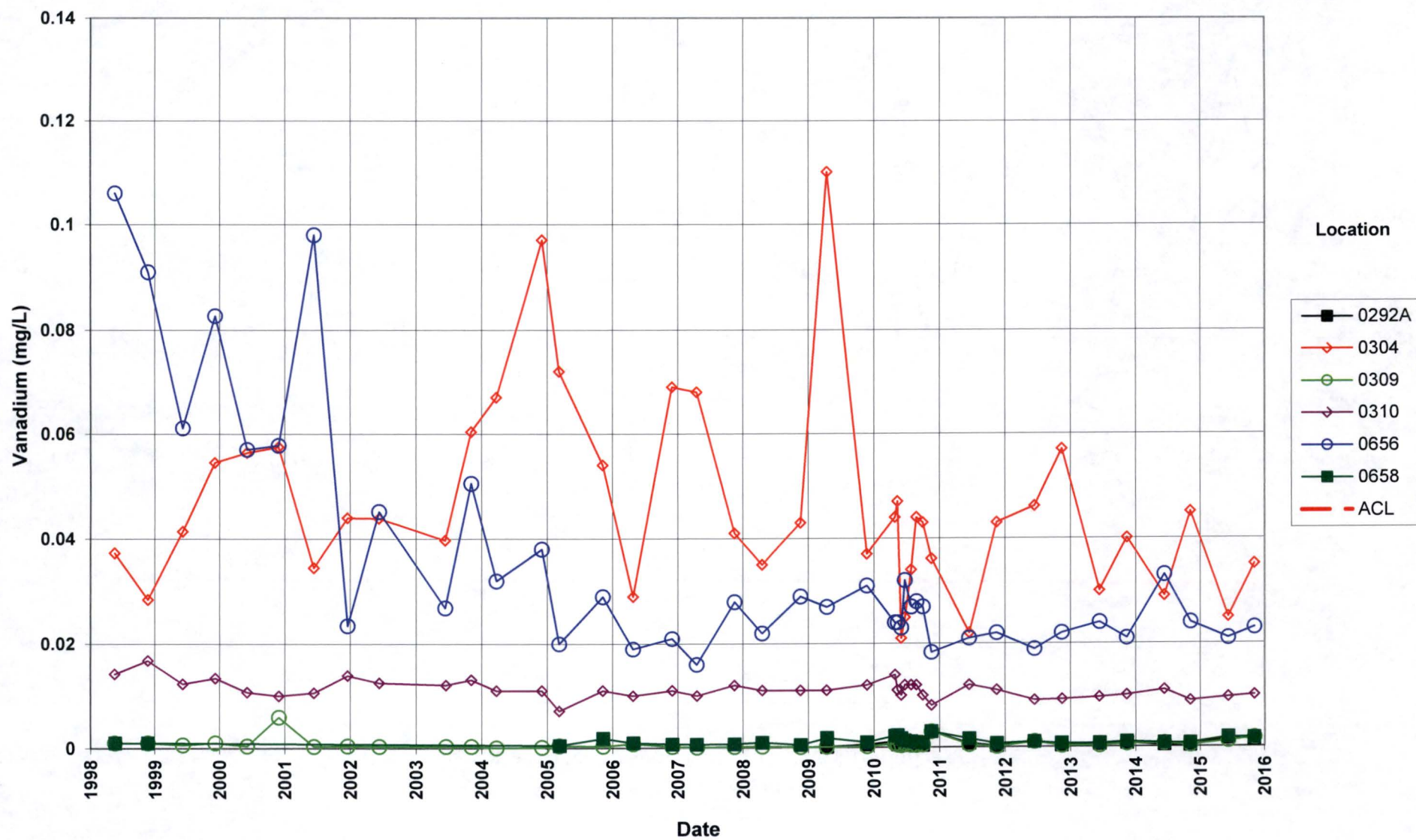
**Rifle Old Processing Site
Uranium Concentration**
Cleanup Goal (CG) = 0.044 mg/L



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



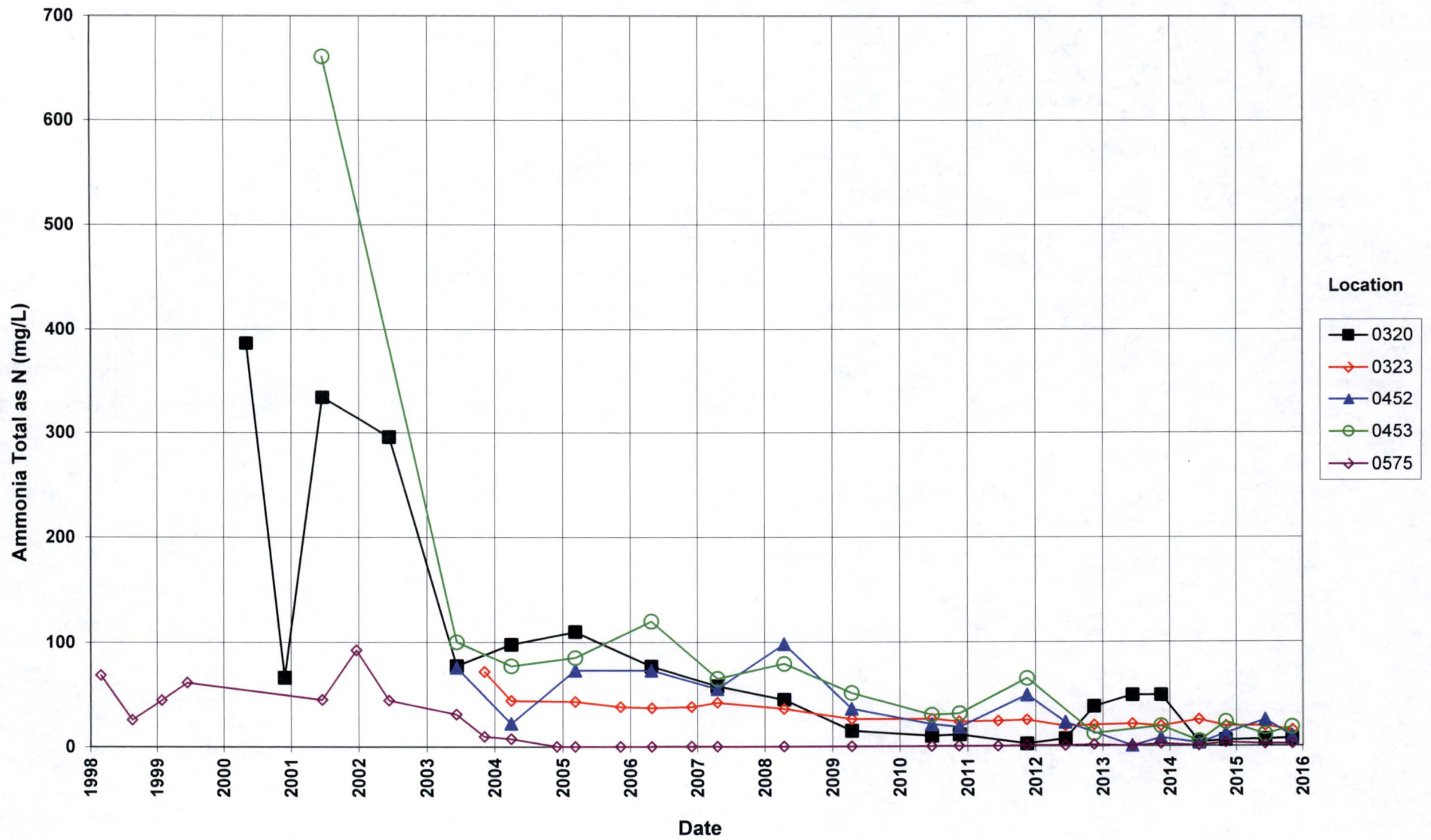
**Rifle Old Processing Site
Vanadium Concentration**
Alternate Concentration Limit (ACL) = 1.0 mg/L



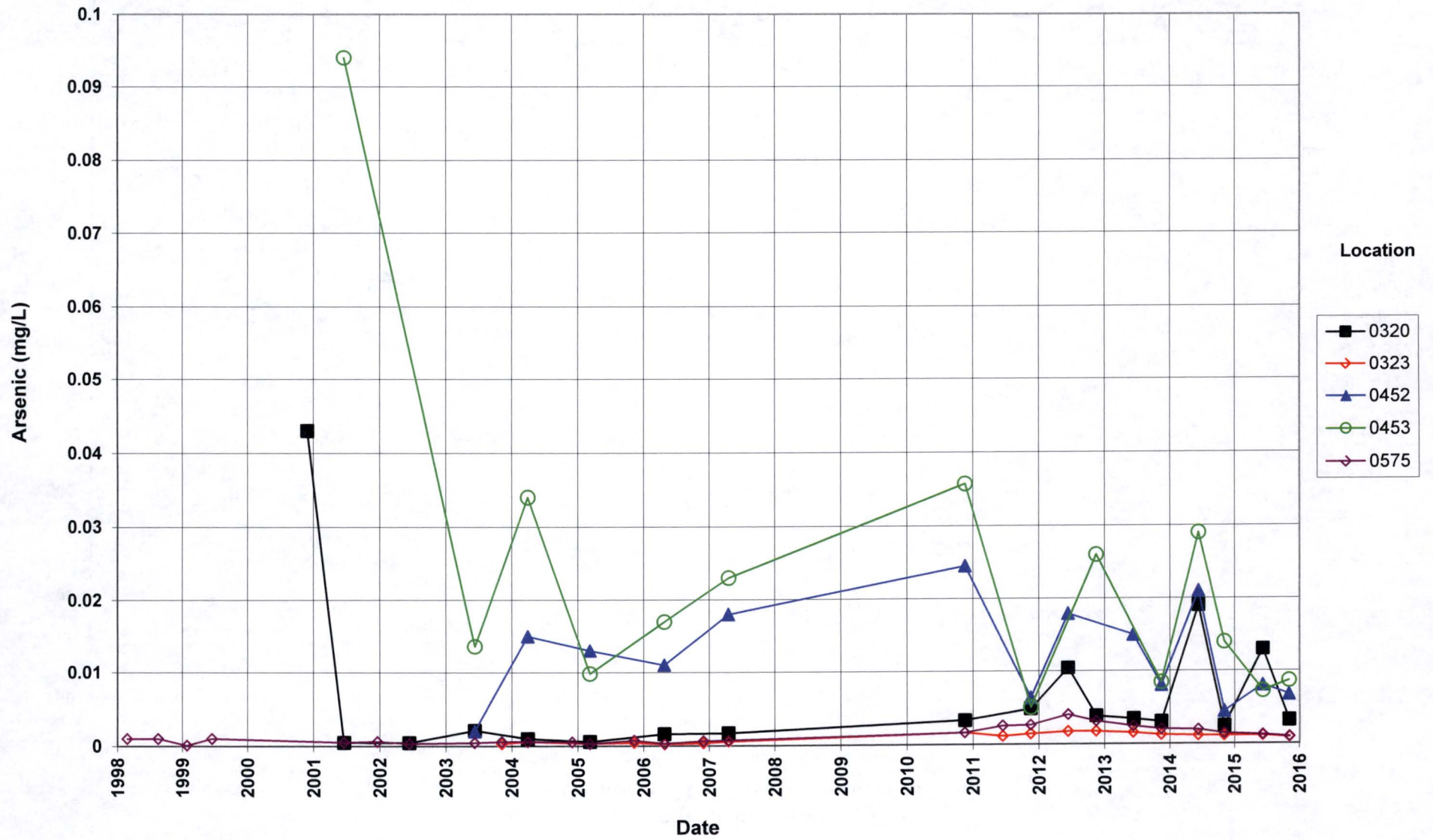
New Rifle Pond Locations Time-Concentration Graphs

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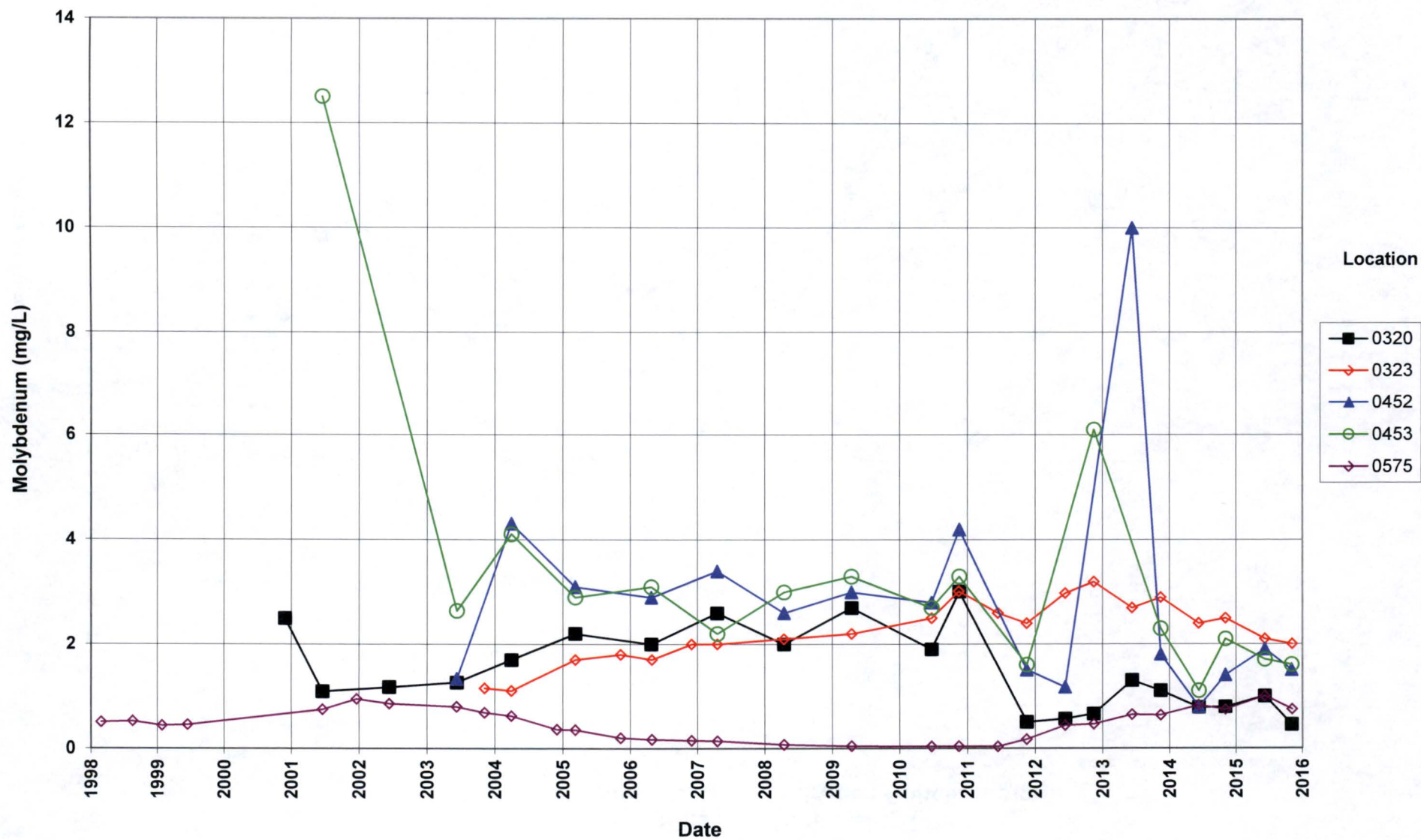
**Rifle New Processing Site
Ammonia Total as N Concentration**



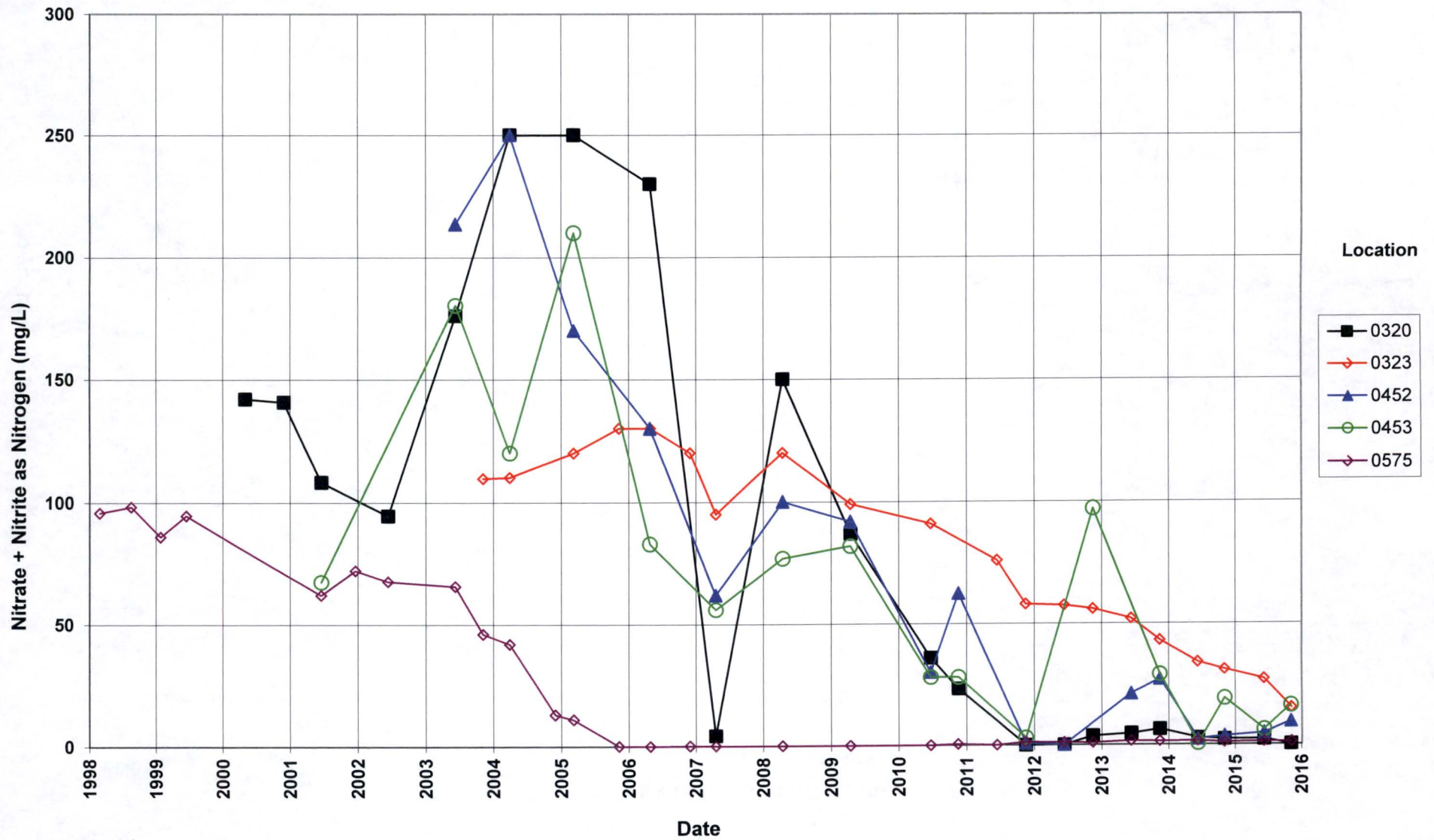
Rifle New Processing Site Arsenic Concentration



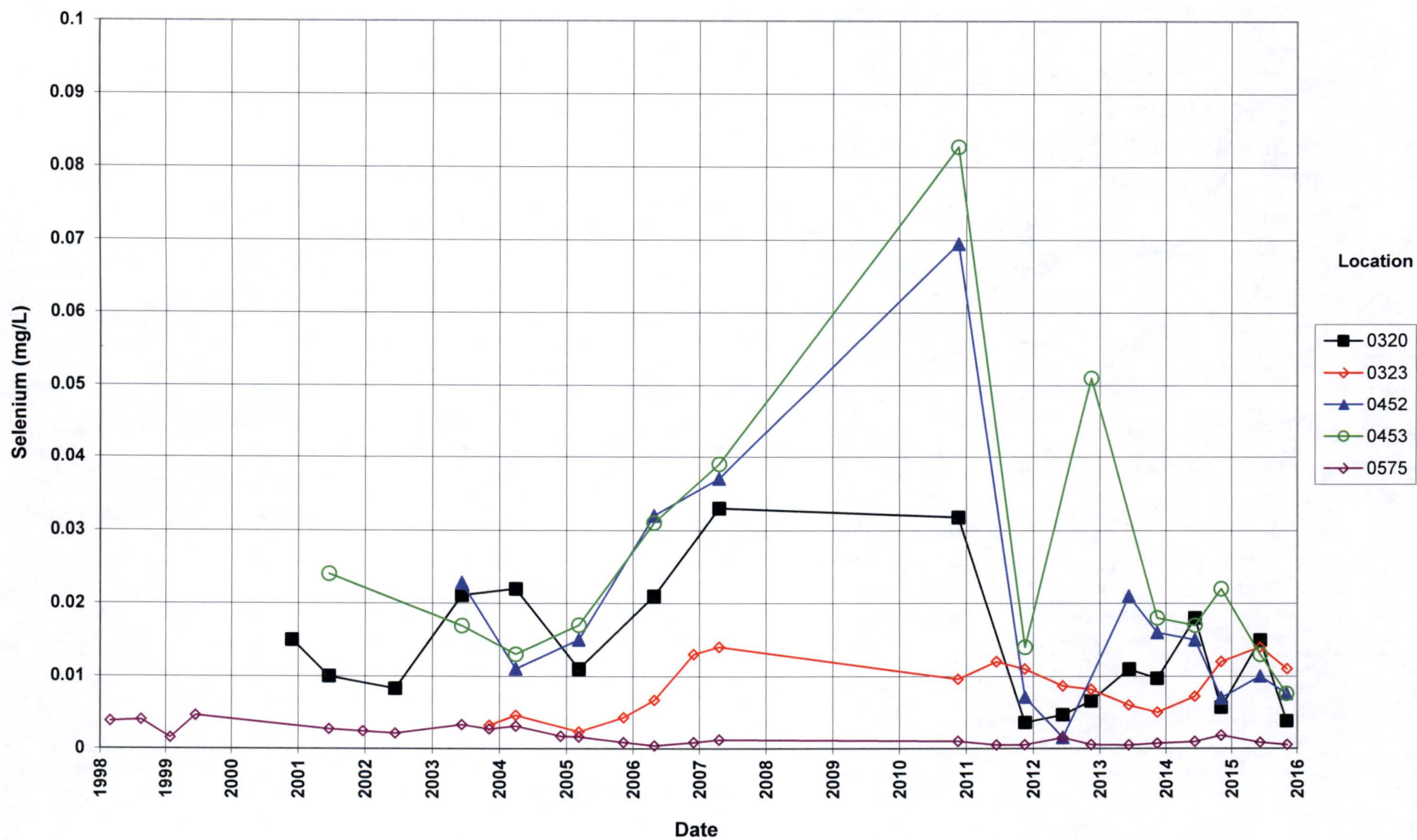
Rifle New Processing Site Molybdenum Concentration



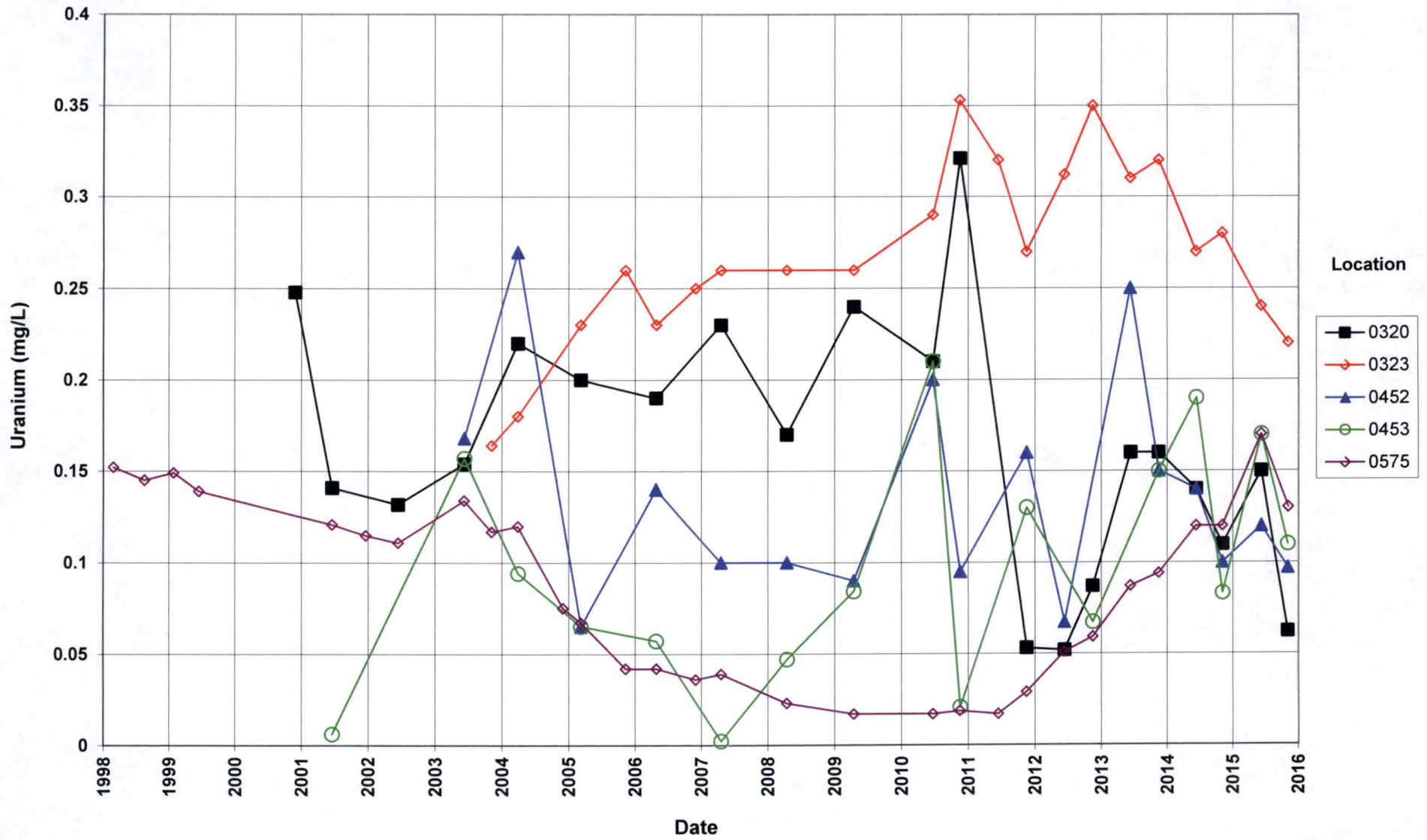
Rifle New Processing Site
Nitrate + Nitrite as Nitrogen Concentration



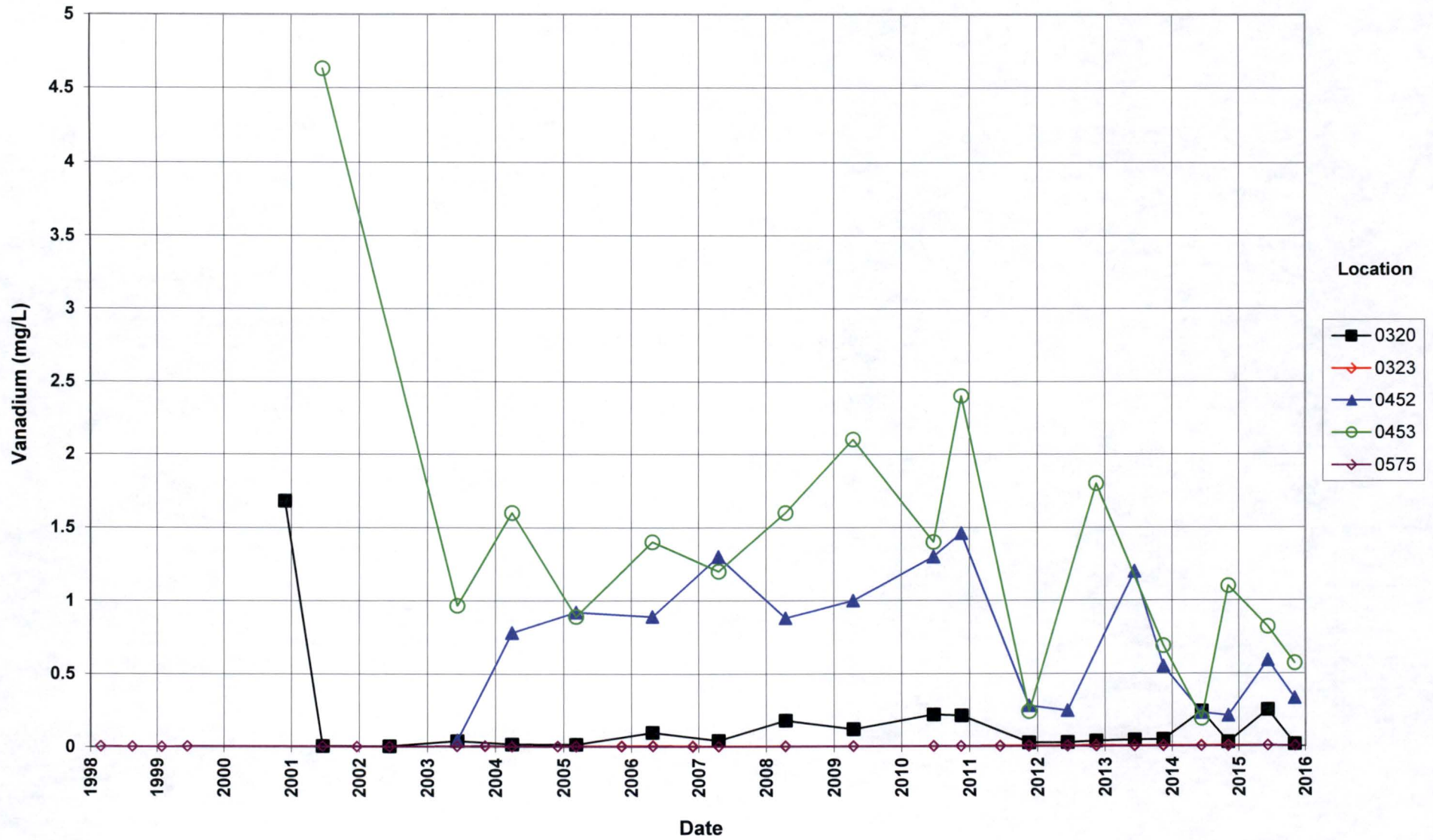
Rifle New Processing Site Selenium Concentration



Rifle New Processing Site Uranium Concentration



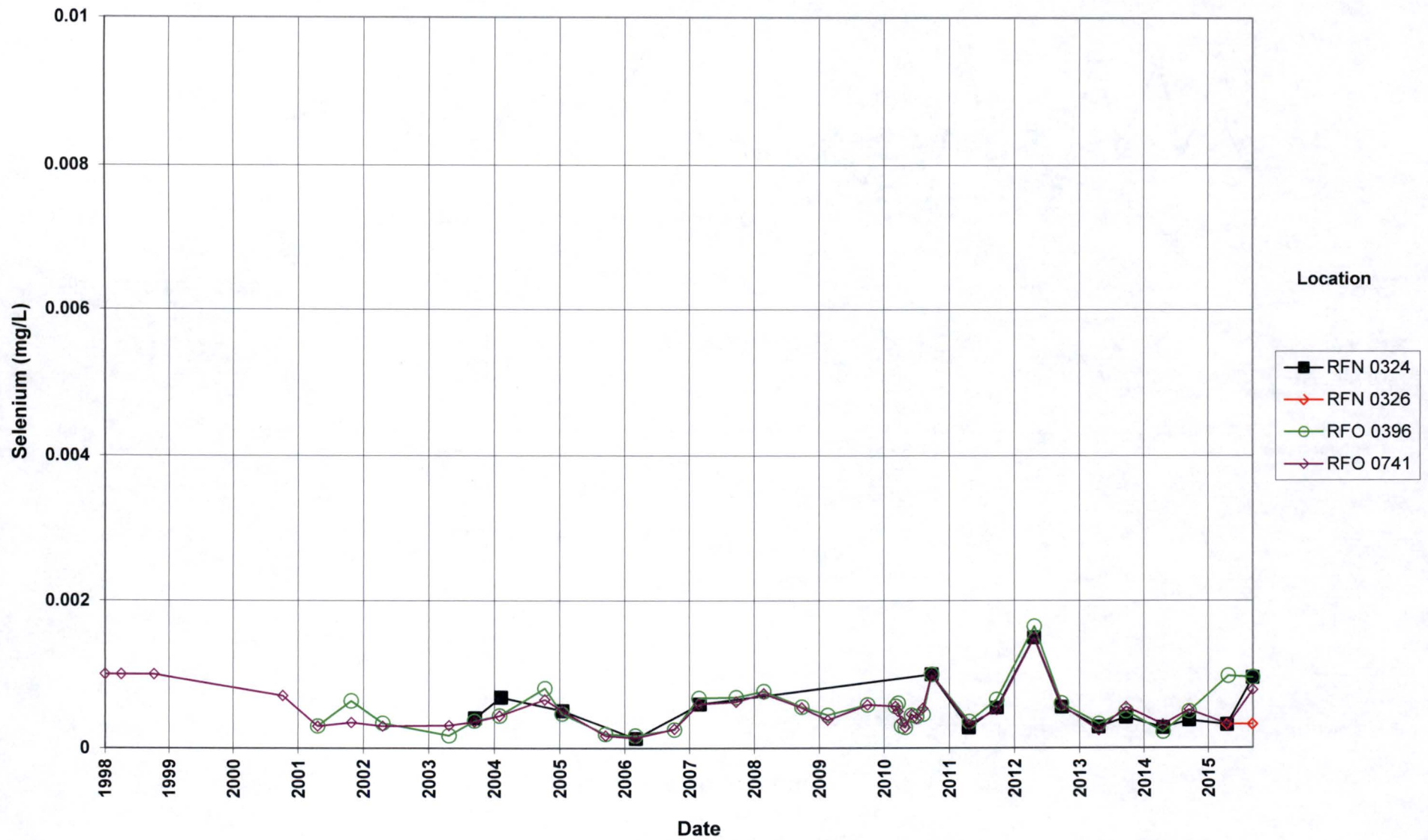
Rifle New Processing Site Vanadium Concentration



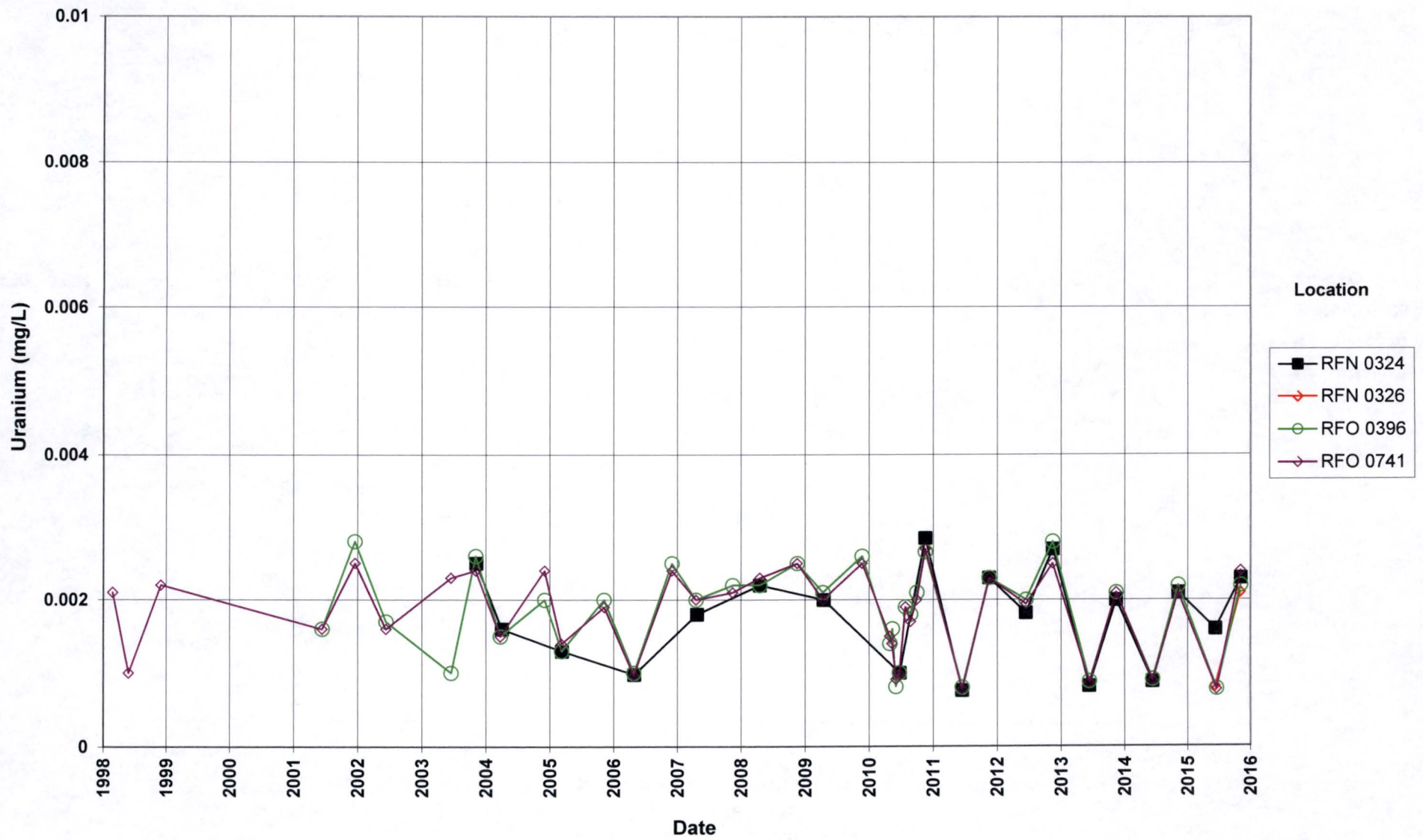
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**New and Old Rifle River Locations
Time-Concentration Graphs**

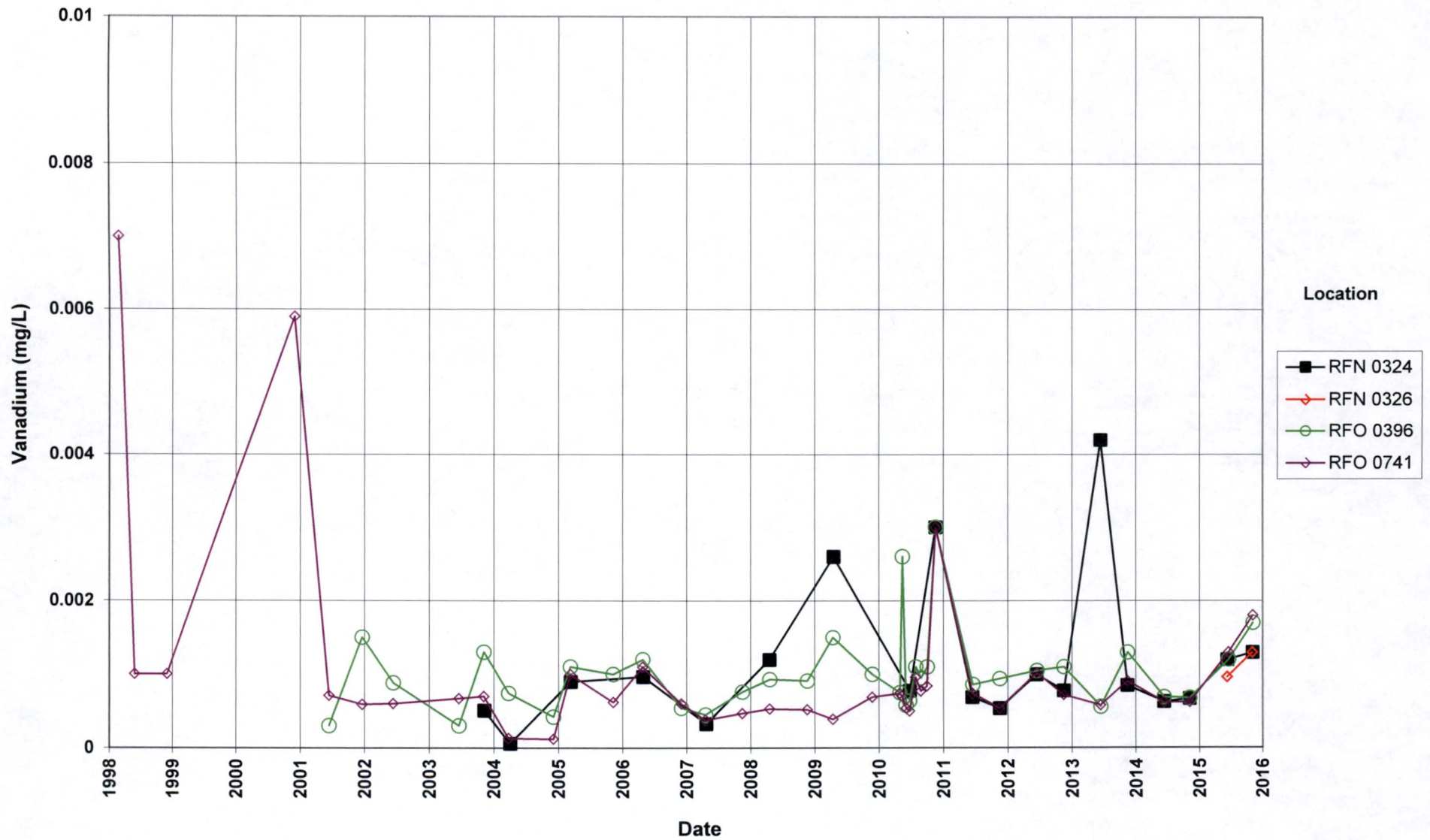
Rifle New Processing Site
River Locations
Selenium Concentration



Rifle New Processing Site
River Locations
Uranium Concentration



Rifle New Processing Site
River Locations
Vanadium Concentration



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Attachment 3

Sampling and Analysis Work Order

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October 23, 2015

Task Assignment 103
Control Number 16-0053

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

SUBJECT: Contract No. DE-LM0000421, Navarro Research & Engineering, Inc. (Navarro)
Task Assignment 103 LTS&M-UMTRCA TI & TII Sites, D&D Sites, Other
Sites, & Other, and AS&T November 2015 Environmental Sampling at the
Rifle, Colorado, Processing Sites

REFERENCE: Task Assignment 103 LTS&M-UMTRCA TI & TII Sites, D&D Sites, Other
Sites, & Other

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Rifle, Colorado. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Rifle New and Old sites. Water quality data will be collected from these sites as part of the environmental sampling currently scheduled to begin the week of November 2, 2015.

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

MONITORING WELLS

New Rifle

169 AI	195 AI	216 AI	620 AI	658 AI	664 AI	670 AI
170 AI	201 AI	217 AI	635 AI	659 AI	669 AI	855 AI
172 AI	215 AI	590 AI				

Old Rifle

292A AI	305 AI	309 AI	310 AI	655 AI	656 AI	658 AI
304 AI						

*NOTE: AI = Alluvium

SURFACE LOCATIONS

New Rifle

320	323	324	326	452	453	575
-----	-----	-----	-----	-----	-----	-----

Rich Bush
Control Number 16-0053
Page 2

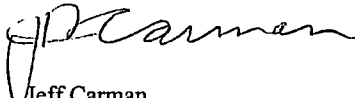
Old Rifle

294 395 396 398 741

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) 248-6044 if you have any questions.

Sincerely,


Jeff Carman
LMS Task Assignment Manager

JC/lcg/lb/bkb

Enclosures (3)

cc: (electronic)

Christina Pennal, DOE
Beverly Cook, Navarro
Steve Donovan, Navarro
Lauren Goodknight, Navarro
Diana Osborne, Navarro
EDD Delivery
rc-grand.junction
File: RFN 410.02(A)
File: RFO 410.02(A)

Constituent Sampling Breakdown

Site	Rifle				Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater		Surface Water				
Approx. No. Samples/yr	51		24				
Field Measurements							
Alkalinity	X		X				
Dissolved Oxygen							
Redox Potential	X		X				
pH	X		X				
Specific Conductance	X		X				
Turbidity	X						
Temperature	X		X				
Laboratory Measurements	*RFO	*RFN	RFO	RFN			
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
Calcium	X	X	X	X	5	SW-846 6010	LMM-01
Chloride	X	X	X	X	0.5	SW-846 9056	MIS-A_039
Chromium							
Gross Alpha							
Gross Beta							
Iron							
Lead							
Magnesium	X	X	X	X	5	SW-846 6010	LMM-01
Manganese							
Molybdenum		X		X	0.003	SW-846 6020	LMM-02
Nickel							
Nickel-63							
Nitrate + Nitrite as N (NO3+NO2)-N	X	X	X	X	0.05	EPA 353.1	WCH-A-022
Potassium	X	X	X	X	1	SW-846 6010	LMM-01
Radium-226							
Radium-228							
Selenium	X	X	X	X	0.0001	SW-846 6020	LMM-02
Silica							
Sodium	X	X	X	X	1	SW-846 6010	LMM-01
Strontium							
Sulfate	X	X	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide							
Total Dissolved Solids							
Total Organic Carbon							
Uranium	X	X	X	X	0.0001	SW-846 6020	LMM-02
Vanadium	X	X	X	X	0.0003	SW-846 6020	LMM-02
Zinc							
Total No. of Analytes	10	13	10	13			

*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.

**Sampling Frequencies for Locations at
Rifle, Colorado**

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
New Rifle						
169		X				Background well
170		X				Far downgradient
172		X				Far downgradient
195		X				Downgradient
201		X				Data logger; downgradient
215		X				Onsite
216		X				Onsite
217		X				Downgradient
590		X				Data logger; downgradient
620		X				Far downgradient
635		X				Downgradient
658		X				Onsite
659		X				Onsite
664		X				Onsite
669		X				Onsite
670		X				Onsite
855		X				Onsite
Old Rifle						
292A		X				Background well
304		X				Onsite
305		X				Onsite
309		X				Onsite
310		X				Data logger; onsite
655		X				Data logger; onsite
656		X				Onsite
658		X				Background well
Surface Locations						
New Rifle						
320		X				Wetland Pond
323		X				Gravel pit pond
324		X				Colorado River downgradient
326		X				Colorado River
452		X				Wetland Pond
453		X				Wetland Pond
575		X				Gravel pit pond
Old Rifle						
294		X				River, upstream
395		X				Seep, upgradient
396		X				River
398		X				Ditch, onsite
741		X				River

Semi-annual sampling conducted in June and November.

Attachment 4

Trip Report

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Memorandum

DATE: November 24, 2015

TO: Scott Smith

FROM: Jennifer Graham

SUBJECT: Sampling Trip Report

Site: Rifle, CO, New and Old Processing Sites

Dates of Sampling Event: November 3, 5 & 6, 2015

Team Members: David Atkinson, Samantha Tigar, and Jennifer Graham

Number of Locations Sampled: 36 of the 37 planned locations were sampled as follows in Table 1.

Table 1: Sampled versus Planned Location Summary

	Sampled Locations	Planned Locations
RFO Monitoring Wells	8	8
RFN Monitoring Wells	16	17
RFO Surface Water	5	5
RFN Surface Water	7	7

Locations Not Sampled/Reason: Monitoring well RFN 0635 was not sampled due to access issues (see Access Issues below).

Location Specific Information:

Table 2: Location Specific Information

Location IDs	Comments
RFO: 0292A, 0304, 0658	Purge water from well contained particulates.
RFN 0201	Obstruction in well at approximately 12.73 ft, possibly a root mat. Water level probe was covered with roots when extracted from well. Not able to take water level during sampling as a result of the obstruction.
RFN: 0658, 0659, 0664, 0669	Purge water from well contained particulates.

Quality Control Sample Cross Reference: Table 3 lists the false identifications assigned to the quality control samples.

Table 3: QC Cross Reference

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2548	NLW 999	RFN-0659	Duplicate	Ground Water
2551	NLX 019	RFO-0304	Duplicate	Ground Water
2804	NLX 004	RFN-0324	RINST/EQBLANK	Surface water
2805	NLX 005	RFN-0855	Duplicate	Ground Water

RIN Number Assigned: Samples were assigned to RIN 15107463 (New Rifle) and 15107464 (Old Rifle). Field data sheets can be found in \\crow\SMS\15107463\FieldData and \\crow\SMS\15107464\FieldData.

Sample Shipment: Samples were shipped overnight via FedEx from Grand Junction to ALS Laboratory in Ft. Collins on November 9, 2015.

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

Well Inspection Summary: Small animals are digging underneath the concrete pad around monitoring well RFN 0216. Monitoring well RFN 0201 has a possible obstruction approximately 12.73 feet downhole. All other wells appeared in good condition.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated).

Field Variance: Water stability requirements were not met at the following Category I locations: RFO 0658-turbidity was not met and samples required filtration; RFN 0201 water level readings were not taken due to a downhole obstruction.

Equipment: All sampling equipment functioned properly. There were navigation issues with the Trimble GPS unit. The GIS team is investigating this unit.

Stakeholder/Regulatory/DOE: Nothing to note.

Institutional Controls

Fences, Gates, Locks: All gates and locks were left as found.

Signs: No issues observed.

Trespassing/Site Disturbances: No issues observed.

Disposal Cell/Drainage Structure Integrity: N/A.

Vegetation/Noxious Weed Concerns: No issues observed.

Safety Issues: Surface water location RFO 0396 requires life vests and life ring.

Access Issues:

- Gary Reed with WPX was on site to provide locked-gate access on Clough Energy's property to locations RFN 0620 and 0324 on November 5, 2015.
- Eric Griffiths with Union Pacific Railroad was present during collection of samples RFO

Scott Smith
November 24, 2015
Page 3

0396 and 0741 on November 5, 2015. New contact information for Union Pacific will be updated.

- An elk fence prevents access to RFN 0635 from the interstate. Additional access was investigated from both the east and west directions along the river. No safe access to this location is possible at this time. Health and Safety will be contacted about the use of a nearby elk jump.

Corrective Action Required/Taken: Mud was removed from the bottom of RFN 0659 and downhole tubing. Well needs further redevelopment.

Future Actions Required or Suggested: Well redevelopment needs to be completed on the following wells:

- RFO 0292A, 0304, and 0658
- RFN 0201, 0658, 0659, 0664, and 0669

(JG/lcg)

cc: (electronic)
Richard Bush, DOE
Steve Donovan, Navarro
Scott Smith, Navarro
EDD Delivery

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