

# Data Validation Package

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**November 2013  
Groundwater and Surface Water  
Sampling at the  
Rifle, Colorado, New and Old  
Processing Sites**

**January 2014**



**U.S. DEPARTMENT OF  
ENERGY**

Legacy  
Management

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# Sampling Event Summary

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

**Sampling Period:** November 12-14, 2013

Thirty-seven water samples were collected at New Rifle and Old Rifle, Colorado, Processing Sites. Duplicate samples were collected from New Rifle locations 0323 and 0575, and Old Rifle location 0305. One equipment blank was collected. Sampling and analysis were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated).

## New Rifle Site

Samples were collected at the New Rifle site from 17 monitoring wells and 7 surface locations in compliance with the 2008 *Ground Water Compliance Action Plan for the New Rifle, Colorado, Processing Site*. Water levels were measured at each sampled well.

The contaminants of concern (COCs) measured at the New Rifle site are arsenic, molybdenum, nitrate + nitrite as nitrogen, selenium, uranium, and vanadium. Major cations and anions, and ammonia as N were also measured per request. The groundwater monitoring wells were sampled to monitor plume movement and natural flushing. Wells with contaminant concentrations that exceeded benchmarks are listed in Table 1.

Time-concentration graphs from the locations sampled are included with the analytical data. Concentrations of the COCs are stable or decreasing at most locations.

The surface water locations were sampled to monitor the impact of groundwater discharge. No large variations in the data were noted with the contaminant concentrations at the two Colorado River surface water locations (0322 and 0324) remaining low, indicating no impact due to groundwater discharge.

## Old Rifle Site

Samples were collected at the Old Rifle site from 8 monitoring wells and 5 surface locations in compliance with the 2001 *Ground Water Compliance Action Plan for the Old Rifle, Colorado, UMTRA Project Site*. Water levels were measured at each sampled well.

The COCs measured at the Old Rifle site are selenium, uranium, and vanadium. Major cations and anions were also measured per request. Locations with contaminant concentrations that exceeded benchmarks are listed in Table 2.

Time-concentration graphs from the locations sampled are included with the analytical data and indicate that the concentrations of the COCs are decreasing at many locations.

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

Table 1. New Rifle Monitoring Wells with Contaminant Concentrations that Exceed Benchmarks

Analyte	Benchmark (mg/L)	Location	Concentration (mg/L)
Arsenic	0.05 <sup>a</sup>	0658	0.05
		0855	0.59
Molybdenum	0.10 <sup>a</sup>	0201	1.4
		0217	1.6
		0590	1
		0635	0.37
		0658	0.95
		0659	1.4
		0664	0.28
		0669	0.75
		0670	0.16
		0855	0.98
Nitrate + Nitrite as Nitrogen	10 <sup>a</sup>	0170	10
		0201	52
		0590	46
		0620	20
Selenium	0.041 <sup>b</sup>	0658	0.8
		0659	0.1
		0664	0.13
		0670	0.31
		0855	0.91
Uranium	0.067 <sup>b</sup>	0201	0.082
		0217	0.13
		0590	0.071
		0659	0.094
		0669	0.084
Vanadium	Not Applicable	-----	-----

<sup>a</sup> U.S. Environmental Protection Agency groundwater standards (40 CFR 192)

<sup>b</sup> Maximum background value, cleanup goal  
mg/L = milligrams per liter

Table 2. Old Rifle Monitoring Wells with Contaminant Concentrations that Exceed Benchmarks

Analyte	Benchmark (mg/L)	Location	Concentration (mg/L)
Selenium	0.05 <sup>a</sup>	None	-----
Uranium	0.044 <sup>b</sup>	0304	0.044
		0305	0.047
		0310	0.17
		0655	0.083
		0656	0.18
Vanadium	0.33 <sup>c</sup>	0305	0.37

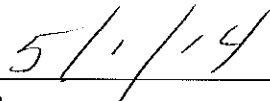
<sup>a</sup> U.S. Environmental Protection Agency Safe Drinking Water Act standard and approved alternate concentration limit

<sup>b</sup> U.S. Environmental Protection Agency groundwater standards (40 CFR 192)

<sup>c</sup> Risk-based concentration  
mg/L = milligrams per liter

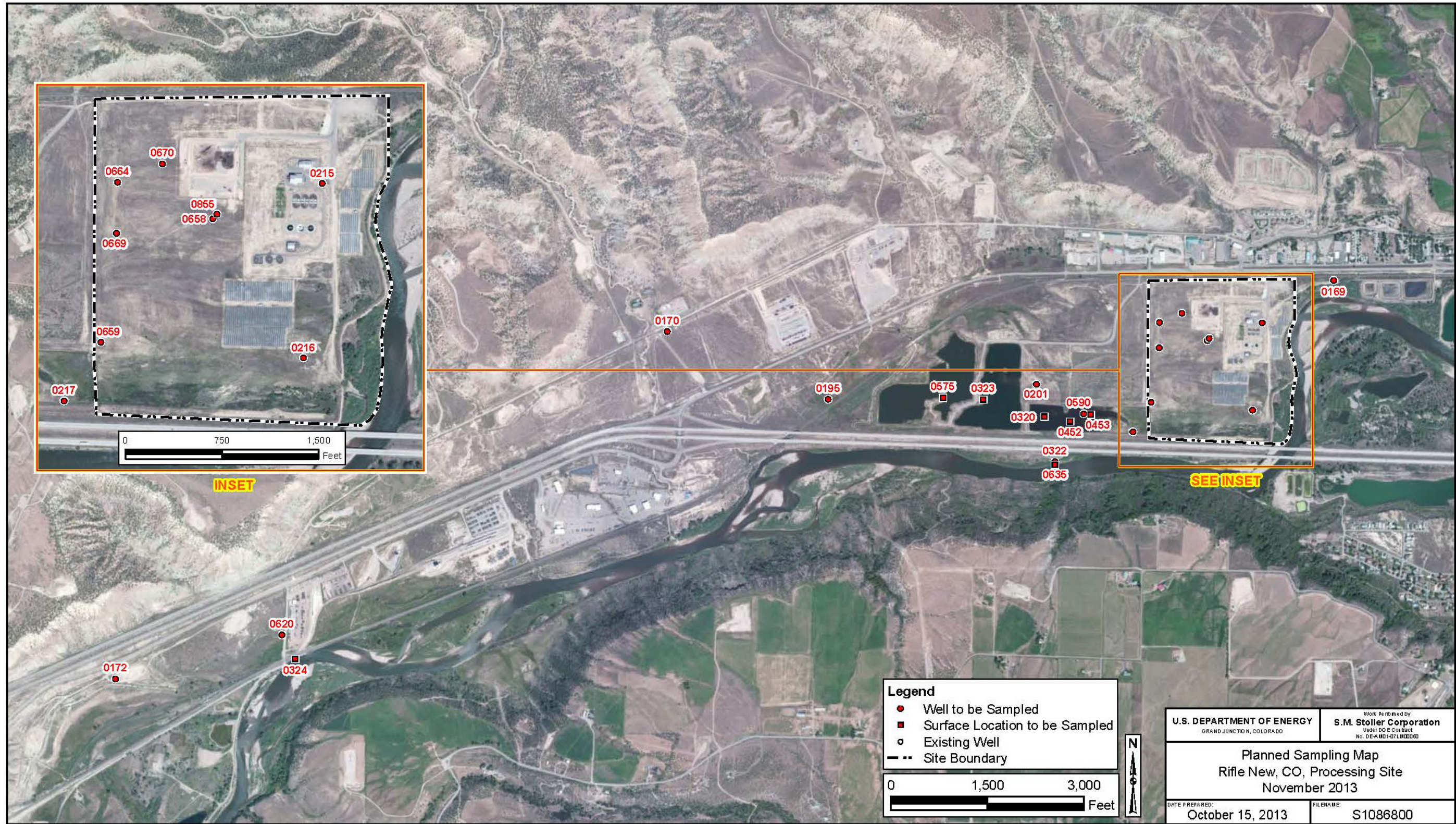
  
Richard Dayvault

Site Lead, S. M. Stoller Corporation

  
Date

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New Rifle, Colorado, Processing Site, Sample Location Map



Old Rifle, Colorado, Processing Site, Sample Location Map

# Data Assessment Summary

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### Water Sampling Field Activities Verification Checklist

<b>Project</b>	Old and New Rifle, Colorado, Processing Sites	<b>Date(s) of Water Sampling</b>	November 12–14, 2013
<b>Date(s) of Verification</b>	January 14, 2014	<b>Name of Verifier</b>	Gretchen Baer

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
1. Is the SAP the primary document directing field procedures? List any Program Directives or other documents, SOPs, instructions.	Yes	Work Order letter dated October 23, 2013.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Were calibrations conducted as specified in the above-named documents?	Yes	
4. Was an operational check of the field equipment conducted daily?  Did the operational checks meet criteria?	Yes	A turbidity reading was entered into the field sheet incorrectly; all previous and subsequent checks were in range, indicating that the instrument performance was acceptable.
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?	No	The specific conductivity did not stabilize at well RFN01 0855. Associated results have been qualified.
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?	NA	
Was one pump/tubing volume removed prior to sampling?	NA	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	Yes	Ammonia, arsenic, & molybdenum samples weren't collected on the equipment blank.
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?	No	Location RFO01 0294: the aliquot for chloride and sulfate, which was not supposed to be acidified, was received with a pH of <2. The sulfate analysis of the sample confirmed that the aliquot had been incorrectly preserved with sulfuric acid. The sulfate result for location RFO01 0294 was not reported.
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?	No	"Measurement Equipment" was not filled out at many locations.
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
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): 13115731  
 Sample Event: November 12-14, 2013  
 Site(s): Rifle Processing Sites, Colorado  
 Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
 Work Order No.: 1311270  
 Analysis: Metals and Wet Chemistry  
 Validator: Gretchen Baer  
 Review Date: January 14, 2014

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 3.

*Table 3. Analytes and Methods*

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as N	WCH-A-005	EPA 350.2	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
Sulfate	MIS-A-045	EPA 300.0	EPA 300.0

### Data Qualifier Summary

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

*Table 4. Data Qualifier Summary*

Sample Number	Location	Analyte(s)	Flag	Reason
1311270-10	0294	Potassium	J	Less than 10 times the equipment blank
1311270-20	0396	Potassium	J	Less than 10 times the equipment blank
1311270-41	Equip Blank	Sodium	U	Less than 5 times the calibration blank
1311270-41	Equip Blank	Uranium	U	Less than 5 times the calibration blank
1311270-41	Equip Blank	Vanadium	U	Less than 5 times the calibration blank

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 41 water samples on November 15, 2013, 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, with one exception. The sample date on the chain of custody was incorrect for sample RFN01 0590. The error was corrected upon entry into the environmental database.

### Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced coolers at 0.2 °C, which complies with requirements. All samples were received in the correct container types and all samples were analyzed within the applicable holding times. The samples had been preserved correctly for the requested analyses, with one exception. For location RFO01 0294, the laboratory noted that the aliquot for chloride and sulfate, which was not supposed to be acidified, was received with a pH of <2. The sulfate analysis of the sample confirmed that the aliquot had been incorrectly preserved with sulfuric acid. The sulfate result for location RFO01 0294 was not reported.

### 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 20, 2013. 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 five calibration standards on November 21, 2013. 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 20 and 21, 2013, using three calibration standards. The correlation coefficient values were greater than 0.995. The absolute values of the intercepts were less than or only slightly above 3 times the MDL, with the exception of the intercept for sodium. This intercept was less than the reporting limit and all results were above the reporting limit. 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.

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

Calibrations were performed on November 19, 2013, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. 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. 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 seven calibration standards on November 11, 2013. 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. All method blank and calibration blank results associated with the samples were below the PQLs. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a “U” flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

### 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 EDD file arrived on November 26, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

# SAMPLE MANAGEMENT SYSTEM

## General Data Validation Report

RIN: 13115731    Lab Code: PAR    Validator: Gretchen Baer    Validation Date: 1/14/2014  
Project: Rifle Disposal/Processing Site (old/new)    Analysis Type:  Metals     General Chem     Rad     Organics  
# of Samples: 41    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

All analyses were completed within the applicable holding times.

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

There was 1 trip/equipment blank evaluated.

There were 3 duplicates evaluated.

**SAMPLE MANAGEMENT SYSTEM  
Metals Data Validation Worksheet**

RIN: 13115731      Lab Code: PAR      Date Due: 12/13/2013  
 Matrix: Water      Site Code: RFL01      Date Completed: 11/26/2013

Analyte	Method Type	Date Analyzed	CALIBRATION			Method	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R <sup>2</sup>	CCV								
Calcium	ICP/ES	11/20/2013				OK	98.0	105.0	93.0	4.0	105.0	2.0	104.0
Calcium	ICP/ES	11/20/2013	-0.1060	1.0000	OK	OK	97.0	105.0	101.0	1.0		1.0	
Calcium	ICP/ES	11/20/2013					100.0	92.0	92.0	0.0	104.0	2.0	104.0
Magnesium	ICP/ES	11/20/2013					97.0	100.0	94.0	3.0		1.0	
Magnesium	ICP/ES	11/20/2013					96.0	102.0	99.0	2.0	105.0	2.0	104.0
Magnesium	ICP/ES	11/20/2013	-0.0420	1.0000	OK	OK	99.0	93.0	92.0	0.0	103.0	1.0	101.0
Potassium	ICP/ES	11/20/2013					98.0	112.0	109.0	2.0			
Potassium	ICP/ES	11/20/2013					97.0	112.0	112.0	0.0		10.0	82.0
Potassium	ICP/ES	11/20/2013	-0.4220	1.0000	OK	OK	95.0	115.0	113.0	1.0		7.0	87.0
Sodium	ICP/ES	11/20/2013					95.0	97.0	97.0	0.0		4.0	87.0
Sodium	ICP/ES	11/20/2013					98.0	113.0	108.0	2.0		4.0	84.0
Sodium	ICP/ES	11/20/2013	0.4700	0.9998	OK	OK	98.0	100.0	106.0	1.0		2.0	85.0
Arsenic	ICP/MS	11/19/2013	-0.0120	1.0000	OK	OK	92.0	97.0	95.0	1.0	99.0		89.0
Arsenic	ICP/MS	11/19/2013					92.0	96.0	98.0	2.0			
Arsenic	ICP/MS	11/19/2013					100.0	98.0	97.0	1.0		10.0	
Molybdenum	ICP/MS	11/19/2013	-0.0030	1.0000	OK	OK	92.0	97.0	99.0	1.0	92.0	1.0	91.0
Molybdenum	ICP/MS	11/19/2013					102.0	97.0	102.0	2.0		2.0	

**SAMPLE MANAGEMENT SYSTEM  
Metals Data Validation Worksheet**

RIN: 13115731      Lab Code: PAR      Date Due: 12/13/2013  
 Matrix: Water      Site Code: RFL01      Date Completed: 11/26/2013

Analyte	Method Type	Date Analyzed	CALIBRATION			Method	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R <sup>2</sup>	CCV								
Molybdenum	ICP/MS	11/19/2013				OK	94.0	101.0	99.0	2.0		0.0	
Selenium	ICP/MS	11/19/2013				OK	100.0	106.0	103.0	3.0			
Selenium	ICP/MS	11/19/2013				OK	110.0	110.0	111.0	0.0			
Selenium	ICP/MS	11/19/2013	-0.0380	1.0000	OK	OK	97.0	100.0	97.0	2.0	101.0	2.0	126.0
Uranium	ICP/MS	11/19/2013	0.0000	1.0000	OK	OK	99.0	107.0	109.0	1.0	102.0	2.0	120.0
Uranium	ICP/MS	11/19/2013				OK	110.0	107.0	122.0	2.0		7.0	
Uranium	ICP/MS	11/19/2013				OK	99.0	111.0	112.0	0.0		1.0	
Vanadium	ICP/MS	11/19/2013				OK	102.0			0.0		7.0	
Vanadium	ICP/MS	11/19/2013	-0.0660	1.0000	OK	OK	90.0	95.0	95.0	0.0	99.0	2.0	81.0
Vanadium	ICP/MS	11/19/2013				OK	91.0	98.0	98.0	1.0			

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

RIN: 13115731      Lab Code: PAR      Date Due: 12/13/2013  
 Matrix: Water      Site Code: RFL01      Date Completed: 11/26/2013

Analyte	Date Analyzed	CALIBRATION			Method	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R <sup>2</sup>	CCV/CCB						
AMMONIA AS N	11/20/2013	-0.017	1.0000	OK	OK	103.00	89.0	93.0	5.00	
AMMONIA AS N	11/20/2013				OK	103.00	106.0	105.0	0	
Chloride	11/11/2013	0.013	1.0000							
CHLORIDE	11/18/2013			OK	OK	103.00	101.0	101.0	0	
CHLORIDE	11/19/2013				OK	102.00	102.0	102.0	0	
CHLORIDE	11/19/2013				OK	103.00				
CHLORIDE	11/20/2013						90.0	89.0	0	
Nitrate+Nitrite as N	11/21/2013	0.000	0.9999	OK	OK	100.00	102.0	102.0	0	
Nitrate+Nitrite as N	11/21/2013	0.000	0.9999	OK	OK	100.00	95.0	96.0	0	
Nitrate+Nitrite as N	11/21/2013	0.000	0.9998	OK	OK	101.00	97.0	99.0	0	
SULFATE	11/11/2013	0.278	0.9999							
SULFATE	11/18/2013			OK	OK	99.00	99.0	100.0	0	
SULFATE	11/19/2013				OK	100.00	104.0	104.0	0	
SULFATE	11/19/2013				OK	101.00				
SULFATE	11/20/2013					104.0	104.0	104.0	0	

## Sampling Quality Control Assessment

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

### Sampling Protocol

Sample results for all monitoring wells were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. All wells met the Category I criteria. Of the six criteria required for Category I wells, RFN01 0855 did not meet one, the specific conductivity stability criterion, which requires stability  $\leq 10\%$ . Well RFN01 0855 had  $\leq 11\%$  and was judged to be acceptable considering the other five criteria were met. However, because this one criterion exceeded the acceptable confidence level by 1%, the specific conductivity result from this location was qualified with a “J” flag (estimated).

### Equipment Blank Assessment

An equipment blank (field ID 2552) was collected after decontamination of the tubing reel used to collect some surface water samples. Chloride, potassium, and selenium were detected in this blank. Sample results for these analytes that are less than 5 times the blank concentration (less than 10 times the blank concentration for major cations) are qualified with a “J” flag (estimated). Sodium, uranium, and vanadium were also detected in the blank by the laboratory, but these analytes have been qualified during data validation with a “U” flag as not detected. The equipment blank results indicate adequate decontamination of the sampling equipment.

### Field Duplicate Analysis

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. Duplicate samples were collected from locations 0305, 0323, and 0575. 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: 13115731    Lab Code: PAR    Project: Rifle Disposal/Processing Site (old/new)    Validation Date: 1/15/2014

**Blank Data**

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1311270-41	SW6010	Potassium	850	B	110	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1311270-10	LMR 985	0294	3900	1		J
1311270-20	LMR 987	0396	3900	1		J
1311270-22	LMR 971	0452	35000	5		
1311270-23	LMR 972	0453	30000	5		

**Blank Data**

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1311270-41	SW6020	Selenium	0.05	B	0.032	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1311270-10	LMR 985	0294	0.39	1		
1311270-20	LMR 987	0396	0.5	1		
1311270-22	LMR 971	0452	16	5		
1311270-23	LMR 972	0453	18	10		

**Blank Data**

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1311270-41	SW9056	CHLORIDE	0.24		0.2	MG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1311270-10	LMR 985	0294	180	50		
1311270-20	LMR 987	0396	170	10		
1311270-22	LMR 971	0452	280	50		
1311270-23	LMR 972	0453	320	50		



**SAMPLE MANAGEMENT SYSTEM**  
**Validation Report: Field Duplicates**

Page 1 of 2

**RIN:** 13115731    **Lab Code:** PAR    **Project:** Rifle Disposal/Processing Site (old/new)    **Validation Date:** 1/14/2014

**Duplicate: 2548**

**Sample: 0575**

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIAAS N	1.9			1	2.1			1	10.00		MG/L
Arsenic	1.9			1	2			1	5.13		UG/L
Calcium	330000			5	330000			10	0		UG/L
CHLORIDE	490			50	490			100	0		MG/L
Magnesium	260000			5	250000			10	3.92		UG/L
Molybdenum	620			1	630			10	1.60		UG/L
Nitrate+Nitrite as N	1.4			1	1.3			5	7.41		MG/L
Potassium	72000			5	66000			10	8.70		UG/L
Selenium	0.7			1	0.62			1	12.12		UG/L
Sodium	1000000			50	1000000			10	0		UG/L
SULFATE	3500			50	3500			100	0		MG/L
Uranium	93			1	94			10	1.07		UG/L
Vanadium	1.7			1	1.7			1	0		UG/L

**Duplicate: 2549**

**Sample: 0323**

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIAAS N	19			10	18			10	5.41		MG/L
Arsenic	1.2			10	1			10	18.18		UG/L
Calcium	600000			10	580000			10	3.39		UG/L
CHLORIDE	590			100	580			100	1.71		MG/L
Magnesium	190000			10	180000			10	5.41		UG/L
Molybdenum	2900			10	2900			10	0		UG/L
Nitrate+Nitrite as N	43			50	41			50	4.76		MG/L
Potassium	100000			10	97000			10	3.05		UG/L
Selenium	5			10	4.9			10	2.02		UG/L
Sodium	1200000			10	1200000			10	0		UG/L
SULFATE	4100			100	4100			100	0		MG/L
Uranium	320			10	320			10	0		UG/L
Vanadium	5.3			10	5.6			10	5.50		UG/L

**Duplicate: 2551**

**Sample: 0305**

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Calcium	140000			2	140000			2	0		UG/L
CHLORIDE	160			20	170			20	6.06		MG/L
Magnesium	60000			2	59000			2	1.68		UG/L

**SAMPLE MANAGEMENT SYSTEM**  
**Validation Report: Field Duplicates**

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RIN: 13115731    Lab Code: PAR    Project: Rifle Disposal/Processing Site (old/new)    Validation Date: 1/14/2014

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Duplicate: 2551

Sample: 0305

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Nitrate+Nitrite as N	0.015			1	0.01	U		1			MG/L
Potassium	7600			2	7500			2	1.32		UG/L
Selenium	19			5	18			10	5.41		UG/L
Sodium	140000			2	140000			2	0		UG/L
SULFATE	340			20	350			20	2.90		MG/L
Uranium	47			5	49			10	4.17		UG/L
Vanadium	370			5	380			10	2.67		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 5-1-2014  
Date

Data Validation Lead: Gretchen Baer 5/1/14  
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 may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

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

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

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the 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 if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

Four results—all from groundwater location RFO01 0310—were identified as potentially anomalous because of the low variability of the historical data. No analytical errors were noted during the review of these data. Potential anomalies in the field parameters were also examined for patterns of repeated high or low bias, which suggest a systematic error due to instrument malfunction. No such patterns were found and all field data from this event are acceptable as qualified. At this time, all data from this sampling event may be treated as validated results.

**Data Validation Outliers Report - No Field Parameters**

**Comparison: All historical Data Beginning 1/1/2003**

Laboratory: ALS Laboratory Group

RIN: 13115731

Report Date: 1/16/2014

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	11/13/2013	Uranium	0.016		F	0.039		F	0.017		F	14	0	No
RFN01	0170	N001	11/12/2013	Nitrate + Nitrite as Nitrogen	10		F	37		F	10.9		F	12	0	No
RFN01	0170	N001	11/12/2013	Selenium	0.018		F	0.017		F	0.003		F	11	0	No
RFN01	0195	N001	11/14/2013	Uranium	0.01		F	0.17		FJ	0.0109		F	15	0	No
RFN01	0323	N002	11/14/2013	Ammonia Total as N	18			44			19			17	0	No
RFN01	0323	N002	11/14/2013	Nitrate + Nitrite as Nitrogen	41			130			52			16	0	No
RFN01	0323	N001	11/14/2013	Nitrate + Nitrite as Nitrogen	43			130			52			16	0	No
RFN01	0452	N001	11/14/2013	Sulfate	1600			4300			2400			5	0	No
RFN01	0453	N001	11/14/2013	Sulfate	1800			3120			2000			5	0	No
RFN01	0575	N002	11/14/2013	Sulfate	3500			2640			990			10	0	No
RFN01	0575	N001	11/14/2013	Sulfate	3500			2640			990			10	0	No
RFN01	0635	N001	11/13/2013	Nitrate + Nitrite as Nitrogen	2.3		F	85		F	4		F	14	0	No
RFN01	0635	N001	11/13/2013	Uranium	0.042		F	0.13		F	0.049		F	16	0	No
RFN01	0658	N001	11/13/2013	Uranium	0.046		F	0.32		FJ	0.053		F	16	0	No
RFN01	0670	N001	11/13/2013	Nitrate + Nitrite as Nitrogen	2.1		F	55		FQ	2.8		FQ	15	0	NA
RFO01	0292A	N001	11/13/2013	Sulfate	480		F	760		F	550		F	10	0	No
RFO01	0292A	N001	11/13/2013	Uranium	0.019		F	0.04	E	F	0.022		F	17	0	No
RFO01	0305	N001	11/13/2013	Sulfate	340		F	840		F	360		F	9	0	No
RFO01	0305	N002	11/13/2013	Sulfate	350		F	840		F	360		F	9	0	No
RFO01	0310	N001	11/12/2013	Calcium	210		F	300		F	221		F	10	0	Yes

**Data Validation Outliers Report - No Field Parameters**

**Comparison: All historical Data Beginning 1/1/2003**

Laboratory: ALS Laboratory Group

RIN: 13115731

Report Date: 1/16/2014

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers		Result	Qualifiers		Result	Qualifiers		N	N Below Detect	
						Lab	Data		Lab	Data		Lab	Data			
RFO01	0310	N001	11/12/2013	Chloride	110		F	230		F	147		F	10	0	Yes
RFO01	0310	N001	11/12/2013	Magnesium	100		F	140		F	106		F	10	0	Yes
RFO01	0310	N001	11/12/2013	Sulfate	690		F	1100		F	816		F	10	0	Yes
RFO01	0395	N001	11/13/2013	Calcium	87			150			95			9	0	No
RFO01	0395	N001	11/13/2013	Chloride	22			83			26			9	0	No
RFO01	0395	N001	11/13/2013	Magnesium	60			110			67			9	0	No
RFO01	0395	N001	11/13/2013	Potassium	2.6			3.6		J	2.9		J	9	0	No
RFO01	0395	N001	11/13/2013	Sodium	62			84			68			9	0	No
RFO01	0395	N001	11/13/2013	Sulfate	290			580			310			9	0	No
RFO01	0395	N001	11/13/2013	Uranium	0.021			0.042			0.024			13	0	No
RFO01	0396	N001	11/13/2013	Calcium	66			65			29			9	0	No
RFO01	0396	N001	11/13/2013	Magnesium	14			13			5.9			9	0	NA
RFO01	0396	N001	11/13/2013	Sodium	110			102			15			9	0	No
RFO01	0655	N001	11/13/2013	Chloride	94		F	190		F	99		F	9	0	No
RFO01	0655	N001	11/13/2013	Nitrate + Nitrite as Nitrogen	0.01	U	F	2.2		F	0.26		F	8	0	No
RFO01	0655	N001	11/13/2013	Selenium	0.0058		F	0.076		F	0.0088		F	27	0	No
RFO01	0655	N001	11/13/2013	Sodium	140		F	240		F	160		F	9	0	No
RFO01	0655	N001	11/13/2013	Sulfate	650		F	1000		F	700		F	9	0	No
RFO01	0656	N001	11/12/2013	Chloride	290		F	230		F	140		F	9	0	No
RFO01	0658	N001	11/12/2013	Sulfate	350		F	560		F	370		F	11	0	No

**Data Validation Outliers Report - No Field Parameters**

**Comparison: All historical Data Beginning 1/1/2003**

Laboratory: ALS Laboratory Group

RIN: 13115731

Report Date: 1/16/2014

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	
RFO01	0658	N001	11/12/2013	Uranium	0.0079		F	0.067		FJ	0.0082		F	26	0	No
RFO01	0741	N001	11/13/2013	Calcium	66			63			31			10	0	No
RFO01	0741	N001	11/13/2013	Sodium	110			102			17			9	0	No

**STATISTICAL TESTS:**

The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test

Outliers are identified using Dixon's Test when there are 25 or fewer data points.

Outliers are identified using Rosner's Test when there are 26 or more data points.

See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

NA: Data are not normally or lognormally distributed.

# **Attachment 2**

## **Data Presentation**

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**New Rifle  
Groundwater Quality Data**

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

REPORT DATE: 1/16/2014

Location: 0169 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Qualifiers			Detection Limit	Uncertainty
							Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	3.13	- 18.13	467		F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	3.13	- 18.13	0.1	U	F	#	0.1	
Arsenic	mg/L	11/13/2013	N001	3.13	- 18.13	0.00054		F	#	0.000015	
Calcium	mg/L	11/13/2013	N001	3.13	- 18.13	170		F	#	0.012	
Chloride	mg/L	11/13/2013	N001	3.13	- 18.13	50		F	#	4	
Magnesium	mg/L	11/13/2013	N001	3.13	- 18.13	100		F	#	0.013	
Molybdenum	mg/L	11/13/2013	N001	3.13	- 18.13	0.0031		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	3.13	- 18.13	0.086		F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	3.13	- 18.13	73.3		F	#		
pH	s.u.	11/13/2013	N001	3.13	- 18.13	6.93		F	#		
Potassium	mg/L	11/13/2013	N001	3.13	- 18.13	7.1		F	#	0.11	
Selenium	mg/L	11/13/2013	N001	3.13	- 18.13	0.004		F	#	0.000032	
Sodium	mg/L	11/13/2013	N001	3.13	- 18.13	160		F	#	0.033	
Specific Conductance	umhos/cm	11/13/2013	N001	3.13	- 18.13	1941		F	#		
Sulfate	mg/L	11/13/2013	N001	3.13	- 18.13	580		F	#	10	
Temperature	C	11/13/2013	N001	3.13	- 18.13	16.08		F	#		
Turbidity	NTU	11/13/2013	N001	3.13	- 18.13	2.89		F	#		
Uranium	mg/L	11/13/2013	N001	3.13	- 18.13	0.016		F	#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	3.13	- 18.13	0.0012		F	#	0.000015	

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

REPORT DATE: 1/16/2014

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

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/12/2013	N001	92.23	- 112.23	562		F	#		
Ammonia Total as N	mg/L	11/12/2013	N001	92.23	- 112.23	0.5		F	#	0.1	
Arsenic	mg/L	11/12/2013	N001	92.23	- 112.23	0.00027		F	#	0.000015	
Calcium	mg/L	11/12/2013	N001	92.23	- 112.23	150		F	#	0.06	
Chloride	mg/L	11/12/2013	N001	92.23	- 112.23	160		F	#	10	
Magnesium	mg/L	11/12/2013	N001	92.23	- 112.23	90		F	#	0.065	
Molybdenum	mg/L	11/12/2013	N001	92.23	- 112.23	0.0029		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/12/2013	N001	92.23	- 112.23	10		F	#	0.1	
Oxidation Reduction Potential	mV	11/12/2013	N001	92.23	- 112.23	146.8		F	#		
pH	s.u.	11/12/2013	N001	92.23	- 112.23	6.92		F	#		
Potassium	mg/L	11/12/2013	N001	92.23	- 112.23	8		F	#	0.54	
Selenium	mg/L	11/12/2013	N001	92.23	- 112.23	0.018		F	#	0.000032	
Sodium	mg/L	11/12/2013	N001	92.23	- 112.23	490		F	#	0.033	
Specific Conductance	umhos /cm	11/12/2013	N001	92.23	- 112.23	3164		F	#		
Sulfate	mg/L	11/12/2013	N001	92.23	- 112.23	990		F	#	25	
Temperature	C	11/12/2013	N001	92.23	- 112.23	14.23		F	#		
Turbidity	NTU	11/12/2013	N001	92.23	- 112.23	0.86		F	#		
Uranium	mg/L	11/12/2013	N001	92.23	- 112.23	0.054		F	#	0.0000029	
Vanadium	mg/L	11/12/2013	N001	92.23	- 112.23	0.001		F	#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0172 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
							Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	6.98	- 31.98	790	F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	6.98	- 31.98	0.14	F	#	0.1	
Arsenic	mg/L	11/13/2013	N001	6.98	- 31.98	0.0052	F	#	0.000015	
Calcium	mg/L	11/13/2013	N001	6.98	- 31.98	450	F	#	0.12	
Chloride	mg/L	11/13/2013	N001	6.98	- 31.98	2200	F	#	40	
Magnesium	mg/L	11/13/2013	N001	6.98	- 31.98	520	F	#	0.13	
Molybdenum	mg/L	11/13/2013	N001	6.98	- 31.98	0.0052	F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	6.98	- 31.98	0.01	F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	6.98	- 31.98	-94.4	F	#		
pH	s.u.	11/13/2013	N001	6.98	- 31.98	6.91	F	#		
Potassium	mg/L	11/13/2013	N001	6.98	- 31.98	22	F	#	1.1	
Selenium	mg/L	11/13/2013	N001	6.98	- 31.98	0.00039	F	#	0.000032	
Sodium	mg/L	11/13/2013	N001	6.98	- 31.98	3400	F	#	0.33	
Specific Conductance	umhos/cm	11/13/2013	N001	6.98	- 31.98	16773	F	#		
Sulfate	mg/L	11/13/2013	N001	6.98	- 31.98	7000	F	#	100	
Temperature	C	11/13/2013	N001	6.98	- 31.98	13.84	F	#		
Turbidity	NTU	11/13/2013	N001	6.98	- 31.98	2.17	F	#		
Uranium	mg/L	11/13/2013	N001	6.98	- 31.98	0.06	F	#	0.000029	
Vanadium	mg/L	11/13/2013	N001	6.98	- 31.98	0.00064	F	#	0.000015	

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

REPORT DATE: 1/16/2014

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

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	5.29	- 25.29	338		F	#		
Ammonia Total as N	mg/L	11/14/2013	N001	5.29	- 25.29	0.24		F	#	0.1	
Arsenic	mg/L	11/14/2013	N001	5.29	- 25.29	0.0013		F	#	0.000015	
Calcium	mg/L	11/14/2013	N001	5.29	- 25.29	80		F	#	0.012	
Chloride	mg/L	11/14/2013	N001	5.29	- 25.29	39		F	#	2	
Magnesium	mg/L	11/14/2013	N001	5.29	- 25.29	41		F	#	0.013	
Molybdenum	mg/L	11/14/2013	N001	5.29	- 25.29	0.022		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	5.29	- 25.29	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/14/2013	N001	5.29	- 25.29	-46.8		F	#		
pH	s.u.	11/14/2013	N001	5.29	- 25.29	7.22		F	#		
Potassium	mg/L	11/14/2013	N001	5.29	- 25.29	5.8		F	#	0.11	
Selenium	mg/L	11/14/2013	N001	5.29	- 25.29	0.00022		F	#	0.000032	
Sodium	mg/L	11/14/2013	N001	5.29	- 25.29	74		F	#	0.0066	
Specific Conductance	umhos /cm	11/14/2013	N001	5.29	- 25.29	1025		F	#		
Sulfate	mg/L	11/14/2013	N001	5.29	- 25.29	160		F	#	5	
Temperature	C	11/14/2013	N001	5.29	- 25.29	13.1		F	#		
Turbidity	NTU	11/14/2013	N001	5.29	- 25.29	7.28		F	#		
Uranium	mg/L	11/14/2013	N001	5.29	- 25.29	0.01		F	#	0.0000029	
Vanadium	mg/L	11/14/2013	N001	5.29	- 25.29	0.00052		F	#	0.000015	

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

REPORT DATE: 1/16/2014

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

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	7.35 - 22.35	277		F #		
Ammonia Total as N	mg/L	11/14/2013	N001	7.35 - 22.35	83		F #	5	
Arsenic	mg/L	11/14/2013	N001	7.35 - 22.35	0.00043		F #	0.000015	
Calcium	mg/L	11/14/2013	N001	7.35 - 22.35	580		F #	0.06	
Chloride	mg/L	11/14/2013	N001	7.35 - 22.35	150		F #	10	
Magnesium	mg/L	11/14/2013	N001	7.35 - 22.35	52		F #	0.065	
Molybdenum	mg/L	11/14/2013	N001	7.35 - 22.35	1.4		F #	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	7.35 - 22.35	52		F #	0.5	
Oxidation Reduction Potential	mV	11/14/2013	N001	7.35 - 22.35	78.4		F #		
pH	s.u.	11/14/2013	N001	7.35 - 22.35	6.82		F #		
Potassium	mg/L	11/14/2013	N001	7.35 - 22.35	14		F #	0.54	
Selenium	mg/L	11/14/2013	N001	7.35 - 22.35	0.0059		F #	0.000032	
Sodium	mg/L	11/14/2013	N001	7.35 - 22.35	270		F #	0.033	
Specific Conductance	umhos/cm	11/14/2013	N001	7.35 - 22.35	4124		F #		
Sulfate	mg/L	11/14/2013	N001	7.35 - 22.35	1800		F #	25	
Temperature	C	11/14/2013	N001	7.35 - 22.35	14.22		F #		
Turbidity	NTU	11/14/2013	N001	7.35 - 22.35	2.63		F #		
Uranium	mg/L	11/14/2013	N001	7.35 - 22.35	0.082		F #	0.00029	
Vanadium	mg/L	11/14/2013	N001	7.35 - 22.35	0.00085		F #	0.000015	

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

REPORT DATE: 1/16/2014

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

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)	Lab		Data	QA			
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/12/2013	N001	6.84	- 21.84	232		F	#		
Ammonia Total as N	mg/L	11/12/2013	N001	6.84	- 21.84	1.9		F	#	0.1	
Arsenic	mg/L	11/12/2013	N001	6.84	- 21.84	0.00044		F	#	0.000015	
Calcium	mg/L	11/12/2013	N001	6.84	- 21.84	71		F	#	0.012	
Chloride	mg/L	11/12/2013	N001	6.84	- 21.84	130		F	#	2	
Magnesium	mg/L	11/12/2013	N001	6.84	- 21.84	36		F	#	0.013	
Molybdenum	mg/L	11/12/2013	N001	6.84	- 21.84	0.012		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/12/2013	N001	6.84	- 21.84	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/12/2013	N001	6.84	- 21.84	61.1		F	#		
pH	s.u.	11/12/2013	N001	6.84	- 21.84	7.27		F	#		
Potassium	mg/L	11/12/2013	N001	6.84	- 21.84	4.6		F	#	0.11	
Selenium	mg/L	11/12/2013	N001	6.84	- 21.84	0.00038		F	#	0.000032	
Sodium	mg/L	11/12/2013	N001	6.84	- 21.84	110		F	#	0.0066	
Specific Conductance	umhos /cm	11/12/2013	N001	6.84	- 21.84	1264		F	#		
Sulfate	mg/L	11/12/2013	N001	6.84	- 21.84	180		F	#	5	
Temperature	C	11/12/2013	N001	6.84	- 21.84	15.59		F	#		
Turbidity	NTU	11/12/2013	N001	6.84	- 21.84	0.97		F	#		
Uranium	mg/L	11/12/2013	N001	6.84	- 21.84	0.011		F	#	0.0000029	
Vanadium	mg/L	11/12/2013	N001	6.84	- 21.84	0.0026		F	#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0216 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	5.5	-	20.5	185		F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	5.5	-	20.5	5.8		F	#	0.2	
Arsenic	mg/L	11/13/2013	N001	5.5	-	20.5	0.034		F	#	0.000015	
Calcium	mg/L	11/13/2013	N001	5.5	-	20.5	87		F	#	0.012	
Chloride	mg/L	11/13/2013	N001	5.5	-	20.5	150		F	#	2	
Magnesium	mg/L	11/13/2013	N001	5.5	-	20.5	18		F	#	0.013	
Molybdenum	mg/L	11/13/2013	N001	5.5	-	20.5	0.043		F	#	0.0016	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	5.5	-	20.5	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	5.5	-	20.5	18.9		F	#		
pH	s.u.	11/13/2013	N001	5.5	-	20.5	7.33		F	#		
Potassium	mg/L	11/13/2013	N001	5.5	-	20.5	7.9		F	#	0.11	
Selenium	mg/L	11/13/2013	N001	5.5	-	20.5	0.0004		F	#	0.000032	
Sodium	mg/L	11/13/2013	N001	5.5	-	20.5	88		F	#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	5.5	-	20.5	1100		F	#		
Sulfate	mg/L	11/13/2013	N001	5.5	-	20.5	110		F	#	5	
Temperature	C	11/13/2013	N001	5.5	-	20.5	13.94		F	#		
Turbidity	NTU	11/13/2013	N001	5.5	-	20.5	5.58		F	#		
Uranium	mg/L	11/13/2013	N001	5.5	-	20.5	0.014		F	#	0.00015	
Vanadium	mg/L	11/13/2013	N001	5.5	-	20.5	0.24		F	#	0.00076	

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

REPORT DATE: 1/16/2014

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

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	7.4	- 22.4	225		F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	7.4	- 22.4	46		F	#	2	
Arsenic	mg/L	11/13/2013	N001	7.4	- 22.4	0.00082		F	#	0.000015	
Calcium	mg/L	11/13/2013	N001	7.4	- 22.4	640		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	7.4	- 22.4	240		F	#	10	
Magnesium	mg/L	11/13/2013	N001	7.4	- 22.4	20		F	#	0.026	
Molybdenum	mg/L	11/13/2013	N001	7.4	- 22.4	1.6		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	7.4	- 22.4	0.014		F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	7.4	- 22.4	84.8		F	#		
pH	s.u.	11/13/2013	N001	7.4	- 22.4	6.91		F	#		
Potassium	mg/L	11/13/2013	N001	7.4	- 22.4	20		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	7.4	- 22.4	0.0059		F	#	0.000032	
Sodium	mg/L	11/13/2013	N001	7.4	- 22.4	200		F	#	0.013	
Specific Conductance	umhos /cm	11/13/2013	N001	7.4	- 22.4	3523		F	#		
Sulfate	mg/L	11/13/2013	N001	7.4	- 22.4	1600		F	#	25	
Temperature	C	11/13/2013	N001	7.4	- 22.4	10.24		F	#		
Turbidity	NTU	11/13/2013	N001	7.4	- 22.4	4.24		F	#		
Uranium	mg/L	11/13/2013	N001	7.4	- 22.4	0.13		F	#	0.00029	
Vanadium	mg/L	11/13/2013	N001	7.4	- 22.4	2		F	#	0.0015	



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

REPORT DATE: 1/16/2014

Location: 0590 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
							Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	5.21	- 19.21	268	F	#		
Ammonia Total as N	mg/L	11/14/2013	N001	5.21	- 19.21	160	F	#	5	
Arsenic	mg/L	11/14/2013	N001	5.21	- 19.21	0.00092	F	#	0.000074	
Calcium	mg/L	11/14/2013	N001	5.21	- 19.21	550	F	#	0.06	
Chloride	mg/L	11/14/2013	N001	5.21	- 19.21	340	F	#	10	
Magnesium	mg/L	11/14/2013	N001	5.21	- 19.21	58	F	#	0.065	
Molybdenum	mg/L	11/14/2013	N001	5.21	- 19.21	1	F	#	0.00016	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	5.21	- 19.21	46	F	#	0.5	
Oxidation Reduction Potential	mV	11/14/2013	N001	5.21	- 19.21	110.7	F	#		
pH	s.u.	11/14/2013	N001	5.21	- 19.21	6.8	F	#		
Potassium	mg/L	11/14/2013	N001	5.21	- 19.21	35	F	#	0.54	
Selenium	mg/L	11/14/2013	N001	5.21	- 19.21	0.039	F	#	0.00016	
Sodium	mg/L	11/14/2013	N001	5.21	- 19.21	470	F	#	0.033	
Specific Conductance	umhos/cm	11/14/2013	N001	5.21	- 19.21	5515	F	#		
Sulfate	mg/L	11/14/2013	N001	5.21	- 19.21	2300	F	#	25	
Temperature	C	11/14/2013	N001	5.21	- 19.21	11.53	F	#		
Turbidity	NTU	11/14/2013	N001	5.21	- 19.21	1.82	F	#		
Uranium	mg/L	11/14/2013	N001	5.21	- 19.21	0.071	F	#	0.000015	
Vanadium	mg/L	11/14/2013	N001	5.21	- 19.21	0.37	F	#	0.000076	

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

REPORT DATE: 1/16/2014

Location: 0620 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID				Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	6.7	-	10.7		F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	6.7	-	10.7	0.1	U	F	#	0.1
Arsenic	mg/L	11/13/2013	N001	6.7	-	10.7	0.00043		F	#	0.000015
Calcium	mg/L	11/13/2013	N001	6.7	-	10.7	380		F	#	0.12
Chloride	mg/L	11/13/2013	N001	6.7	-	10.7	1100		F	#	20
Magnesium	mg/L	11/13/2013	N001	6.7	-	10.7	230		F	#	0.13
Molybdenum	mg/L	11/13/2013	N001	6.7	-	10.7	0.0082		F	#	0.000032
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	6.7	-	10.7	20		F	#	0.2
Oxidation Reduction Potential	mV	11/13/2013	N001	6.7	-	10.7	24.1		F	#	
pH	s.u.	11/13/2013	N001	6.7	-	10.7	7.14		F	#	
Potassium	mg/L	11/13/2013	N001	6.7	-	10.7	12		F	#	1.1
Selenium	mg/L	11/13/2013	N001	6.7	-	10.7	0.027		F	#	0.000032
Sodium	mg/L	11/13/2013	N001	6.7	-	10.7	1100		F	#	0.066
Specific Conductance	umhos/cm	11/13/2013	N001	6.7	-	10.7	6985		F	#	
Sulfate	mg/L	11/13/2013	N001	6.7	-	10.7	2100		F	#	25
Temperature	C	11/13/2013	N001	6.7	-	10.7	13.55		F	#	
Turbidity	NTU	11/13/2013	N001	6.7	-	10.7	2.3		F	#	
Uranium	mg/L	11/13/2013	N001	6.7	-	10.7	0.056		F	#	0.0000029
Vanadium	mg/L	11/13/2013	N001	6.7	-	10.7	0.0018		F	#	0.000015

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

REPORT DATE: 1/16/2014

Location: 0635 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	12 - 17	278		F #		
Ammonia Total as N	mg/L	11/13/2013	N001	12 - 17	63		F #	5	
Arsenic	mg/L	11/13/2013	N001	12 - 17	0.00018		F #	0.000015	
Calcium	mg/L	11/13/2013	N001	12 - 17	260		F #	0.06	
Chloride	mg/L	11/13/2013	N001	12 - 17	210		F #	5	
Magnesium	mg/L	11/13/2013	N001	12 - 17	18		F #	0.065	
Molybdenum	mg/L	11/13/2013	N001	12 - 17	0.37		F #	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	12 - 17	2.3		F #	0.1	
Oxidation Reduction Potential	mV	11/13/2013	N001	12 - 17	96.6		F #		
pH	s.u.	11/13/2013	N001	12 - 17	7		F #		
Potassium	mg/L	11/13/2013	N001	12 - 17	32		F #	0.54	
Selenium	mg/L	11/13/2013	N001	12 - 17	0.0062		F #	0.000032	
Sodium	mg/L	11/13/2013	N001	12 - 17	190		F #	0.033	
Specific Conductance	umhos/cm	11/13/2013	N001	12 - 17	2593		F #		
Sulfate	mg/L	11/13/2013	N001	12 - 17	780		F #	12	
Temperature	C	11/13/2013	N001	12 - 17	12.3		F #		
Turbidity	NTU	11/13/2013	N001	12 - 17	1.97		F #		
Uranium	mg/L	11/13/2013	N001	12 - 17	0.042		F #	0.0000029	
Vanadium	mg/L	11/13/2013	N001	12 - 17	0.00075		F #	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0658 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	.5 - 5.5	270		F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	.5 - 5.5	44		F	#	2	
Arsenic	mg/L	11/13/2013	N001	.5 - 5.5	0.05		F	#	0.0015	
Calcium	mg/L	11/13/2013	N001	.5 - 5.5	480		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	.5 - 5.5	210		F	#	10	
Magnesium	mg/L	11/13/2013	N001	.5 - 5.5	30		F	#	0.026	
Molybdenum	mg/L	11/13/2013	N001	.5 - 5.5	0.95		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	.5 - 5.5	4.1		F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2013	N001	.5 - 5.5	-23.3		F	#		
pH	s.u.	11/13/2013	N001	.5 - 5.5	6.77		F	#		
Potassium	mg/L	11/13/2013	N001	.5 - 5.5	9.1		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	.5 - 5.5	0.8		F	#	0.0032	
Sodium	mg/L	11/13/2013	N001	.5 - 5.5	170		F	#	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	.5 - 5.5	3050		F	#		
Sulfate	mg/L	11/13/2013	N001	.5 - 5.5	1100		F	#	25	
Temperature	C	11/13/2013	N001	.5 - 5.5	13.6		F	#		
Turbidity	NTU	11/13/2013	N001	.5 - 5.5	9.29		F	#		
Uranium	mg/L	11/13/2013	N001	.5 - 5.5	0.046		F	#	0.00029	
Vanadium	mg/L	11/13/2013	N001	.5 - 5.5	19		F	#	0.0015	

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

REPORT DATE: 1/16/2014

Location: 0659 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	0001	.5 - 10.5	210		F	#		
Ammonia Total as N	mg/L	11/13/2013	0001	.5 - 10.5	33		F	#	1	
Arsenic	mg/L	11/13/2013	0001	.5 - 10.5	0.018		F	#	0.00074	
Calcium	mg/L	11/13/2013	0001	.5 - 10.5	660		F	#	0.024	
Chloride	mg/L	11/13/2013	0001	.5 - 10.5	220		F	#	10	
Magnesium	mg/L	11/13/2013	0001	.5 - 10.5	26		F	#	0.026	
Molybdenum	mg/L	11/13/2013	0001	.5 - 10.5	1.4		F	#	0.0016	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	0001	.5 - 10.5	5.9		F	#	0.1	
Oxidation Reduction Potential	mV	11/13/2013	N001	.5 - 10.5	33.6		F	#		
pH	s.u.	11/13/2013	N001	.5 - 10.5	6.92		F	#		
Potassium	mg/L	11/13/2013	0001	.5 - 10.5	13		F	#	0.22	
Selenium	mg/L	11/13/2013	0001	.5 - 10.5	0.1		F	#	0.0016	
Sodium	mg/L	11/13/2013	0001	.5 - 10.5	190		F	#	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	.5 - 10.5	3542		F	#		
Sulfate	mg/L	11/13/2013	0001	.5 - 10.5	1600		F	#	25	
Temperature	C	11/13/2013	N001	.5 - 10.5	12.15		F	#		
Turbidity	NTU	11/13/2013	N001	.5 - 10.5	45.9		F	#		
Uranium	mg/L	11/13/2013	0001	.5 - 10.5	0.094		F	#	0.00015	
Vanadium	mg/L	11/13/2013	0001	.5 - 10.5	1.3		F	#	0.00076	

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

REPORT DATE: 1/16/2014

Location: 0664 WELL

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	7.7	- 14.7	411		F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	7.7	- 14.7	30		F	#	2	
Arsenic	mg/L	11/13/2013	N001	7.7	- 14.7	0.0031		F	#	0.000074	
Calcium	mg/L	11/13/2013	N001	7.7	- 14.7	170		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	7.7	- 14.7	130		F	#	5	
Magnesium	mg/L	11/13/2013	N001	7.7	- 14.7	75		F	#	0.026	
Molybdenum	mg/L	11/13/2013	N001	7.7	- 14.7	0.28		F	#	0.00016	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	7.7	- 14.7	2.4		F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2013	N001	7.7	- 14.7	62.9		F	#		
pH	s.u.	11/13/2013	N001	7.7	- 14.7	6.86		F	#		
Potassium	mg/L	11/13/2013	N001	7.7	- 14.7	12		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	7.7	- 14.7	0.13		F	#	0.00016	
Sodium	mg/L	11/13/2013	N001	7.7	- 14.7	210		F	#	0.013	
Specific Conductance	umhos /cm	11/13/2013	N001	7.7	- 14.7	2361		F	#		
Sulfate	mg/L	11/13/2013	N001	7.7	- 14.7	690		F	#	12	
Temperature	C	11/13/2013	N001	7.7	- 14.7	13.12		F	#		
Turbidity	NTU	11/13/2013	N001	7.7	- 14.7	2.77		F	#		
Uranium	mg/L	11/13/2013	N001	7.7	- 14.7	0.054		F	#	0.000015	
Vanadium	mg/L	11/13/2013	N001	7.7	- 14.7	2		F	#	0.000076	

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

REPORT DATE: 1/16/2014

Location: 0669 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	4 - 10.6	356		F #		
Ammonia Total as N	mg/L	11/13/2013	N001	4 - 10.6	82		F #	2	
Arsenic	mg/L	11/13/2013	N001	4 - 10.6	0.0064		F #	0.00074	
Calcium	mg/L	11/13/2013	N001	4 - 10.6	340		F #	0.024	
Chloride	mg/L	11/13/2013	N001	4 - 10.6	130		F #	5	
Magnesium	mg/L	11/13/2013	N001	4 - 10.6	42		F #	0.026	
Molybdenum	mg/L	11/13/2013	N001	4 - 10.6	0.75		F #	0.0016	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	4 - 10.6	1.3		F #	0.05	
Oxidation Reduction Potential	mV	11/13/2013	N001	4 - 10.6	-1.4		F #		
pH	s.u.	11/13/2013	N001	4 - 10.6	6.87		F #		
Potassium	mg/L	11/13/2013	N001	4 - 10.6	7.6		F #	0.22	
Selenium	mg/L	11/13/2013	N001	4 - 10.6	0.0095		F #	0.0016	
Sodium	mg/L	11/13/2013	N001	4 - 10.6	200		F #	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	4 - 10.6	2874		F #		
Sulfate	mg/L	11/13/2013	N001	4 - 10.6	1100		F #	12	
Temperature	C	11/13/2013	N001	4 - 10.6	13.12		F #		
Turbidity	NTU	11/13/2013	N001	4 - 10.6	2.8		F #		
Uranium	mg/L	11/13/2013	N001	4 - 10.6	0.084		F #	0.00015	
Vanadium	mg/L	11/13/2013	N001	4 - 10.6	2.6		F #	0.00076	

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

REPORT DATE: 1/16/2014

Location: 0670 WELL For Organics Study.

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	5.2	- 12.2	396		F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	5.2	- 12.2	15		F	#	1	
Arsenic	mg/L	11/13/2013	N001	5.2	- 12.2	0.0041		F	#	0.00015	
Calcium	mg/L	11/13/2013	N001	5.2	- 12.2	140		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	5.2	- 12.2	130		F	#	4	
Magnesium	mg/L	11/13/2013	N001	5.2	- 12.2	83		F	#	0.026	
Molybdenum	mg/L	11/13/2013	N001	5.2	- 12.2	0.16		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	5.2	- 12.2	2.1		F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2013	N001	5.2	- 12.2	67.3		F	#		
pH	s.u.	11/13/2013	N001	5.2	- 12.2	6.93		F	#		
Potassium	mg/L	11/13/2013	N001	5.2	- 12.2	11		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	5.2	- 12.2	0.31		F	#	0.00032	
Sodium	mg/L	11/13/2013	N001	5.2	- 12.2	210		F	#	0.013	
Specific Conductance	umhos /cm	11/13/2013	N001	5.2	- 12.2	2197		F	#		
Sulfate	mg/L	11/13/2013	N001	5.2	- 12.2	600		F	#	10	
Temperature	C	11/13/2013	N001	5.2	- 12.2	15.37		F	#		
Turbidity	NTU	11/13/2013	N001	5.2	- 12.2	5.75		F	#		
Uranium	mg/L	11/13/2013	N001	5.2	- 12.2	0.06		F	#	0.000029	
Vanadium	mg/L	11/13/2013	N001	5.2	- 12.2	2.1		F	#	0.00015	



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

REPORT DATE: 1/16/2014

Location: 0855 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
								Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	6	-	11	260	F	#		
Ammonia Total as N	mg/L	11/13/2013	N001	6	-	11	34	F	#	1	
Arsenic	mg/L	11/13/2013	N001	6	-	11	0.59	F	#	0.0015	
Calcium	mg/L	11/13/2013	N001	6	-	11	390	F	#	0.024	
Chloride	mg/L	11/13/2013	N001	6	-	11	220	F	#	5	
Magnesium	mg/L	11/13/2013	N001	6	-	11	37	F	#	0.026	
Molybdenum	mg/L	11/13/2013	N001	6	-	11	0.98	F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	6	-	11	8.9	F	#	0.1	
Oxidation Reduction Potential	mV	11/13/2013	N001	6	-	11	94.3	F	#		
pH	s.u.	11/13/2013	N001	6	-	11	6.62	F	#		
Potassium	mg/L	11/13/2013	N001	6	-	11	11	F	#	0.22	
Selenium	mg/L	11/13/2013	N001	6	-	11	0.91	F	#	0.0032	
Sodium	mg/L	11/13/2013	N001	6	-	11	190	F	#	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	6	-	11	3003	JF	#		
Sulfate	mg/L	11/13/2013	N001	6	-	11	960	F	#	12	
Temperature	C	11/13/2013	N001	6	-	11	14.41	F	#		
Turbidity	NTU	11/13/2013	N001	6	-	11	3.75	F	#		
Uranium	mg/L	11/13/2013	N001	6	-	11	0.039	F	#	0.00029	
Vanadium	mg/L	11/13/2013	N001	6	-	11	24	F	#	0.0015	

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**

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

REPORT DATE: 1/16/2014

Location: 0292A WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	10.5	-	20.5	391		F	#		
Calcium	mg/L	11/13/2013	N001	10.5	-	20.5	140		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	10.5	-	20.5	65		F	#	4	
Magnesium	mg/L	11/13/2013	N001	10.5	-	20.5	83		F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	10.5	-	20.5	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	10.5	-	20.5	-137.2		F	#		
pH	s.u.	11/13/2013	N001	10.5	-	20.5	7.13		F	#		
Potassium	mg/L	11/13/2013	N001	10.5	-	20.5	5.2		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	10.5	-	20.5	0.00037		F	#	0.000032	
Sodium	mg/L	11/13/2013	N001	10.5	-	20.5	160		F	#	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	10.5	-	20.5	1810		F	#		
Sulfate	mg/L	11/13/2013	N001	10.5	-	20.5	480		F	#	10	
Temperature	C	11/13/2013	N001	10.5	-	20.5	13.26		F	#		
Turbidity	NTU	11/13/2013	N001	10.5	-	20.5	0.47		F	#		
Uranium	mg/L	11/13/2013	N001	10.5	-	20.5	0.019		F	#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	10.5	-	20.5	0.0007		F	#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0304 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	13.2	-	18.2	181	F	#		
Calcium	mg/L	11/13/2013	N001	13.2	-	18.2	170	F	#	0.024	
Chloride	mg/L	11/13/2013	N001	13.2	-	18.2	230	F	#	4	
Magnesium	mg/L	11/13/2013	N001	13.2	-	18.2	66	F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	13.2	-	18.2	0.015	F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	13.2	-	18.2	47.3	F	#		
pH	s.u.	11/13/2013	N001	13.2	-	18.2	7.19	F	#		
Potassium	mg/L	11/13/2013	N001	13.2	-	18.2	6.4	F	#	0.22	
Selenium	mg/L	11/13/2013	N001	13.2	-	18.2	0.0022	F	#	0.000032	
Sodium	mg/L	11/13/2013	N001	13.2	-	18.2	150	F	#	0.013	
Specific Conductance	umhos /cm	11/13/2013	N001	13.2	-	18.2	1900	F	#		
Sulfate	mg/L	11/13/2013	N001	13.2	-	18.2	360	F	#	10	
Temperature	C	11/13/2013	N001	13.2	-	18.2	14.53	F	#		
Turbidity	NTU	11/13/2013	N001	13.2	-	18.2	2.11	F	#		
Uranium	mg/L	11/13/2013	N001	13.2	-	18.2	0.044	F	#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	13.2	-	18.2	0.04	F	#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0305 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Qualifiers			Detection Limit	Uncertainty
							Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	13.76	- 18.76	306		F	#		
Calcium	mg/L	11/13/2013	N001	13.76	- 18.76	140		F	#	0.024	
Calcium	mg/L	11/13/2013	N002	13.76	- 18.76	140		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	13.76	- 18.76	160		F	#	4	
Chloride	mg/L	11/13/2013	N002	13.76	- 18.76	170		F	#	4	
Magnesium	mg/L	11/13/2013	N001	13.76	- 18.76	60		F	#	0.026	
Magnesium	mg/L	11/13/2013	N002	13.76	- 18.76	59		F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	13.76	- 18.76	0.015		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N002	13.76	- 18.76	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	13.76	- 18.76	32.4		F	#		
pH	s.u.	11/13/2013	N001	13.76	- 18.76	7.32		F	#		
Potassium	mg/L	11/13/2013	N001	13.76	- 18.76	7.6		F	#	0.22	
Potassium	mg/L	11/13/2013	N002	13.76	- 18.76	7.5		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	13.76	- 18.76	0.019		F	#	0.00016	
Selenium	mg/L	11/13/2013	N002	13.76	- 18.76	0.018		F	#	0.00032	
Sodium	mg/L	11/13/2013	N001	13.76	- 18.76	140		F	#	0.013	
Sodium	mg/L	11/13/2013	N002	13.76	- 18.76	140		F	#	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	13.76	- 18.76	1734		F	#		
Sulfate	mg/L	11/13/2013	N001	13.76	- 18.76	340		F	#	10	
Sulfate	mg/L	11/13/2013	N002	13.76	- 18.76	350		F	#	10	

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

REPORT DATE: 1/16/2014

Location: 0305 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID				Lab	Data	QA		
Temperature	C	11/13/2013	N001	13.76	- 18.76	15.25		F	#		
Turbidity	NTU	11/13/2013	N001	13.76	- 18.76	1.96		F	#		
Uranium	mg/L	11/13/2013	N001	13.76	- 18.76	0.047		F	#	0.000015	
Uranium	mg/L	11/13/2013	N002	13.76	- 18.76	0.049		F	#	0.000029	
Vanadium	mg/L	11/13/2013	N001	13.76	- 18.76	0.37		F	#	0.000076	
Vanadium	mg/L	11/13/2013	N002	13.76	- 18.76	0.38		F	#	0.00015	



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

REPORT DATE: 1/16/2014

Location: 0309 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Qualifiers			Detection Limit	Uncertainty
							Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	16.93	- 21.93	326		F	#		
Calcium	mg/L	11/13/2013	N001	16.93	- 21.93	180		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	16.93	- 21.93	130		F	#	5	
Magnesium	mg/L	11/13/2013	N001	16.93	- 21.93	120		F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	16.93	- 21.93	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	16.93	- 21.93	-43.9		F	#		
pH	s.u.	11/13/2013	N001	16.93	- 21.93	7.22		F	#		
Potassium	mg/L	11/13/2013	N001	16.93	- 21.93	8.4		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	16.93	- 21.93	0.00021		F	#	0.000032	
Sodium	mg/L	11/13/2013	N001	16.93	- 21.93	200		F	#	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	16.93	- 21.93	2355		F	#		
Sulfate	mg/L	11/13/2013	N001	16.93	- 21.93	820		F	#	12	
Temperature	C	11/13/2013	N001	16.93	- 21.93	14.84		F	#		
Turbidity	NTU	11/13/2013	N001	16.93	- 21.93	1.16		F	#		
Uranium	mg/L	11/13/2013	N001	16.93	- 21.93	0.018		F	#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	16.93	- 21.93	0.00057		F	#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0310 WELL

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/12/2013	N001	17.93	- 22.93	479		F	#		
Calcium	mg/L	11/12/2013	N001	17.93	- 22.93	210		F	#	0.024	
Chloride	mg/L	11/12/2013	N001	17.93	- 22.93	110		F	#	5	
Magnesium	mg/L	11/12/2013	N001	17.93	- 22.93	100		F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/12/2013	N001	17.93	- 22.93	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/12/2013	N001	17.93	- 22.93	-46.2		F	#		
pH	s.u.	11/12/2013	N001	17.93	- 22.93	7.11		F	#		
Potassium	mg/L	11/12/2013	N001	17.93	- 22.93	9.7		F	#	0.22	
Selenium	mg/L	11/12/2013	N001	17.93	- 22.93	0.00033		F	#	0.000032	
Sodium	mg/L	11/12/2013	N001	17.93	- 22.93	200		F	#	0.013	
Specific Conductance	umhos/cm	11/12/2013	N001	17.93	- 22.93	2284		F	#		
Sulfate	mg/L	11/12/2013	N001	17.93	- 22.93	690		F	#	12	
Temperature	C	11/12/2013	N001	17.93	- 22.93	14.74		F	#		
Turbidity	NTU	11/12/2013	N001	17.93	- 22.93	2.54		F	#		
Uranium	mg/L	11/12/2013	N001	17.93	- 22.93	0.17		F	#	0.00015	
Vanadium	mg/L	11/12/2013	N001	17.93	- 22.93	0.01		F	#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0655 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	13.6	-	23.6	417		F	#		
Calcium	mg/L	11/13/2013	N001	13.6	-	23.6	190		F	#	0.024	
Chloride	mg/L	11/13/2013	N001	13.6	-	23.6	94		F	#	4	
Magnesium	mg/L	11/13/2013	N001	13.6	-	23.6	120		F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	13.6	-	23.6	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	13.6	-	23.6	-76.1		F	#		
pH	s.u.	11/13/2013	N001	13.6	-	23.6	7.06		F	#		
Potassium	mg/L	11/13/2013	N001	13.6	-	23.6	8.2		F	#	0.22	
Selenium	mg/L	11/13/2013	N001	13.6	-	23.6	0.0058		F	#	0.00016	
Sodium	mg/L	11/13/2013	N001	13.6	-	23.6	140		F	#	0.013	
Specific Conductance	umhos/cm	11/13/2013	N001	13.6	-	23.6	2125		F	#		
Sulfate	mg/L	11/13/2013	N001	13.6	-	23.6	650		F	#	10	
Temperature	C	11/13/2013	N001	13.6	-	23.6	14.72		F	#		
Turbidity	NTU	11/13/2013	N001	13.6	-	23.6	0.95		F	#		
Uranium	mg/L	11/13/2013	N001	13.6	-	23.6	0.083		F	#	0.000015	
Vanadium	mg/L	11/13/2013	N001	13.6	-	23.6	0.31		F	#	0.000076	

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

REPORT DATE: 1/16/2014

Location: 0656 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/12/2013	N001	6.35 - 21.35	318		F	#		
Calcium	mg/L	11/12/2013	N001	6.35 - 21.35	150		F	#	0.024	
Chloride	mg/L	11/12/2013	N001	6.35 - 21.35	290		F	#	4	
Magnesium	mg/L	11/12/2013	N001	6.35 - 21.35	80		F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/12/2013	N001	6.35 - 21.35	0.32		F	#	0.01	
Oxidation Reduction Potential	mV	11/12/2013	N001	6.35 - 21.35	-33.7		F	#		
pH	s.u.	11/12/2013	N001	6.35 - 21.35	6.97		F	#		
Potassium	mg/L	11/12/2013	N001	6.35 - 21.35	9.3		F	#	0.22	
Selenium	mg/L	11/12/2013	N001	6.35 - 21.35	0.0039		F	#	0.000032	
Sodium	mg/L	11/12/2013	N001	6.35 - 21.35	170		F	#	0.013	
Specific Conductance	umhos /cm	11/12/2013	N001	6.35 - 21.35	2123		F	#		
Sulfate	mg/L	11/12/2013	N001	6.35 - 21.35	370		F	#	10	
Temperature	C	11/12/2013	N001	6.35 - 21.35	17.08		F	#		
Turbidity	NTU	11/12/2013	N001	6.35 - 21.35	4.02		F	#		
Uranium	mg/L	11/12/2013	N001	6.35 - 21.35	0.18		F	#	0.000015	
Vanadium	mg/L	11/12/2013	N001	6.35 - 21.35	0.021		F	#	0.000076	

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

REPORT DATE: 1/16/2014

Location: 0658 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/12/2013	N001	2.3 - 17.3	381		F	#		
Calcium	mg/L	11/12/2013	N001	2.3 - 17.3	140		F	#	0.024	
Chloride	mg/L	11/12/2013	N001	2.3 - 17.3	22		F	#	4	
Magnesium	mg/L	11/12/2013	N001	2.3 - 17.3	77		F	#	0.026	
Nitrate + Nitrite as Nitrogen	mg/L	11/12/2013	N001	2.3 - 17.3	0.015		F	#	0.01	
Oxidation Reduction Potential	mV	11/12/2013	N001	2.3 - 17.3	-42.3		F	#		
pH	s.u.	11/12/2013	N001	2.3 - 17.3	7.03		F	#		
Potassium	mg/L	11/12/2013	N001	2.3 - 17.3	2.8		F	#	0.22	
Selenium	mg/L	11/12/2013	N001	2.3 - 17.3	0.0018		F	#	0.000032	
Sodium	mg/L	11/12/2013	N001	2.3 - 17.3	61		F	#	0.013	
Specific Conductance	umhos/cm	11/12/2013	N001	2.3 - 17.3	1408		F	#		
Sulfate	mg/L	11/12/2013	N001	2.3 - 17.3	350		F	#	10	
Temperature	C	11/12/2013	N001	2.3 - 17.3	11.81		F	#		
Turbidity	NTU	11/12/2013	N001	2.3 - 17.3	4.41		F	#		
Uranium	mg/L	11/12/2013	N001	2.3 - 17.3	0.0079		F	#	0.0000029	
Vanadium	mg/L	11/12/2013	N001	2.3 - 17.3	0.00097		F	#	0.000015	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

**New Rifle  
Surface Water Quality Data**

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

REPORT DATE: 1/16/2014

Location: 0320 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	157		#		
Ammonia Total as N	mg/L	11/14/2013	N001	49		#	1	
Arsenic	mg/L	11/14/2013	N001	0.003		#	0.000074	
Calcium	mg/L	11/14/2013	N001	640		#	0.12	
Chloride	mg/L	11/14/2013	N001	600		#	20	
Magnesium	mg/L	11/14/2013	N001	140		#	0.13	
Molybdenum	mg/L	11/14/2013	N001	1.1		#	0.00016	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	6.4		#	0.1	
Oxidation Reduction Potential	mV	11/14/2013	N001	216.2		#		
pH	s.u.	11/14/2013	N001	7.76		#		
Potassium	mg/L	11/14/2013	N001	88		#	1.1	
Selenium	mg/L	11/14/2013	N001	0.0097		#	0.00016	
Sodium	mg/L	11/14/2013	N001	960		#	0.066	
Specific Conductance	umhos/cm	11/14/2013	N001	7330		#		
Sulfate	mg/L	11/14/2013	N001	3500		#	50	
Temperature	C	11/14/2013	N001	9.59		#		
Turbidity	NTU	11/14/2013	N001	3.3		#		
Uranium	mg/L	11/14/2013	N001	0.16		#	0.000015	
Vanadium	mg/L	11/14/2013	N001	0.048		#	0.000076	

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

REPORT DATE: 1/16/2014

Location: 0322 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	115			#		
Ammonia Total as N	mg/L	11/13/2013	N001	0.1	U		#	0.1	
Arsenic	mg/L	11/13/2013	N001	0.00039			#	0.000015	
Calcium	mg/L	11/13/2013	N001	65			#	0.012	
Chloride	mg/L	11/13/2013	N001	170			#	2	
Magnesium	mg/L	11/13/2013	N001	13			#	0.013	
Molybdenum	mg/L	11/13/2013	N001	0.0049			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	0.032			#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	46.8			#		
pH	s.u.	11/13/2013	N001	8.86			#		
Potassium	mg/L	11/13/2013	N001	4			#	0.11	
Selenium	mg/L	11/13/2013	N001	0.00048			#	0.000032	
Sodium	mg/L	11/13/2013	N001	110			#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	1013			#		
Sulfate	mg/L	11/13/2013	N001	100			#	5	
Temperature	C	11/13/2013	N001	5.31			#		
Turbidity	NTU	11/13/2013	N001	8.81			#		
Uranium	mg/L	11/13/2013	N001	0.002			#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	0.0015			#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0323 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	154		#		
Ammonia Total as N	mg/L	11/14/2013	N001	19		#	1	
Ammonia Total as N	mg/L	11/14/2013	N002	18		#	1	
Arsenic	mg/L	11/14/2013	N001	0.0012		#	0.00015	
Arsenic	mg/L	11/14/2013	N002	0.001		#	0.00015	
Calcium	mg/L	11/14/2013	N001	600		#	0.12	
Calcium	mg/L	11/14/2013	N002	580		#	0.12	
Chloride	mg/L	11/14/2013	N001	590		#	20	
Chloride	mg/L	11/14/2013	N002	580		#	20	
Magnesium	mg/L	11/14/2013	N001	190		#	0.13	
Magnesium	mg/L	11/14/2013	N002	180		#	0.13	
Molybdenum	mg/L	11/14/2013	N001	2.9		#	0.00032	
Molybdenum	mg/L	11/14/2013	N002	2.9		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	43		#	0.5	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N002	41		#	0.5	
Oxidation Reduction Potential	mV	11/14/2013	N001	226.3		#		
pH	s.u.	11/14/2013	N001	7.66		#		
Potassium	mg/L	11/14/2013	N001	100		#	1.1	
Potassium	mg/L	11/14/2013	N002	97		#	1.1	
Selenium	mg/L	11/14/2013	N001	0.005		#	0.00032	
Selenium	mg/L	11/14/2013	N002	0.0049		#	0.00032	

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

REPORT DATE: 1/16/2014

Location: 0323 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Sodium	mg/L	11/14/2013	N001	1200			#	0.066	
Sodium	mg/L	11/14/2013	N002	1200			#	0.066	
Specific Conductance	umhos/cm	11/14/2013	N001	8256			#		
Sulfate	mg/L	11/14/2013	N001	4100			#	50	
Sulfate	mg/L	11/14/2013	N002	4100			#	50	
Temperature	C	11/14/2013	N001	8.55			#		
Turbidity	NTU	11/14/2013	N001	3.02			#		
Uranium	mg/L	11/14/2013	N001	0.32			#	0.000029	
Uranium	mg/L	11/14/2013	N002	0.32			#	0.000029	
Vanadium	mg/L	11/14/2013	N001	0.0053			#	0.00015	
Vanadium	mg/L	11/14/2013	N002	0.0056			#	0.00015	

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

REPORT DATE: 1/16/2014

Location: 0324 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	113		#		
Ammonia Total as N	mg/L	11/13/2013	N001	0.1	U	#	0.1	
Arsenic	mg/L	11/13/2013	N001	0.00032		#	0.000015	
Calcium	mg/L	11/13/2013	N001	63		#	0.012	
Chloride	mg/L	11/13/2013	N001	170		#	2	
Magnesium	mg/L	11/13/2013	N001	13		#	0.013	
Molybdenum	mg/L	11/13/2013	N001	0.0043		#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	0.01	U	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	37.7		#		
pH	s.u.	11/13/2013	N001	8.13		#		
Potassium	mg/L	11/13/2013	N001	3.8		#	0.11	
Selenium	mg/L	11/13/2013	N001	0.00042		#	0.000032	
Sodium	mg/L	11/13/2013	N001	100		#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	1217		#		
Sulfate	mg/L	11/13/2013	N001	100		#	5	
Temperature	C	11/13/2013	N001	5.64		#		
Turbidity	NTU	11/13/2013	N001	7.95		#		
Uranium	mg/L	11/13/2013	N001	0.002		#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	0.00085		#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0452 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	151		#		
Ammonia Total as N	mg/L	11/14/2013	N001	7.8		#	0.5	
Arsenic	mg/L	11/14/2013	N001	0.008		#	0.000074	
Calcium	mg/L	11/14/2013	N001	530		#	0.06	
Chloride	mg/L	11/14/2013	N001	280		#	10	
Magnesium	mg/L	11/14/2013	N001	52		#	0.065	
Molybdenum	mg/L	11/14/2013	N001	1.8		#	0.00016	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	27		#	0.2	
Oxidation Reduction Potential	mV	11/14/2013	N001	46.6		#		
pH	s.u.	11/14/2013	N001	7.81		#		
Potassium	mg/L	11/14/2013	N001	35		#	0.54	
Selenium	mg/L	11/14/2013	N001	0.016		#	0.00016	
Sodium	mg/L	11/14/2013	N001	340		#	0.033	
Specific Conductance	umhos/cm	11/14/2013	N001	3790		#		
Sulfate	mg/L	11/14/2013	N001	1600		#	25	
Temperature	C	11/14/2013	N001	7.86		#		
Turbidity	NTU	11/14/2013	N001	6.96		#		
Uranium	mg/L	11/14/2013	N001	0.15		#	0.000015	
Vanadium	mg/L	11/14/2013	N001	0.55		#	0.000076	

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

REPORT DATE: 1/16/2014

Location: 0453 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	147		#		
Ammonia Total as N	mg/L	11/14/2013	N001	19		#	1	
Arsenic	mg/L	11/14/2013	N001	0.0084		#	0.00015	
Calcium	mg/L	11/14/2013	N001	590		#	0.06	
Chloride	mg/L	11/14/2013	N001	320		#	10	
Magnesium	mg/L	11/14/2013	N001	51		#	0.065	
Molybdenum	mg/L	11/14/2013	N001	2.3		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	29		#	0.5	
Oxidation Reduction Potential	mV	11/14/2013	N001	60.3		#		
pH	s.u.	11/14/2013	N001	7.33		#		
Potassium	mg/L	11/14/2013	N001	30		#	0.54	
Selenium	mg/L	11/14/2013	N001	0.018		#	0.00032	
Sodium	mg/L	11/14/2013	N001	360		#	0.033	
Specific Conductance	umhos/cm	11/14/2013	N001	4205		#		
Sulfate	mg/L	11/14/2013	N001	1800		#	25	
Temperature	C	11/14/2013	N001	9.65		#		
Turbidity	NTU	11/14/2013	N001	3.2		#		
Uranium	mg/L	11/14/2013	N001	0.15		#	0.000029	
Vanadium	mg/L	11/14/2013	N001	0.69		#	0.00015	

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

REPORT DATE: 1/16/2014

Location: 0575 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/14/2013	N001	117			#		
Ammonia Total as N	mg/L	11/14/2013	N001	1.9			#	0.1	
Ammonia Total as N	mg/L	11/14/2013	N002	2.1			#	0.1	
Arsenic	mg/L	11/14/2013	N001	0.0019			#	0.000015	
Arsenic	mg/L	11/14/2013	N002	0.002			#	0.000015	
Calcium	mg/L	11/14/2013	N001	330			#	0.06	
Calcium	mg/L	11/14/2013	N002	330			#	0.12	
Chloride	mg/L	11/14/2013	N001	490			#	10	
Chloride	mg/L	11/14/2013	N002	490			#	20	
Magnesium	mg/L	11/14/2013	N001	260			#	0.065	
Magnesium	mg/L	11/14/2013	N002	250			#	0.13	
Molybdenum	mg/L	11/14/2013	N001	0.62			#	0.000032	
Molybdenum	mg/L	11/14/2013	N002	0.63			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N001	1.4			#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	11/14/2013	N002	1.3			#	0.05	
Oxidation Reduction Potential	mV	11/14/2013	N001	231.4			#		
pH	s.u.	11/14/2013	N001	6.78			#		
Potassium	mg/L	11/14/2013	N001	72			#	0.54	
Potassium	mg/L	11/14/2013	N002	66			#	1.1	
Selenium	mg/L	11/14/2013	N001	0.0007			#	0.000032	
Selenium	mg/L	11/14/2013	N002	0.00062			#	0.000032	
Sodium	mg/L	11/14/2013	N001	1000			#	0.33	
Sodium	mg/L	11/14/2013	N002	1000			#	0.066	



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

REPORT DATE: 1/16/2014

Location: 0575 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Specific Conductance	umhos/cm	11/14/2013	N001	6931			#		
Sulfate	mg/L	11/14/2013	N001	3500			#	25	
Sulfate	mg/L	11/14/2013	N002	3500			#	50	
Temperature	C	11/14/2013	N001	9.2			#		
Turbidity	NTU	11/14/2013	N001	2.63			#		
Uranium	mg/L	11/14/2013	N001	0.093			#	0.000029	
Uranium	mg/L	11/14/2013	N002	0.094			#	0.000029	
Vanadium	mg/L	11/14/2013	N001	0.0017			#	0.000015	
Vanadium	mg/L	11/14/2013	N002	0.0017			#	0.000015	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

**Old Rifle  
Surface Water Quality Data**

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

REPORT DATE: 1/16/2014

Location: 0294 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	118		#		
Calcium	mg/L	11/13/2013	N001	63		#	0.012	
Chloride	mg/L	11/13/2013	N001	180		#	10	
Magnesium	mg/L	11/13/2013	N001	13		#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	0.01	U	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	138.3		#		
pH	s.u.	11/13/2013	N001	8.86		#		
Potassium	mg/L	11/13/2013	N001	3.9		J #	0.11	
Selenium	mg/L	11/13/2013	N001	0.00039		#	0.000032	
Sodium	mg/L	11/13/2013	N001	110		#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	1034		#		
Temperature	C	11/13/2013	N001	6.62		#		
Turbidity	NTU	11/13/2013	N001	6.2		#		
Uranium	mg/L	11/13/2013	N001	0.0018		#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	0.00091		#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0395 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	308		#		
Calcium	mg/L	11/13/2013	N001	87		#	0.012	
Chloride	mg/L	11/13/2013	N001	22		#	2	
Magnesium	mg/L	11/13/2013	N001	60		#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	0.08		#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	-25.4		#		
pH	s.u.	11/13/2013	N001	7.91		#		
Potassium	mg/L	11/13/2013	N001	2.6		#	0.11	
Selenium	mg/L	11/13/2013	N001	0.0025		#	0.000032	
Sodium	mg/L	11/13/2013	N001	62		#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	1089		#		
Sulfate	mg/L	11/13/2013	N001	290		#	5	
Temperature	C	11/13/2013	N001	12.53		#		
Turbidity	NTU	11/13/2013	N001	2.14		#		
Uranium	mg/L	11/13/2013	N001	0.021		#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	0.0018		#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0396 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	121			#		
Calcium	mg/L	11/13/2013	N001	66			#	0.012	
Chloride	mg/L	11/13/2013	N001	170			#	2	
Magnesium	mg/L	11/13/2013	N001	14			#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	123.3			#		
pH	s.u.	11/13/2013	N001	8.27			#		
Potassium	mg/L	11/13/2013	N001	3.9		J	#	0.11	
Selenium	mg/L	11/13/2013	N001	0.0005			#	0.000032	
Sodium	mg/L	11/13/2013	N001	110			#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	993			#		
Sulfate	mg/L	11/13/2013	N001	99			#	5	
Temperature	C	11/13/2013	N001	7.6			#		
Turbidity	NTU	11/13/2013	N001	7.96			#		
Uranium	mg/L	11/13/2013	N001	0.0021			#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	0.0013			#	0.000015	

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

REPORT DATE: 1/16/2014

Location: 0398 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	212			#		
Calcium	mg/L	11/13/2013	N001	130			#	0.012	
Chloride	mg/L	11/13/2013	N001	150			#	4	
Magnesium	mg/L	11/13/2013	N001	49			#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	0.41			#	0.02	
Oxidation Reduction Potential	mV	11/13/2013	N001	177.4			#		
pH	s.u.	11/13/2013	N001	8.33			#		
Potassium	mg/L	11/13/2013	N001	4.1			#	0.11	
Selenium	mg/L	11/13/2013	N001	0.0025			#	0.000032	
Sodium	mg/L	11/13/2013	N001	140			#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	1532			#		
Sulfate	mg/L	11/13/2013	N001	330			#	10	
Temperature	C	11/13/2013	N001	9.93			#		
Turbidity	NTU	11/13/2013	N001	2.08			#		
Uranium	mg/L	11/13/2013	N001	0.016			#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	0.004			#	0.000015	



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

REPORT DATE: 1/16/2014

Location: 0741 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	11/13/2013	N001	118		#		
Calcium	mg/L	11/13/2013	N001	66		#	0.012	
Chloride	mg/L	11/13/2013	N001	170		#	2	
Magnesium	mg/L	11/13/2013	N001	13		#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2013	N001	0.01	U	#	0.01	
Oxidation Reduction Potential	mV	11/13/2013	N001	-46.4		#		
pH	s.u.	11/13/2013	N001	7.83		#		
Potassium	mg/L	11/13/2013	N001	3.9		#	0.11	
Selenium	mg/L	11/13/2013	N001	0.00056		#	0.000032	
Sodium	mg/L	11/13/2013	N001	110		#	0.0066	
Specific Conductance	umhos/cm	11/13/2013	N001	1063		#		
Sulfate	mg/L	11/13/2013	N001	97		#	5	
Temperature	C	11/13/2013	N001	5.97		#		
Turbidity	NTU	11/13/2013	N001	6.11		#		
Uranium	mg/L	11/13/2013	N001	0.0021		#	0.0000029	
Vanadium	mg/L	11/13/2013	N001	0.00091		#	0.000015	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

## **Equipment Blank Data**

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**BLANKS REPORT**

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

RIN: 13115731

Report Date: 1/16/2014

Parameter	Site Code	Location ID	Sample		Units	Result	Qualifiers		Detection Limit	Uncertainty	Sample Type
			Date	ID			Lab	Data			
Calcium	RFN01	0999	11/13/2013	N001	mg/L	0.012	U		0.012		E
Chloride	RFN01	0999	11/13/2013	N001	mg/L	0.24			0.2		E
Magnesium	RFN01	0999	11/13/2013	N001	mg/L	0.013	U		0.013		E
Nitrate + Nitrite as Nitrogen	RFN01	0999	11/13/2013	N001	mg/L	0.01	U		0.01		E
Potassium	RFN01	0999	11/13/2013	N001	mg/L	0.85	B		0.11		E
Selenium	RFN01	0999	11/13/2013	N001	mg/L	0.00005	B		0.000032		E
Sodium	RFN01	0999	11/13/2013	N001	mg/L	0.095	B	U	0.0066		E
Sulfate	RFN01	0999	11/13/2013	N001	mg/L	0.5	U		0.5		E
Uranium	RFN01	0999	11/13/2013	N001	mg/L	0.00005	B	U	0.000029		E
Vanadium	RFN01	0999	11/13/2013	N001	mg/L	0.00028	B	U	0.000015		E

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

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.
- 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.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

SAMPLE TYPES:

- E Equipment Blank.

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## **Static Water Level Data**

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**STATIC WATER LEVELS (USEE700) FOR SITE RFN01, Rifle New Processing Site**  
**REPORT DATE: 1/16/2014**

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	11/13/2013	12:35:36	9.31	5266.16	
0170	D	5332.97	11/12/2013	12:05:35	95.18	5237.79	
0172	D	5229.45	11/13/2013	10:15:00	17.08	5212.37	
0172	D	5229.45	11/13/2013	10:20:20	17.08	5212.37	
0195	D	5253.1	11/14/2013	10:45:49	10.69	5242.41	
0201	D	5261.07	11/14/2013	11:10:23	14.39	5246.68	
0215	O	5271.42	11/12/2013	13:55:22	12.07	5259.35	
0216	O	5265.41	11/13/2013	13:10:41	7.71	5257.7	
0217	D	5256.98	11/13/2013	15:45:23	4.74	5252.24	
0590	D	5256.37	11/14/2013	11:35:20	7.21	5249.16	
0620	D	5231.22	11/13/2013	11:00:05	10.02	5221.2	
0635	D	5256.12	11/13/2013	16:20:23	8.75	5247.37	
0658	O	5265.91	11/13/2013	14:50:53	7.53	5258.38	
0659	O	5261.33	11/13/2013	16:05:57	7.11	5254.22	
0664	O	5270.17	11/13/2013	16:30:46	14.02	5256.15	
0669	O	5266.56	11/13/2013	15:15:56	10.57	5255.99	
0670	O	5270.94	11/13/2013	13:45:45	13.64	5257.3	
0855	O	5267.24	11/13/2013	14:10:10	8.77	5258.47	

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

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

**STATIC WATER LEVELS (USEE700) FOR SITE RFO01, Rifle Old Processing Site**  
**REPORT DATE: 1/16/2014**

<b>Location Code</b>	<b>Flow Code</b>	<b>Top of Casing Elevation (Ft)</b>	<b>Measurement Date</b>	<b>Measurement Time</b>	<b>Depth From Top of Casing (Ft)</b>	<b>Water Elevation (Ft)</b>	<b>Water Level Flag</b>
0292A		5323.08	11/13/2013	14:50:21	12.19	5310.89	
0304	O	5310.63	11/13/2013	12:40:57	11.42	5299.21	
0305	O	5312.08	11/13/2013	13:00:47	12.39	5299.69	
0309	O	5313.37	11/13/2013	11:15:52	15.41	5297.96	
0310	O	5311.64	11/12/2013	14:25:38	13.23	5298.41	
0655	O	5312.87	11/13/2013	13:20:49	13.33	5299.54	
0656	O	5313.28	11/12/2013	16:20:12	13.51	5299.77	
0658	U	5323.07	11/12/2013	15:55:21	7.74	5315.33	

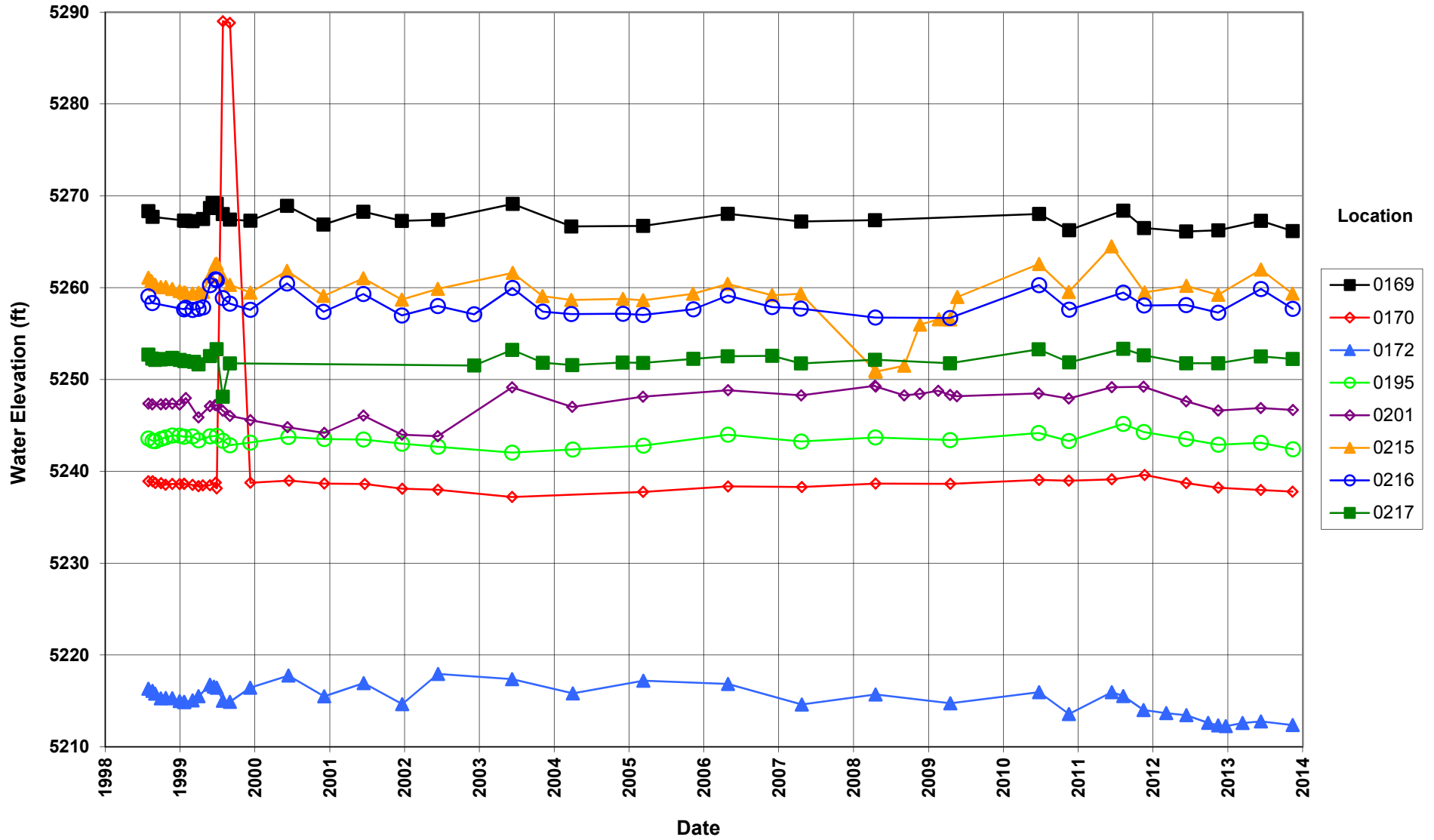
FLOW CODES: B BACKGROUND      C CROSS GRADIENT      D DOWN GRADIENT      F OFF SITE  
                   N UNKNOWN              O ON SITE              U UPGRADIENT

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

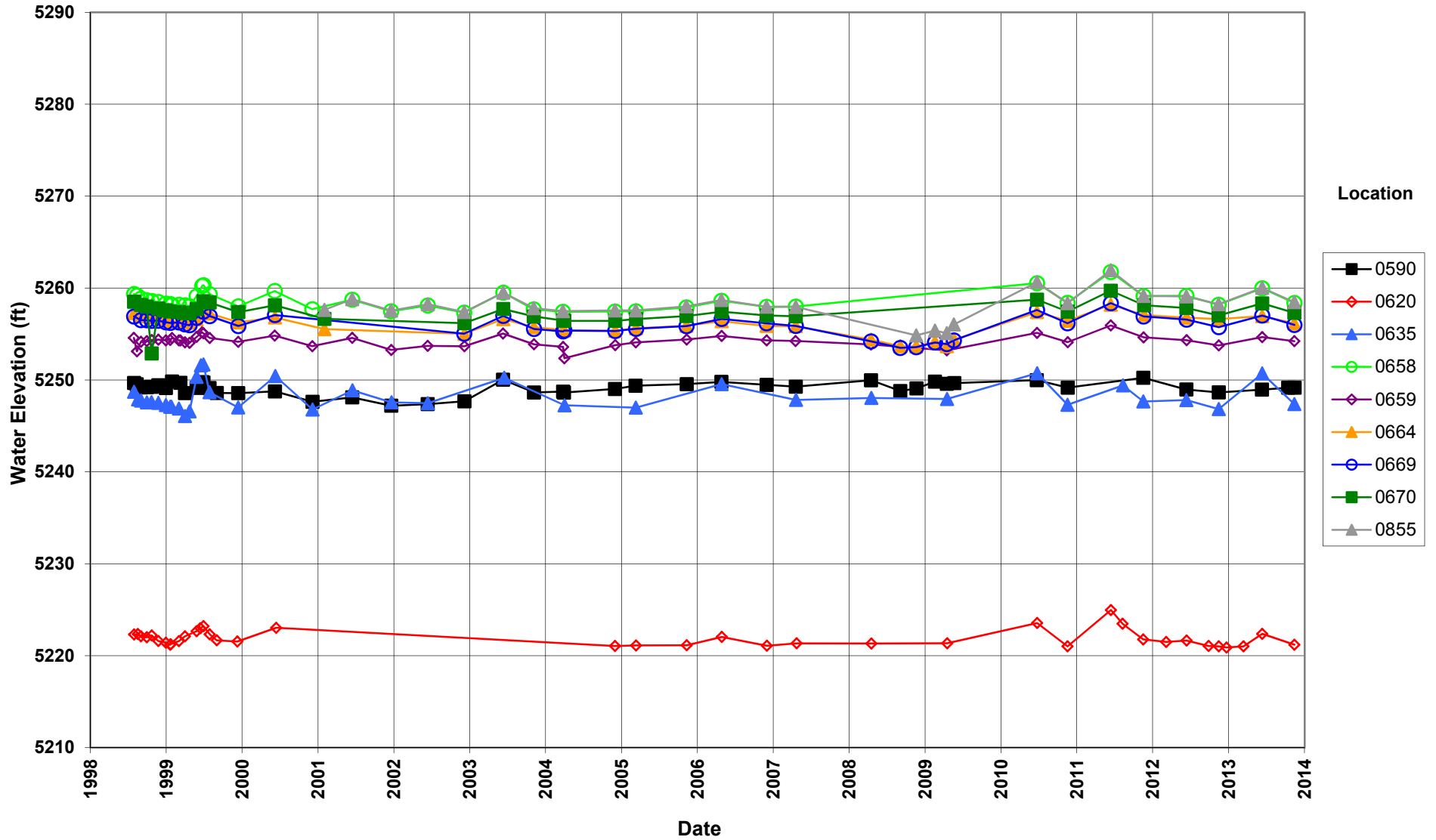
# **New Rifle Hydrographs**

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# Rifle New Processing Site Hydrograph



# Rifle New Processing Site Hydrograph

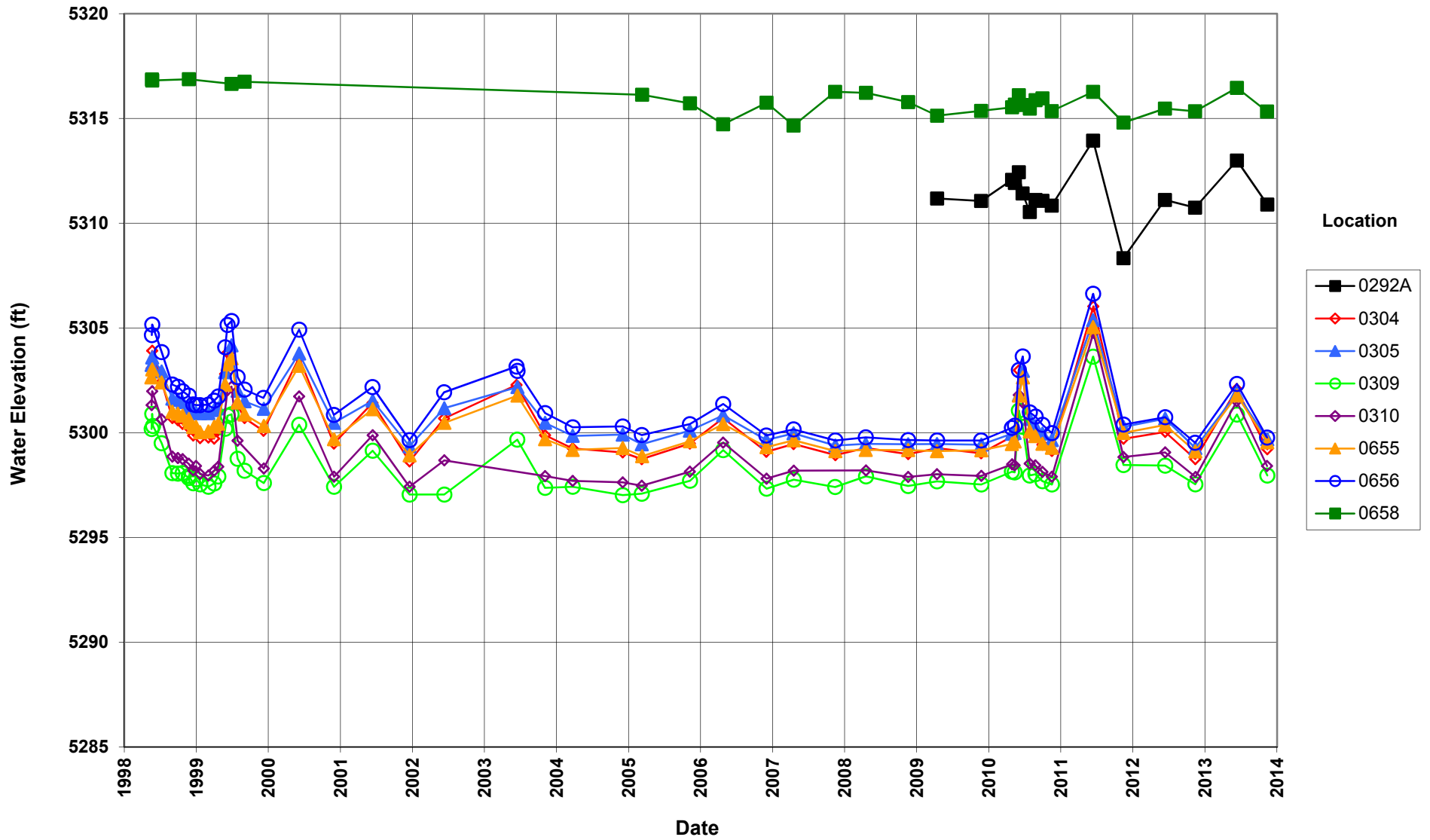


# **Old Rifle Hydrograph**

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# Rifle Old Processing Site Hydrograph

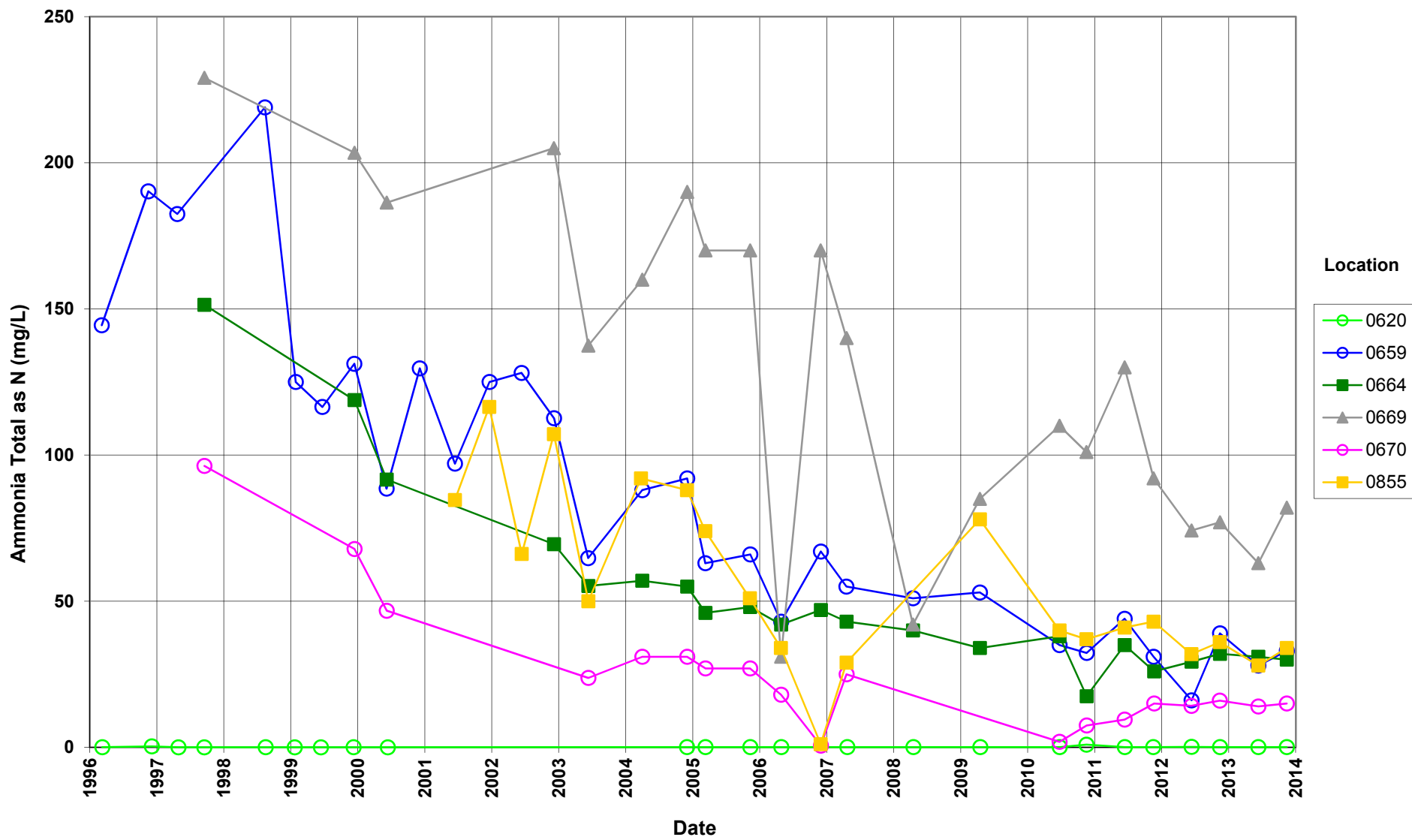


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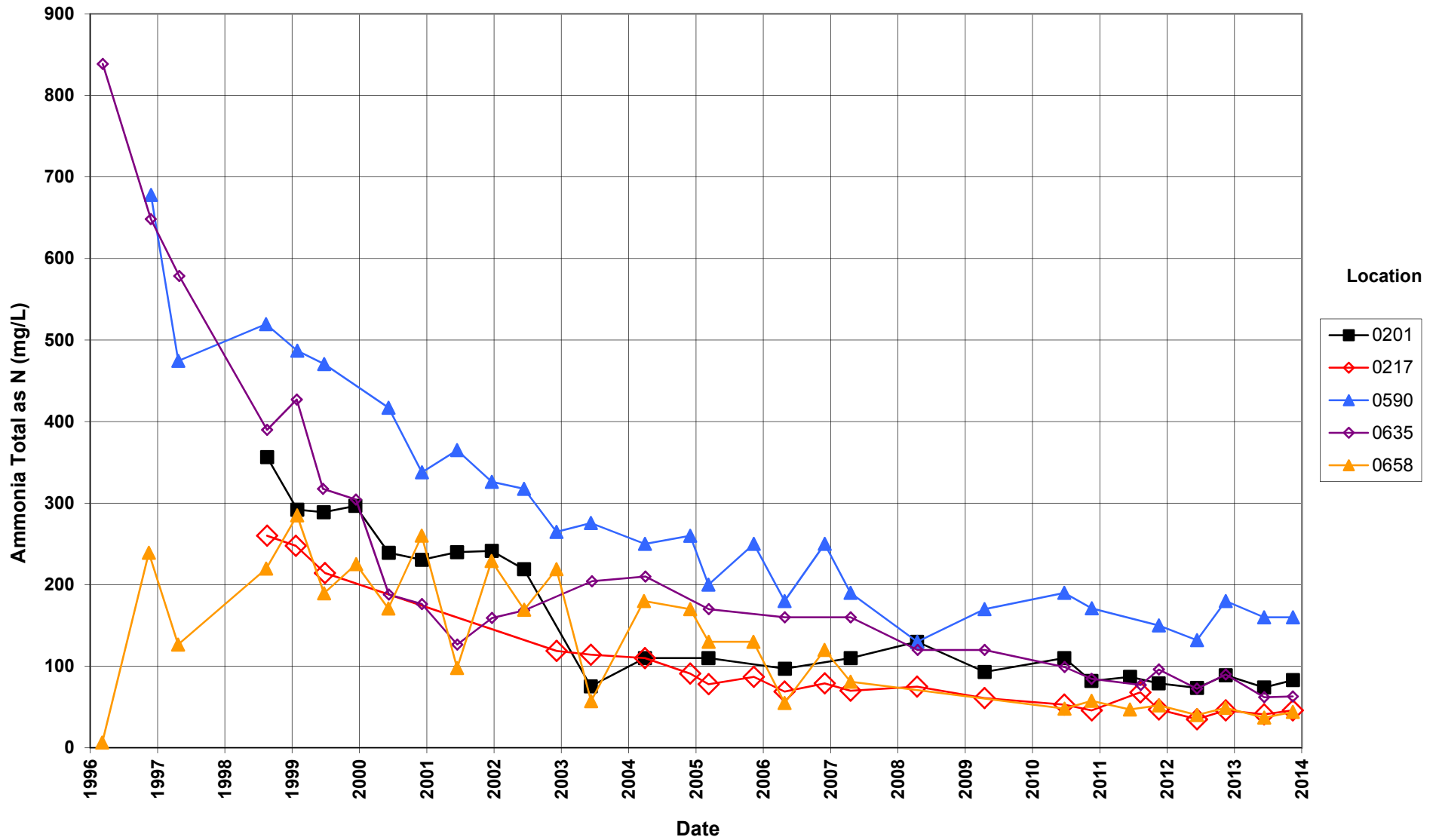
# **New Rifle Groundwater Time-Concentration Graphs**

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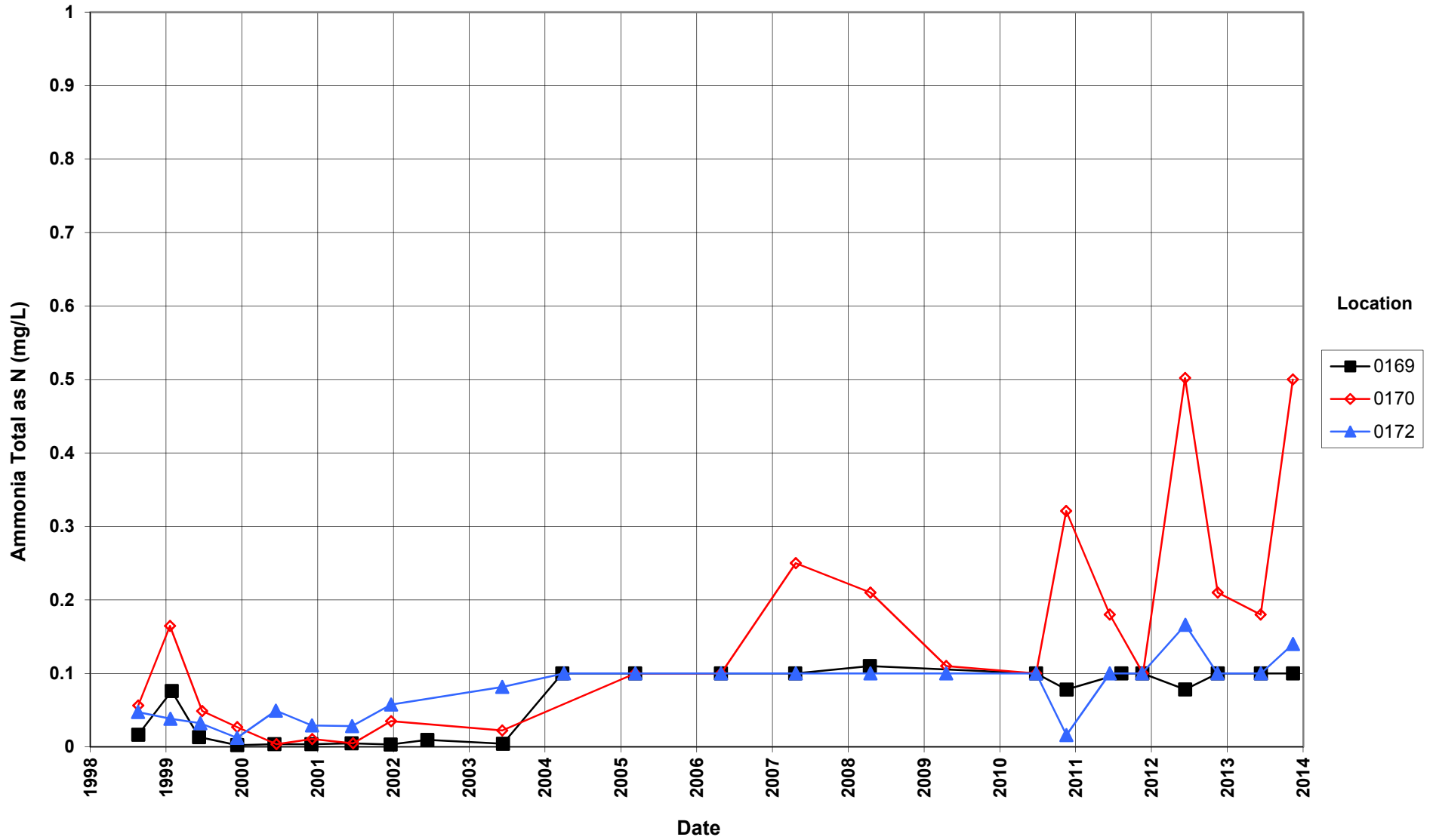
### Rifle New Processing Site Ammonia Total as N Concentration



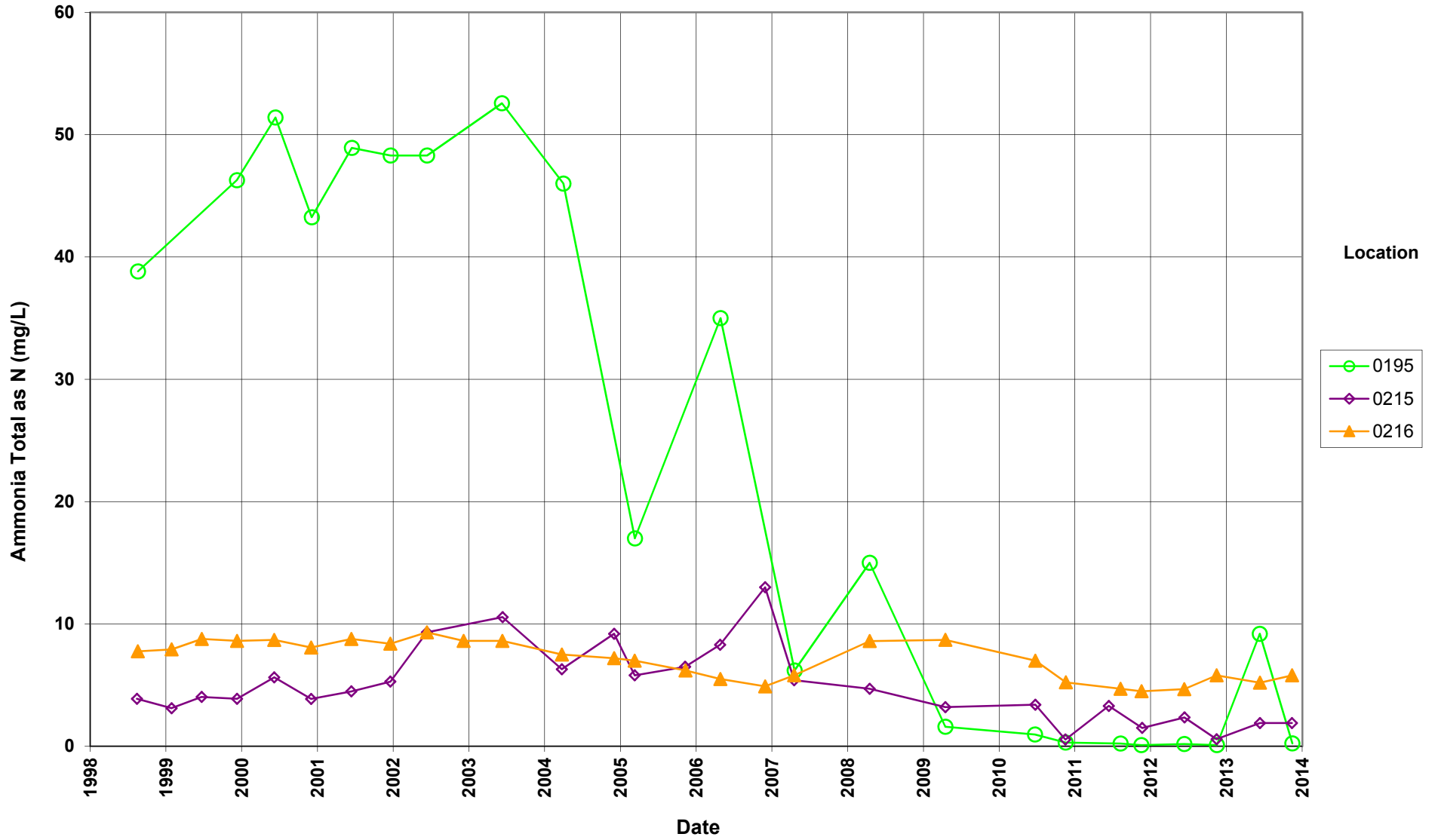
# Rifle New Processing Site Ammonia Total as N Concentration



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

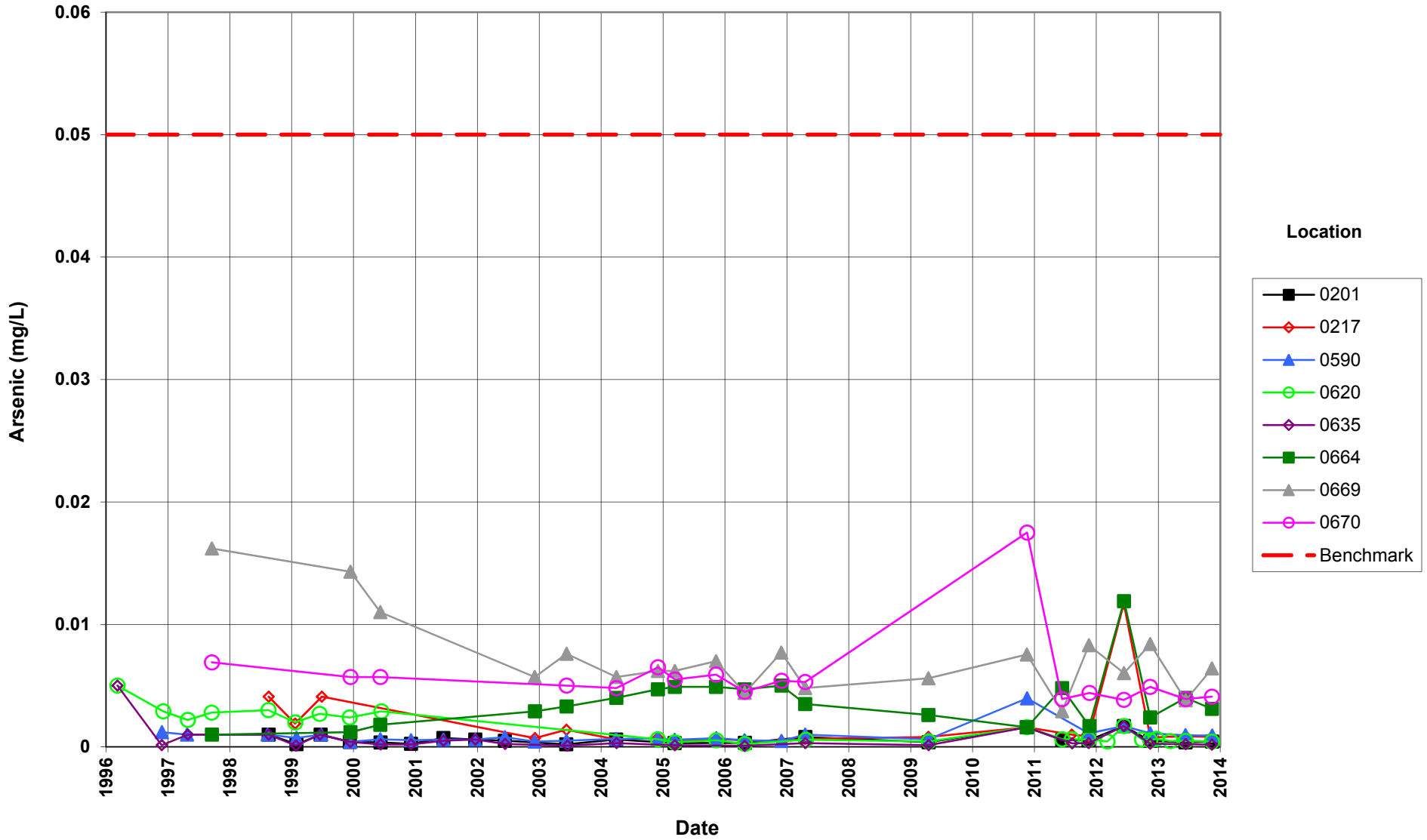


### Rifle New Processing Site Ammonia Total as N Concentration

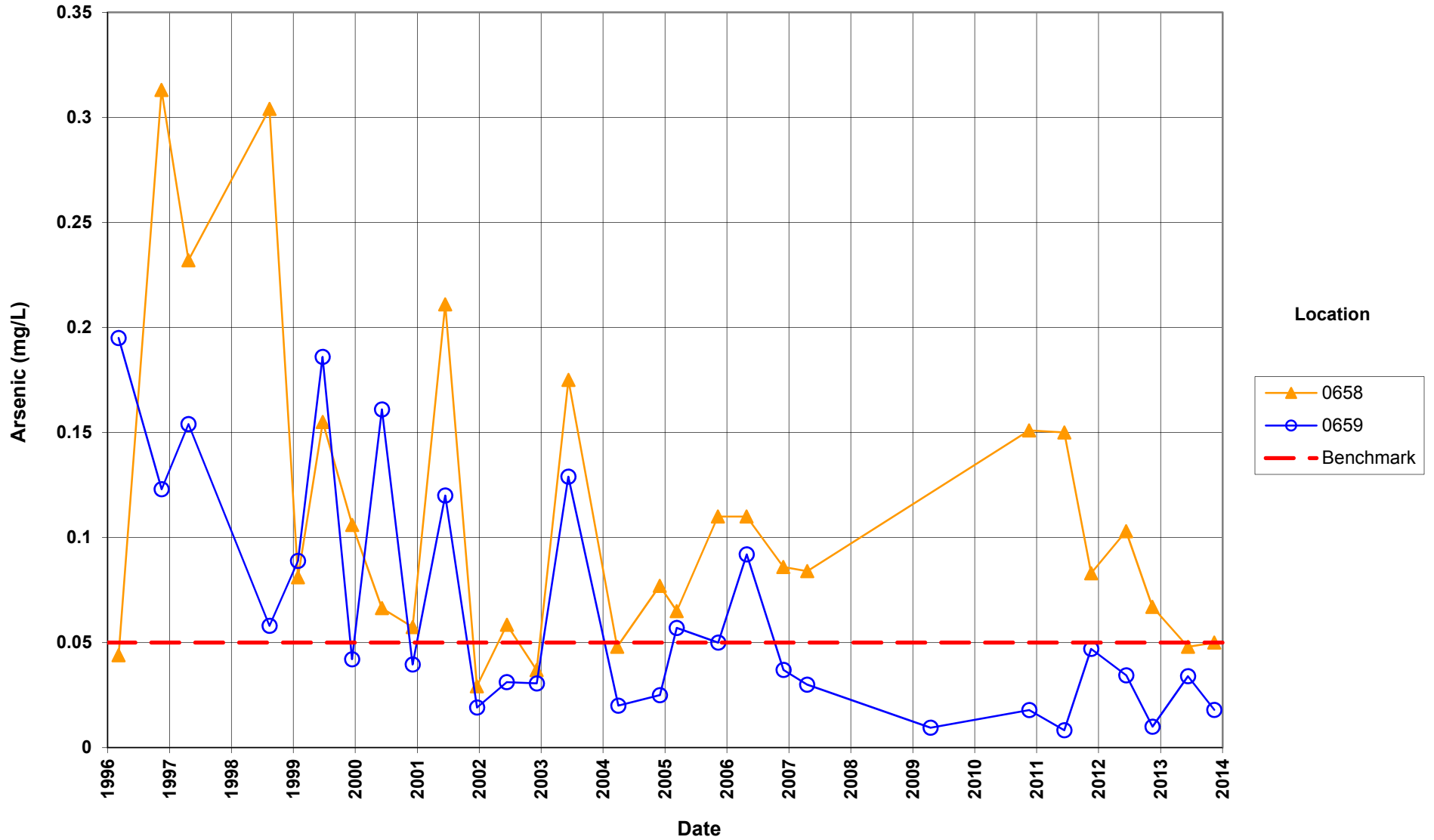




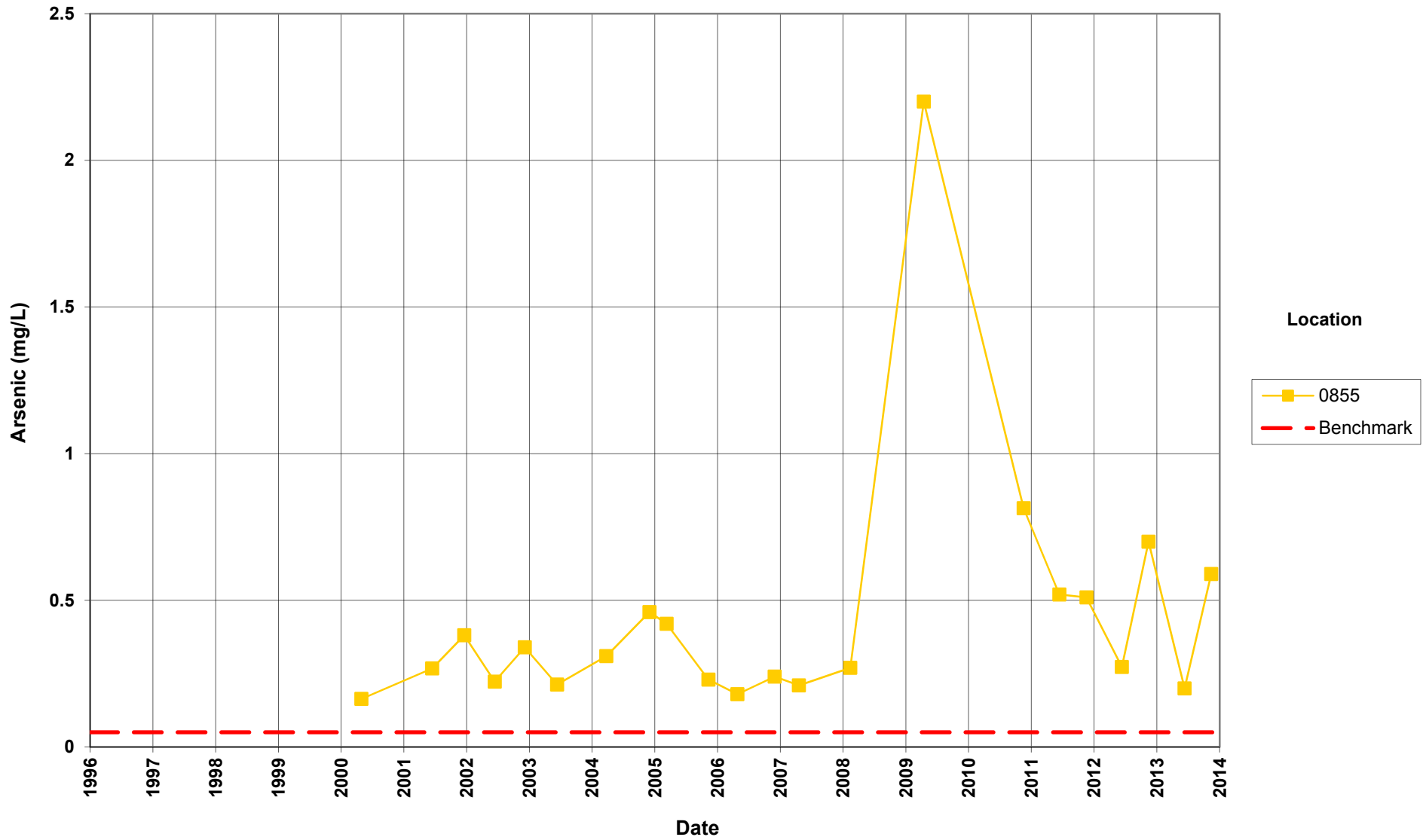
Rifle New Processing Site  
Arsenic Concentration  
Benchmark = 0.05 mg/L



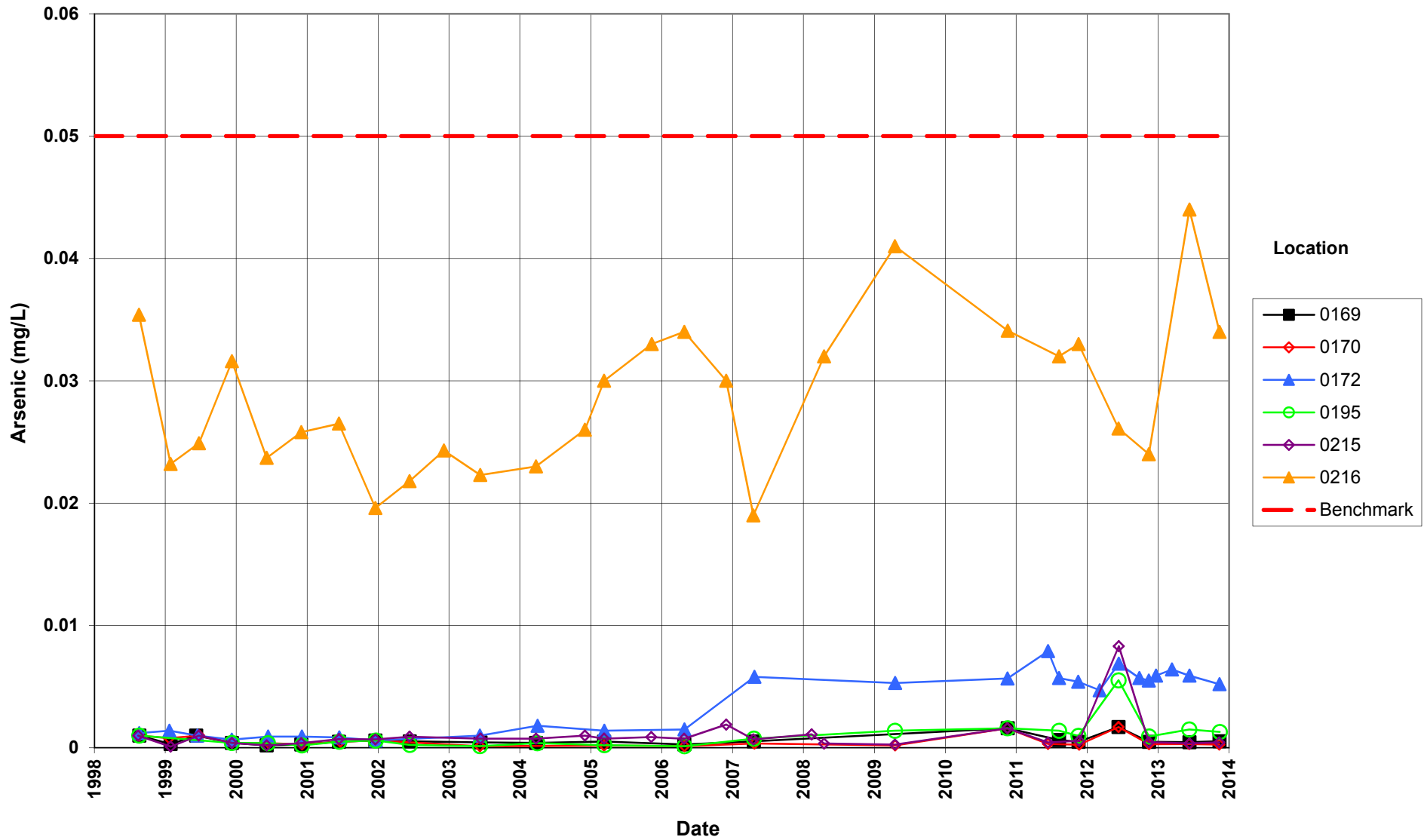
**Rifle New Processing Site  
Arsenic Concentration**  
Benchmark = 0.05 mg/L



**Rifle New Processing Site  
Arsenic Concentration**  
Benchmark = 0.05 mg/L

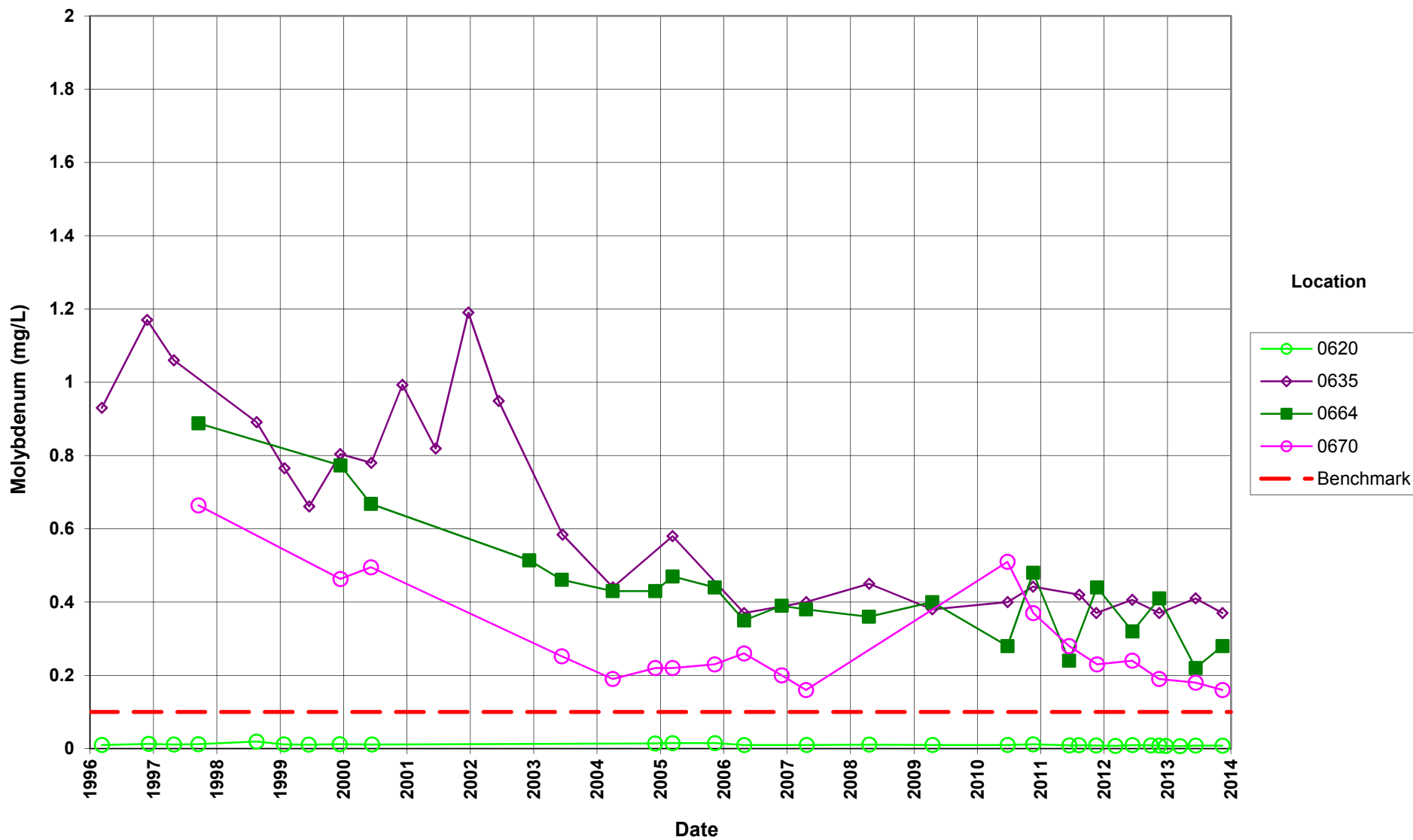


Rifle New Processing Site  
Arsenic Concentration  
Benchmark = 0.05 mg/L



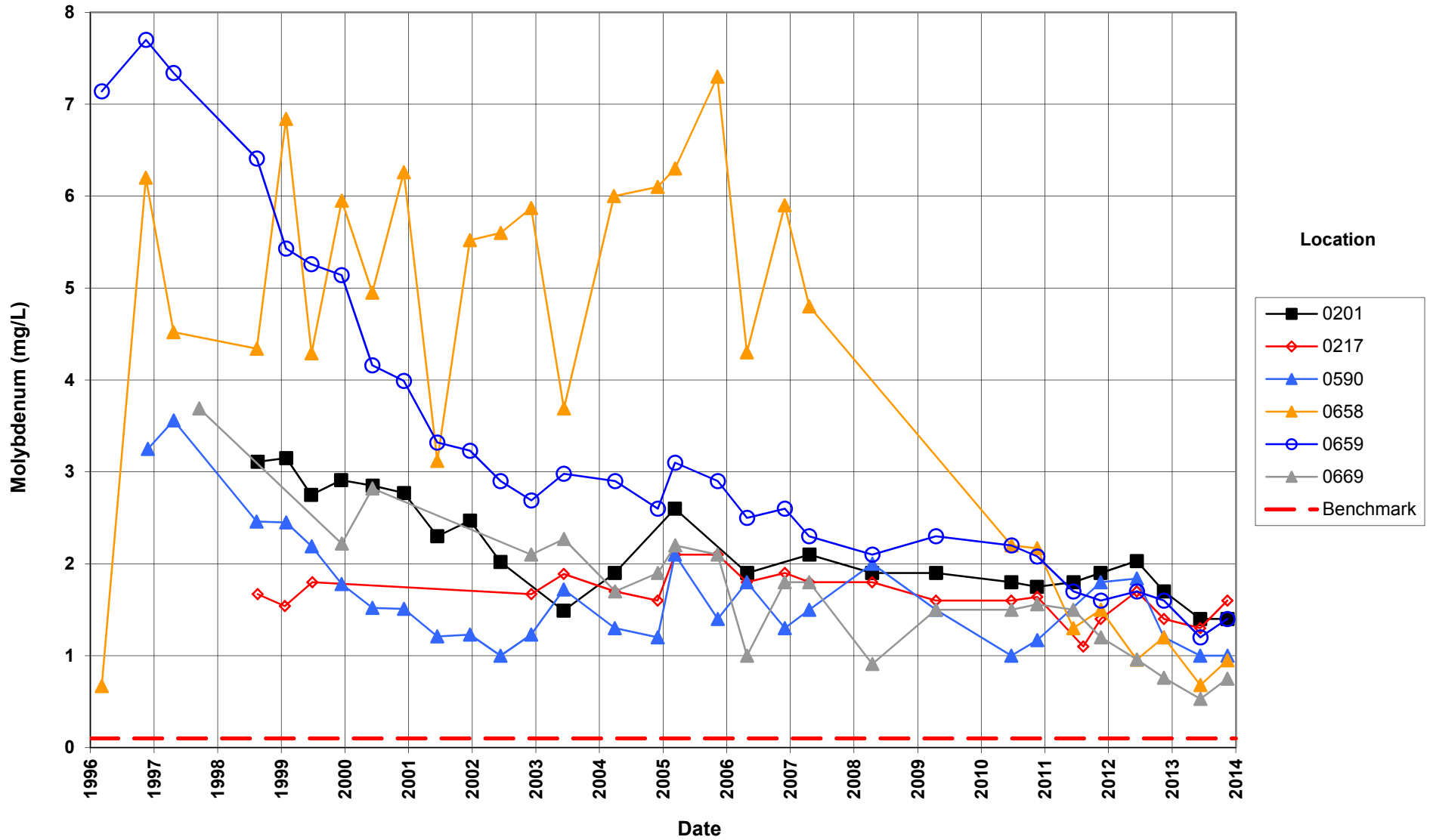
# Rifle New Processing Site Molybdenum Concentration

Benchmark = 0.1 mg/L



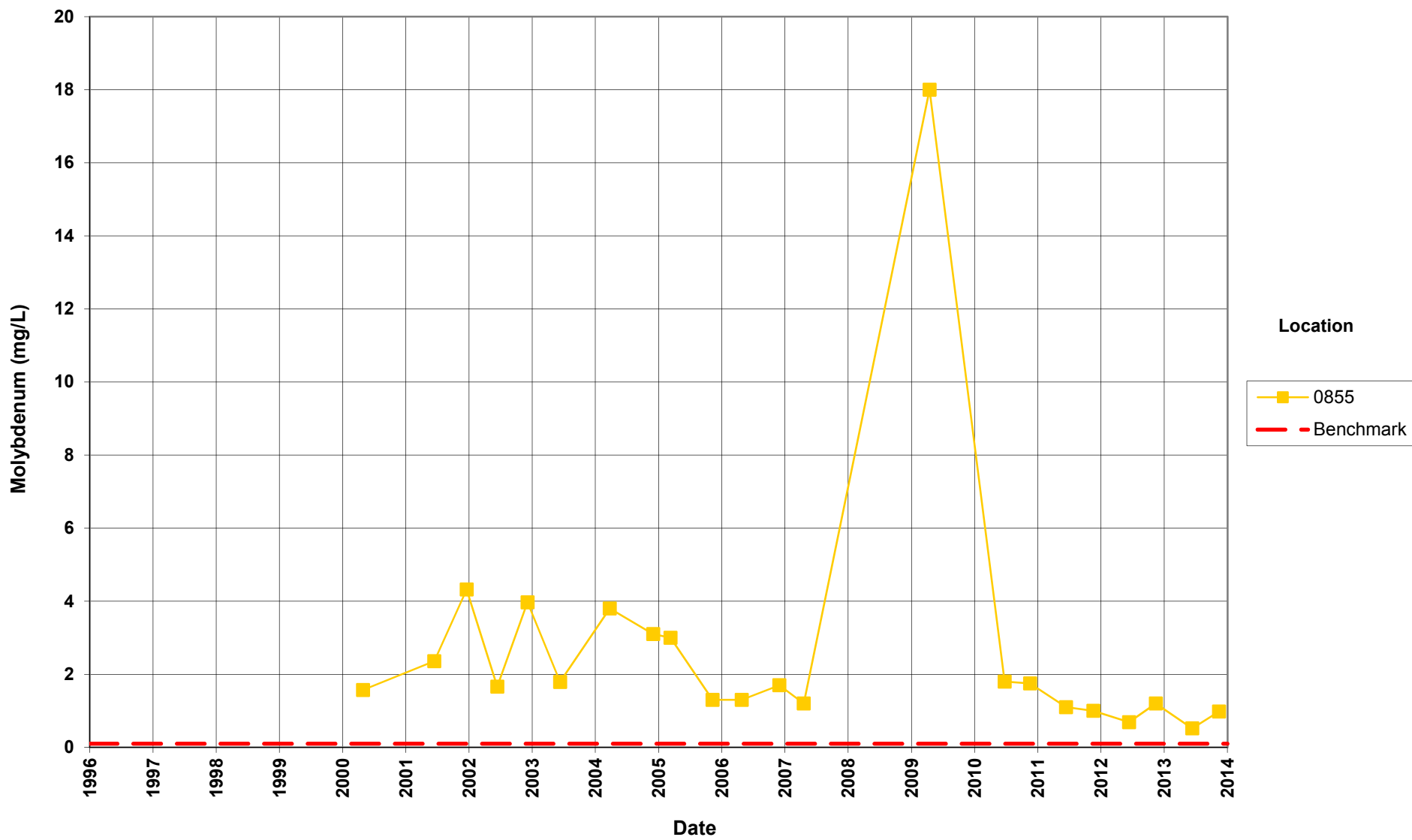
# Rifle New Processing Site Molybdenum Concentration

Benchmark = 0.1 mg/L



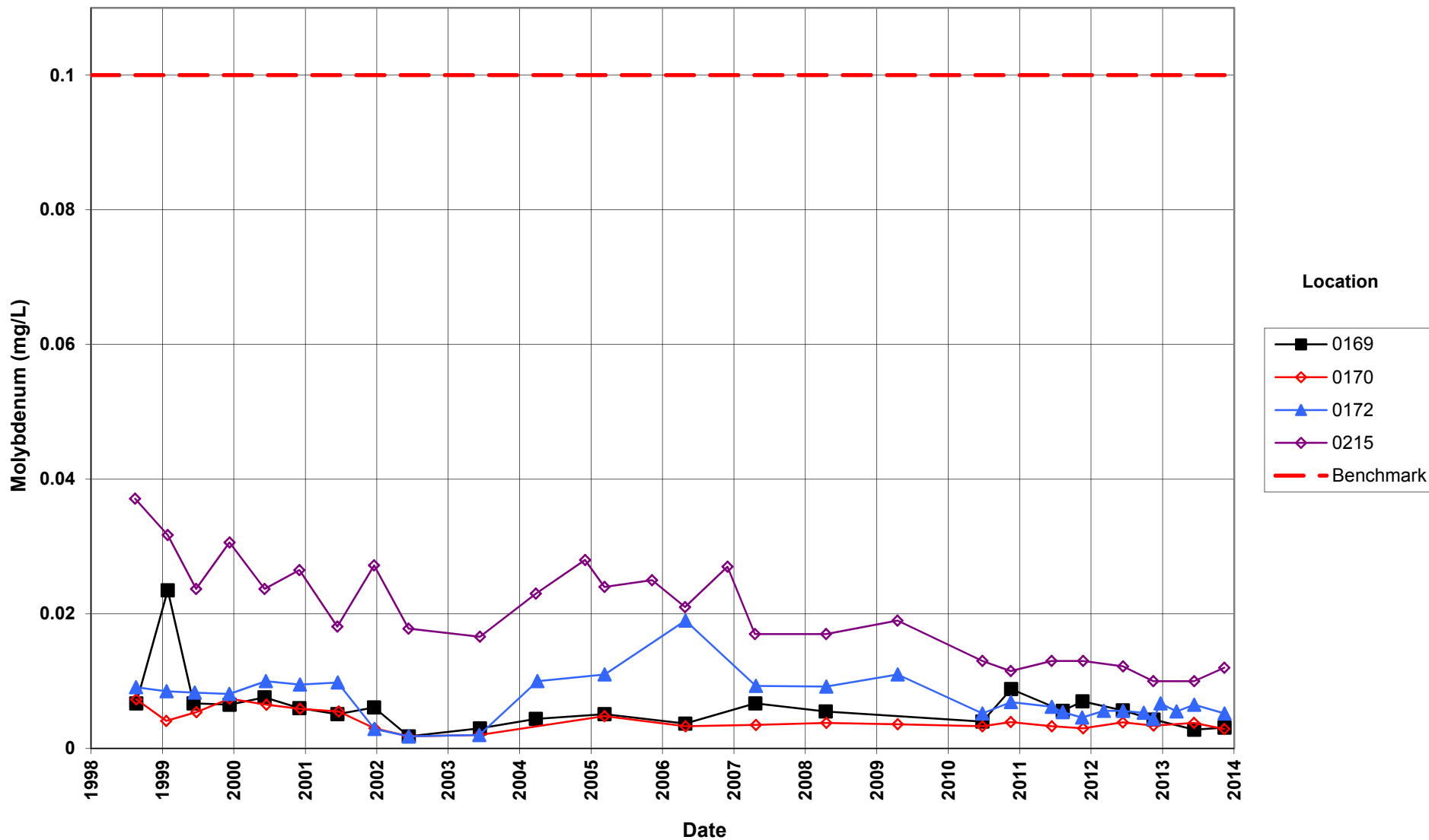
# Rifle New Processing Site Molybdenum Concentration

Benchmark = 0.1 mg/L



# Rifle New Processing Site Molybdenum Concentration

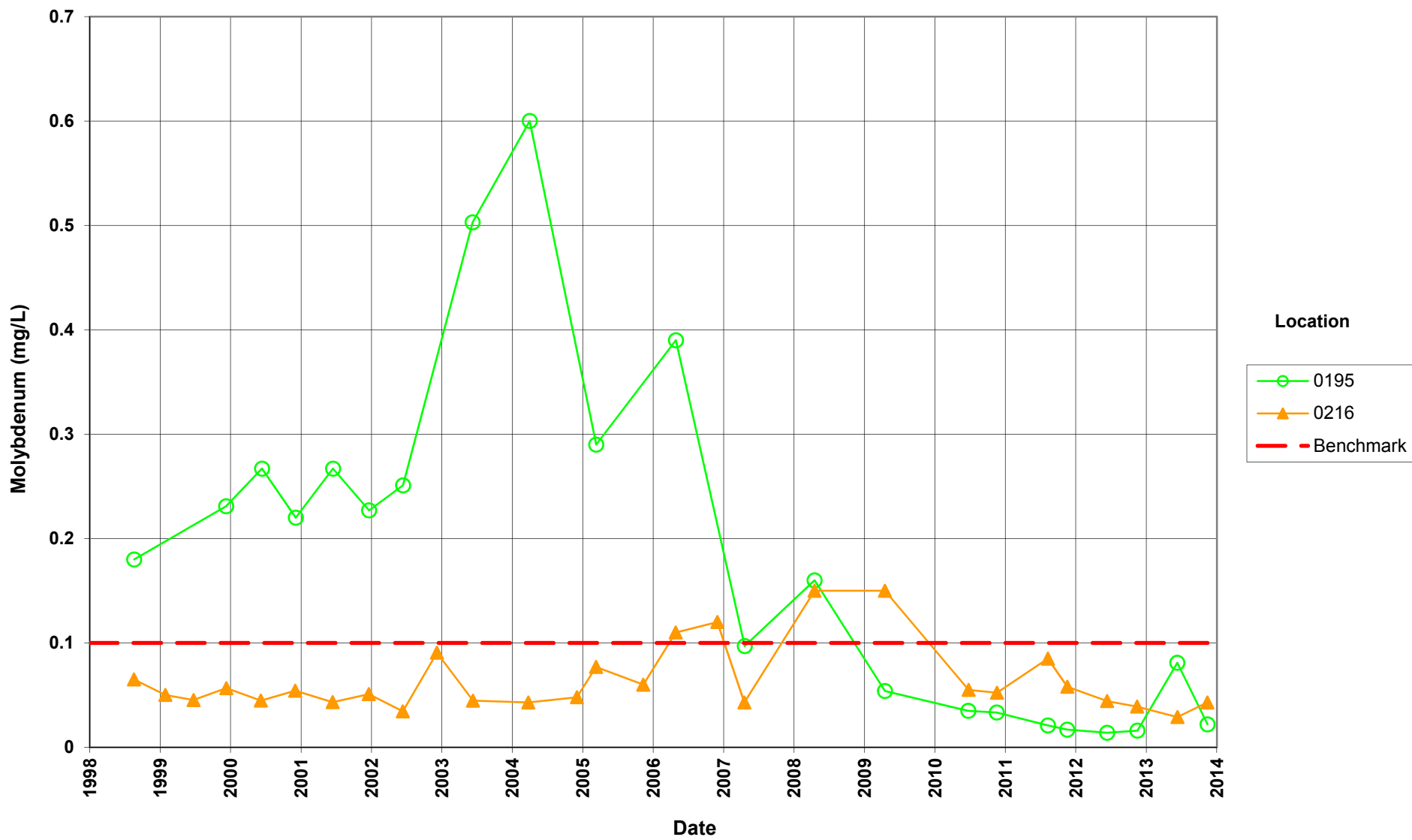
Benchmark = 0.1 mg/L



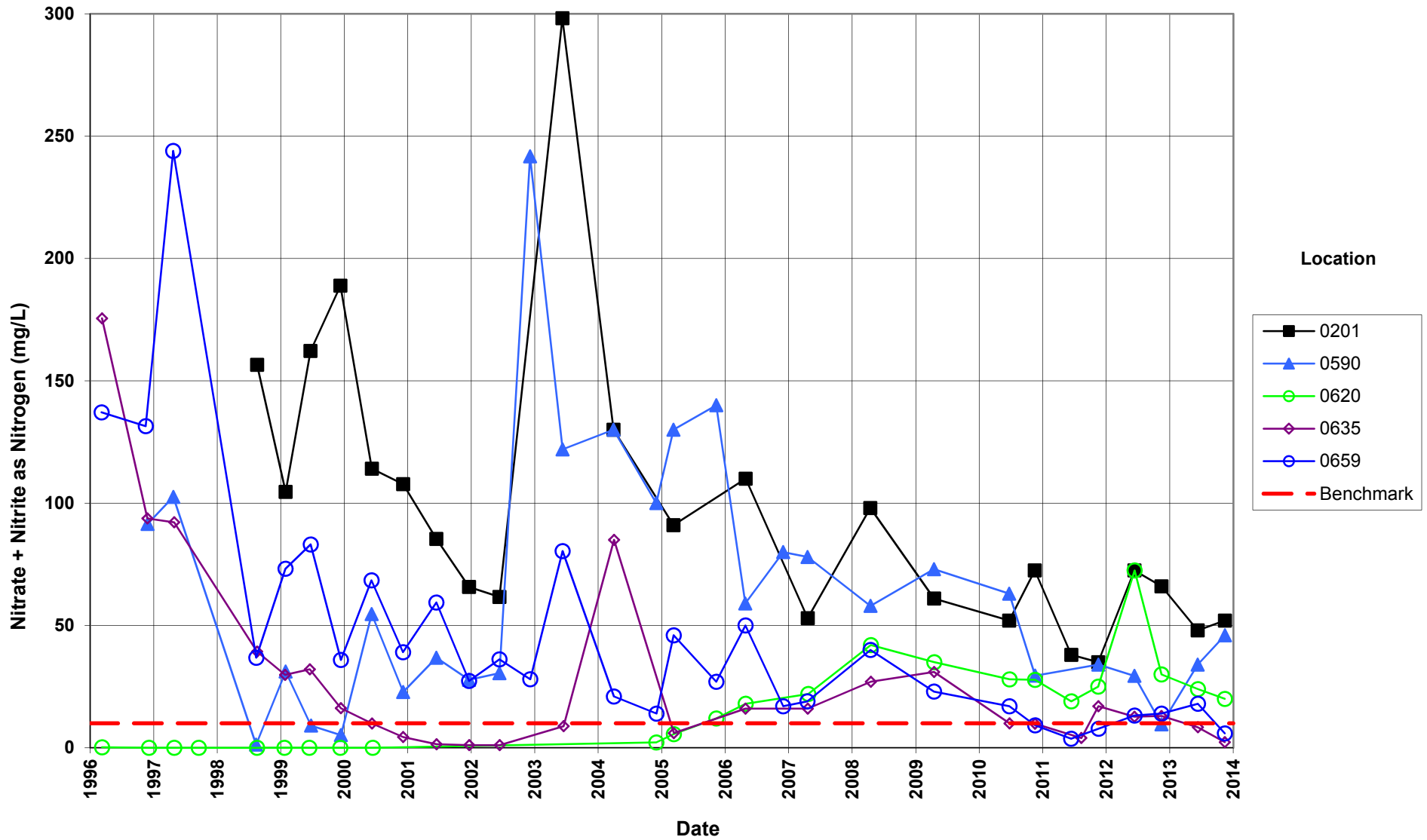


### Rifle New Processing Site Molybdenum Concentration

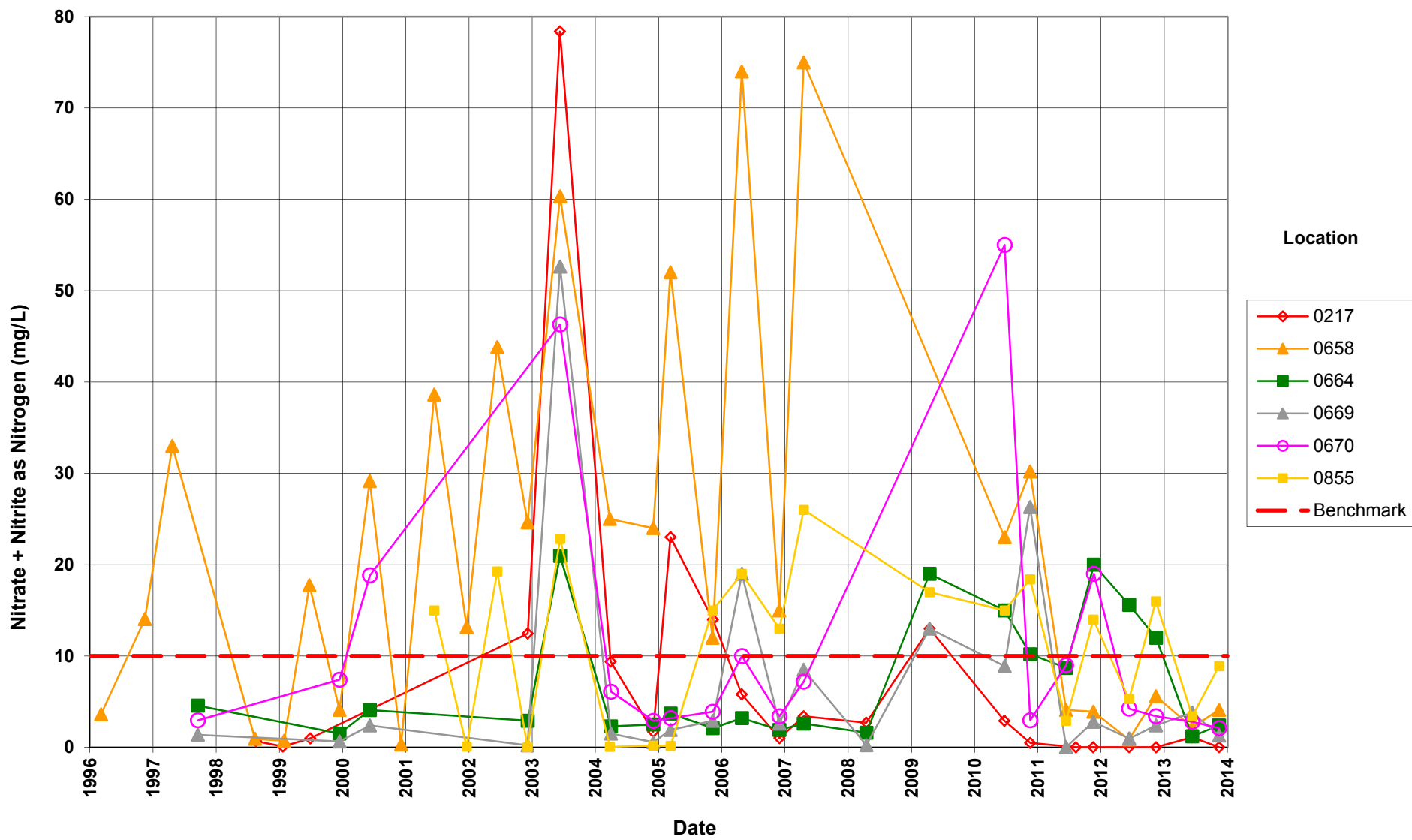
Benchmark = 0.1 mg/L



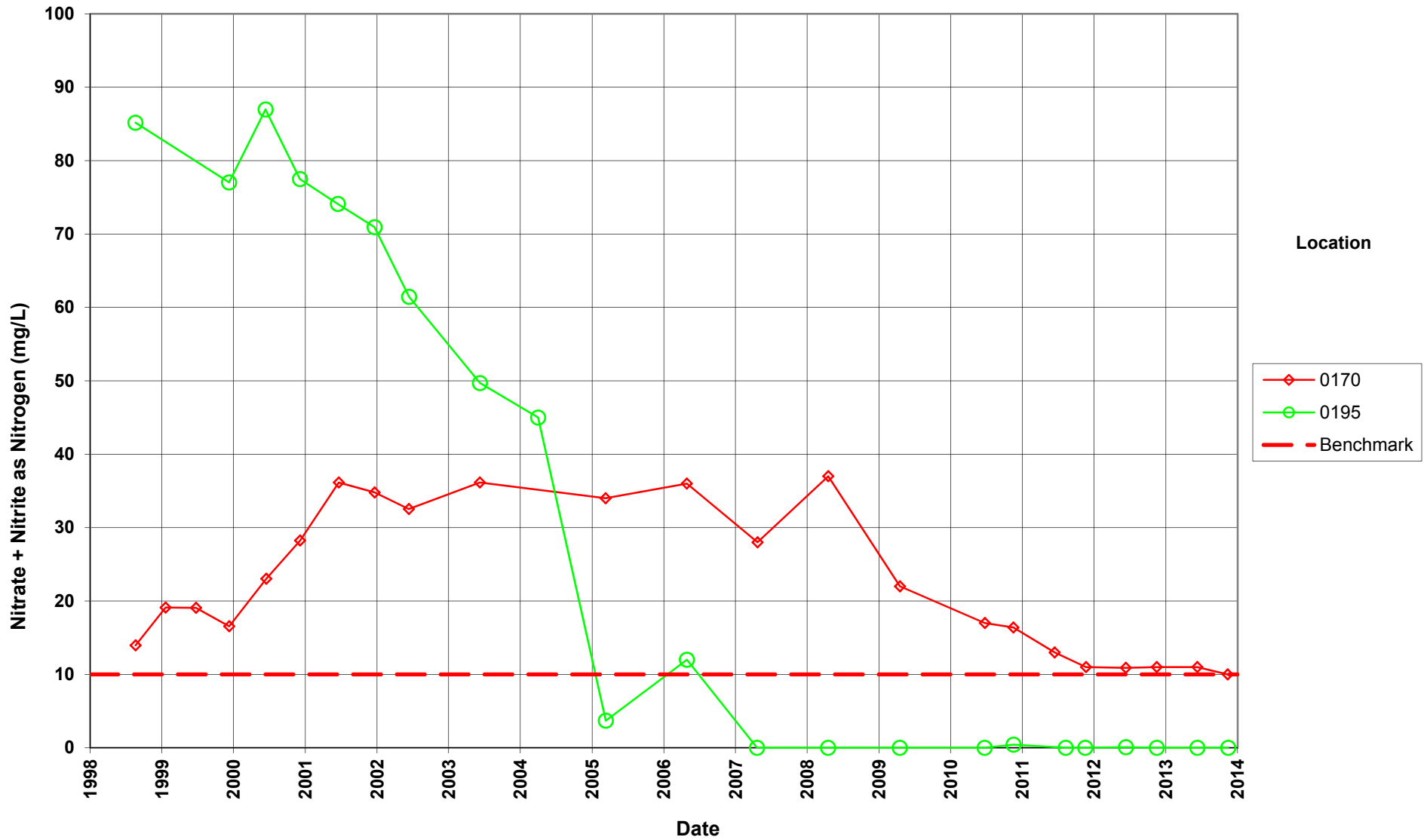
**Rifle New Processing Site**  
**Nitrate + Nitrite as Nitrogen Concentration**  
 Benchmark = 10.0 mg/L



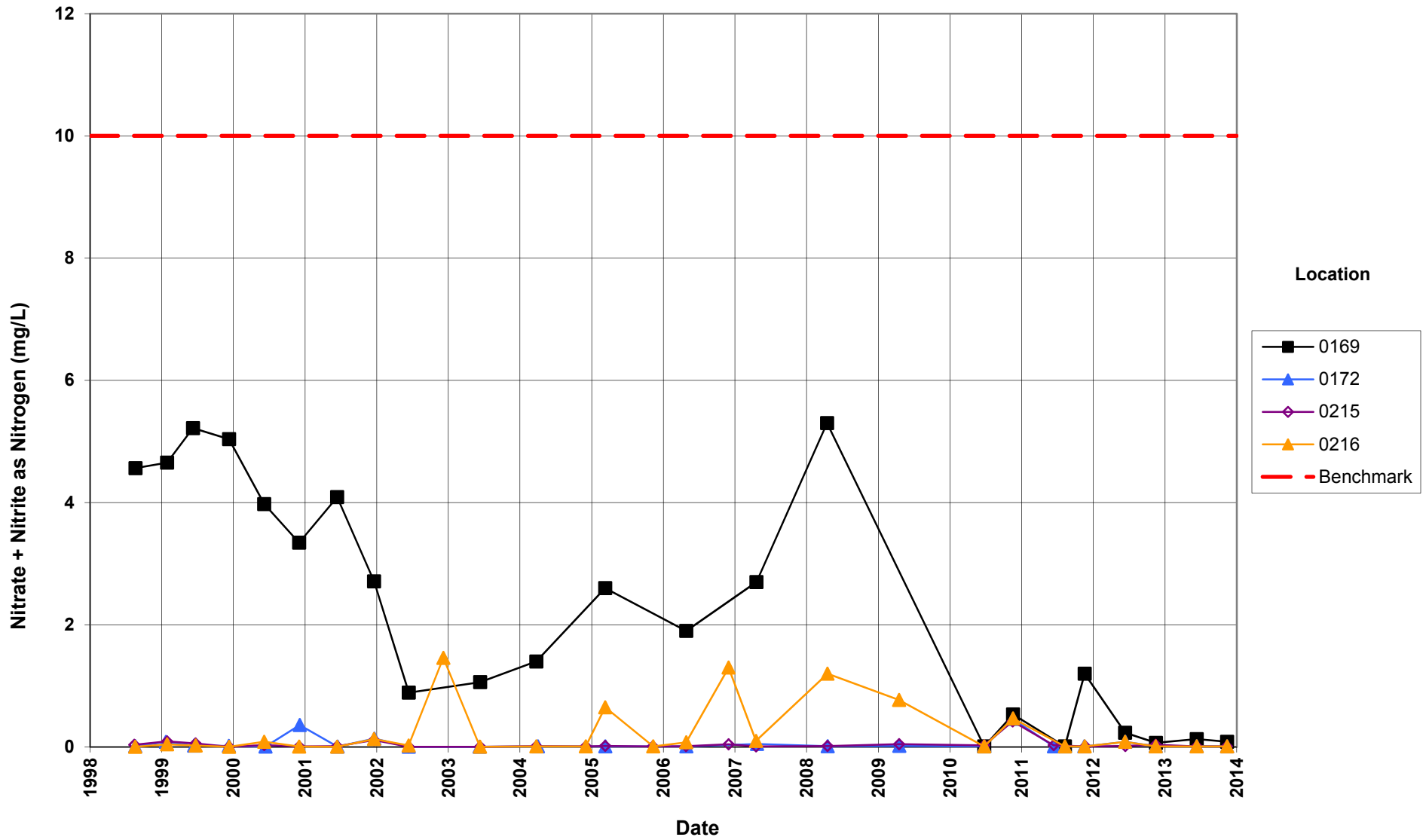
**Rifle New Processing Site**  
**Nitrate + Nitrite as Nitrogen Concentration**  
Benchmark = 10.0 mg/L



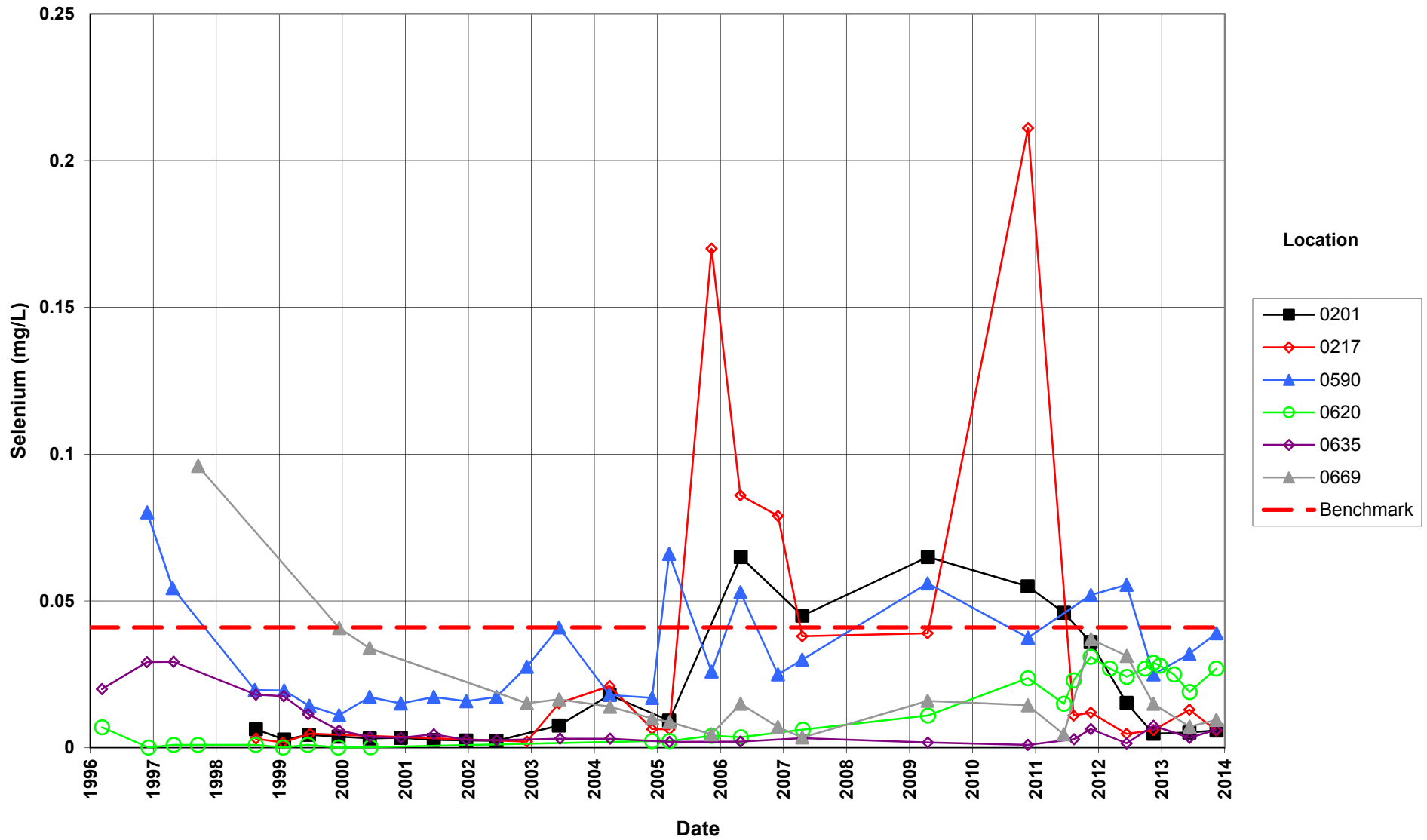
**Rifle New Processing Site**  
**Nitrate + Nitrite as Nitrogen Concentration**  
Benchmark = 10.0 mg/L



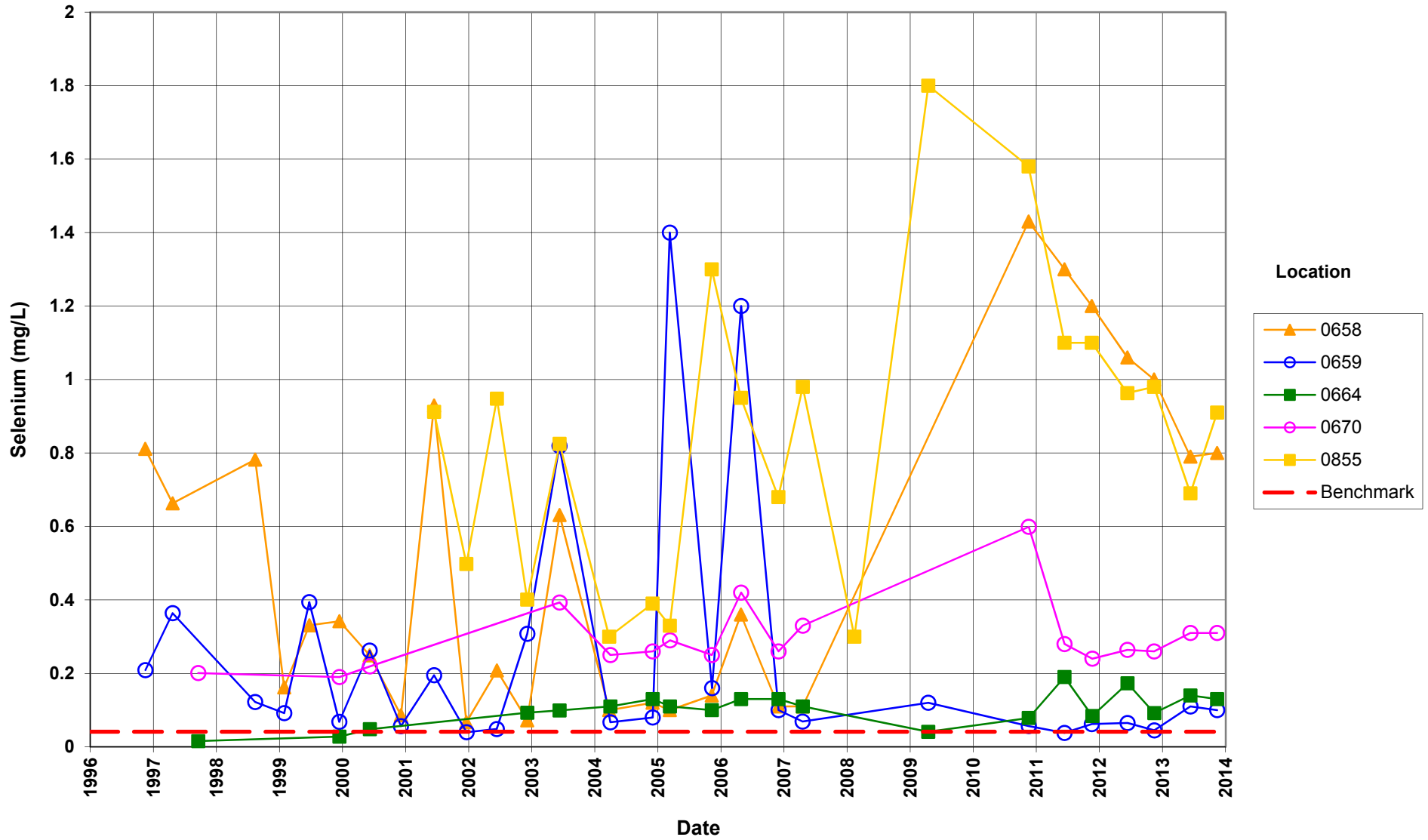
Rifle New Processing Site  
Nitrate + Nitrite as Nitrogen Concentration  
Benchmark = 10.0 mg/L



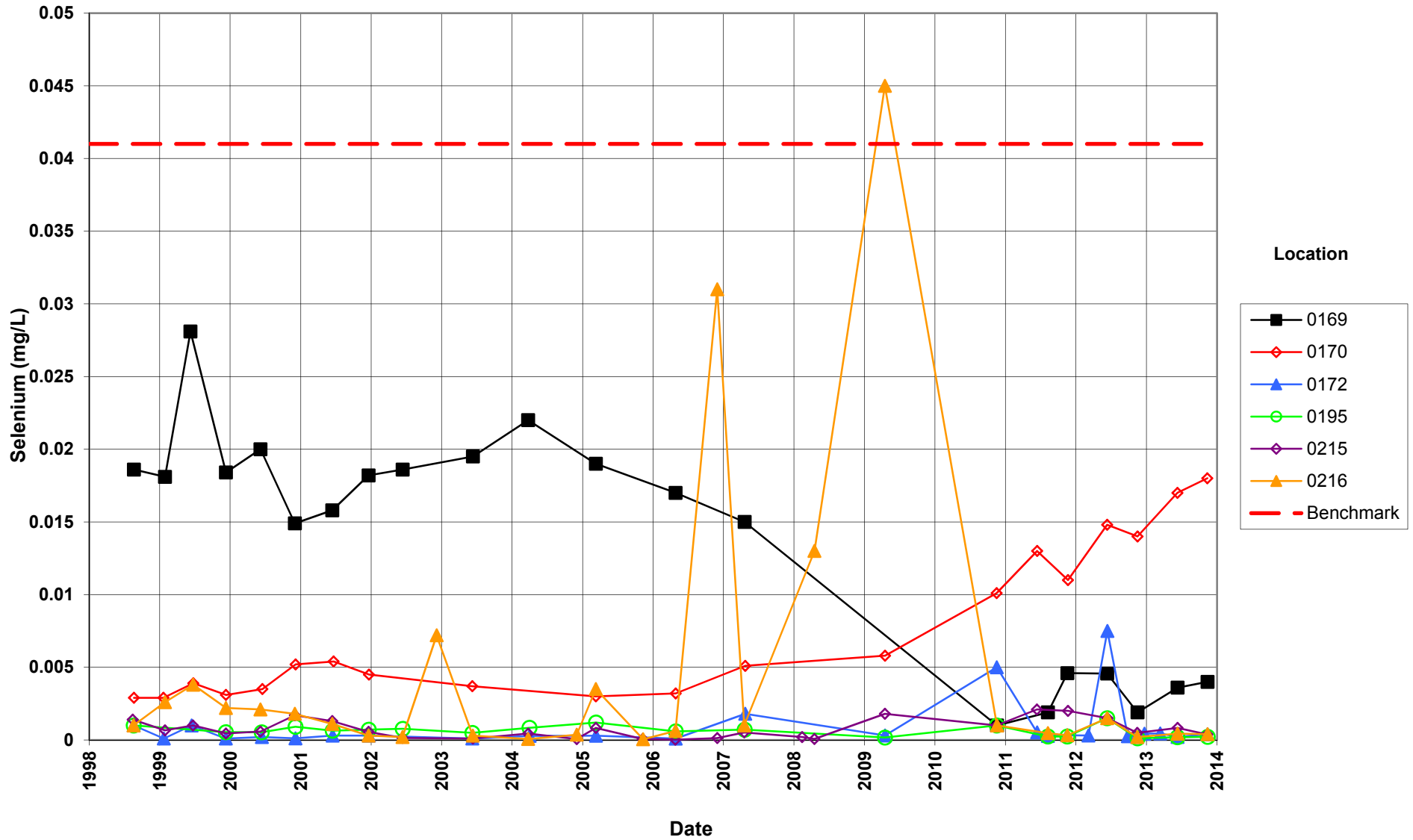
**Rifle New Processing Site**  
**Selenium Concentration**  
Benchmark = 0.041 mg/L



Rifle New Processing Site  
Selenium Concentration  
Benchmark = 0.041 mg/L

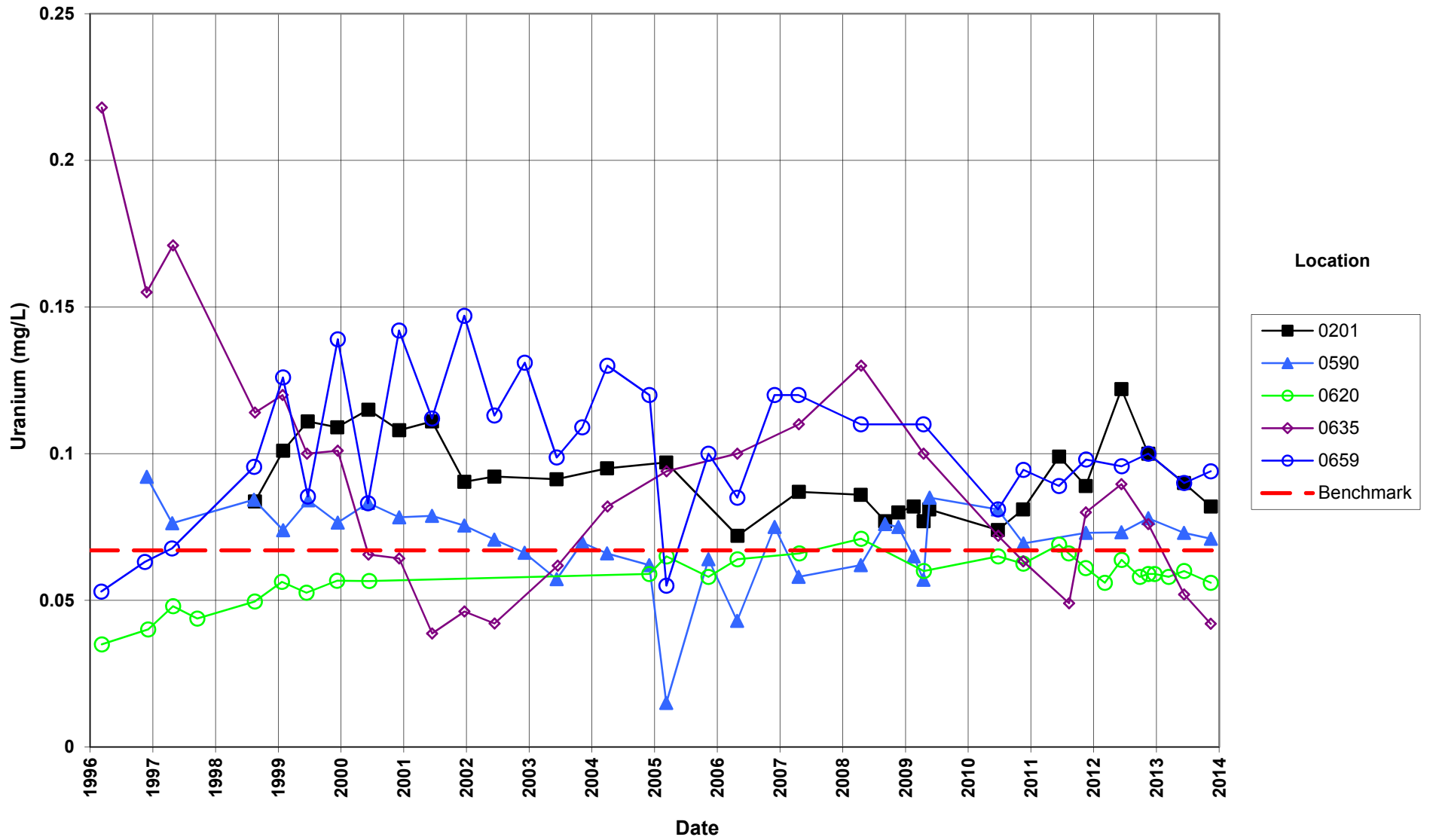


Rifle New Processing Site  
Selenium Concentration  
Benchmark = 0.041 mg/L

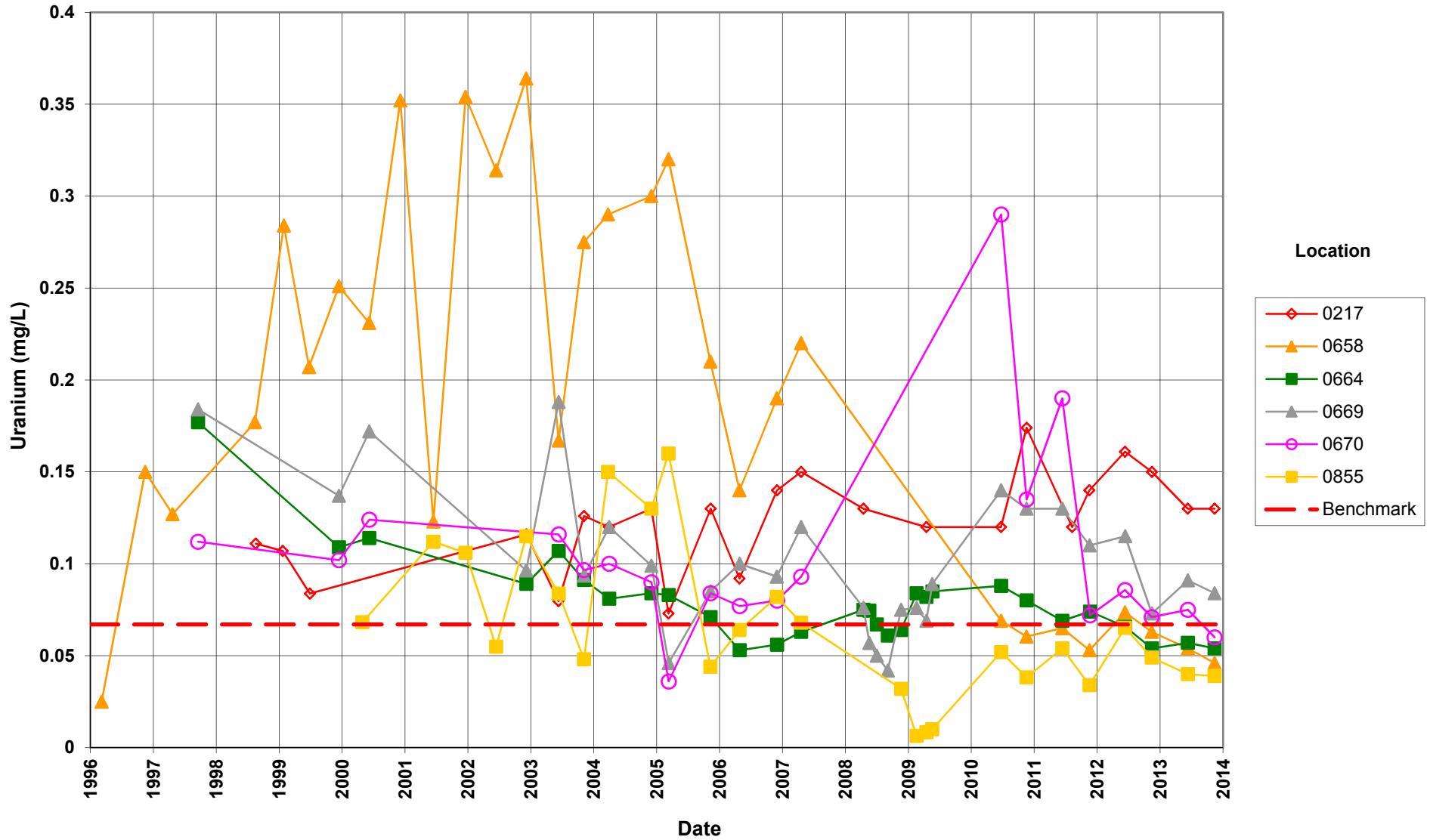




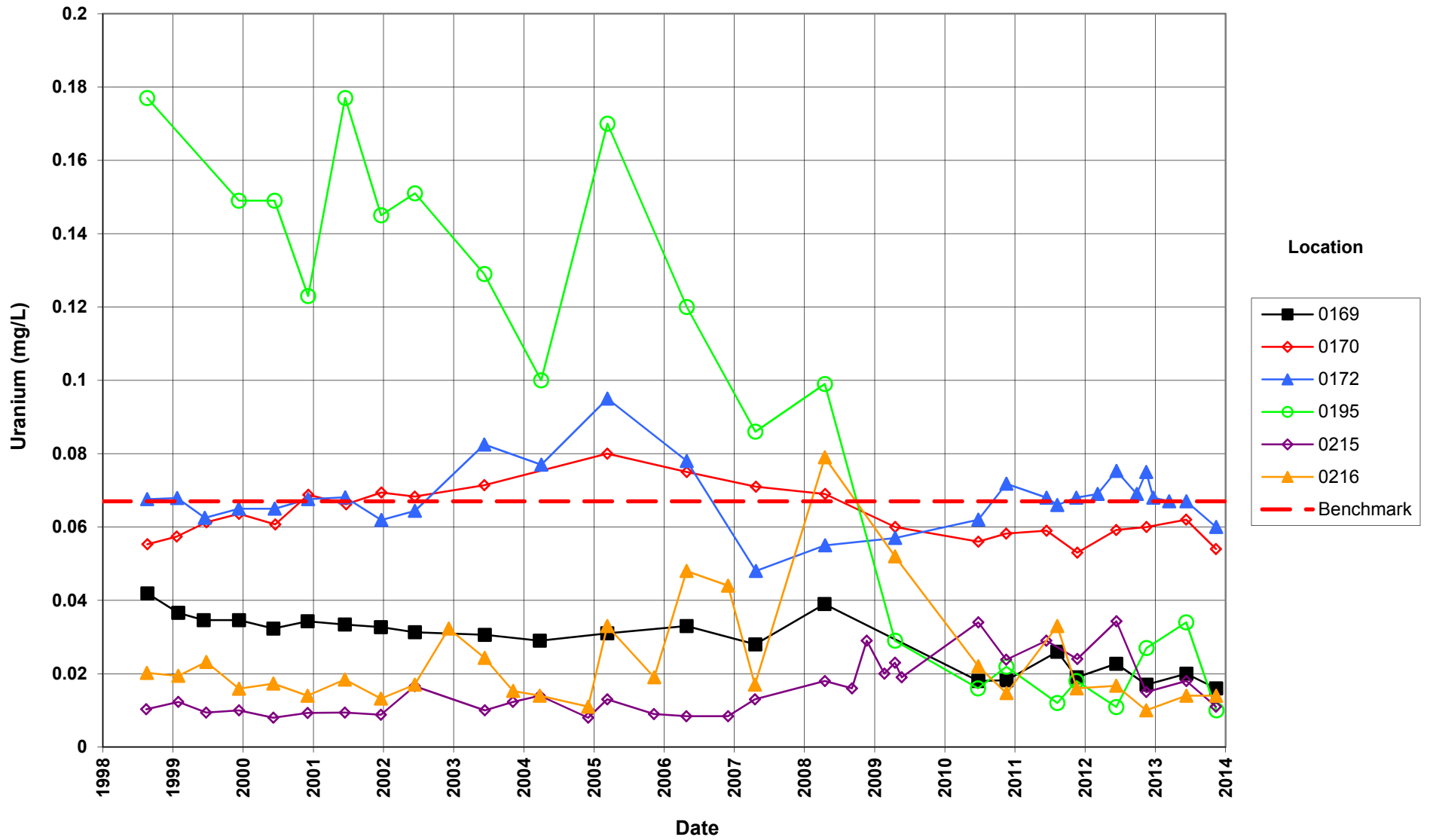
Rifle New Processing Site  
Uranium Concentration  
Benchmark = 0.067 mg/L



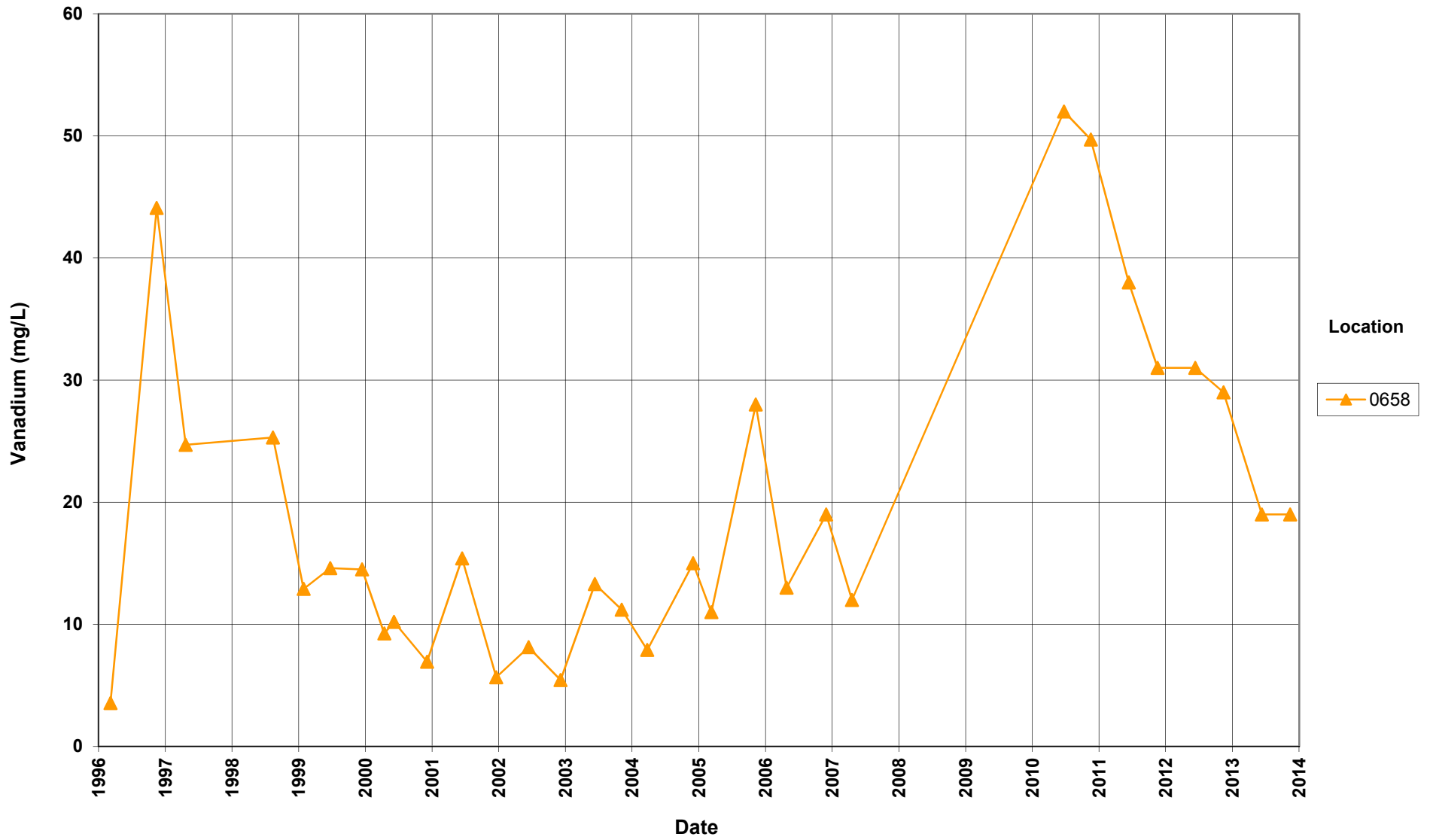
**Rifle New Processing Site**  
**Uranium Concentration**  
Benchmark = 0.067 mg/L



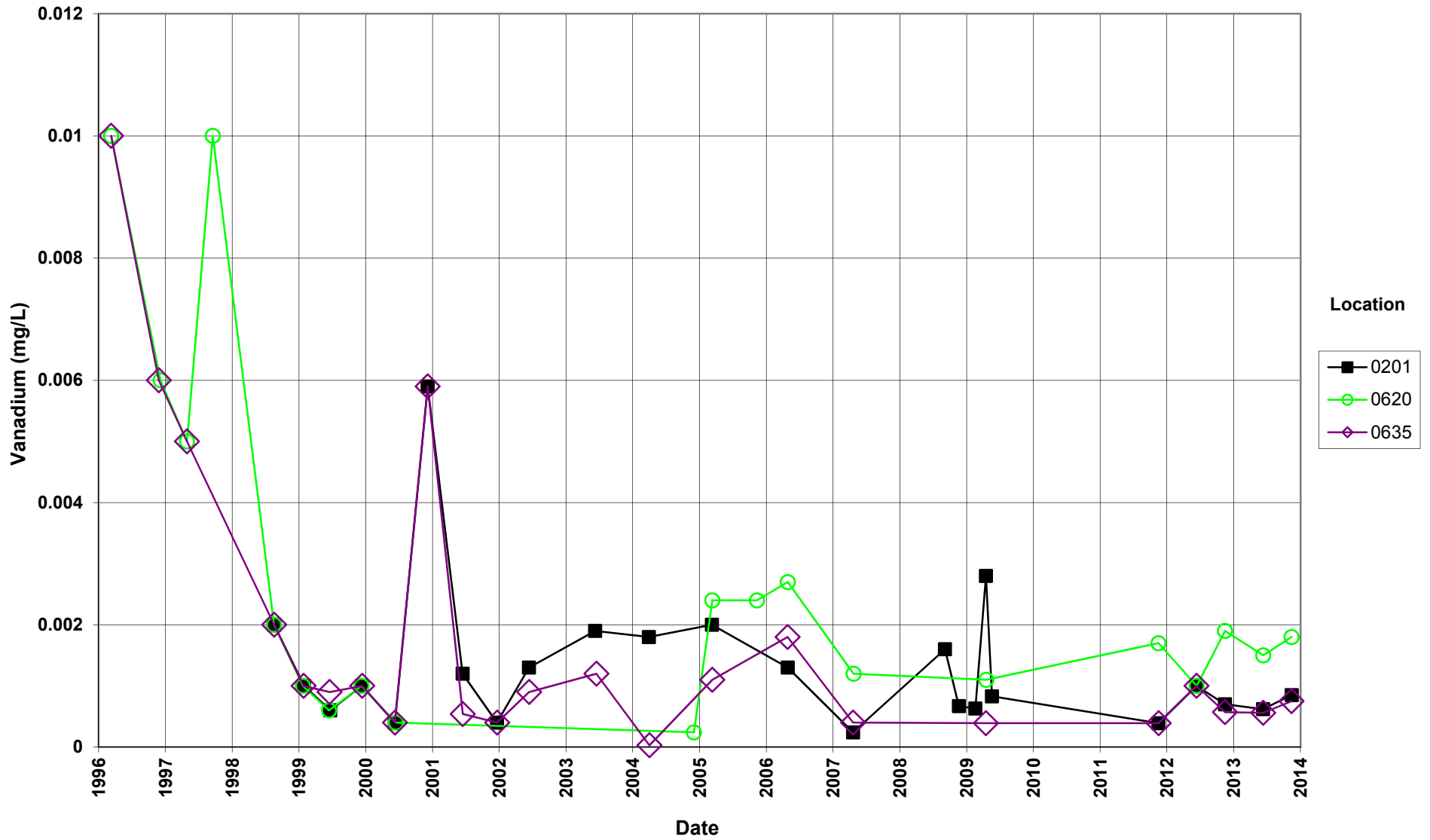
**Rifle New Processing Site  
Uranium Concentration**  
Benchmark = 0.067 mg/L



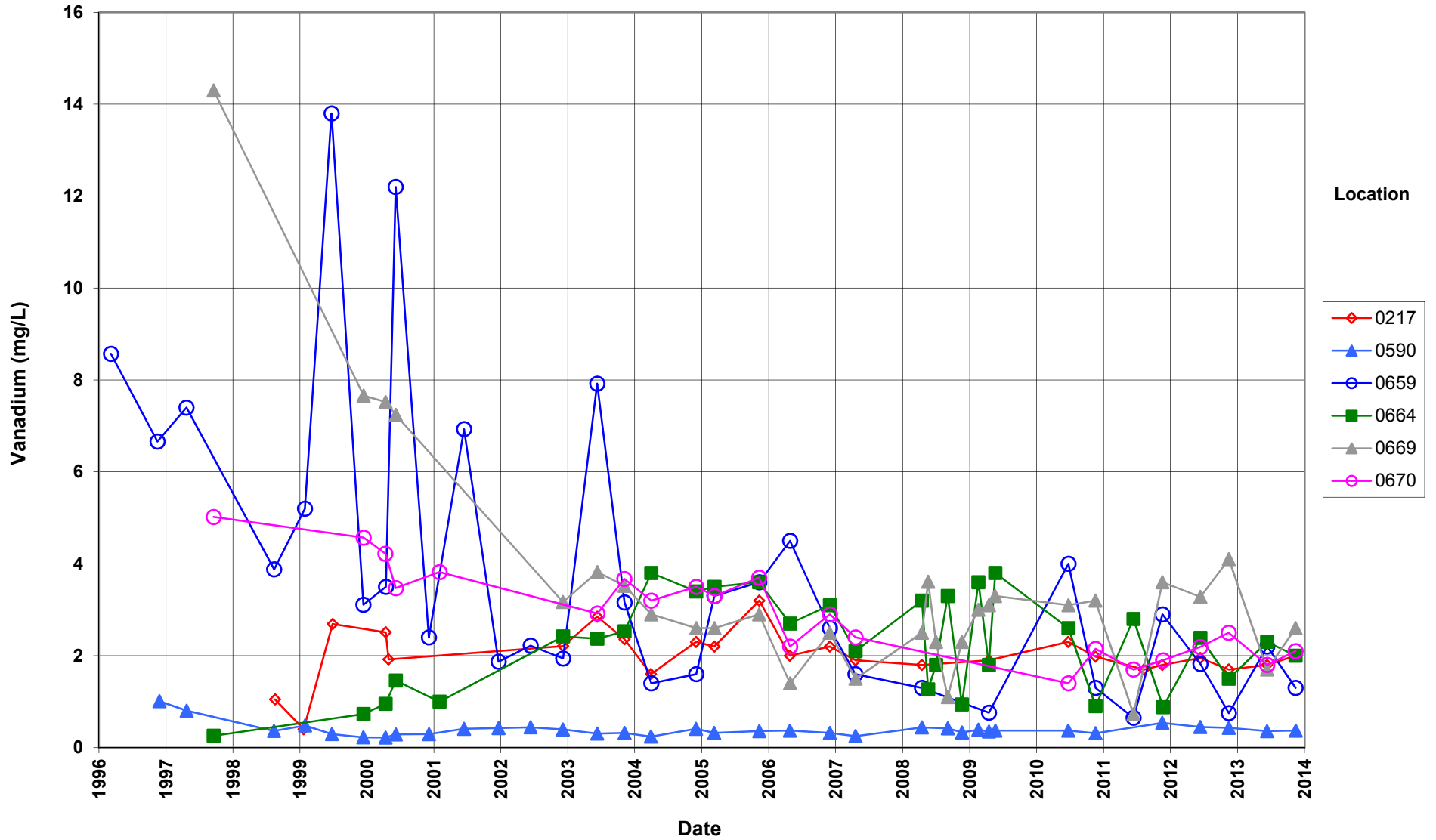
# Rifle New Processing Site Vanadium Concentration



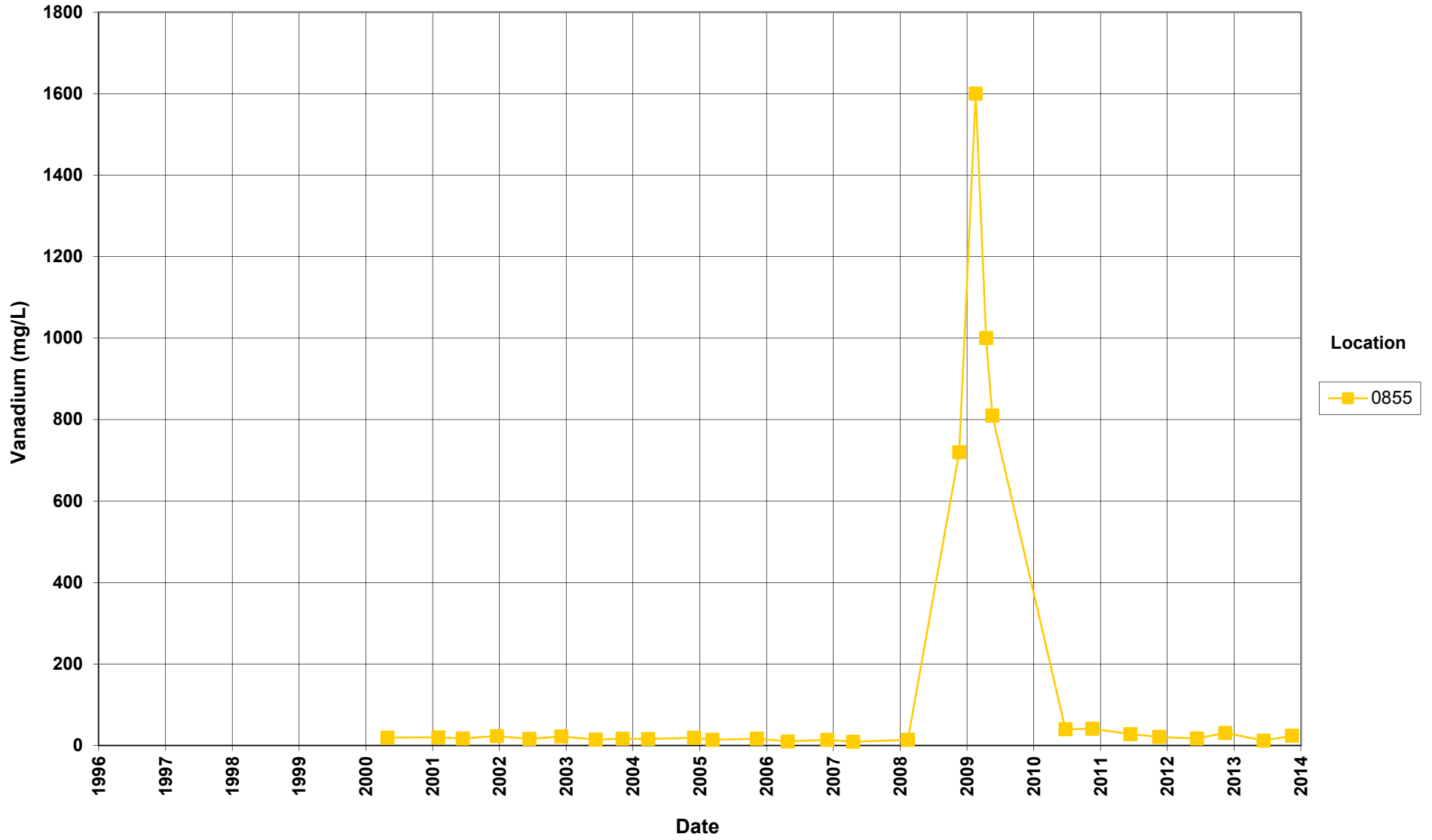
### Rifle New Processing Site Vanadium Concentration



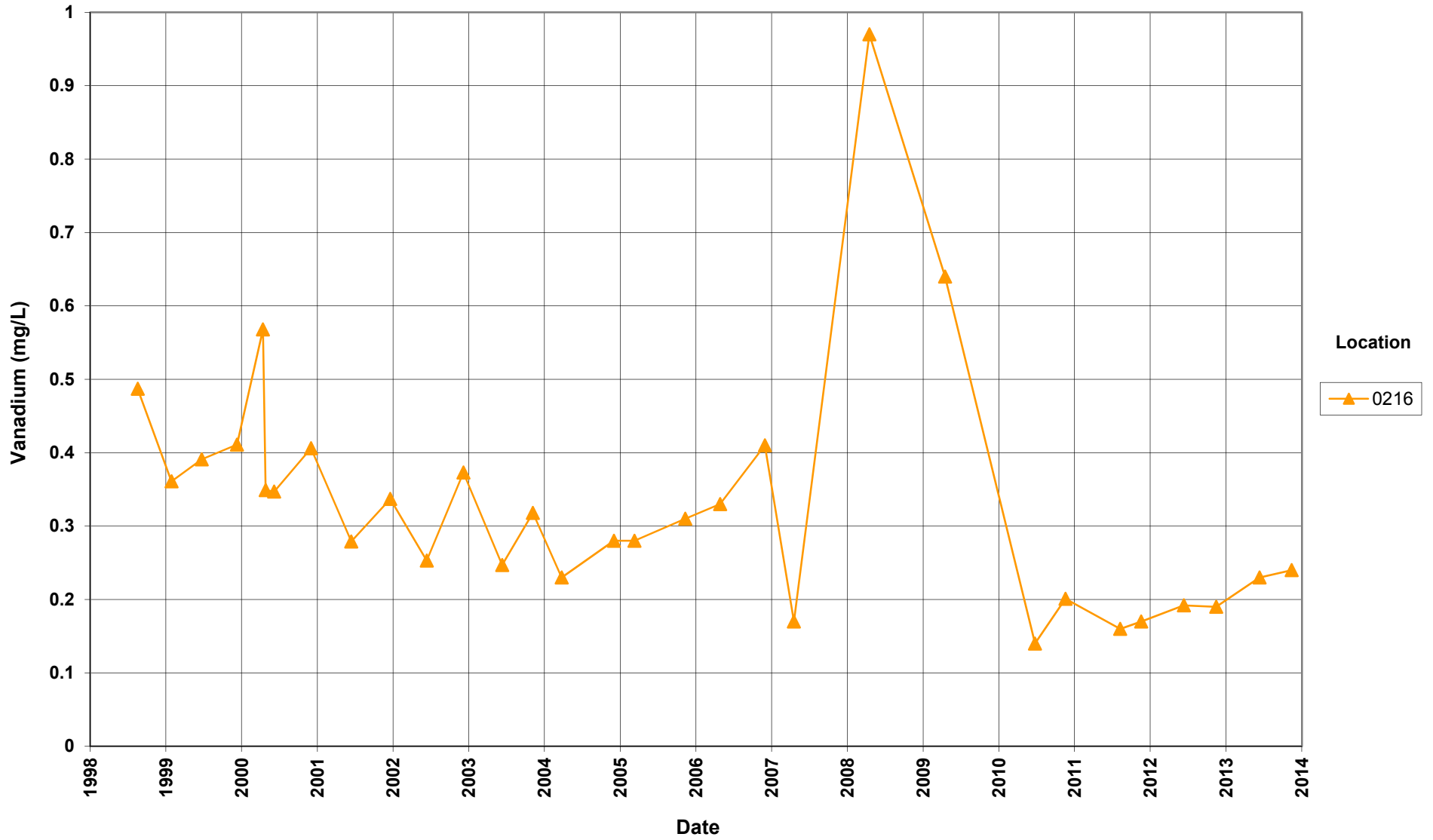
# Rifle New Processing Site Vanadium Concentration



# Rifle New Processing Site Vanadium Concentration

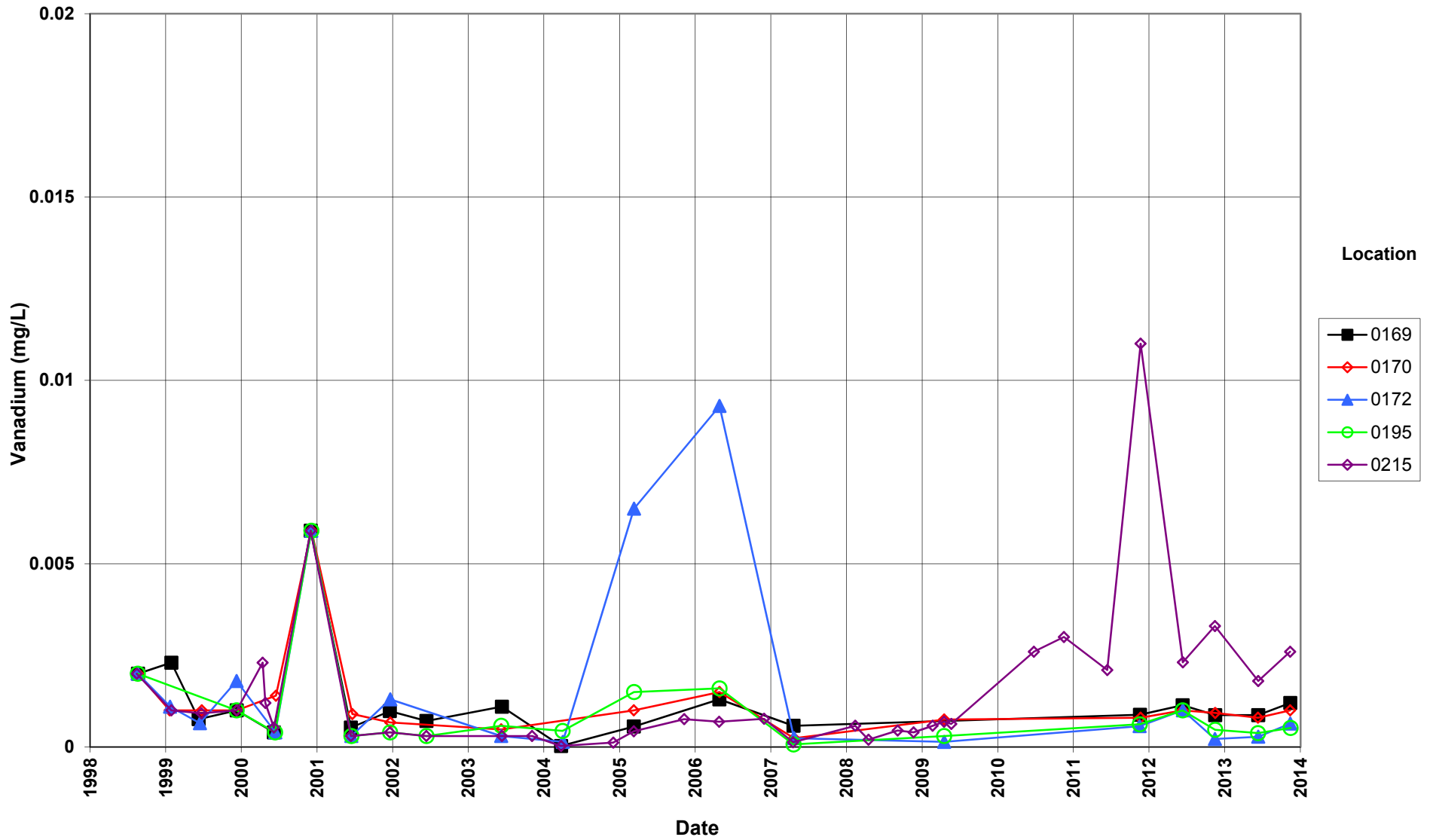


# Rifle New Processing Site Vanadium Concentration





# Rifle New Processing Site Vanadium Concentration

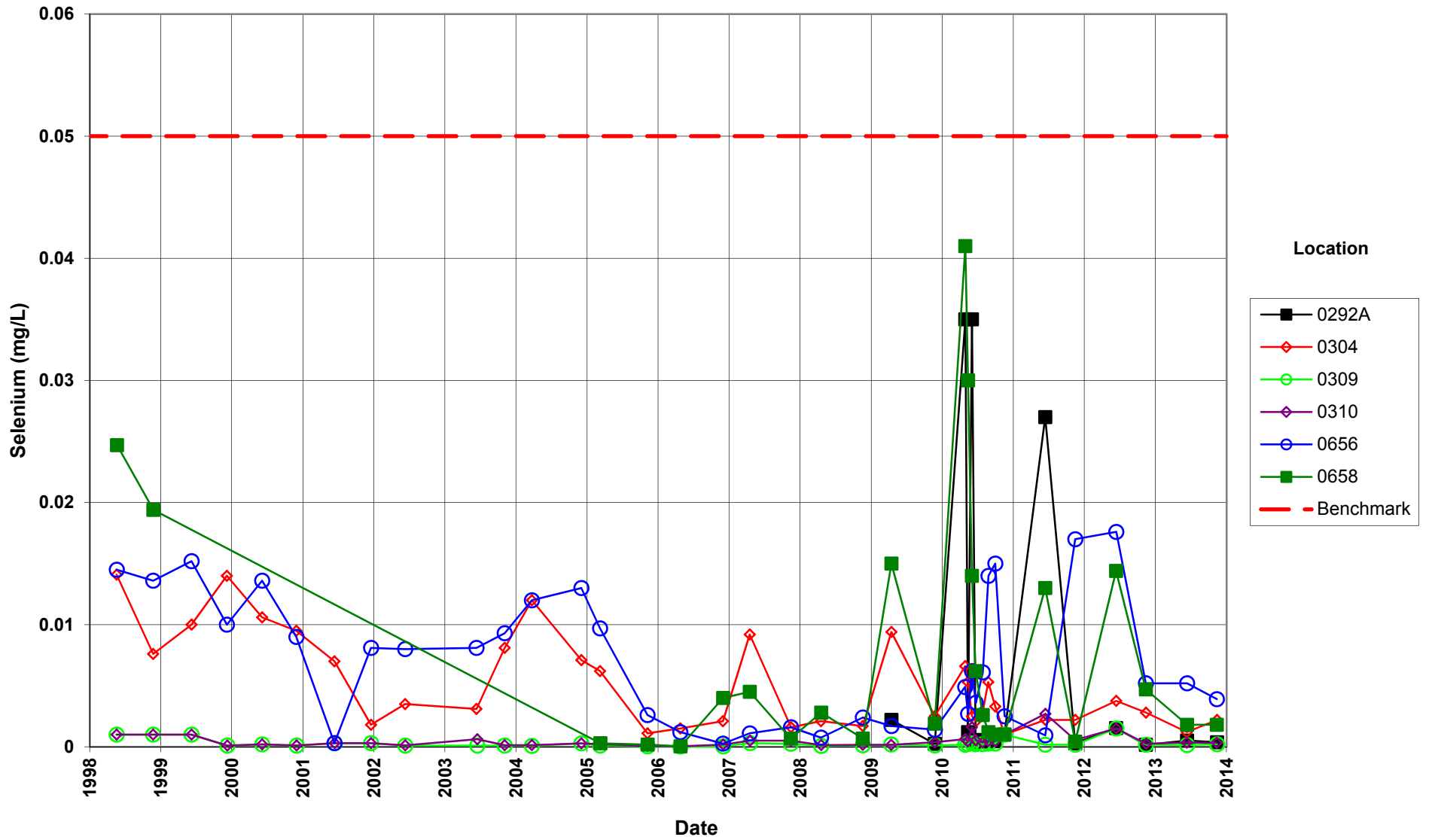


# **Old Rifle Groundwater Time-Concentration Graphs**

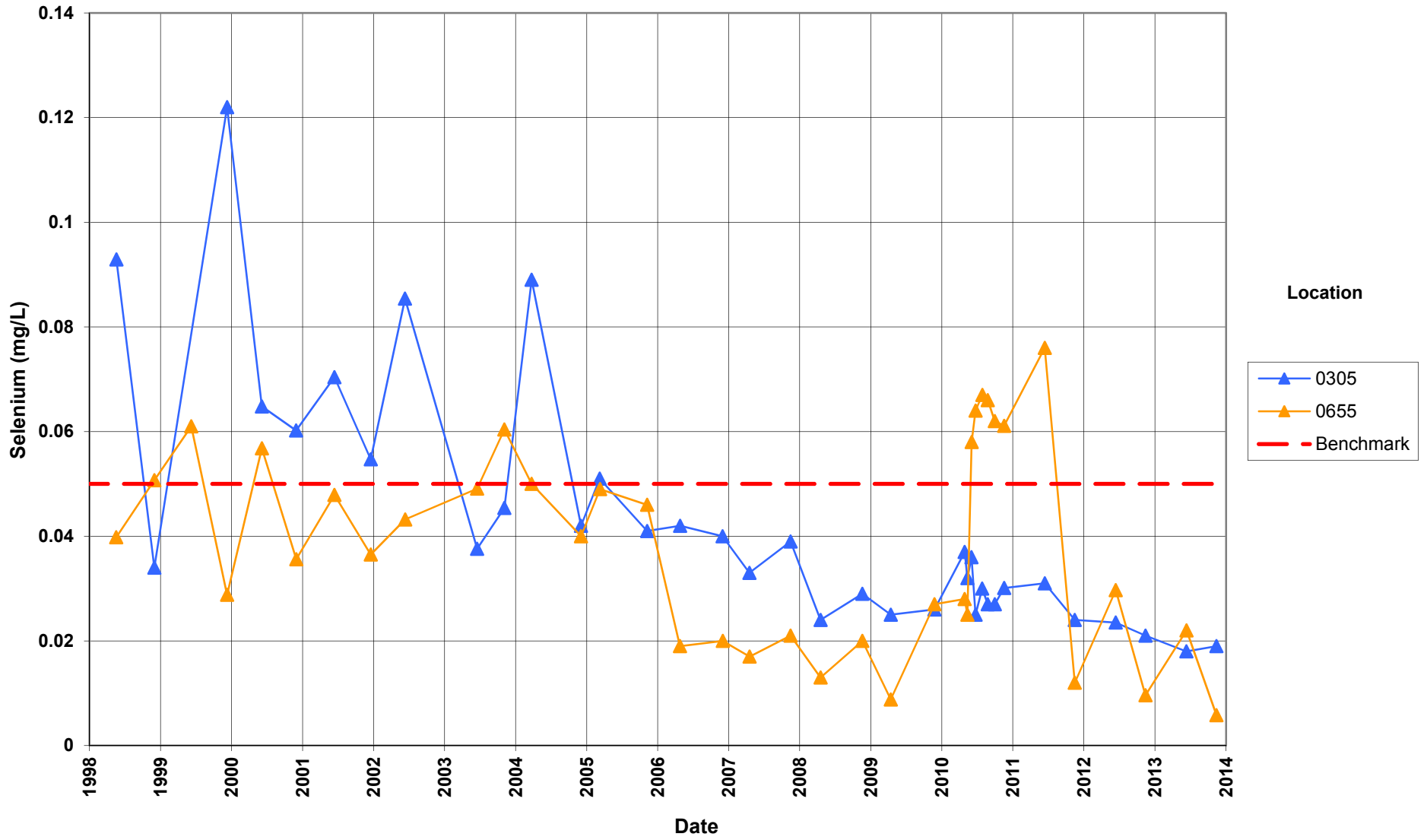
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# Rifle Old Processing Site Selenium Concentration

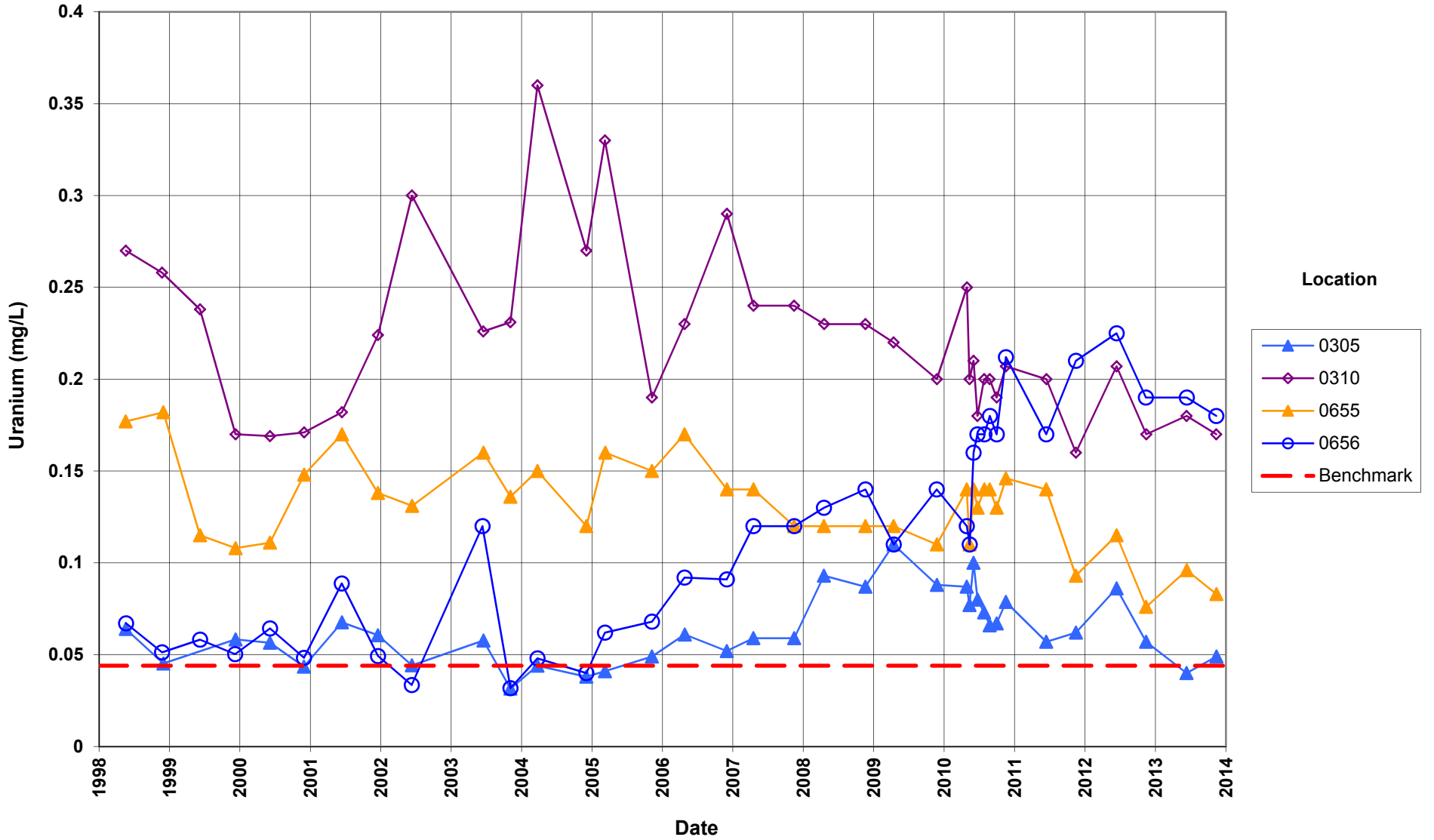
Benchmark = 0.05 mg/L



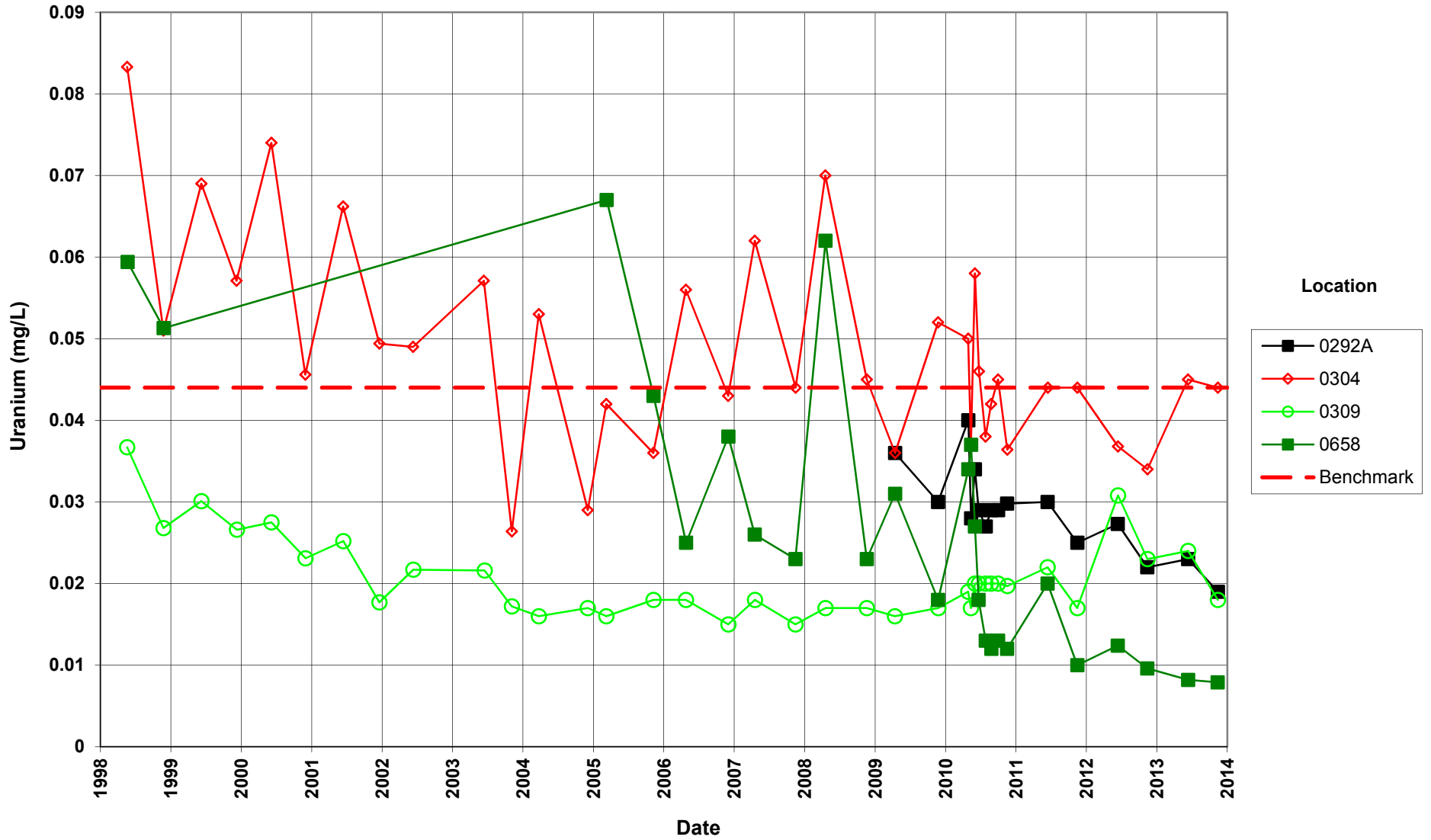
**Rifle Old Processing Site  
Selenium Concentration**  
Benchmark = 0.05 mg/L



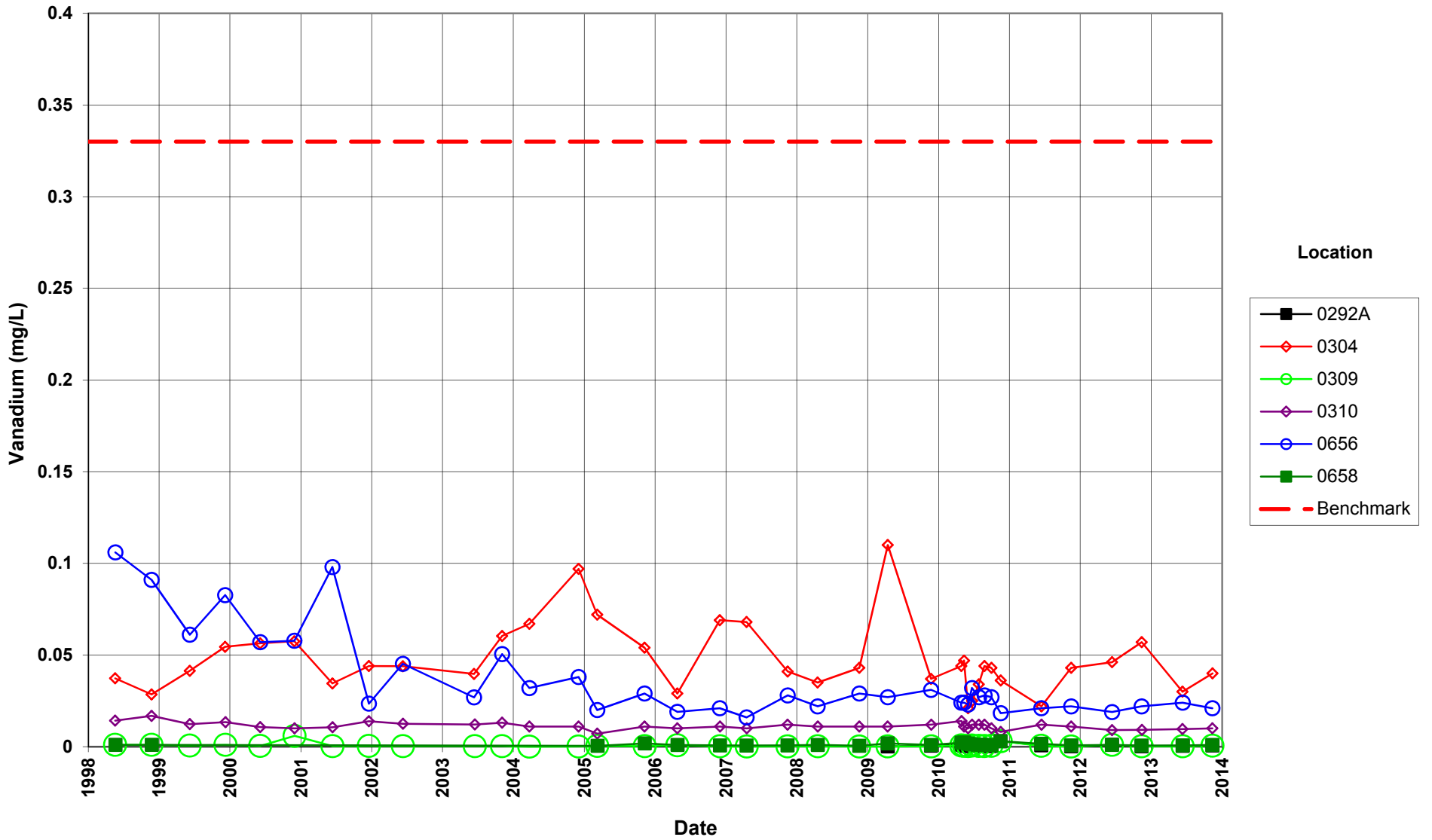
**Rifle Old Processing Site  
Uranium Concentration**  
Benchmark = 0.044 mg/L



**Rifle Old Processing Site  
Uranium Concentration**  
Benchmark = 0.044 mg/L



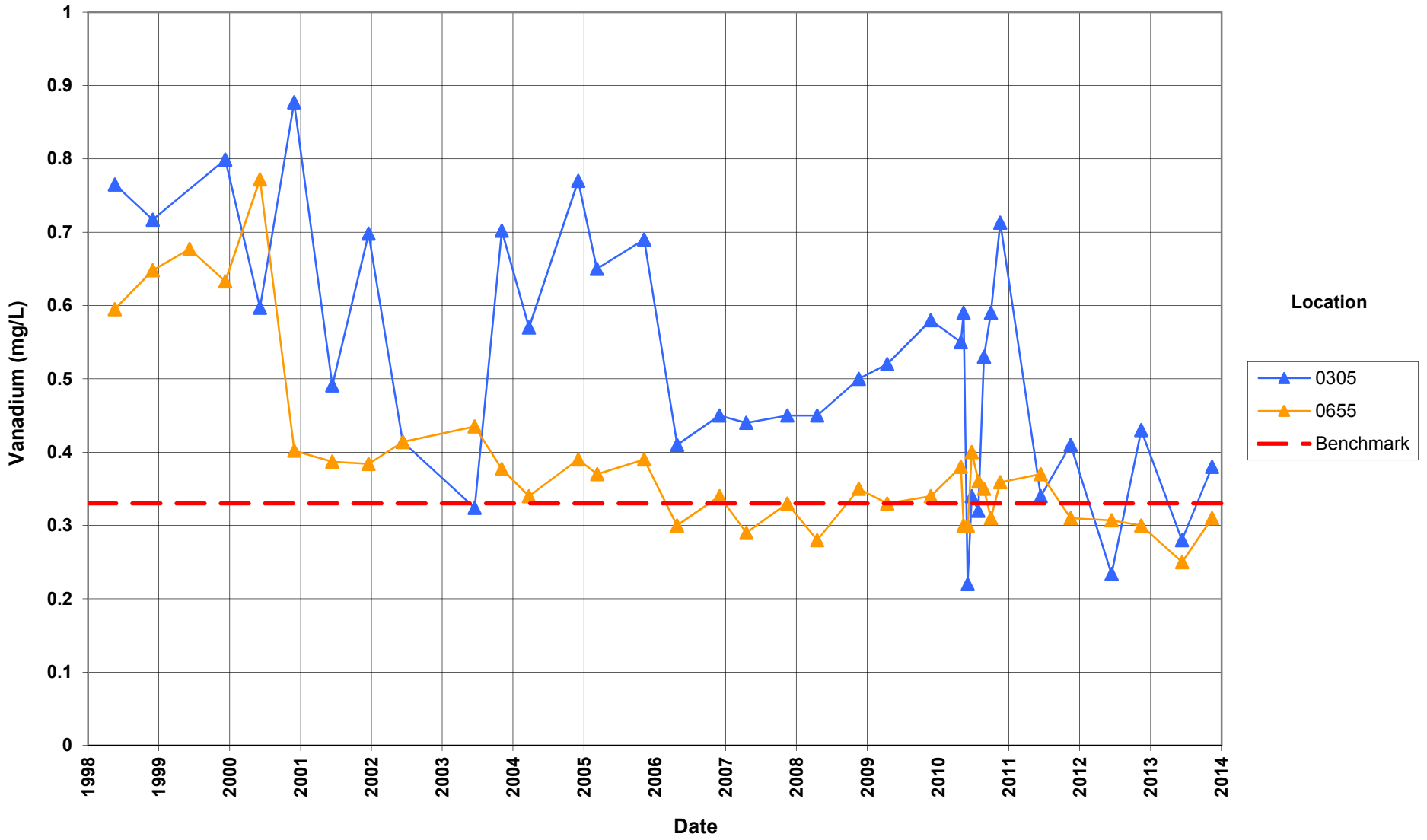
**Rifle Old Processing Site  
Vanadium Concentration**  
Benchmark= 0.33 mg/L





# Rifle Old Processing Site Vanadium Concentration

Benchmark= 0.33 mg/L

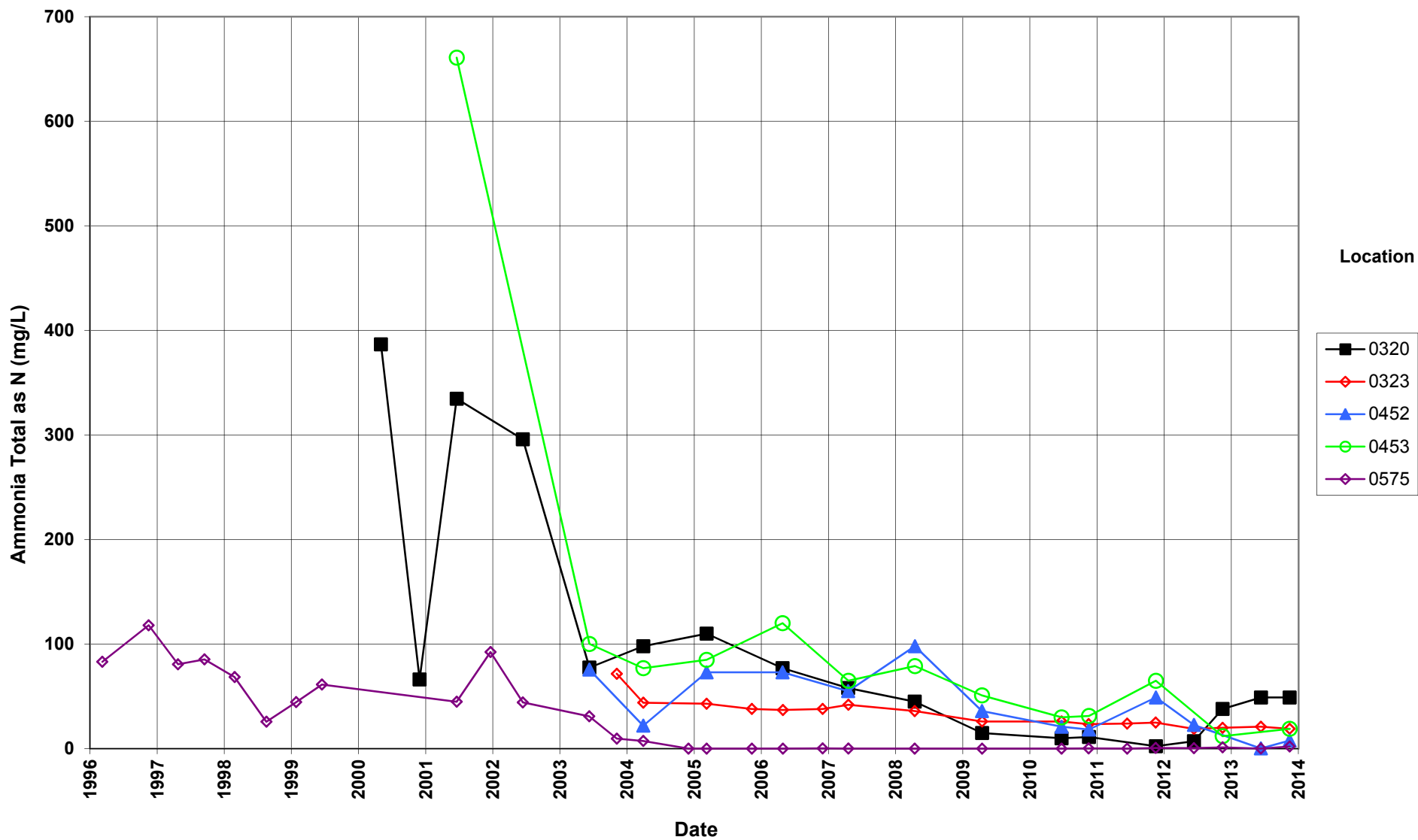


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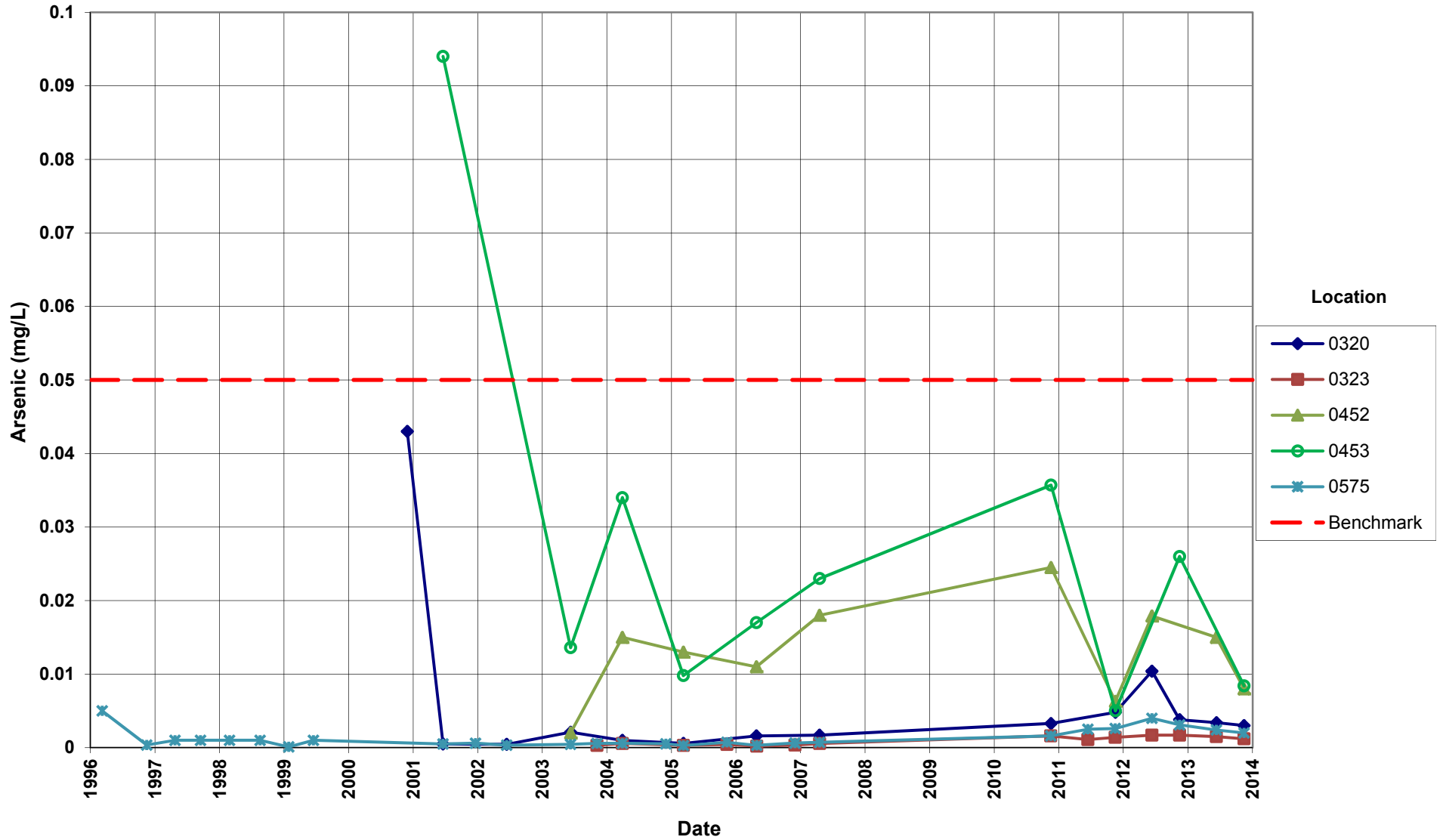
**Pond Locations  
Time-Concentration Graphs**

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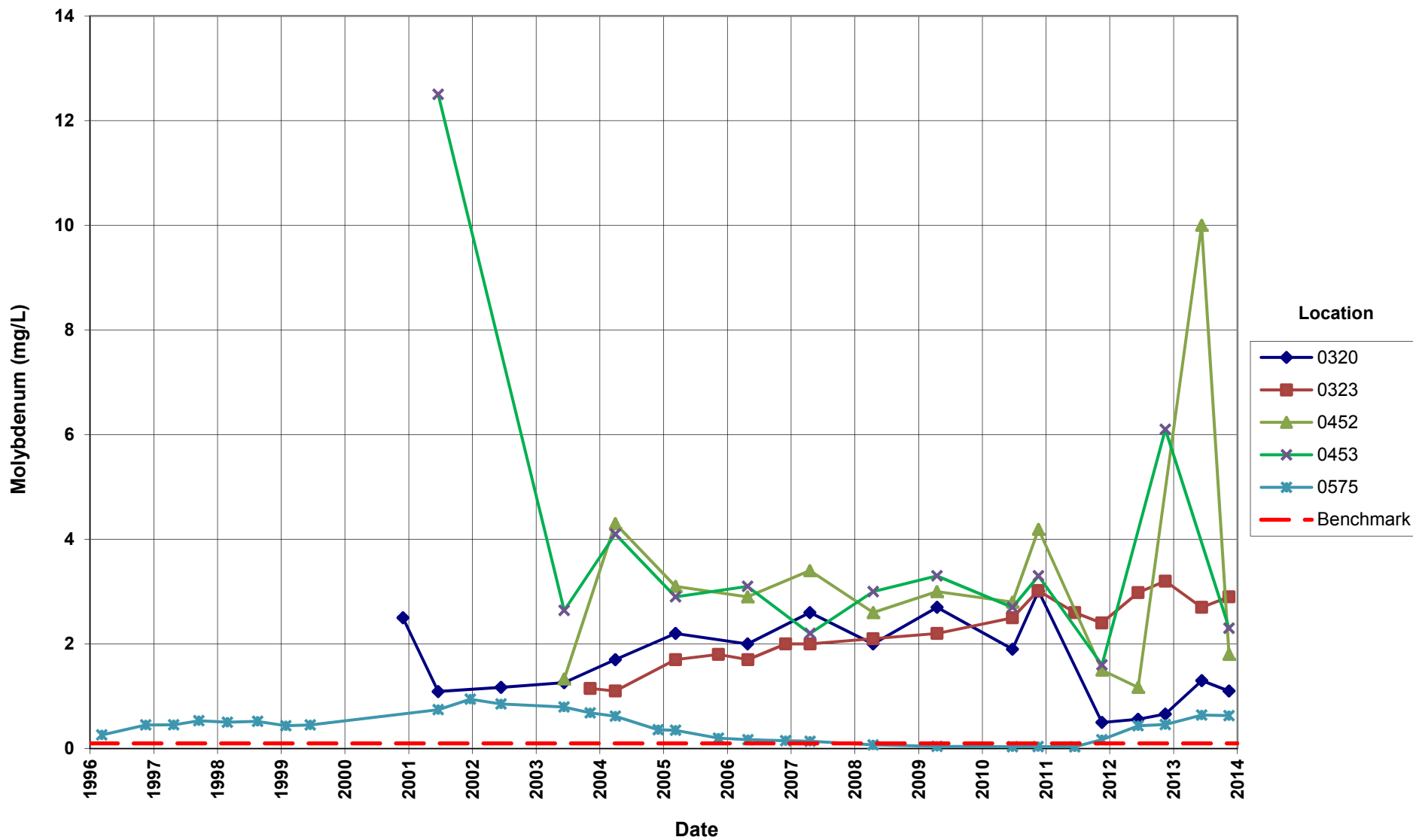
Rifle New Processing Site  
Ammonia Total as N Concentration  
Pond Locations



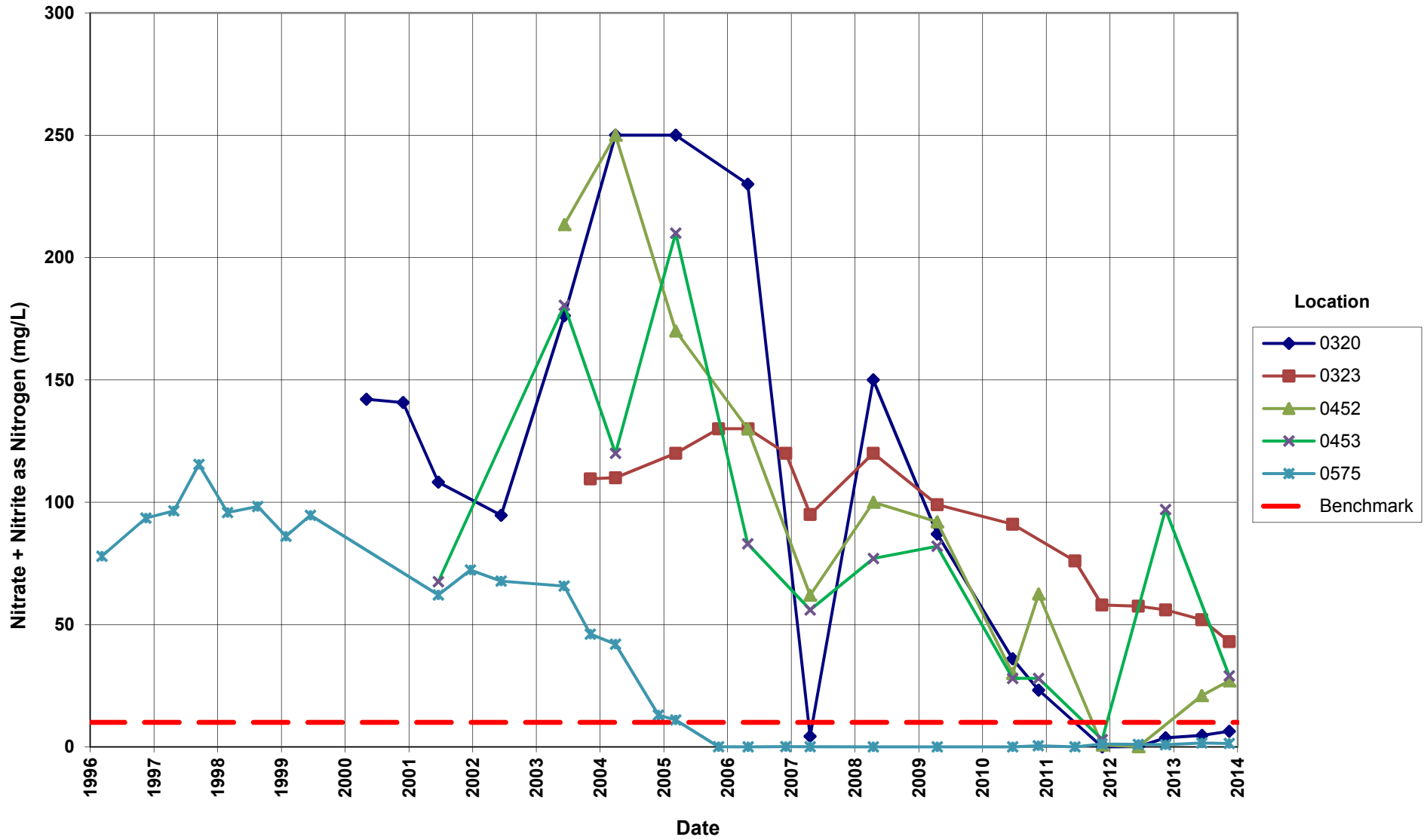
Rifle New Processing Site  
Arsenic Concentration  
Pond Locations  
Benchmark= 0.05 mg/L



Rifle New Processing Site  
Molybdenum Concentration  
Pond Locations  
Benchmark= 0.1 mg/L



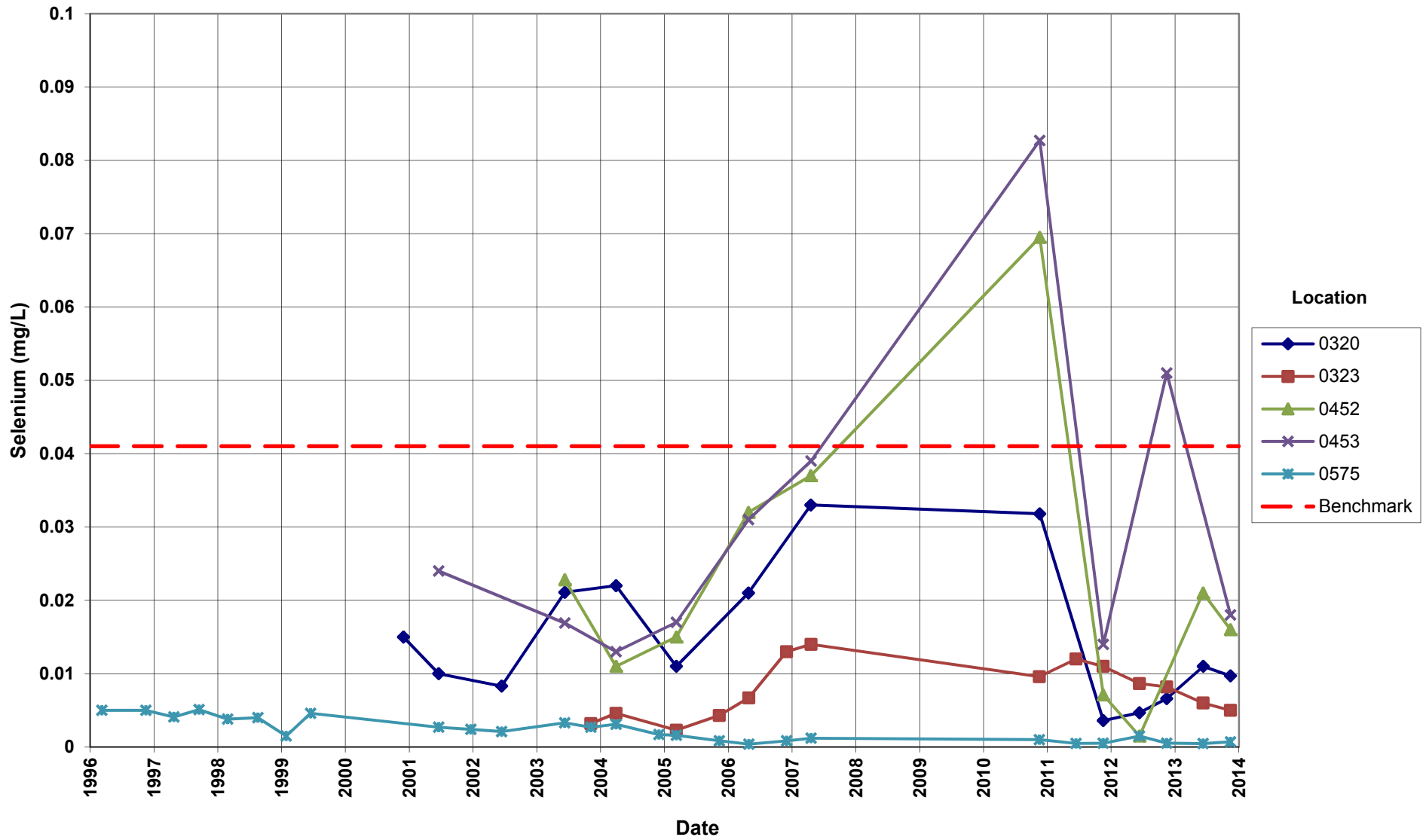
**Rifle New Processing Site**  
**Nitrate + Nitrite as Nitrogen Concentration**  
**Pond Locations**  
 Benchmark = 10 mg/L



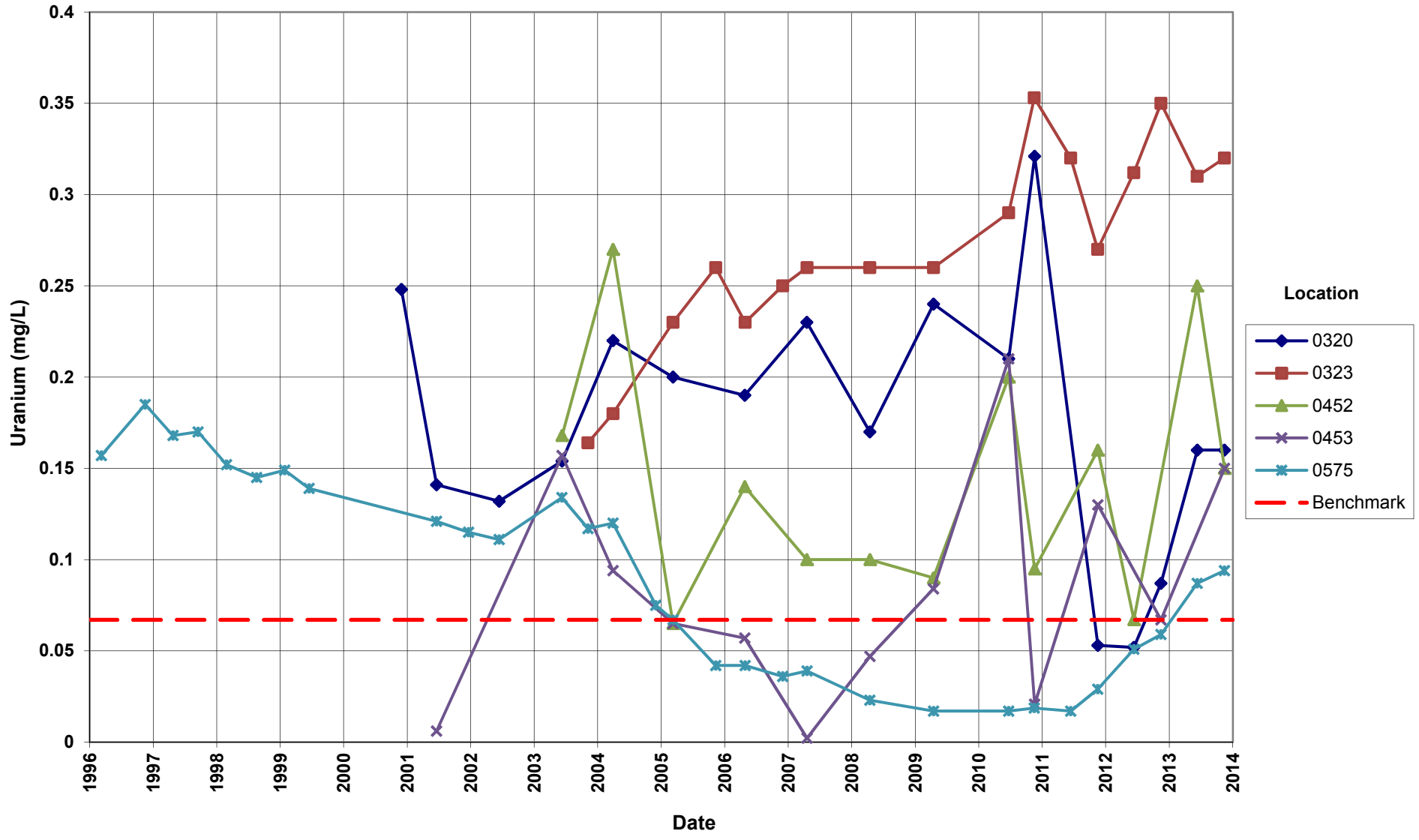


# Rifle New Processing Site Selenium Concentration Pond Locations

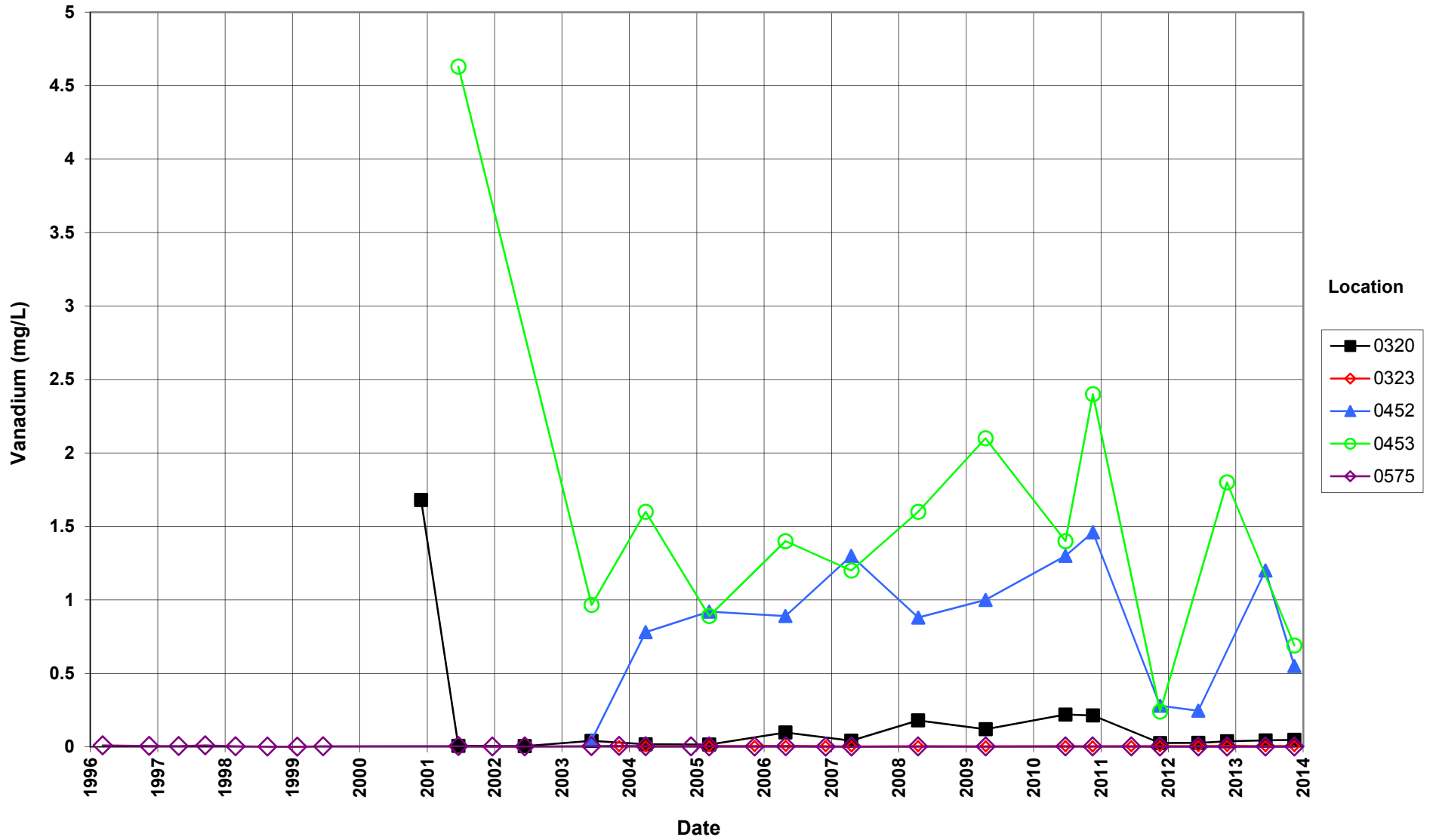
Benchmark = 0.041 mg/L



**Rifle New Processing Site  
Uranium Concentration  
Pond Locations**  
Benchmark = 0.067 mg/L



# Rifle New Processing Site Vanadium Concentration Pond Locations



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**Attachment 3**  
**Sampling and Analysis Work Order**

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established 1959

Task Order LM-501  
Control Number 14-0052

October 23, 2013

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)  
November 2013 Environmental Sampling at Rifle, Colorado, Old and New  
Processing Sites

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

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 (Old and New) sites. Water quality data will be collected from these sites as part of the environmental sampling currently scheduled to begin the week of November 18, 2013.

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 AL	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	322	323	324	452	453	575
-----	-----	-----	-----	-----	-----	-----

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.

Additional samples will be collected from Old Rifle at the following locations: 0310, 0656, 0658, LQ-107, SY-02, SY-04, SY-05, SY-07, and SY-08. These samples will be sent to the University of Illinois for isotopic analyses.

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

Sincerely,



Richard Dayvault  
Site Lead

RD/lcg/lb

Enclosures (3)

cc: (electronic)

Christina Pennal, DOE  
Richard Dayvault, Stoller  
Steve Donovan, Stoller  
Bev Gallagher, Stoller  
Lauren Goodknight, Stoller  
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
	Groundwater	Surface Water						
Approx. No. Samples/yr	57	24						
<b>Field Measurements</b>								
Alkalinity	X	X						
Dissolved Oxygen								
Redox Potential	X	X						
pH	X	X						
Specific Conductance	X	X						
Turbidity	X							
Temperature	X	X						
<b>Laboratory Measurements</b>								
	<b>*RFO</b>	<b>*RFN</b>	<b>RFO</b>	<b>RFN</b>	<b>RFL</b>			
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	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	X	0.0001	SW-846 6020	LMM-02
Vanadium	X	X	X	X	X	0.0003	SW-846 6020	LMM-02
Zinc								
<b>Total No. of Analytes</b>	10	13	10	13	3			

\*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
<b>Monitoring Wells</b>						
<b>New Rifle</b>						
169		X				
170		X				
172		X				
195		X				
201		X				Data logger
215		X				
216		X				
217		X				
590		X				Data logger
620		X				
635		X				
658		X				
659		X				
664		X				
669		X				
670		X				
855		X				
<b>Old Rifle</b>						
292A		X				GCAP; bkgd well
304		X				GCAP
305		X				GCAP
309		X				GCAP
310		X				GCAP; data logger
655		X				GCAP; data logger
656		X				GCAP
658		X				Background well
<b>Surface Locations</b>						
<b>New Rifle</b>						
320		X				Wetland Pond
322		X				Colorado River
323		X				Gravel pit pond
324		X				Colorado River downgradient
452		X				Wetland Pond
453		X				Wetland Pond
575		X				Gravel pit pond
<b>Old Rifle</b>						
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; annual sampling conducted for Rifle Disposal Cell in July

# **Attachment 4 Trip Report**

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## Memorandum

DATE: December 3, 2013  
 TO: Richard Dayvault  
 FROM: Alison Kuhlman  
 SUBJECT: Trip Report

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

**Dates of Sampling Event:** November 11-14, 2013

**Team Members:** Jose Treviño, Dan Sellers, David Atkinson, Lauren Goodknight, and Alison Kuhlman

**Number of Locations Sampled:** Samples were collected at all monitoring locations identified on the sampling notification letter, as follows:

Site ID	Site	Location Type	Number Sampled
RFN01	New Rifle	Monitoring Wells	17
RFN01	New Rifle	Surface Water	7
RFO01	Old Rifle	Monitoring Wells	8
RFO01	Old Rifle	Surface Water	5

Additional samples were collected for isotopic analyses per Ken Williams' request. Samples were collected from nine locations at Old Rifle: SY-02, SY-04, SY-05, SY-07, SY-08, LQ-107, 0310, 0656, and 0658.

**Locations Not Sampled/Reason:** All locations were sampled.

### Location Specific Information:

Site ID	Location IDs	Comments
RFN01	0172	Sampling splits were collected with Cinnamon (Olsson Associates Consulting personnel).
RFN01	0195	Iron flecks in purge water.
RFN01	0659	High turbidity indicates this well could potentially benefit from additional development.
RFN01	0669 and 670	Previously classified as Category II wells. Were sampled as Category I wells.
RFN01	0787	The lock is stuck and may need to be removed.
RFO01	0658	Per request, the well was scoped and found to be cracked at approximately five feet from the top of the casing. New tubing installed.

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

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2548	LMR 974	RFN01-0575	Duplicate	Surface Water
2549	LMR 975	RFN01-0323	Duplicate	Surface Water
2551	LMR 990	RFO01-0305	Duplicate	Groundwater
2552	LMR 991	N/A	Equipment Blank	N/A

**Report Identification Number (RIN) Assigned:** 13115731. Field data sheets can be found in Crow\sms\13115731 in the Field Data folder.

**Sample Shipment:** Samples were shipped overnight via FedEx from Grand Junction to ALS Laboratory Group on November 14, 2013.

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

**Well Inspection Summary:** No issues were identified.

**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:** Turbidity stabilization requirements could not be met for the Category I well at RFN01-0659. Therefore, the samples from this location were filtered.

**Equipment:** All equipment functioned properly. Wells were sampled with a peristaltic pump and dedicated tubing or a dedicated bladder pump. Surface waters were sampled using a peristaltic pump and tubing reel, or by container immersion. An equipment blank was collected from the tubing reel used for sampling surface water. All other equipment was dedicated or disposable.

**Regulatory:** Nothing to note.

**Institutional Controls:**

**Fences, Gates, and Locks:** Nothing to note.

**Signs:** Nothing to note.

**Trespassing/Site Disturbances:** None observed.

**Site Issues:**

**Disposal Cell/Drainage Structure Integrity:** N/A

**Vegetation/Noxious Weed Concerns:** None observed.

**Maintenance Requirements:** Potential maintenance issues at New Rifle well 0787 and Old Rifle well 0658 to correct the issues identified in the Location Specific Information.

**Safety Issues:** None.

Richard Dayvault  
December 3, 2013  
Page 3

**Access Issues:** Vehicle access to RFN01 locations 0620 and 0324 is blocked by a locked gate owned by Williams Production. The combination to the lock has been provided by Bryan Hotard of Williams. *See the Field Notebook for the combination.*

**Corrective Action Required:** Determine the appropriate response to maintenance requirements at well 0787 at New Rifle and well 0658 at Old Rifle.

(AK/lg)

cc: (electronic)  
Rich Bush, DOE  
Dick Dayvault, Stoller  
Steve Donovan, Stoller  
EDD Delivery

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