

Data Validation Package

**June-July 2015
Groundwater and Surface Water
Sampling at the
Old and New Rifle, Colorado,
Processing Sites**

November 2015



**U.S. DEPARTMENT OF
ENERGY**

Legacy
Management

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Sampling Event Summary

Site: Old and New Rifle, Colorado, Processing Sites

Sampling Period: Jun 9, 10, and 18, 2015
Jul 17 and 20, 2015

Thirty-six water samples were collected at New Rifle and Old Rifle, Colorado, Processing Sites. Several trips to the site were required to complete this sampling event because high water from spring runoff prevented access to several locations. Duplicate samples were collected from New Rifle locations 0216 and 0855, and Old Rifle location 0304. One equipment blank was collected. Sampling and analyses were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated).

New Rifle Site

Samples were collected at the New Rifle site from 16 monitoring wells and 7 surface locations in compliance with the December 2008 *Groundwater Compliance Action Plan for the New Rifle, Colorado, Processing Site* (LMS/RFN/S01920).

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

The surface water locations were sampled to monitor the impact of groundwater discharge. COC concentrations at Colorado River surface water locations downgradient of the site (0324 and 0326) remained low and consistent with historical results, as shown in the time-concentration graphs, which indicate no impacts from groundwater discharge to the river. In many cases, elevated COC concentrations at the New Rifle site pond locations were observed, as shown in the time-versus concentration graphs. As noted in the GCAP, this indicates impacts from groundwater discharge to the ponds.

Old Rifle Site

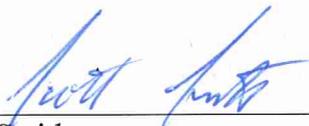
Samples were collected at the Old Rifle site from eight monitoring wells and five surface locations in compliance with the December 2001 *Groundwater Compliance Action Plan for the Old Rifle, Colorado, UMTRA Project Site* (GJO-2000-177-TAR).

Analytes measured at the Old Rifle site included COCs (selenium, uranium, and vanadium), major cations, and major anions. Field measurements of total alkalinity, oxidation-reduction

potential, pH, specific conductance, turbidity, temperature, were made at each location, and the water level was measured at each sampled well.

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

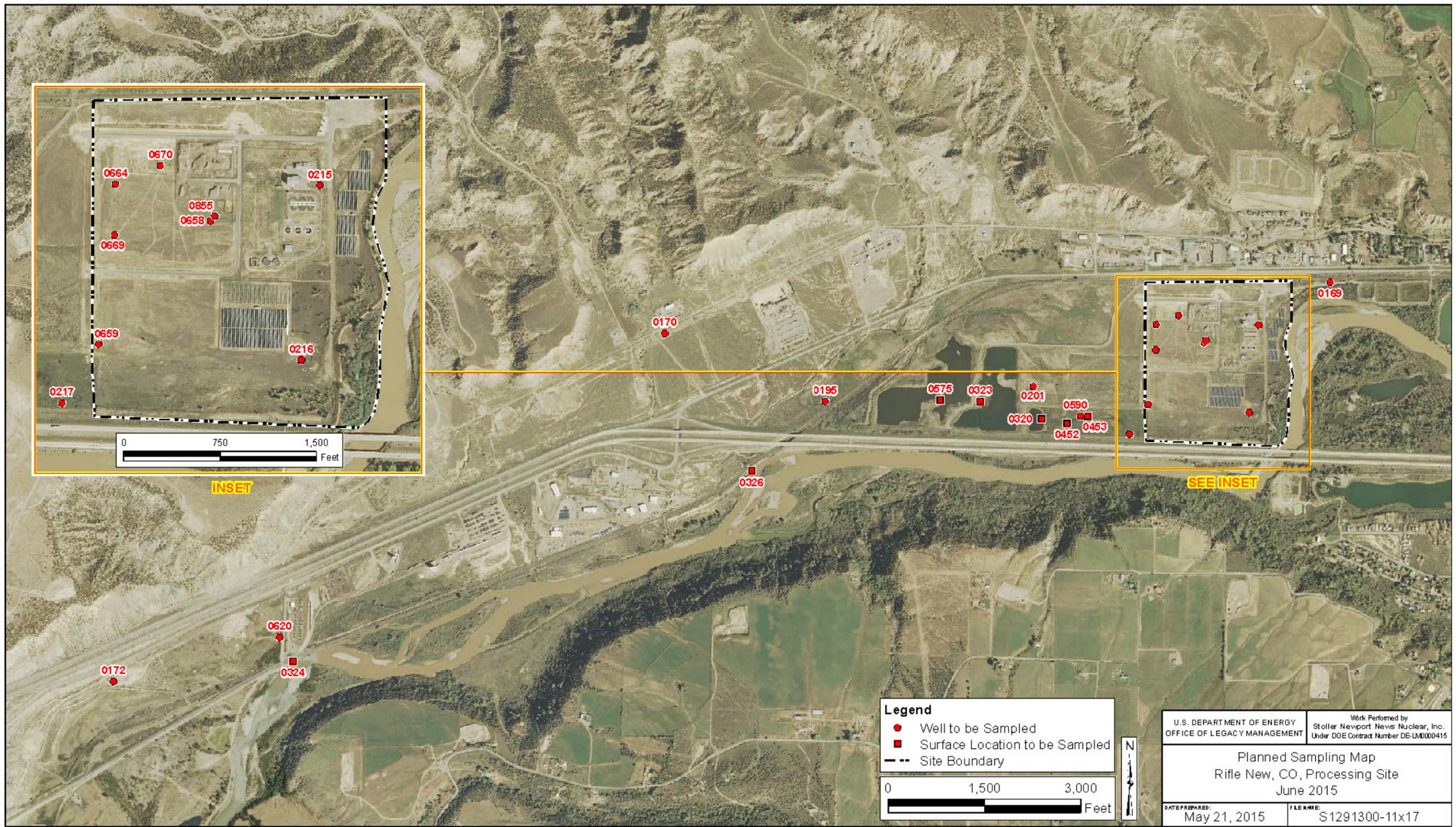
The surface water locations were sampled to monitor the impact of groundwater discharge at Colorado River surface water locations adjacent to (0396) and downgradient of the site (0741). COC concentrations remain low and consistent with historical concentrations as shown in the time-concentration graphs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



Scott Smith
Navarro Research and Engineering, Inc.

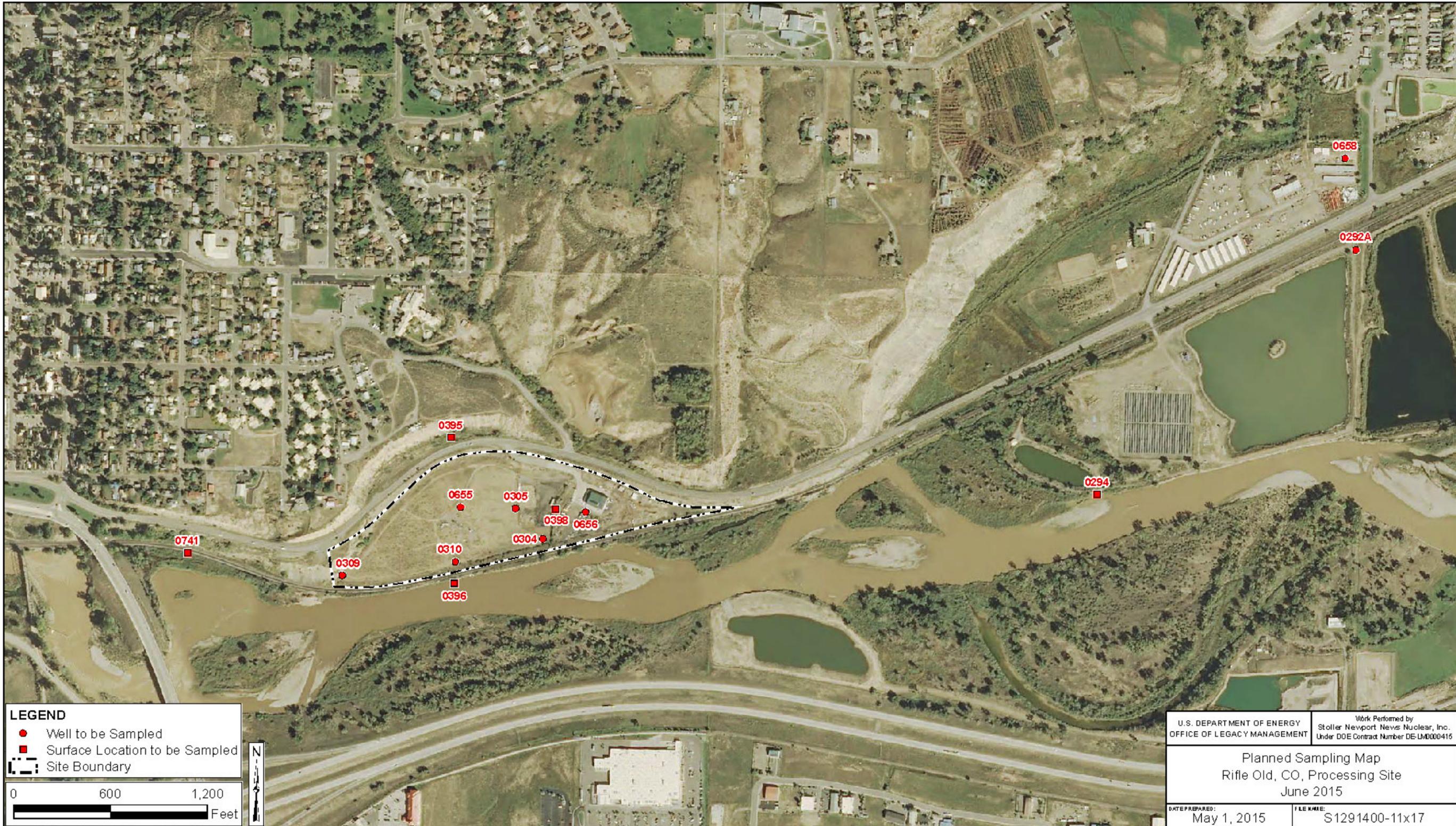
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New Rifle, Colorado, Processing Site, Planned Sampling Map



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Old Rifle, Colorado, Processing Site, Planned Sampling Map

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Rifle, Colorado	Date(s) of Water Sampling	Jun 9, 10, and 18, 2015 Jul 17 and 20, 2015
Date(s) of Verification	September 23, 2015	Name of Verifier	Stephen Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List any Program Directives or other documents, SOPs, instructions.	Yes	Work Order letter dated May 26, 2015.
2. Were the sampling locations specified in the planning documents sampled?	Yes	An additional sample was collected from New Rifle monitoring well 0609.
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed June 8 and July 15, 2015.
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	Yes	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well: Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicate samples were collected from New Rifle locations 0216 and 0855, and Old Rifle location 0304.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	Yes	One equipment blank was collected.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN): 15067100
 Sample Event: June 9–11, 2015
 Site(s): New Rifle Processing Site, Colorado
 Laboratory: ALS Laboratory Group, Fort Collins, Colorado
 Work Order No.: 1506419
 Analysis: Metals and Wet Chemistry
 Validator: Stephen Donovan
 Review Date: September 21, 2015

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), “Standard Practice for Validation of Environmental Data.” The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

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

Data Qualifier Summary

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

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1506419-1	0169	Arsenic	U	Less than 5 times the calibration blank
1506419-1	0169	Selenium	J	PQL check result
1506419-1	0169	Vanadium	U	Less than 5 times the calibration blank
1506419-2	0170	Arsenic	U	Less than 5 times the calibration blank
1506419-2	0170	Vanadium	U	Less than 5 times the calibration blank
1506419-3	0172	Selenium	U	Less than 5 times the calibration blank
1506419-3	0172	Vanadium	U	Less than 5 times the calibration blank
1506419-4	0201	Arsenic	U	Less than 5 times the calibration blank

Table 2 (continued). Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1506419-4	0201	Vanadium	U	Less than 5 times the calibration blank
1506419-5	0215	Arsenic	U	Less than 5 times the calibration blank
1506419-5	0215	Vanadium	U	Less than 5 times the calibration blank
1506419-8	0323	Vanadium	U	Less than 5 times the calibration blank
1506419-9	0324	Arsenic	U	Less than 5 times the calibration blank
1506419-9	0324	Vanadium	U	Less than 5 times the calibration blank
1506419-10	0326	Arsenic	U	Less than 5 times the calibration blank
1506419-10	0326	Vanadium	U	Less than 5 times the calibration blank
1506419-13	0575	Selenium	U	Less than 5 times the calibration blank
1506419-14	0590	Arsenic	U	Less than 5 times the calibration blank
1506419-15	0620	Arsenic	U	Less than 5 times the calibration blank
1506419-15	0620	Vanadium	U	Less than 5 times the calibration blank
1506419-20	0670	Arsenic	J	Laboratory duplicate result
1506419-20	0670	Selenium	J	Serial dilution result

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 22 water samples on June 23, 2015, accompanied a Chain of Custody form. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The receiving documentation included copies of the air bills. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 3.0 °C, which complies with requirements. All samples were analyzed within the applicable holding times. All samples were received in the correct container types and had been preserved correctly for the requested analyses.

Detection and Quantitation Limits

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

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes.

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

Method EPA 350.1 Ammonia as N

Calibrations for ammonia as N were performed using six calibration standards on June 24, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

Method EPA 353.2 Nitrate + Nitrite as N

Calibrations for nitrate + nitrite as N were performed using seven calibration standards on June 24, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

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

Calibrations were performed on June 26, 2015, using three calibration standards. The correlation coefficient values were greater than 0.995. The absolute values of some intercepts were greater than 3 times the MDL. These intercepts were less than 3 times the reporting limits and all field results were above the reporting limits. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

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

Calibrations were performed on June 29, 2015, 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 or only slightly above 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range with the exception of selenium and uranium. The associated sample results less than 5 times the PQL are qualified with a “J” flag as estimated values. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056 Chloride, Sulfate

Calibrations for chloride and sulfate were performed using six calibration standards on June 16, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing

calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

Method 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 interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

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

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. All replicate results met these criteria, demonstrating acceptable precision, with the exception of the arsenic duplicate result for sample 0670. The associated sample result is qualified with a “J” flag as an estimated value.

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 with the exception of a serial dilution for selenium at location 0670. Because of the possible reduced accuracy due to matrix interference, the associated result is qualified with a “J” flag as an estimated value.

Completeness

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

Electronic Data Deliverable (EDD) File

The original EDD file arrived on July 1, 2015, and the revised file with corrected sulfate results on September 16, 2015. The Sample Management System EDD validation module was used to verify that the EDD files were complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter (meq/L). Table 3 shows the total anion and cation results in samples from this event (using the field measurements of alkalinity) and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference less than or equal to 10 percent is considered acceptable.

Table 3. Comparison of Major Anions and Cations

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0169	25.55	24.93	1.24
0170	35.33	30.29	7.68
0172	154.00	383.18	2.04 (42.66)
0201	48.89	47.27	1.68
0215	13.36	13.55	0.70
0217	44.12	42.16	2.27
0320	45.82	40.13	6.61
0323	76.65	79.40	1.76
0324	2.62	2.60	0.36
0326	2.57	2.45	2.39
0452	56.91	52.80	3.74
0453	43.97	44.11	0.15
0575	91.39	94.95	1.91
0590	60.66	60.57	0.07
0620	79.52	82.45	1.81
0658	31.98	30.76	1.95
0659	44.35	44.86	0.57
0664	24.77	24.63	0.28
0669	34.90	34.12	1.13
0670	24.55	24.68	0.27
0855	25.18	23.58	3.29

The charge balance value for all locations was less than 10 percent with the following exception. The charge balance for location 0172 was originally 43 percent erroneously high because of the reported sulfate concentration. The sulfate result for this location was also identified as an outlier (below). The sulfate analysis of the sample from that location was repeated resulting in an acceptable balance (2.04 percent).

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 15067100 Lab Code: PAR Validator: Stephen Donovan Validation Date: 08/25/2015
Project: Rifle Disposal/Processing Site (old/new) Analysis Type: Metals General Chem Rad Organics
of Samples: 22 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 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM
Metals Data Validation Worksheet

RIN: 15067100 Lab Code: PAR Date Due: 07/21/2015
 Matrix: Water Site Code: RFL01 Date Completed: 07/02/2015

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Arsenic	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK	OK	105.0	101.0	105.0	4.0	104.0		121.0
Arsenic	ICP/MS	06/29/2015					OK	112.0	111.0	106.0	4.0	104.0		121.0
Calcium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	103.0	102.0	100.0	0.0	100.0	1.0	116.0
Calcium	ICP/ES	06/26/2015					OK	102.0	101.0	111.0	2.0	99.0	3.0	
Magnesium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	100.0	116.0	113.0	1.0	104.0	4.0	105.0
Magnesium	ICP/ES	06/26/2015					OK	98.0	102.0	114.0	4.0	108.0	5.0	
Molybdenum	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK	OK	101.0	105.0	104.0	1.0	103.0	7.0	87.0
Molybdenum	ICP/MS	06/29/2015					OK	109.0	102.0	96.0	2.0	103.0		87.0
Potassium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	102.0	106.0	102.0	3.0		9.0	89.0
Potassium	ICP/ES	06/26/2015					OK	101.0	101.0	102.0	1.0		5.0	
Selenium	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK	OK	114.0	116.0	103.0	12.0	98.0	13.0	64.0
Selenium	ICP/MS	06/29/2015					OK	115.0	97.0	87.0	2.0	98.0		64.0
Sodium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	102.0			2.0		1.0	95.0
Sodium	ICP/ES	06/26/2015					OK	100.0			4.0		2.0	
Uranium	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK	OK	100.0	87.0	92.0	1.0	103.0	7.0	180.0
Uranium	ICP/MS	06/29/2015					OK	110.0	104.0	109.0	0.0	103.0	5.0	180.0
Vanadium	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK	OK	100.0	104.0	105.0	1.0	101.0	9.0	85.0
Vanadium	ICP/MS	06/29/2015					OK	110.0			2.0	101.0		85.0

SAMPLE MANAGEMENT SYSTEM
Wet Chemistry Data Validation Worksheet

RIN: 15067100 **Lab Code:** PAR **Date Due:** 07/21/2015
Matrix: Water **Site Code:** RFL01 **Date Completed:** 07/02/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
AMMONIA AS N	06/24/2015	0.000	1.0000	OK	OK	OK	99.00	98.0	99.0	0	
AMMONIA AS N	06/24/2015					OK	99.00	76.0	77.0	0	
CHLORIDE	06/24/2015	0.000	1.0000	OK	OK	OK	100.00				
CHLORIDE	06/25/2015					OK	101.00	98.0	97.0	1.00	
Nitrate+Nitrite as N	06/24/2015	0.000	1.0000	OK	OK	OK	105.00	106.0	110.0	3.00	
Nitrate+Nitrite as N	06/24/2015					OK	110.00	110.0	107.0	1.00	
SULFATE	06/24/2015	0.000	1.0000	OK	OK	OK	97.00	104.0	102.0	1.00	
SULFATE	06/25/2015					OK	99.00	100.0	100.0	0	

General Information

Report Number (RIN): 15067101
Sample Event: June 9–18, 2015
Site(s): Old Rifle Processing Site, Colorado
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1506420
Analysis: Metals and Wet Chemistry
Validator: Stephen Donivan
Review Date: August 25, 2015

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), “Standard Practice for Validation of Environmental Data.” The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 4.

Table 4. Analytes and Methods

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

Data Qualifier Summary

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

Table 5. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1506420-2	0294	Alkalinity	J	Erroneously low result
1506420-15	Equipment Blank	Vanadium	U	Less than 5 times the calibration blank

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 15 water samples on June 23, 2015, accompanied a Chain of Custody form. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The receiving documentation

included copies of the air bills. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 3.0 °C, which complies with requirements. All samples were analyzed within the applicable holding times. All samples were received in the correct container types and had been preserved correctly for the requested analyses with the following exception. The anions and metals bottles from location 0655 were incorrectly labeled with the labels switched. No data qualification or further corrective action is required.

Detection and Quantitation Limits

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

Laboratory Instrument Calibration

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

Method EPA 353.2 Nitrate + Nitrite as N

Calibrations for nitrate + nitrite as N were performed using seven calibration standards on June 24, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

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

Calibrations were performed on June 26, 2015, using three calibration standards. The correlation coefficient values were greater than 0.995. The absolute values of some intercepts were greater than 3 times the MDL. These intercepts were less than 3 times the reporting limits and all field results were above the reporting limits. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

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

Calibrations were performed on June 29-30, 2015, 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 or only slightly above 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range with the exception of uranium. The associated sample results are greater than 5 times the PQL, requiring no qualification. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056 Chloride, Sulfate

Calibrations for chloride and sulfate were performed using six calibration standards on June 16, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

Method 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 interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

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

Laboratory Replicate Analysis

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

Laboratory Control Sample

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

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable.

Completeness

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

Electronic Data Deliverable (EDD) File

The EDD file arrived on July 1, 2015. 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.

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter (meq/L). Table 6 shows the total anion and cation results in samples from this event (using the field measurements of alkalinity) and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference less than or equal to 10 percent is considered acceptable.

Table 6. Comparison of Major Anions and Cations

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0292A	27.28	26.43	1.57
0294	3.04	1.95	21.86
0304	18.99	32.38	1.76
0305	21.82	20.82	2.35
0309	28.14	27.36	1.40
0310	31.62	29.84	2.89
0395	NA	NA	NA
0396	2.21	1.92	7.10
0398	13.86	12.98	3.30
0655	31.47	32.32	1.34

Table 6 (continued). Comparison of Major Anions and Cations

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0656	28.34	26.88	2.64
0658	21.55	20.06	3.58
0741	2.21	2.00	5.06

The charge balance value for all locations was less than 10 percent with the following exception. The charge balance for location 0294 is 22 percent, likely due to a reported alkalinity value of 38 mg/L, below the previous historic low value of 62 mg/L. The alkalinity result for this location is qualified with a “J” flag as an estimated value.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 15067101 Lab Code: PAR Validator: Stephen Donovan Validation Date: 08/25/2015
Project: Rifle Disposal/Processing Site (old/new) Analysis Type: Metals General Chem Rad Organics
of Samples: 15 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 was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM
Metals Data Validation Worksheet

RIN: 15067101 Lab Code: PAR Date Due: 07/21/2015
 Matrix: Water Site Code: RFL01 Date Completed: 07/02/2015

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Calcium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	102.0	101.0	103.0	0.0	100.0	3.0	116.0
Magnesium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	98.0	103.0	113.0	3.0	104.0	6.0	105.0
Potassium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	101.0	104.0	102.0	1.0		4.0	89.0
Selenium	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK		115.0				98.0		82.0
Selenium	ICP/MS	06/30/2015	0.0000	1.0000	OK	OK			119.0	115.0	3.0	100.0		75.0
Sodium	ICP/ES	06/26/2015	0.0000	1.0000	OK	OK	OK	100.0	83.0	110.0	4.0		0.0	95.0
Uranium	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK		110.0	104.0	94.0	2.0	103.0	6.0	180.0
Vanadium	ICP/MS	06/29/2015	0.0000	1.0000	OK	OK		110.0	104.0	104.0	0.0	101.0		85.0

SAMPLE MANAGEMENT SYSTEM
Wet Chemistry Data Validation Worksheet

RIN: 15067101 **Lab Code:** PAR **Date Due:** 07/21/2015
Matrix: Water **Site Code:** RFL01 **Date Completed:** 07/02/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
CHLORIDE	06/24/2015	0.000	1.0000	OK	OK	OK	100.00				
Nitrate+Nitrite as N	06/24/2015	0.000	1.0000	OK	OK	OK	109.00	113.0	112.0	0	
SULFATE	06/24/2015	0.000	1.0000	OK	OK	OK	97.00	103.0			
SULFATE	06/25/2015								103.0	0	

General Information

Report Number (RIN): 15077206
Sample Event: July 17–20, 2015
Site(s): New Rifle Processing Site, Colorado
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1507393
Analysis: Metals and Wet Chemistry
Validator: Stephen Donivan
Review Date: August 25, 2015

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 7.

Table 7. Analytes and Methods

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

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received four water samples on July 22, 2015, accompanied a Chain of Custody form. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The receiving documentation included copies of the air bills. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 2.2 °C, which complies with requirements. All samples were analyzed within the applicable holding times. All samples were received in the correct container types and had been preserved correctly for the requested analyses.

Detection and Quantitation Limits

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

Laboratory Instrument Calibration

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

Method EPA 350.1 Ammonia as N

Calibrations for ammonia as N were performed using six calibration standards on July 29, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

Method EPA 353.2 Nitrite + Nitrate as N

Calibrations for nitrate + nitrite as N were performed using seven calibration standards on July 28, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

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

Calibrations were performed on July 25, 2015, using three calibration standards. The correlation coefficient values were greater than 0.995. The absolute values of some intercepts were greater than 3 times the MDL. These intercepts were less than 3 times the reporting limits and all field results were above the reporting limits. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

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

Calibrations were performed on July 24, 2015, 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 or only slightly above 3 times the MDL. Initial and continuing

calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056 Chloride, Sulfate

Calibrations for chloride and sulfate were performed using six calibration standards on July 10, 2015. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

Method 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 interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

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

Laboratory Replicate Analysis

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

Laboratory Control Sample

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

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable.

Completeness

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

Electronic Data Deliverable (EDD) File

The EDD file arrived on July 21, 2015. 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.

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter (meq/L). Table 8 shows the total anion and cation results in samples from this event (using the field measurements of alkalinity) and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference less than or equal to 10 percent is considered acceptable.

Table 8. Comparison of Major Anions and Cations

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0195	15.41	15.87	1.5
0216	8.83	9.16	1.8
0609	11.95	13.13	4.7

The charge balance value for all locations was less than 10 percent.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 15077206 Lab Code: PAR Validator: Stephen Donovan Validation Date: 08/25/2015
Project: Rifle Disposal/Processing Site (old/new) Analysis Type: Metals General Chem Rad Organics
of Samples: 4 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 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM
Metals Data Validation Worksheet

RIN: 15077206 Lab Code: PAR Date Due: 08/19/2015
 Matrix: Water Site Code: RFL01 Date Completed: 08/03/2015

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Arsenic	ICP/MS	07/24/2015	0.0000	1.0000	OK	OK	OK	101.0	102.0	104.0	2.0	101.0		82.0
Calcium	ICP/ES	07/25/2015	0.0000	1.0000	OK	OK	OK	103.0	98.0	98.0	0.0	99.0	2.0	97.0
Magnesium	ICP/ES	07/25/2015	0.0000	1.0000	OK	OK	OK	99.0	102.0	103.0	0.0	104.0	2.0	88.0
Molybdenum	ICP/MS	07/24/2015	0.0000	1.0000	OK	OK	OK	98.0	99.0	104.0	4.0	104.0		108.0
Potassium	ICP/ES	07/25/2015	0.0000	1.0000	OK	OK	OK	103.0	105.0	106.0	0.0		5.0	92.0
Selenium	ICP/MS	07/24/2015	0.0000	1.0000	OK	OK	OK	111.0	104.0	101.0	2.0	105.0		81.0
Sodium	ICP/ES	07/25/2015	0.0000	1.0000	OK	OK	OK	104.0	97.0	110.0	3.0		0.0	97.0
Uranium	ICP/MS	07/24/2015	0.0000	1.0000	OK	OK	OK	103.0	103.0	107.0	1.0	102.0	4.0	85.0
Vanadium	ICP/MS	07/24/2015	0.0000	1.0000	OK	OK	OK	96.0	97.0	99.0	2.0	99.0		98.0

SAMPLE MANAGEMENT SYSTEM
Wet Chemistry Data Validation Worksheet

RIN: 15077206 **Lab Code:** PAR **Date Due:** 08/19/2015
Matrix: Water **Site Code:** RFL01 **Date Completed:** 08/03/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
AMMONIA AS N	07/29/2015	0.000	1.0000	OK	OK	OK	107.00	104.0	104.0	0	
CHLORIDE	07/23/2015	0.000	1.0000	OK	OK	OK	102.00	94.0	92.0	1.00	
Nitrate+Nitrite as N	07/28/2015	0.000	1.0000	OK	OK	OK	100.00	108.0	108.0	0	
SULFATE	07/23/2015	0.000	1.0000	OK	OK	OK	99.00	102.0	102.0	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 met the Category I low-flow sampling criteria and were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method.

Equipment Blank Assessment

An equipment blank (field ID 2741) was collected after decontamination of the tubing reel used to collect some of the surface water samples. Calcium, magnesium, potassium, sodium, and uranium were detected in the equipment blank at concentrations below the applicable PQLs. All associated sample results were greater than 5 times the equipment blank, requiring no qualification.

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 RFN01-0216, RFN01-0855, and RFO01-0314. 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 with the following exception. The sulfate duplicate results for RFO01-0314 did not meet the acceptance criteria, with a relative percent difference (RPD) of 78 percent. The sulfate samples for this location were reanalyzed with acceptable results.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 15067100 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 08/25/2015

Duplicate: 2548

Sample: 0855

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIA AS N	24			10	24			25	0		MG/L
Arsenic	240			10	230			10	4.26		UG/L
Calcium	230000			5	220000			5	4.44		UG/L
CHLORIDE	130			20	130			20	0		MG/L
Magnesium	37000			5	36000			5	2.74		UG/L
Molybdenum	550			10	530			10	3.70		UG/L
Nitrate+Nitrite as N	5.6			20	5.5			25	1.80		MG/L
Potassium	9600			5	9300			5	3.17		UG/L
Selenium	870			10	820			10	5.92		UG/L
Sodium	200000			5	200000			5	0		UG/L
SULFATE	670			20	670			20	0		MG/L
Uranium	46			10	45			10	2.20		UG/L
Vanadium	13000			100	12000			100	8.00		UG/L

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 15067101 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 09/21/2015

Duplicate: 2551

Sample: 0304

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Calcium	160000			5	160000			1	0		UG/L
CHLORIDE	160			20	160			20	0		MG/L
Magnesium	58000			5	61000			1	5.04		UG/L
Nitrate+Nitrite as N	0.01	U		1	0.01	U		1			MG/L
Potassium	5900			5	6200			1	4.96		UG/L
Selenium	0.41	J		10	1.3			10			UG/L
Sodium	140000			5	150000			1	6.90		UG/L
SULFATE	490			20	500			20	2.0 (78)		MG/L
Uranium	42			10	41			10	2.41		UG/L
Vanadium	25			10	23			10	8.33		UG/L

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 15077206 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 08/25/2015

Duplicate: 2548

Sample: 0216

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIA AS N	5.3			2	8.8			10	NA		MG/L
Arsenic	18			10	20			10	10.53		UG/L
Calcium	73000			1	75000			1	2.70		UG/L
CHLORIDE	140			10	140			10	0		MG/L
Magnesium	15000			1	15000			1	0		UG/L
Molybdenum	33			10	34			10	2.99		UG/L
Nitrate+Nitrite as N	0.016			1	0.022			1			MG/L
Potassium	6400			1	6400			1	0		UG/L
Selenium	0.32	U		10	0.32	U		10			UG/L
Sodium	86000			1	85000			1	1.17		UG/L
SULFATE	100			10	100			10	0		MG/L
Uranium	11			10	11			10	0		UG/L
Vanadium	130			10	140			10	7.41		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 15067101 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 08/25/2015

Blank Data							
Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1506420-15	SW6010	Calcium	66	J	24	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1506420-13	NHR 476	0741	25000	1		
1506420-2	NHR 472	0294	34000	1		
1506420-8	NHR 474	0396	25000	1		

Blank Data							
Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1506420-15	SW6010	Magnesium	35	J	30	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1506420-13	NHR 476	0741	4500	1		
1506420-2	NHR 472	0294	6800	1		
1506420-8	NHR 474	0396	4500	1		

Blank Data							
Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1506420-15	SW6010	Potassium	100	J	52	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1506420-13	NHR 476	0741	1100	1		
1506420-2	NHR 472	0294	1700	1		
1506420-8	NHR 474	0396	1100	1		

Blank Data							
Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1506420-15	SW6010	Sodium	120	J	47	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1506420-13	NHR 476	0741	13000	1		
1506420-2	NHR 472	0294	17000	1		
1506420-8	NHR 474	0396	13000	1		

SAMPLE MANAGEMENT SYSTEM

Page 2 of 2

Validation Report: Equipment/Trip Blanks

RIN: 15067101 Lab Code: PAR Project: Rifle Disposal/Processing Site (old/new) Validation Date: 08/25/2015

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1506420-15	SW6020	Uranium	0.06	J	0.029	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1506420-13	NHR 476	0741	0.77	10		
1506420-2	NHR 472	0294	0.97	10		
1506420-8	NHR 474	0396	0.78	10		

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
Stephen Donovan

12-2-2015
Date

Data Validation Lead:

Stephen Donovan
Stephen Donovan

12-2-2015
Date

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Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

There were no potential outliers identified, and the data for this event are acceptable as qualified.

The sulfate result for location RFN01-0172 was initially identified as an outlier. However, the sulfate sample from that location was reanalyzed with an acceptable result of 5,300 mg/L. The data for these sampling events are acceptable as qualified. Potential anomalies in the field parameters were also examined for evidence which would suggest a systematic error due to instrument malfunction. No such data were found. All field data from this event are acceptable.

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Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2005

Laboratory: ALS Laboratory Group

RIN: 15067100

Report Date: 09/23/2015

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
RFN01	0169	N001	06/09/2015	Potassium	4.90		F	7.10		F	5.50		F	5	0	No
RFN01	0170	N001	06/11/2015	Selenium	0.0230		F	0.0200		F	0.00300		F	13	0	No
RFN01	0170	N001	06/11/2015	Sulfate	910		F	1200		F	940		F	5	0	No
RFN01	0172	N001	06/10/2015	Calcium	410		F	500		F	420		F	6	0	No
RFN01	0172	N001	06/10/2015	Chloride	1300		F	3000		F	1400		F	6	0	No
RFN01	0172	N001	06/10/2015	Magnesium	350		F	710		F	380		F	6	0	No
RFN01	0172	N001	06/10/2015	Sodium	2400		F	3600		F	2600		F	6	0	No
RFN01	0172	N001	06/10/2015	Sulfate	16000		F	7900		F	6000		F	6	0	Yes
RFN01	0201	N001	06/09/2015	Magnesium	48.0		F	62.0		F	51.0		F	5	0	No
RFN01	0201	N001	06/09/2015	Nitrate + Nitrite as Nitrogen	22.0		F	110		F	35.0		F	18	0	No
RFN01	0201	N001	06/09/2015	Potassium	9.80		F	19.0		JF	11.0		F	5	0	No
RFN01	0217	N001	06/09/2015	Potassium	15.0		F	24.0		F	17.0		F	5	0	No
RFN01	0320	N001	06/09/2015	Vanadium	0.250			0.240			0.0160		J	14	0	No
RFN01	0323	N001	06/09/2015	Chloride	430			630			480			6	0	No
RFN01	0323	N001	06/09/2015	Magnesium	130			200			150			6	0	No
RFN01	0323	N001	06/09/2015	Nitrate + Nitrite as Nitrogen	27.0			130			30.0			20	0	No
RFN01	0323	N001	06/09/2015	Potassium	53.0			100.0			60.0			6	0	No

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2005

Laboratory: ALS Laboratory Group

RIN: 15067100

Report Date: 09/23/2015

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	0323	N001	06/09/2015	Sodium	800			1200			950			6	0	No
RFN01	0323	N001	06/09/2015	Sulfate	3000			4400			3400			12	0	No
RFN01	0324	0001	06/11/2015	Molybdenum	0.0130			0.00910			0.00120	J		17	0	No
RFN01	0324	0001	06/11/2015	Sulfate	30.0			120			31.0			6	0	No
RFN01	0453	N001	06/09/2015	Selenium	0.0130			0.0827	N		0.0140			10	0	No
RFN01	0575	N001	06/09/2015	Calcium	410			390			210			5	0	No
RFN01	0575	N001	06/09/2015	Molybdenum	1.000			0.820			0.0340			20	0	No
RFN01	0575	N001	06/09/2015	Uranium	0.170			0.120			0.0170			20	0	No
RFN01	0575	N001	06/09/2015	Vanadium	0.00480			0.00340		J	0.00140	B	U	20	2	No
RFN01	0590	N001	06/09/2015	Potassium	22.0		F	43.0		F	27.0		F	5	0	No
RFN01	0590	N001	06/09/2015	Sodium	410		F	530		F	420		F	5	0	No
RFN01	0620	N001	06/11/2015	Sulfate	1800		F	2300		F	1900		F	7	0	No
RFN01	0658	N001	06/09/2015	Ammonia Total as N	34.0		F	130		F	37.0		F	15	0	NA
RFN01	0664	0001	06/10/2015	Molybdenum	0.190		F	0.480		F	0.220		F	19	0	No
RFN01	0669	N001	06/10/2015	Chloride	150		F	140		FQ	120		FQ	5	0	No
RFN01	0669	N001	06/10/2015	Potassium	6.50		F	13.0		JFQ	7.10		FQ	5	0	No
RFN01	0855	N002	06/09/2015	Calcium	220		F	780		FQ	260		F	6	0	No

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2005

Laboratory: ALS Laboratory Group

RIN: 15067100

Report Date: 09/23/2015

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
RFN01	0855	N001	06/09/2015	Calcium	230		F	780		FQ	260		F	6	0	No
RFN01	0855	N002	06/09/2015	Chloride	130		F	220		F	150		F	6	0	No
RFN01	0855	N001	06/09/2015	Chloride	130		F	220		F	150		F	6	0	No
RFN01	0855	N001	06/09/2015	Sulfate	670		F	1500		FQ	700		F	6	0	No
RFN01	0855	N002	06/09/2015	Sulfate	670		F	1500		FQ	700		F	6	0	No

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2005

Laboratory: ALS Laboratory Group

RIN: 15067101

Report Date: 09/23/2015

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
RFO01	0292A	N001	06/09/2015	Calcium	170		F	160		F	130		F	13	0	No
RFO01	0292A	N001	06/09/2015	Magnesium	100.0		F	97.0		F	78.0		F	13	0	No
RFO01	0294	0001	06/09/2015	Chloride	19.0			250			20.0			12	0	No
RFO01	0294	0001	06/09/2015	Vanadium	0.00450			0.00300	U		0.0003			21	3	NA
RFO01	0304	N001	06/09/2015	Selenium	0.00041	J	F	0.00940		F	0.001	UN	F	29	1	No
RFO01	0305	N001	06/09/2015	Selenium	0.0150		F	0.0510		F	0.0160		F	28	0	No
RFO01	0305	N001	06/09/2015	Vanadium	0.140		F	0.713		F	0.220		F	28	0	No
RFO01	0309	N001	06/09/2015	Potassium	6.00		F	9.80		FJ	6.49		F	12	0	No
RFO01	0395	N001	06/09/2015	Sulfate	260			580			290			12	0	No
RFO01	0395	N001	06/09/2015	Uranium	0.0190			0.0420			0.0200			16	0	No
RFO01	0396	0001	06/18/2015	Calcium	25.0			66.0			29.0			12	0	No
RFO01	0396	0001	06/18/2015	Chloride	16.0			180			20.0			12	0	No
RFO01	0396	0001	06/18/2015	Magnesium	4.50			14.0			5.60			12	0	No
RFO01	0396	0001	06/18/2015	Sodium	13.0			110			15.0			12	0	No
RFO01	0396	0001	06/18/2015	Sulfate	25.0			110			29.0			12	0	No
RFO01	0396	0001	06/18/2015	Uranium	0.00078			0.00280			0.0008			26	0	No
RFO01	0398	N001	06/09/2015	Nitrate + Nitrite as Nitrogen	0.150			1.30			0.220			11	0	No

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2005

Laboratory: ALS Laboratory Group

RIN: 15067101

Report Date: 09/23/2015

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	0398	N001	06/09/2015	Uranium	0.0110			0.0380			0.0120			26	0	NA
RFO01	0656	N001	06/09/2015	Sodium	280		F	270		F	150		F	13	0	No
RFO01	0658	N001	06/09/2015	Magnesium	110		F	100.0		F	75.9		F	15	0	No
RFO01	0658	N001	06/09/2015	Potassium	2.70		F	4.90		FJ	2.77		F	15	0	No
RFO01	0658	N001	06/09/2015	Sulfate	590		F	560		F	350		F	15	0	No
RFO01	0741	0001	06/18/2015	Calcium	25.0			66.0			31.0			13	0	NA
RFO01	0741	0001	06/18/2015	Magnesium	4.50			14.0			5.60			13	0	NA
RFO01	0741	0001	06/18/2015	Sodium	13.0			110			15.0			12	0	No
RFO01	0741	0001	06/18/2015	Sulfate	25.0			110			31.0			12	0	No

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2005

Laboratory: ALS Laboratory Group

RIN: 15077206

Report Date: 09/23/2015

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	0195	0001	07/20/2015	Molybdenum	0.0130		F	0.390		FQ	0.0140		F	14	0	No
RFN01	0216	N002	07/17/2015	Ammonia Total as N	8.80		F	8.70		F	4.50		F	18	0	NA
RFN01	0216	N001	07/17/2015	Arsenic	0.0180		F	0.0440		F	0.0190		F	17	0	No
RFN01	0216	N001	07/17/2015	Sulfate	100.0		F	210		F	110		F	6	0	No
RFN01	0216	N002	07/17/2015	Sulfate	100.0		F	210		F	110		F	6	0	No
RFN01	0216	N001	07/17/2015	Vanadium	0.130		F	0.970		F	0.140		F	18	0	NA

STATISTICAL TESTS:

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

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

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

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

NA: Data are not normally or lognormally distributed.

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: 09/23/2015

Location: 0169 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	3.13 - 18.13	488		F #		
Ammonia Total as N	mg/L	06/09/2015	N001	3.13 - 18.13	0.1	U	F #	0.1	
Arsenic	mg/L	06/09/2015	N001	3.13 - 18.13	0.0011		UF #	0.00015	
Calcium	mg/L	06/09/2015	N001	3.13 - 18.13	180		F #	0.024	
Chloride	mg/L	06/09/2015	N001	3.13 - 18.13	65		F #	4	
Magnesium	mg/L	06/09/2015	N001	3.13 - 18.13	110		F #	0.03	
Molybdenum	mg/L	06/09/2015	N001	3.13 - 18.13	0.0031		F #	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	3.13 - 18.13	0.14		F #	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	3.13 - 18.13	154.4		F #		
pH	s.u.	06/09/2015	N001	3.13 - 18.13	6.97		F #		
Potassium	mg/L	06/09/2015	N001	3.13 - 18.13	4.9		F #	0.052	
Selenium	mg/L	06/09/2015	N001	3.13 - 18.13	0.0042		FJ #	0.00032	
Sodium	mg/L	06/09/2015	N001	3.13 - 18.13	170		F #	0.047	
Specific Conductance	umhos /cm	06/09/2015	N001	3.13 - 18.13	2082		F #		
Sulfate	mg/L	06/09/2015	N001	3.13 - 18.13	640		F #	10	
Temperature	C	06/09/2015	N001	3.13 - 18.13	14.37		F #		
Turbidity	NTU	06/09/2015	N001	3.13 - 18.13	0.85		F #		
Uranium	mg/L	06/09/2015	N001	3.13 - 18.13	0.023		F #	0.000029	
Vanadium	mg/L	06/09/2015	N001	3.13 - 18.13	0.0019	J	UF #	0.00015	

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

REPORT DATE: 09/23/2015

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

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/11/2015	N001	92.23 - 112.23	320	F	#		
Ammonia Total as N	mg/L	06/11/2015	N001	92.23 - 112.23	0.6	F	#	0.1	
Arsenic	mg/L	06/11/2015	N001	92.23 - 112.23	0.00047	J	UF	#	0.00015
Calcium	mg/L	06/11/2015	N001	92.23 - 112.23	160	F	#	0.12	
Chloride	mg/L	06/11/2015	N001	92.23 - 112.23	150	F	#	5	
Magnesium	mg/L	06/11/2015	N001	92.23 - 112.23	87	F	#	0.15	
Molybdenum	mg/L	06/11/2015	N001	92.23 - 112.23	0.0034	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/11/2015	N001	92.23 - 112.23	10	F	#	0.1	
Oxidation Reduction Potential	mV	06/11/2015	N001	92.23 - 112.23	211.2	F	#		
pH	s.u.	06/11/2015	N001	92.23 - 112.23	6.99	F	#		
Potassium	mg/L	06/11/2015	N001	92.23 - 112.23	5.6	F	#	0.26	
Selenium	mg/L	06/11/2015	N001	92.23 - 112.23	0.023	F	#	0.00032	
Sodium	mg/L	06/11/2015	N001	92.23 - 112.23	460	F	#	0.23	
Specific Conductance	umhos/cm	06/11/2015	N001	92.23 - 112.23	3088	F	#		
Sulfate	mg/L	06/11/2015	N001	92.23 - 112.23	910	F	#	12	
Temperature	C	06/11/2015	N001	92.23 - 112.23	14.97	F	#		
Turbidity	NTU	06/11/2015	N001	92.23 - 112.23	3.25	F	#		
Uranium	mg/L	06/11/2015	N001	92.23 - 112.23	0.059	F	#	0.000029	
Vanadium	mg/L	06/11/2015	N001	92.23 - 112.23	0.0015	J	UF	#	0.00015

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

REPORT DATE: 09/23/2015

Location: 0172 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2015	N001	6.98 - 31.98	669		F #		
Ammonia Total as N	mg/L	06/10/2015	N001	6.98 - 31.98	0.1	U	F #	0.1	
Arsenic	mg/L	06/10/2015	N001	6.98 - 31.98	0.0077		F #	0.00015	
Calcium	mg/L	06/10/2015	N001	6.98 - 31.98	410		F #	0.024	
Chloride	mg/L	06/10/2015	N001	6.98 - 31.98	1300		F #	40	
Magnesium	mg/L	06/10/2015	N001	6.98 - 31.98	350		F #	0.03	
Molybdenum	mg/L	06/10/2015	N001	6.98 - 31.98	0.008		F #	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2015	N001	6.98 - 31.98	0.01		F #	0.01	
Oxidation Reduction Potential	mV	06/10/2015	N001	6.98 - 31.98	-62.1		F #		
pH	s.u.	06/10/2015	N001	6.98 - 31.98	7.09		F #		
Potassium	mg/L	06/10/2015	N001	6.98 - 31.98	14		F #	0.052	
Selenium	mg/L	06/10/2015	N001	6.98 - 31.98	0.00048	J	UF #	0.00032	
Sodium	mg/L	06/10/2015	N001	6.98 - 31.98	2400		F #	0.47	
Specific Conductance	umhos /cm	06/10/2015	N001	6.98 - 31.98	12558		F #		
Sulfate	mg/L	06/10/2015	N001	6.98 - 31.98	5300		F #	100	
Temperature	C	06/10/2015	N001	6.98 - 31.98	14.14		F #		
Turbidity	NTU	06/10/2015	N001	6.98 - 31.98	2.42		F #		
Uranium	mg/L	06/10/2015	N001	6.98 - 31.98	0.049		F #	0.000029	
Vanadium	mg/L	06/10/2015	N001	6.98 - 31.98	0.00092	J	UF #	0.00015	

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

REPORT DATE: 09/23/2015

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

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	07/20/2015	0001	5.29 - 25.29	515		F #		
Ammonia Total as N	mg/L	07/20/2015	0001	5.29 - 25.29	0.1	U	F #	0.1	
Arsenic	mg/L	07/20/2015	0001	5.29 - 25.29	0.0011		F #	0.00015	
Calcium	mg/L	07/20/2015	0001	5.29 - 25.29	120		F #	0.024	
Chloride	mg/L	07/20/2015	0001	5.29 - 25.29	34		F #	2	
Magnesium	mg/L	07/20/2015	0001	5.29 - 25.29	49		F #	0.03	
Molybdenum	mg/L	07/20/2015	0001	5.29 - 25.29	0.013		F #	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	07/20/2015	0001	5.29 - 25.29	0.01	U	F #	0.01	
Oxidation Reduction Potential	mV	07/20/2015	N001	5.29 - 25.29	-26		F #		
pH	s.u.	07/20/2015	N001	5.29 - 25.29	7.05		F #		
Potassium	mg/L	07/20/2015	0001	5.29 - 25.29	7.8		F #	0.052	
Selenium	mg/L	07/20/2015	0001	5.29 - 25.29	0.00034	J	F #	0.00032	
Sodium	mg/L	07/20/2015	0001	5.29 - 25.29	130		F #	0.047	
Specific Conductance	umhos /cm	07/20/2015	N001	5.29 - 25.29	1359		F #		
Sulfate	mg/L	07/20/2015	0001	5.29 - 25.29	200		F #	5	
Temperature	C	07/20/2015	N001	5.29 - 25.29	21.99		F #		
Turbidity	NTU	07/20/2015	N001	5.29 - 25.29	14.7		F #		
Uranium	mg/L	07/20/2015	0001	5.29 - 25.29	0.022		F #	0.000029	
Vanadium	mg/L	07/20/2015	0001	5.29 - 25.29	0.00034	J	F #	0.00015	

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

REPORT DATE: 09/23/2015

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

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	7.35 - 22.35	247	F	#		
Ammonia Total as N	mg/L	06/09/2015	N001	7.35 - 22.35	69	F	#	5	
Arsenic	mg/L	06/09/2015	N001	7.35 - 22.35	0.00099	J	UF	#	0.00015
Calcium	mg/L	06/09/2015	N001	7.35 - 22.35	570	F	#	0.12	
Chloride	mg/L	06/09/2015	N001	7.35 - 22.35	190	F	#	10	
Magnesium	mg/L	06/09/2015	N001	7.35 - 22.35	48	F	#	0.15	
Molybdenum	mg/L	06/09/2015	N001	7.35 - 22.35	1.6	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	7.35 - 22.35	22	F	#	0.25	
Oxidation Reduction Potential	mV	06/09/2015	N001	7.35 - 22.35	147.5	F	#		
pH	s.u.	06/09/2015	N001	7.35 - 22.35	6.82	F	#		
Potassium	mg/L	06/09/2015	N001	7.35 - 22.35	9.8	F	#	0.26	
Selenium	mg/L	06/09/2015	N001	7.35 - 22.35	0.024	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	7.35 - 22.35	260	F	#	0.23	
Specific Conductance	umhos /cm	06/09/2015	N001	7.35 - 22.35	3950	F	#		
Sulfate	mg/L	06/09/2015	N001	7.35 - 22.35	1700	F	#	25	
Temperature	C	06/09/2015	N001	7.35 - 22.35	16.32	F	#		
Turbidity	NTU	06/09/2015	N001	7.35 - 22.35	1.52	F	#		
Uranium	mg/L	06/09/2015	N001	7.35 - 22.35	0.1	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	7.35 - 22.35	0.001	J	UF	#	0.00015

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

REPORT DATE: 09/23/2015

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

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	6.84 - 21.84	262	F	#		
Ammonia Total as N	mg/L	06/09/2015	N001	6.84 - 21.84	2.6	F	#	0.1	
Arsenic	mg/L	06/09/2015	N001	6.84 - 21.84	0.00031	J	UF	#	0.00015
Calcium	mg/L	06/09/2015	N001	6.84 - 21.84	88	F	#	0.024	
Chloride	mg/L	06/09/2015	N001	6.84 - 21.84	110	F	#	2	
Magnesium	mg/L	06/09/2015	N001	6.84 - 21.84	42	F	#	0.03	
Molybdenum	mg/L	06/09/2015	N001	6.84 - 21.84	0.018	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	6.84 - 21.84	0.029	F	#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	6.84 - 21.84	25.6	F	#		
pH	s.u.	06/09/2015	N001	6.84 - 21.84	7.35	F	#		
Potassium	mg/L	06/09/2015	N001	6.84 - 21.84	4.3	F	#	0.052	
Selenium	mg/L	06/09/2015	N001	6.84 - 21.84	0.00032	U	F	#	0.00032
Sodium	mg/L	06/09/2015	N001	6.84 - 21.84	120	F	#	0.047	
Specific Conductance	umhos /cm	06/09/2015	N001	6.84 - 21.84	1251	F	#		
Sulfate	mg/L	06/09/2015	N001	6.84 - 21.84	250	F	#	5	
Temperature	C	06/09/2015	N001	6.84 - 21.84	13.42	F	#		
Turbidity	NTU	06/09/2015	N001	6.84 - 21.84	0.99	F	#		
Uranium	mg/L	06/09/2015	N001	6.84 - 21.84	0.017	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	6.84 - 21.84	0.0015	J	UF	#	0.00015

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

REPORT DATE: 09/23/2015

Location: 0216 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	07/17/2015	N001	5.5 - 20.5	140	F	#		
Ammonia Total as N	mg/L	07/17/2015	N001	5.5 - 20.5	5.3	F	#	0.2	
Ammonia Total as N	mg/L	07/17/2015	N002	5.5 - 20.5	8.8	F	#	1	
Arsenic	mg/L	07/17/2015	N001	5.5 - 20.5	0.018	F	#	0.00015	
Arsenic	mg/L	07/17/2015	N002	5.5 - 20.5	0.02	F	#	0.00015	
Calcium	mg/L	07/17/2015	N001	5.5 - 20.5	73	F	#	0.024	
Calcium	mg/L	07/17/2015	N002	5.5 - 20.5	75	F	#	0.024	
Chloride	mg/L	07/17/2015	N001	5.5 - 20.5	140	F	#	2	
Chloride	mg/L	07/17/2015	N002	5.5 - 20.5	140	F	#	2	
Magnesium	mg/L	07/17/2015	N001	5.5 - 20.5	15	F	#	0.03	
Magnesium	mg/L	07/17/2015	N002	5.5 - 20.5	15	F	#	0.03	
Molybdenum	mg/L	07/17/2015	N001	5.5 - 20.5	0.033	F	#	0.00032	
Molybdenum	mg/L	07/17/2015	N002	5.5 - 20.5	0.034	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	07/17/2015	N001	5.5 - 20.5	0.016	F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	07/17/2015	N002	5.5 - 20.5	0.022	F	#	0.01	
Oxidation Reduction Potential	mV	07/17/2015	N001	5.5 - 20.5	-38.8	F	#		
pH	s.u.	07/17/2015	N001	5.5 - 20.5	7.32	F	#		
Potassium	mg/L	07/17/2015	N001	5.5 - 20.5	6.4	F	#	0.052	

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

REPORT DATE: 09/23/2015

Location: 0216 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Potassium	mg/L	07/17/2015	N002	5.5 - 20.5	6.4	F	#	0.052	
Selenium	mg/L	07/17/2015	N001	5.5 - 20.5	0.00032	U F	#	0.00032	
Selenium	mg/L	07/17/2015	N002	5.5 - 20.5	0.00032	U F	#	0.00032	
Sodium	mg/L	07/17/2015	N001	5.5 - 20.5	86	F	#	0.047	
Sodium	mg/L	07/17/2015	N002	5.5 - 20.5	85	F	#	0.047	
Specific Conductance	umhos /cm	07/17/2015	N001	5.5 - 20.5	954	F	#		
Sulfate	mg/L	07/17/2015	N001	5.5 - 20.5	100	F	#	5	
Sulfate	mg/L	07/17/2015	N002	5.5 - 20.5	100	F	#	5	
Temperature	C	07/17/2015	N001	5.5 - 20.5	16.41	F	#		
Turbidity	NTU	07/17/2015	N001	5.5 - 20.5	1.87	F	#		
Uranium	mg/L	07/17/2015	N001	5.5 - 20.5	0.011	F	#	0.000029	
Uranium	mg/L	07/17/2015	N002	5.5 - 20.5	0.011	F	#	0.000029	
Vanadium	mg/L	07/17/2015	N001	5.5 - 20.5	0.13	F	#	0.00015	
Vanadium	mg/L	07/17/2015	N002	5.5 - 20.5	0.14	F	#	0.00015	

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

REPORT DATE: 09/23/2015

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

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	7.4 - 22.4	236	F	#		
Ammonia Total as N	mg/L	06/09/2015	N001	7.4 - 22.4	39	F	#	2	
Arsenic	mg/L	06/09/2015	N001	7.4 - 22.4	0.0018	F	#	0.00015	
Calcium	mg/L	06/09/2015	N001	7.4 - 22.4	610	F	#	0.12	
Chloride	mg/L	06/09/2015	N001	7.4 - 22.4	220	F	#	10	
Magnesium	mg/L	06/09/2015	N001	7.4 - 22.4	22	F	#	0.15	
Molybdenum	mg/L	06/09/2015	N001	7.4 - 22.4	1.6	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	7.4 - 22.4	0.031	F	#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	7.4 - 22.4	121.6	F	#		
pH	s.u.	06/09/2015	N001	7.4 - 22.4	6.85	F	#		
Potassium	mg/L	06/09/2015	N001	7.4 - 22.4	15	F	#	0.26	
Selenium	mg/L	06/09/2015	N001	7.4 - 22.4	0.0091	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	7.4 - 22.4	200	F	#	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	7.4 - 22.4	3489	F	#		
Sulfate	mg/L	06/09/2015	N001	7.4 - 22.4	1500	F	#	25	
Temperature	C	06/09/2015	N001	7.4 - 22.4	14.54	F	#		
Turbidity	NTU	06/09/2015	N001	7.4 - 22.4	2.36	F	#		
Uranium	mg/L	06/09/2015	N001	7.4 - 22.4	0.16	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	7.4 - 22.4	2.3	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0590 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	5.21 - 19.21	276		F #		
Ammonia Total as N	mg/L	06/09/2015	N001	5.21 - 19.21	130		F #	5	
Arsenic	mg/L	06/09/2015	N001	5.21 - 19.21	0.00076	J	UF #	0.00015	
Calcium	mg/L	06/09/2015	N001	5.21 - 19.21	570		F #	0.12	
Chloride	mg/L	06/09/2015	N001	5.21 - 19.21	300		F #	10	
Magnesium	mg/L	06/09/2015	N001	5.21 - 19.21	55		F #	0.15	
Molybdenum	mg/L	06/09/2015	N001	5.21 - 19.21	1.4		F #	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	5.21 - 19.21	11		F #	0.25	
Oxidation Reduction Potential	mV	06/09/2015	N001	5.21 - 19.21	136.5		F #		
pH	s.u.	06/09/2015	N001	5.21 - 19.21	6.72		F #		
Potassium	mg/L	06/09/2015	N001	5.21 - 19.21	22		F #	0.26	
Selenium	mg/L	06/09/2015	N001	5.21 - 19.21	0.038		F #	0.00032	
Sodium	mg/L	06/09/2015	N001	5.21 - 19.21	410		F #	0.23	
Specific Conductance	umhos /cm	06/09/2015	N001	5.21 - 19.21	5001		F #		
Sulfate	mg/L	06/09/2015	N001	5.21 - 19.21	2200		F #	25	
Temperature	C	06/09/2015	N001	5.21 - 19.21	15.08		F #		
Turbidity	NTU	06/09/2015	N001	5.21 - 19.21	1.99		F #		
Uranium	mg/L	06/09/2015	N001	5.21 - 19.21	0.072		F #	0.000029	
Vanadium	mg/L	06/09/2015	N001	5.21 - 19.21	0.34		F #	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0609 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	07/17/2015	0001	6 - 21	330		F #		
Ammonia Total as N	mg/L	07/17/2015	0001	6 - 21	0.13		F #	0.1	
Arsenic	mg/L	07/17/2015	0001	6 - 21	0.00089	J	F #	0.00015	
Calcium	mg/L	07/17/2015	0001	6 - 21	100		F #	0.024	
Chloride	mg/L	07/17/2015	0001	6 - 21	20		F #	2	
Magnesium	mg/L	07/17/2015	0001	6 - 21	61		F #	0.03	
Molybdenum	mg/L	07/17/2015	0001	6 - 21	0.012		F #	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	07/17/2015	0001	6 - 21	0.026		F #	0.01	
Oxidation Reduction Potential	mV	07/17/2015	N001	6 - 21	45.5		F #		
pH	s.u.	07/17/2015	N001	6 - 21	6.98		F #		
Potassium	mg/L	07/17/2015	0001	6 - 21	7.7		F #	0.052	
Selenium	mg/L	07/17/2015	0001	6 - 21	0.00043	J	F #	0.00032	
Sodium	mg/L	07/17/2015	0001	6 - 21	67		F #	0.047	
Specific Conductance	umhos /cm	07/17/2015	N001	6 - 21	1157		F #		
Sulfate	mg/L	07/17/2015	0001	6 - 21	230		F #	5	
Temperature	C	07/17/2015	N001	6 - 21	18.62		F #		
Turbidity	NTU	07/17/2015	N001	6 - 21	22.4		F #		
Uranium	mg/L	07/17/2015	0001	6 - 21	0.02		F #	0.000029	
Vanadium	mg/L	07/17/2015	0001	6 - 21	0.0013	J	F #	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0620 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/11/2015	N001	6.7 - 10.7	510		F #		
Ammonia Total as N	mg/L	06/11/2015	N001	6.7 - 10.7	0.1	U	F #	0.1	
Arsenic	mg/L	06/11/2015	N001	6.7 - 10.7	0.00086	J	UF #	0.00015	
Calcium	mg/L	06/11/2015	N001	6.7 - 10.7	380		F #	0.12	
Chloride	mg/L	06/11/2015	N001	6.7 - 10.7	1200		F #	20	
Magnesium	mg/L	06/11/2015	N001	6.7 - 10.7	210		F #	0.15	
Molybdenum	mg/L	06/11/2015	N001	6.7 - 10.7	0.013		F #	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/11/2015	N001	6.7 - 10.7	13		F #	0.2	
Oxidation Reduction Potential	mV	06/11/2015	N001	6.7 - 10.7	280.2		F #		
pH	s.u.	06/11/2015	N001	6.7 - 10.7	6.99		F #		
Potassium	mg/L	06/11/2015	N001	6.7 - 10.7	8.4		F #	0.26	
Selenium	mg/L	06/11/2015	N001	6.7 - 10.7	0.02		F #	0.00032	
Sodium	mg/L	06/11/2015	N001	6.7 - 10.7	990		F #	0.23	
Specific Conductance	umhos /cm	06/11/2015	N001	6.7 - 10.7	7000		F #		
Sulfate	mg/L	06/11/2015	N001	6.7 - 10.7	1800		F #	50	
Temperature	C	06/11/2015	N001	6.7 - 10.7	13.67		F #		
Turbidity	NTU	06/11/2015	N001	6.7 - 10.7	2.67		F #		
Uranium	mg/L	06/11/2015	N001	6.7 - 10.7	0.06		F #	0.000029	
Vanadium	mg/L	06/11/2015	N001	6.7 - 10.7	0.0026	J	UF #	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0658 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	.5 - 5.5	276	F	#		
Ammonia Total as N	mg/L	06/09/2015	N001	.5 - 5.5	34	F	#	2	
Arsenic	mg/L	06/09/2015	N001	.5 - 5.5	0.13	F	#	0.00015	
Calcium	mg/L	06/09/2015	N001	.5 - 5.5	370	F	#	0.12	
Chloride	mg/L	06/09/2015	N001	.5 - 5.5	150	F	#	5	
Magnesium	mg/L	06/09/2015	N001	.5 - 5.5	32	F	#	0.15	
Molybdenum	mg/L	06/09/2015	N001	.5 - 5.5	1.2	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	.5 - 5.5	2.6	F	#	0.1	
Oxidation Reduction Potential	mV	06/09/2015	N001	.5 - 5.5	130.7	F	#		
pH	s.u.	06/09/2015	N001	.5 - 5.5	6.9	F	#		
Potassium	mg/L	06/09/2015	N001	.5 - 5.5	7.4	F	#	0.26	
Selenium	mg/L	06/09/2015	N001	.5 - 5.5	1	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	.5 - 5.5	190	F	#	0.23	
Specific Conductance	umhos /cm	06/09/2015	N001	.5 - 5.5	2773	F	#		
Sulfate	mg/L	06/09/2015	N001	.5 - 5.5	1000	F	#	12	
Temperature	C	06/09/2015	N001	.5 - 5.5	13.51	F	#		
Turbidity	NTU	06/09/2015	N001	.5 - 5.5	4.03	F	#		
Uranium	mg/L	06/09/2015	N001	.5 - 5.5	0.055	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	.5 - 5.5	20	F	#	0.0015	

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

REPORT DATE: 09/23/2015

Location: 0659 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	.5 - 10.5	210	F	#		
Ammonia Total as N	mg/L	06/09/2015	N001	.5 - 10.5	7.8	F	#	1	
Arsenic	mg/L	06/09/2015	N001	.5 - 10.5	0.076	F	#	0.00015	
Calcium	mg/L	06/09/2015	N001	.5 - 10.5	640	F	#	0.12	
Chloride	mg/L	06/09/2015	N001	.5 - 10.5	220	F	#	5	
Magnesium	mg/L	06/09/2015	N001	.5 - 10.5	40	F	#	0.15	
Molybdenum	mg/L	06/09/2015	N001	.5 - 10.5	1.4	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	.5 - 10.5	16	F	#	0.1	
Oxidation Reduction Potential	mV	06/09/2015	N001	.5 - 10.5	-25.6	F	#		
pH	s.u.	06/09/2015	N001	.5 - 10.5	6.88	F	#		
Potassium	mg/L	06/09/2015	N001	.5 - 10.5	12	F	#	0.26	
Selenium	mg/L	06/09/2015	N001	.5 - 10.5	0.18	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	.5 - 10.5	190	F	#	0.23	
Specific Conductance	umhos /cm	06/09/2015	N001	.5 - 10.5	3450	F	#		
Sulfate	mg/L	06/09/2015	N001	.5 - 10.5	1600	F	#	12	
Temperature	C	06/09/2015	N001	.5 - 10.5	17.57	F	#		
Turbidity	NTU	06/09/2015	N001	.5 - 10.5	8.13	F	#		
Uranium	mg/L	06/09/2015	N001	.5 - 10.5	0.11	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	.5 - 10.5	4.2	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0664 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2015	N001	7.7 - 14.7	394	F	#		
Ammonia Total as N	mg/L	06/10/2015	0001	7.7 - 14.7	27	F	#	2	
Arsenic	mg/L	06/10/2015	0001	7.7 - 14.7	0.005	F	#	0.00015	
Calcium	mg/L	06/10/2015	0001	7.7 - 14.7	150	F	#	0.12	
Chloride	mg/L	06/10/2015	0001	7.7 - 14.7	120	F	#	4	
Magnesium	mg/L	06/10/2015	0001	7.7 - 14.7	73	F	#	0.15	
Molybdenum	mg/L	06/10/2015	0001	7.7 - 14.7	0.19	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2015	0001	7.7 - 14.7	3.5	F	#	0.05	
Oxidation Reduction Potential	mV	06/10/2015	N001	7.7 - 14.7	154.6	F	#		
pH	s.u.	06/10/2015	N001	7.7 - 14.7	7.03	F	#		
Potassium	mg/L	06/10/2015	0001	7.7 - 14.7	8.4	F	#	0.26	
Selenium	mg/L	06/10/2015	0001	7.7 - 14.7	0.19	F	#	0.00032	
Sodium	mg/L	06/10/2015	0001	7.7 - 14.7	210	F	#	0.23	
Specific Conductance	umhos /cm	06/10/2015	N001	7.7 - 14.7	2214	F	#		
Sulfate	mg/L	06/10/2015	0001	7.7 - 14.7	630	F	#	10	
Temperature	C	06/10/2015	N001	7.7 - 14.7	11.85	F	#		
Turbidity	NTU	06/10/2015	N001	7.7 - 14.7	38.8	F	#		
Uranium	mg/L	06/10/2015	0001	7.7 - 14.7	0.055	F	#	0.000029	
Vanadium	mg/L	06/10/2015	0001	7.7 - 14.7	2.9	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0669 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2015	N001	4 - 10.6	347	F	#		
Ammonia Total as N	mg/L	06/10/2015	N001	4 - 10.6	62	F	#	2	
Arsenic	mg/L	06/10/2015	N001	4 - 10.6	0.0061	F	#	0.00015	
Calcium	mg/L	06/10/2015	N001	4 - 10.6	350	F	#	0.12	
Chloride	mg/L	06/10/2015	N001	4 - 10.6	150	F	#	5	
Magnesium	mg/L	06/10/2015	N001	4 - 10.6	45	F	#	0.15	
Molybdenum	mg/L	06/10/2015	N001	4 - 10.6	0.77	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2015	N001	4 - 10.6	0.63	F	#	0.01	
Oxidation Reduction Potential	mV	06/10/2015	N001	4 - 10.6	149	F	#		
pH	s.u.	06/10/2015	N001	4 - 10.6	6.93	F	#		
Potassium	mg/L	06/10/2015	N001	4 - 10.6	6.5	F	#	0.26	
Selenium	mg/L	06/10/2015	N001	4 - 10.6	0.018	F	#	0.00032	
Sodium	mg/L	06/10/2015	N001	4 - 10.6	210	F	#	0.23	
Specific Conductance	umhos /cm	06/10/2015	N001	4 - 10.6	2883	F	#		
Sulfate	mg/L	06/10/2015	N001	4 - 10.6	1100	F	#	12	
Temperature	C	06/10/2015	N001	4 - 10.6	12.45	F	#		
Turbidity	NTU	06/10/2015	N001	4 - 10.6	9.13	F	#		
Uranium	mg/L	06/10/2015	N001	4 - 10.6	0.1	F	#	0.000029	
Vanadium	mg/L	06/10/2015	N001	4 - 10.6	2.3	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0670 WELL For Organics Study.

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	5.2 - 12.2	420	F	#		
Ammonia Total as N	mg/L	06/09/2015	N001	5.2 - 12.2	12	F	#	1	
Arsenic	mg/L	06/09/2015	N001	5.2 - 12.2	0.006	*	FJ	0.00015	
Calcium	mg/L	06/09/2015	N001	5.2 - 12.2	140	F	#	0.024	
Chloride	mg/L	06/09/2015	N001	5.2 - 12.2	110	F	#	4	
Magnesium	mg/L	06/09/2015	N001	5.2 - 12.2	84	F	#	0.03	
Molybdenum	mg/L	06/09/2015	N001	5.2 - 12.2	0.2	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	5.2 - 12.2	3.8	F	#	0.05	
Oxidation Reduction Potential	mV	06/09/2015	N001	5.2 - 12.2	97.1	F	#		
pH	s.u.	06/09/2015	N001	5.2 - 12.2	7.02	F	#		
Potassium	mg/L	06/09/2015	N001	5.2 - 12.2	9	F	#	0.052	
Selenium	mg/L	06/09/2015	N001	5.2 - 12.2	0.41	E	FJ	0.00032	
Sodium	mg/L	06/09/2015	N001	5.2 - 12.2	220	F	#	0.047	
Specific Conductance	umhos /cm	06/09/2015	N001	5.2 - 12.2	2155	F	#		
Sulfate	mg/L	06/09/2015	N001	5.2 - 12.2	620	F	#	10	
Temperature	C	06/09/2015	N001	5.2 - 12.2	14.08	F	#		
Turbidity	NTU	06/09/2015	N001	5.2 - 12.2	3.64	F	#		
Uranium	mg/L	06/09/2015	N001	5.2 - 12.2	0.1	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	5.2 - 12.2	2	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0855 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	6 - 11	278	F	#		
Ammonia Total as N	mg/L	06/09/2015	N001	6 - 11	24	F	#	1	
Ammonia Total as N	mg/L	06/09/2015	N002	6 - 11	24	F	#	2.5	
Arsenic	mg/L	06/09/2015	N001	6 - 11	0.24	F	#	0.00015	
Arsenic	mg/L	06/09/2015	N002	6 - 11	0.23	F	#	0.00015	
Calcium	mg/L	06/09/2015	N001	6 - 11	230	F	#	0.12	
Calcium	mg/L	06/09/2015	N002	6 - 11	220	F	#	0.12	
Chloride	mg/L	06/09/2015	N001	6 - 11	130	F	#	4	
Chloride	mg/L	06/09/2015	N002	6 - 11	130	F	#	4	
Magnesium	mg/L	06/09/2015	N001	6 - 11	37	F	#	0.15	
Magnesium	mg/L	06/09/2015	N002	6 - 11	36	F	#	0.15	
Molybdenum	mg/L	06/09/2015	N001	6 - 11	0.55	F	#	0.00032	
Molybdenum	mg/L	06/09/2015	N002	6 - 11	0.53	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	6 - 11	5.6	F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N002	6 - 11	5.5	F	#	0.25	
Oxidation Reduction Potential	mV	06/09/2015	N001	6 - 11	113	F	#		
pH	s.u.	06/09/2015	N001	6 - 11	6.96	F	#		
Potassium	mg/L	06/09/2015	N001	6 - 11	9.6	F	#	0.26	

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

REPORT DATE: 09/23/2015

Location: 0855 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Potassium	mg/L	06/09/2015	N002	6 - 11	9.3	F	#	0.26	
Selenium	mg/L	06/09/2015	N001	6 - 11	0.87	F	#	0.00032	
Selenium	mg/L	06/09/2015	N002	6 - 11	0.82	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	6 - 11	200	F	#	0.23	
Sodium	mg/L	06/09/2015	N002	6 - 11	200	F	#	0.23	
Specific Conductance	umhos /cm	06/09/2015	N001	6 - 11	2213	F	#		
Sulfate	mg/L	06/09/2015	N001	6 - 11	670	F	#	10	
Sulfate	mg/L	06/09/2015	N002	6 - 11	670	F	#	10	
Temperature	C	06/09/2015	N001	6 - 11	16.56	F	#		
Turbidity	NTU	06/09/2015	N001	6 - 11	3.96	F	#		
Uranium	mg/L	06/09/2015	N001	6 - 11	0.046	F	#	0.000029	
Uranium	mg/L	06/09/2015	N002	6 - 11	0.045	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	6 - 11	13	F	#	0.0015	
Vanadium	mg/L	06/09/2015	N002	6 - 11	12	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: 09/23/2015

Location: 0292A WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	10.5 - 20.5	493	F	#		
Calcium	mg/L	06/09/2015	N001	10.5 - 20.5	170	F	#	0.024	
Chloride	mg/L	06/09/2015	N001	10.5 - 20.5	93	F	#	4	
Magnesium	mg/L	06/09/2015	N001	10.5 - 20.5	100	F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	10.5 - 20.5	0.01	U	F	#	0.01
Oxidation Reduction Potential	mV	06/09/2015	N001	10.5 - 20.5	-20	F	#		
pH	s.u.	06/09/2015	N001	10.5 - 20.5	6.86	F	#		
Potassium	mg/L	06/09/2015	N001	10.5 - 20.5	5.1	F	#	0.052	
Selenium	mg/L	06/09/2015	N001	10.5 - 20.5	0.00085	J	F	#	0.00032
Sodium	mg/L	06/09/2015	N001	10.5 - 20.5	240	F	#	0.047	
Specific Conductance	umhos/cm	06/09/2015	N001	10.5 - 20.5	2243	F	#		
Sulfate	mg/L	06/09/2015	N001	10.5 - 20.5	670	F	#	10	
Temperature	C	06/09/2015	N001	10.5 - 20.5	12.51	F	#		
Turbidity	NTU	06/09/2015	N001	10.5 - 20.5	9.97	F	#		
Uranium	mg/L	06/09/2015	N001	10.5 - 20.5	0.034	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	10.5 - 20.5	0.0016	J	F	#	0.00015

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

REPORT DATE: 09/23/2015

Location: 0304 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	13.2 - 18.2	248	F	#		
Calcium	mg/L	06/09/2015	N001	13.2 - 18.2	160	F	#	0.12	
Calcium	mg/L	06/09/2015	N002	13.2 - 18.2	160	F	#	0.024	
Chloride	mg/L	06/09/2015	N001	13.2 - 18.2	160	F	#	4	
Chloride	mg/L	06/09/2015	N002	13.2 - 18.2	160	F	#	4	
Magnesium	mg/L	06/09/2015	N001	13.2 - 18.2	58	F	#	0.15	
Magnesium	mg/L	06/09/2015	N002	13.2 - 18.2	61	F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	13.2 - 18.2	0.01	U	F	#	0.01
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N002	13.2 - 18.2	0.01	U	F	#	0.01
Oxidation Reduction Potential	mV	06/09/2015	N001	13.2 - 18.2	-22.7	F	#		
pH	s.u.	06/09/2015	N001	13.2 - 18.2	7.16	F	#		
Potassium	mg/L	06/09/2015	N001	13.2 - 18.2	5.9	F	#	0.26	
Potassium	mg/L	06/09/2015	N002	13.2 - 18.2	6.2	F	#	0.052	
Selenium	mg/L	06/09/2015	N001	13.2 - 18.2	0.00041	J	F	#	0.00032
Selenium	mg/L	06/09/2015	N002	13.2 - 18.2	0.0013	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	13.2 - 18.2	140	F	#	0.23	
Sodium	mg/L	06/09/2015	N002	13.2 - 18.2	150	F	#	0.047	
Specific Conductance	umhos/cm	06/09/2015	N001	13.2 - 18.2	1783	F	#		

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

REPORT DATE: 09/23/2015

Location: 0304 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Sulfate	mg/L	06/09/2015	N001	13.2 - 18.2	490	F	#	10	
Sulfate	mg/L	06/09/2015	N002	13.2 - 18.2	500	F	#	10	
Temperature	C	06/09/2015	N001	13.2 - 18.2	12.98	F	#		
Turbidity	NTU	06/09/2015	N001	13.2 - 18.2	5	F	#		
Uranium	mg/L	06/09/2015	N001	13.2 - 18.2	0.042	F	#	0.000029	
Uranium	mg/L	06/09/2015	N002	13.2 - 18.2	0.041	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	13.2 - 18.2	0.025	F	#	0.00015	
Vanadium	mg/L	06/09/2015	N002	13.2 - 18.2	0.023	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0305 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	13.76 - 18.76	311	F	#		
Calcium	mg/L	06/09/2015	N001	13.76 - 18.76	170	F	#	0.024	
Chloride	mg/L	06/09/2015	N001	13.76 - 18.76	200	F	#	4	
Magnesium	mg/L	06/09/2015	N001	13.76 - 18.76	70	F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	13.76 - 18.76	0.01	U	F	#	0.01
Oxidation Reduction Potential	mV	06/09/2015	N001	13.76 - 18.76	127.7	F	#		
pH	s.u.	06/09/2015	N001	13.76 - 18.76	7.15	F	#		
Potassium	mg/L	06/09/2015	N001	13.76 - 18.76	7.2	F	#	0.052	
Selenium	mg/L	06/09/2015	N001	13.76 - 18.76	0.015	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	13.76 - 18.76	170	F	#	0.047	
Specific Conductance	umhos/cm	06/09/2015	N001	13.76 - 18.76	1931	F	#		
Sulfate	mg/L	06/09/2015	N001	13.76 - 18.76	430	F	#	10	
Temperature	C	06/09/2015	N001	13.76 - 18.76	13.53	F	#		
Turbidity	NTU	06/09/2015	N001	13.76 - 18.76	1.35	F	#		
Uranium	mg/L	06/09/2015	N001	13.76 - 18.76	0.059	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	13.76 - 18.76	0.14	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0309 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	16.93 - 21.93	369		F #		
Calcium	mg/L	06/09/2015	N001	16.93 - 21.93	180		F #	0.12	
Chloride	mg/L	06/09/2015	N001	16.93 - 21.93	140		F #	4	
Magnesium	mg/L	06/09/2015	N001	16.93 - 21.93	120		F #	0.15	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	16.93 - 21.93	0.01	U	F #	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	16.93 - 21.93	-28.9		F #		
pH	s.u.	06/09/2015	N001	16.93 - 21.93	7.04		F #		
Potassium	mg/L	06/09/2015	N001	16.93 - 21.93	6		F #	0.26	
Selenium	mg/L	06/09/2015	N001	16.93 - 21.93	0.0009	J	F #	0.00032	
Sodium	mg/L	06/09/2015	N001	16.93 - 21.93	210		F #	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	16.93 - 21.93	2337		F #		
Sulfate	mg/L	06/09/2015	N001	16.93 - 21.93	770		F #	10	
Temperature	C	06/09/2015	N001	16.93 - 21.93	14.75		F #		
Turbidity	NTU	06/09/2015	N001	16.93 - 21.93	7.46		F #		
Uranium	mg/L	06/09/2015	N001	16.93 - 21.93	0.023		F #	0.000029	
Vanadium	mg/L	06/09/2015	N001	16.93 - 21.93	0.0011	J	F #	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0310 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	17.93 - 22.93	458	F	#		
Calcium	mg/L	06/09/2015	N001	17.93 - 22.93	240	F	#	0.12	
Chloride	mg/L	06/09/2015	N001	17.93 - 22.93	150	F	#	4	
Magnesium	mg/L	06/09/2015	N001	17.93 - 22.93	120	F	#	0.15	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	17.93 - 22.93	0.01	U	F	#	0.01
Oxidation Reduction Potential	mV	06/09/2015	N001	17.93 - 22.93	-20.7	F	#		
pH	s.u.	06/09/2015	N001	17.93 - 22.93	7.03	F	#		
Potassium	mg/L	06/09/2015	N001	17.93 - 22.93	8	F	#	0.26	
Selenium	mg/L	06/09/2015	N001	17.93 - 22.93	0.00072	J	F	#	0.00032
Sodium	mg/L	06/09/2015	N001	17.93 - 22.93	220	F	#	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	17.93 - 22.93	2510	F	#		
Sulfate	mg/L	06/09/2015	N001	17.93 - 22.93	790	F	#	10	
Temperature	C	06/09/2015	N001	17.93 - 22.93	14.05	F	#		
Turbidity	NTU	06/09/2015	N001	17.93 - 22.93	4.94	F	#		
Uranium	mg/L	06/09/2015	N001	17.93 - 22.93	0.19	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	17.93 - 22.93	0.0096	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0655 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2015	N001	13.6 - 23.6	492	F	#		
Calcium	mg/L	06/10/2015	N001	13.6 - 23.6	220	F	#	0.12	
Chloride	mg/L	06/10/2015	N001	13.6 - 23.6	190	F	#	4	
Magnesium	mg/L	06/10/2015	N001	13.6 - 23.6	120	F	#	0.15	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2015	N001	13.6 - 23.6	0.71	F	#	0.01	
Oxidation Reduction Potential	mV	06/10/2015	N001	13.6 - 23.6	152	F	#		
pH	s.u.	06/10/2015	N001	13.6 - 23.6	7.01	F	#		
Potassium	mg/L	06/10/2015	N001	13.6 - 23.6	7.3	F	#	0.26	
Selenium	mg/L	06/10/2015	N001	13.6 - 23.6	0.074	F	#	0.00032	
Sodium	mg/L	06/10/2015	N001	13.6 - 23.6	240	F	#	0.23	
Specific Conductance	umhos/cm	06/10/2015	N001	13.6 - 23.6	2673	F	#		
Sulfate	mg/L	06/10/2015	N001	13.6 - 23.6	820	F	#	10	
Temperature	C	06/10/2015	N001	13.6 - 23.6	12.52	F	#		
Turbidity	NTU	06/10/2015	N001	13.6 - 23.6	0.42	F	#		
Uranium	mg/L	06/10/2015	N001	13.6 - 23.6	0.15	F	#	0.000029	
Vanadium	mg/L	06/10/2015	N001	13.6 - 23.6	0.35	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0656 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	6.35 - 21.35	337	F	#		
Calcium	mg/L	06/09/2015	N001	6.35 - 21.35	180	F	#	0.12	
Chloride	mg/L	06/09/2015	N001	6.35 - 21.35	330	F	#	4	
Magnesium	mg/L	06/09/2015	N001	6.35 - 21.35	85	F	#	0.15	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	6.35 - 21.35	0.1	F	#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	6.35 - 21.35	126.8	F	#		
pH	s.u.	06/09/2015	N001	6.35 - 21.35	6.99	F	#		
Potassium	mg/L	06/09/2015	N001	6.35 - 21.35	7.4	F	#	0.26	
Selenium	mg/L	06/09/2015	N001	6.35 - 21.35	0.0024	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	6.35 - 21.35	280	F	#	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	6.35 - 21.35	2557	F	#		
Sulfate	mg/L	06/09/2015	N001	6.35 - 21.35	520	F	#	10	
Temperature	C	06/09/2015	N001	6.35 - 21.35	17.31	F	#		
Turbidity	NTU	06/09/2015	N001	6.35 - 21.35	9.03	F	#		
Uranium	mg/L	06/09/2015	N001	6.35 - 21.35	0.24	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	6.35 - 21.35	0.021	F	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0658 WELL

Parameter	Units	Sample ID	Date	Depth Range (Ft BLS)	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	2.3 - 17.3	362	F	#		
Calcium	mg/L	06/09/2015	N001	2.3 - 17.3	190	F	#	0.024	
Chloride	mg/L	06/09/2015	N001	2.3 - 17.3	19	F	#	4	
Magnesium	mg/L	06/09/2015	N001	2.3 - 17.3	110	F	#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	2.3 - 17.3	0.038	F	#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	2.3 - 17.3	-32.5	F	#		
pH	s.u.	06/09/2015	N001	2.3 - 17.3	7.08	F	#		
Potassium	mg/L	06/09/2015	N001	2.3 - 17.3	2.7	F	#	0.052	
Selenium	mg/L	06/09/2015	N001	2.3 - 17.3	0.0035	F	#	0.00032	
Sodium	mg/L	06/09/2015	N001	2.3 - 17.3	68	F	#	0.047	
Specific Conductance	umhos/cm	06/09/2015	N001	2.3 - 17.3	1691	F	#		
Sulfate	mg/L	06/09/2015	N001	2.3 - 17.3	590	F	#	10	
Temperature	C	06/09/2015	N001	2.3 - 17.3	10.57	F	#		
Turbidity	NTU	06/09/2015	N001	2.3 - 17.3	9.12	F	#		
Uranium	mg/L	06/09/2015	N001	2.3 - 17.3	0.016	F	#	0.000029	
Vanadium	mg/L	06/09/2015	N001	2.3 - 17.3	0.0018	J	F	#	0.00015

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

Validated according to quality assurance guidelines.

**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: 09/23/2015

Location: 0320 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data QA	Lab	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	06/09/2015	N001	6.7		#	0.5	
Arsenic	mg/L	06/09/2015	N001	0.013		#	0.00015	
Calcium	mg/L	06/09/2015	N001	450		#	0.12	
Chloride	mg/L	06/09/2015	N001	310		#	10	
Magnesium	mg/L	06/09/2015	N001	62		#	0.15	
Molybdenum	mg/L	06/09/2015	N001	1		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	2.2		#	0.05	
Oxidation Reduction Potential	mV	06/09/2015	N001	104.1		#		
pH	s.u.	06/09/2015	N001	7.84		#		
Potassium	mg/L	06/09/2015	N001	32		#	0.26	
Selenium	mg/L	06/09/2015	N001	0.015		#	0.00032	
Sodium	mg/L	06/09/2015	N001	390		#	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	3753		#		
Sulfate	mg/L	06/09/2015	N001	1500		#	25	
Temperature	C	06/09/2015	N001	31.8		#		
Turbidity	NTU	06/09/2015	N001	3.28		#		
Uranium	mg/L	06/09/2015	N001	0.15		#	0.000029	
Vanadium	mg/L	06/09/2015	N001	0.25		#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0323 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data QA	Lab	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	144				
Ammonia Total as N	mg/L	06/09/2015	N001	19			1	
Arsenic	mg/L	06/09/2015	N001	0.0011			0.00015	
Calcium	mg/L	06/09/2015	N001	570			0.12	
Chloride	mg/L	06/09/2015	N001	430			20	
Magnesium	mg/L	06/09/2015	N001	130			0.15	
Molybdenum	mg/L	06/09/2015	N001	2.1			0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	27			0.25	
Oxidation Reduction Potential	mV	06/09/2015	N001	154.2				
pH	s.u.	06/09/2015	N001	7.31				
Potassium	mg/L	06/09/2015	N001	53			0.26	
Selenium	mg/L	06/09/2015	N001	0.014			0.00032	
Sodium	mg/L	06/09/2015	N001	800			0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	6329				
Sulfate	mg/L	06/09/2015	N001	3000			50	
Temperature	C	06/09/2015	N001	23.85				
Turbidity	NTU	06/09/2015	N001	3.02				
Uranium	mg/L	06/09/2015	N001	0.24			0.000029	
Vanadium	mg/L	06/09/2015	N001	0.0044		U	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0324 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/11/2015	N001	70		#		
Ammonia Total as N	mg/L	06/11/2015	0001	0.1	U	#	0.1	
Arsenic	mg/L	06/11/2015	0001	0.00031	J	U	#	0.00015
Calcium	mg/L	06/11/2015	0001	29		#	0.024	
Chloride	mg/L	06/11/2015	0001	20		#	1	
Magnesium	mg/L	06/11/2015	0001	5.3		#	0.03	
Molybdenum	mg/L	06/11/2015	0001	0.013		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/11/2015	0001	0.12		#	0.01	
Oxidation Reduction Potential	mV	06/11/2015	N001	192.5		#		
pH	s.u.	06/11/2015	N001	8.13		#		
Potassium	mg/L	06/11/2015	0001	1.2		#	0.052	
Selenium	mg/L	06/11/2015	0001	0.00032	U	#	0.00032	
Sodium	mg/L	06/11/2015	0001	16		#	0.047	
Specific Conductance	umhos/cm	06/11/2015	N001	312		#		
Sulfate	mg/L	06/11/2015	0001	30		#	0.5	
Temperature	C	06/11/2015	N001	14.29		#		
Turbidity	NTU	06/11/2015	N001	27.7		#		
Uranium	mg/L	06/11/2015	0001	0.0016		#	0.000029	
Vanadium	mg/L	06/11/2015	0001	0.0012	J	U	#	0.00015

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

REPORT DATE: 09/23/2015

Location: 0326 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2015	N001	64		#		
Ammonia Total as N	mg/L	06/10/2015	0001	0.1	U	#	0.1	
Arsenic	mg/L	06/10/2015	0001	0.00037	J	U	#	0.00015
Calcium	mg/L	06/10/2015	0001	30		#	0.12	
Chloride	mg/L	06/10/2015	0001	19		#	0.2	
Magnesium	mg/L	06/10/2015	0001	5.2		#	0.15	
Molybdenum	mg/L	06/10/2015	0001	0.0044		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2015	0001	0.091		#	0.01	
Oxidation Reduction Potential	mV	06/10/2015	N001	107.9		#		
pH	s.u.	06/10/2015	N001	8.04		#		
Potassium	mg/L	06/10/2015	0001	1	J	#	0.26	
Selenium	mg/L	06/10/2015	0001	0.00032	U	#	0.00032	
Sodium	mg/L	06/10/2015	0001	14		#	0.23	
Specific Conductance	umhos/cm	06/10/2015	N001	289		#		
Sulfate	mg/L	06/10/2015	0001	30		#	0.5	
Temperature	C	06/10/2015	N001	13.22		#		
Turbidity	NTU	06/10/2015	N001	42.4		#		
Uranium	mg/L	06/10/2015	0001	0.00081		#	0.000029	
Vanadium	mg/L	06/10/2015	0001	0.00096	J	U	#	0.00015

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

REPORT DATE: 09/23/2015

Location: 0452 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	06/09/2015	N001	25		#	0.5	
Arsenic	mg/L	06/09/2015	N001	0.008		#	0.00015	
Calcium	mg/L	06/09/2015	N001	640		#	0.12	
Chloride	mg/L	06/09/2015	N001	310		#	10	
Magnesium	mg/L	06/09/2015	N001	61		#	0.15	
Molybdenum	mg/L	06/09/2015	N001	1.9		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	4.7		#	0.05	
Oxidation Reduction Potential	mV	06/09/2015	N001	110.3		#		
pH	s.u.	06/09/2015	N001	7.96		#		
Potassium	mg/L	06/09/2015	N001	30		#	0.26	
Selenium	mg/L	06/09/2015	N001	0.01		#	0.00032	
Sodium	mg/L	06/09/2015	N001	400		#	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	4475		#		
Sulfate	mg/L	06/09/2015	N001	2100		#	25	
Temperature	C	06/09/2015	N001	31.86		#		
Turbidity	NTU	06/09/2015	N001	2.43		#		
Uranium	mg/L	06/09/2015	N001	0.12		#	0.000029	
Vanadium	mg/L	06/09/2015	N001	0.59		#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0453 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	213		#		
Ammonia Total as N	mg/L	06/09/2015	N001	11		#	1	
Arsenic	mg/L	06/09/2015	N001	0.0072		#	0.00015	
Calcium	mg/L	06/09/2015	N001	530		#	0.12	
Chloride	mg/L	06/09/2015	N001	290		#	10	
Magnesium	mg/L	06/09/2015	N001	43		#	0.15	
Molybdenum	mg/L	06/09/2015	N001	1.7		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	6.1		#	0.2	
Oxidation Reduction Potential	mV	06/09/2015	N001	62.3		#		
pH	s.u.	06/09/2015	N001	7.92		#		
Potassium	mg/L	06/09/2015	N001	23		#	0.26	
Selenium	mg/L	06/09/2015	N001	0.013		#	0.00032	
Sodium	mg/L	06/09/2015	N001	290		#	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	3652		#		
Sulfate	mg/L	06/09/2015	N001	1500		#	25	
Temperature	C	06/09/2015	N001	31.22		#		
Turbidity	NTU	06/09/2015	N001	4.05		#		
Uranium	mg/L	06/09/2015	N001	0.17		#	0.000029	
Vanadium	mg/L	06/09/2015	N001	0.82		#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0575 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	130		#		
Ammonia Total as N	mg/L	06/09/2015	N001	2		#	0.1	
Arsenic	mg/L	06/09/2015	N001	0.0012		#	0.00015	
Calcium	mg/L	06/09/2015	N001	410		#	0.12	
Chloride	mg/L	06/09/2015	N001	540		#	20	
Magnesium	mg/L	06/09/2015	N001	260		#	0.15	
Molybdenum	mg/L	06/09/2015	N001	1		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	1.2		#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	165		#		
pH	s.u.	06/09/2015	N001	8.44		#		
Potassium	mg/L	06/09/2015	N001	61		#	0.26	
Selenium	mg/L	06/09/2015	N001	0.00082	J	U	#	0.00032
Sodium	mg/L	06/09/2015	N001	1100		#	0.23	
Specific Conductance	umhos/cm	06/09/2015	N001	7435		#		
Sulfate	mg/L	06/09/2015	N001	3700		#	50	
Temperature	C	06/09/2015	N001	23.57		#		
Turbidity	NTU	06/09/2015	N001	8.2		#		
Uranium	mg/L	06/09/2015	N001	0.17		#	0.000029	
Vanadium	mg/L	06/09/2015	N001	0.0048		#	0.00015	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

Validated according to quality assurance guidelines.

**Old Rifle
Surface Water Quality Data**

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

REPORT DATE: 09/23/2015

Location: 0294 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	38	J	#		
Calcium	mg/L	06/09/2015	0001	34		#	0.024	
Chloride	mg/L	06/09/2015	0001	19		#	0.2	
Magnesium	mg/L	06/09/2015	0001	6.8		#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	0001	0.098		#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	34.3		#		
pH	s.u.	06/09/2015	N001	7.97		#		
Potassium	mg/L	06/09/2015	0001	1.7		#	0.052	
Selenium	mg/L	06/09/2015	0001	0.00033	J	#	0.00032	
Sodium	mg/L	06/09/2015	0001	17		#	0.047	
Specific Conductance	umhos/cm	06/09/2015	N001	269		#		
Sulfate	mg/L	06/09/2015	0001	31		#	0.5	
Temperature	C	06/09/2015	N001	15.32		#		
Turbidity	NTU	06/09/2015	N001	30.1		#		
Uranium	mg/L	06/09/2015	0001	0.00097		#	0.000029	
Vanadium	mg/L	06/09/2015	0001	0.0045		#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0395 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Calcium	mg/L	06/09/2015	N001	94		#	0.024	
Chloride	mg/L	06/09/2015	N001	25		#	2	
Magnesium	mg/L	06/09/2015	N001	60		#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	0.12		#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	104.2		#		
pH	s.u.	06/09/2015	N001	7.82		#		
Potassium	mg/L	06/09/2015	N001	2.7		#	0.052	
Selenium	mg/L	06/09/2015	N001	0.004		#	0.00032	
Sodium	mg/L	06/09/2015	N001	66		#	0.047	
Specific Conductance	umhos/cm	06/09/2015	N001	1072		#		
Sulfate	mg/L	06/09/2015	N001	260		#	5	
Temperature	C	06/09/2015	N001	30.02		#		
Turbidity	NTU	06/09/2015	N001	9.55		#		
Uranium	mg/L	06/09/2015	N001	0.019		#	0.000029	
Vanadium	mg/L	06/09/2015	N001	0.003		#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0396 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/18/2015	0001	47		#		
Calcium	mg/L	06/18/2015	0001	25		#	0.024	
Chloride	mg/L	06/18/2015	0001	16		#	0.2	
Magnesium	mg/L	06/18/2015	0001	4.5		#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/18/2015	0001	0.081		#	0.01	
Oxidation Reduction Potential	mV	06/18/2015	N001	123.5		#		
pH	s.u.	06/18/2015	N001	7.47		#		
Potassium	mg/L	06/18/2015	0001	1.1		#	0.052	
Selenium	mg/L	06/18/2015	0001	0.00098	J	#	0.00032	
Sodium	mg/L	06/18/2015	0001	13		#	0.047	
Specific Conductance	umhos/cm	06/18/2015	N001	235		#		
Sulfate	mg/L	06/18/2015	0001	25		#	0.5	
Temperature	C	06/18/2015	N001	15.86		#		
Turbidity	NTU	06/18/2015	N001	71.8		#		
Uranium	mg/L	06/18/2015	0001	0.00078		#	0.000029	
Vanadium	mg/L	06/18/2015	0001	0.0012	J	#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0398 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/09/2015	N001	195		#		
Calcium	mg/L	06/09/2015	N001	120		#	0.024	
Chloride	mg/L	06/09/2015	N001	100		#	2	
Magnesium	mg/L	06/09/2015	N001	42		#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/09/2015	N001	0.15		#	0.01	
Oxidation Reduction Potential	mV	06/09/2015	N001	139.1		#		
pH	s.u.	06/09/2015	N001	8.1		#		
Potassium	mg/L	06/09/2015	N001	2.8		#	0.052	
Selenium	mg/L	06/09/2015	N001	0.0015		#	0.00032	
Sodium	mg/L	06/09/2015	N001	100		#	0.047	
Specific Conductance	umhos/cm	06/09/2015	N001	1266		#		
Sulfate	mg/L	06/09/2015	N001	300		#	5	
Temperature	C	06/09/2015	N001	20.62		#		
Turbidity	NTU	06/09/2015	N001	7.5		#		
Uranium	mg/L	06/09/2015	N001	0.011		#	0.000029	
Vanadium	mg/L	06/09/2015	N001	0.0042		#	0.00015	

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

REPORT DATE: 09/23/2015

Location: 0741 SURFACE LOCATION

Parameter	Units	Sample ID	Date	Result	Qualifiers Data	Lab QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/18/2015	0001	51		#		
Calcium	mg/L	06/18/2015	0001	25		#	0.024	
Chloride	mg/L	06/18/2015	0001	16		#	0.2	
Magnesium	mg/L	06/18/2015	0001	4.5		#	0.03	
Nitrate + Nitrite as Nitrogen	mg/L	06/18/2015	0001	0.085		#	0.01	
Oxidation Reduction Potential	mV	06/18/2015	N001	106.5		#		
pH	s.u.	06/18/2015	N001	7.09		#		
Potassium	mg/L	06/18/2015	0001	1.1		#	0.052	
Selenium	mg/L	06/18/2015	0001	0.00032	U	#	0.00032	
Sodium	mg/L	06/18/2015	0001	13		#	0.047	
Specific Conductance	umhos/cm	06/18/2015	N001	240		#		
Sulfate	mg/L	06/18/2015	0001	25		#	0.5	
Temperature	C	06/18/2015	N001	16.64		#		
Turbidity	NTU	06/18/2015	N001	83.8		#		
Uranium	mg/L	06/18/2015	0001	0.00077		#	0.000029	
Vanadium	mg/L	06/18/2015	0001	0.0013	J	#	0.00015	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

Equipment Blank Data

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BLANKS REPORT

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

RIN: 15067101

Report Date: 09/23/2015

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab Data	Detection Limit	Uncertainty	Sample Type
Calcium	RFO01	0999	06/18/2015	N001	mg/L	0.066	J	0.024		E
Chloride	RFO01	0999	06/18/2015	N001	mg/L	0.2	U	0.2		E
Magnesium	RFO01	0999	06/18/2015	N001	mg/L	0.035	J	0.03		E
Nitrate + Nitrite as Nitrogen	RFO01	0999	06/18/2015	N001	mg/L	0.01	U	0.01		E
Potassium	RFO01	0999	06/18/2015	N001	mg/L	0.1	J	0.052		E
Selenium	RFO01	0999	06/18/2015	N001	mg/L	0.00032	U	0.00032		E
Sodium	RFO01	0999	06/18/2015	N001	mg/L	0.12	J	0.047		E
Sulfate	RFO01	0999	06/18/2015	N001	mg/L	0.5	U	0.5		E
Uranium	RFO01	0999	06/18/2015	N001	mg/L	0.00006	J	0.000029		E
Vanadium	RFO01	0999	06/18/2015	N001	mg/L	0.00098	J U	0.00015		E

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

- F Low flow sampling method used.
- 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: 09/23/2015

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Time	Date	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0169	U	5275.47	06/09/2015	09:40:51	6.7	5268.77	
0170	D	5332.97	06/11/2015	10:00:59	94.71	5238.26	
0172	D	5229.45	06/10/2015	12:05:02	15.79	5213.66	
0195	D	5253.1	07/20/2015	12:55:04	9.5	5243.6	
0201	D	5261.07	06/09/2015	16:10:46	12.68	5248.39	
0215	O	5271.42	06/09/2015	10:20:06	7.69	5263.73	
0216	O	5265.41	07/17/2015	11:50:27	5.7	5259.71	
0217	D	5256.98	06/09/2015	15:10:55	3.29	5253.69	
0590	D	5256.37	06/09/2015	14:30:45	6.15	5250.22	
0609	D	5260.19	07/17/2015	14:25:13	10	5250.19	
0620	D	5231.22	06/11/2015	09:00:23	8.05	5223.17	
0658	O	5265.91	06/09/2015	11:50:34	4.52	5261.39	
0659	O	5261.33	06/09/2015	13:40:42	5.98	5255.35	
0664	O	5270.17	06/10/2015	10:25:22	12.24	5257.93	
0669	O	5266.56	06/10/2015	10:50:38	8.51	5258.05	
0670	O	5270.94	06/09/2015	10:50:23	11.61	5259.33	
0855	O	5267.24	06/09/2015	11:20:10	5.68	5261.56	

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

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

STATIC WATER LEVELS (USEE700) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 09/23/2015

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Time	Date	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0292A		5323.08	06/09/2015	09:20:54	10.6	5312.48	
0304	O	5310.63	06/09/2015	15:30:56	6.4	5304.23	
0305	O	5312.08	06/09/2015	15:10:23	8.5	5303.58	
0309	O	5313.37	06/09/2015	16:30:10	11	5302.37	
0310	O	5311.64	06/09/2015	16:00:30	8.42	5303.22	
0655	O	5312.87	06/10/2015	09:35:40	9.55	5303.32	
0656	O	5313.28	06/09/2015	14:20:07	8.68	5304.6	
0658	U	5323.07	06/09/2015	11:30:32	6.33	5316.74	

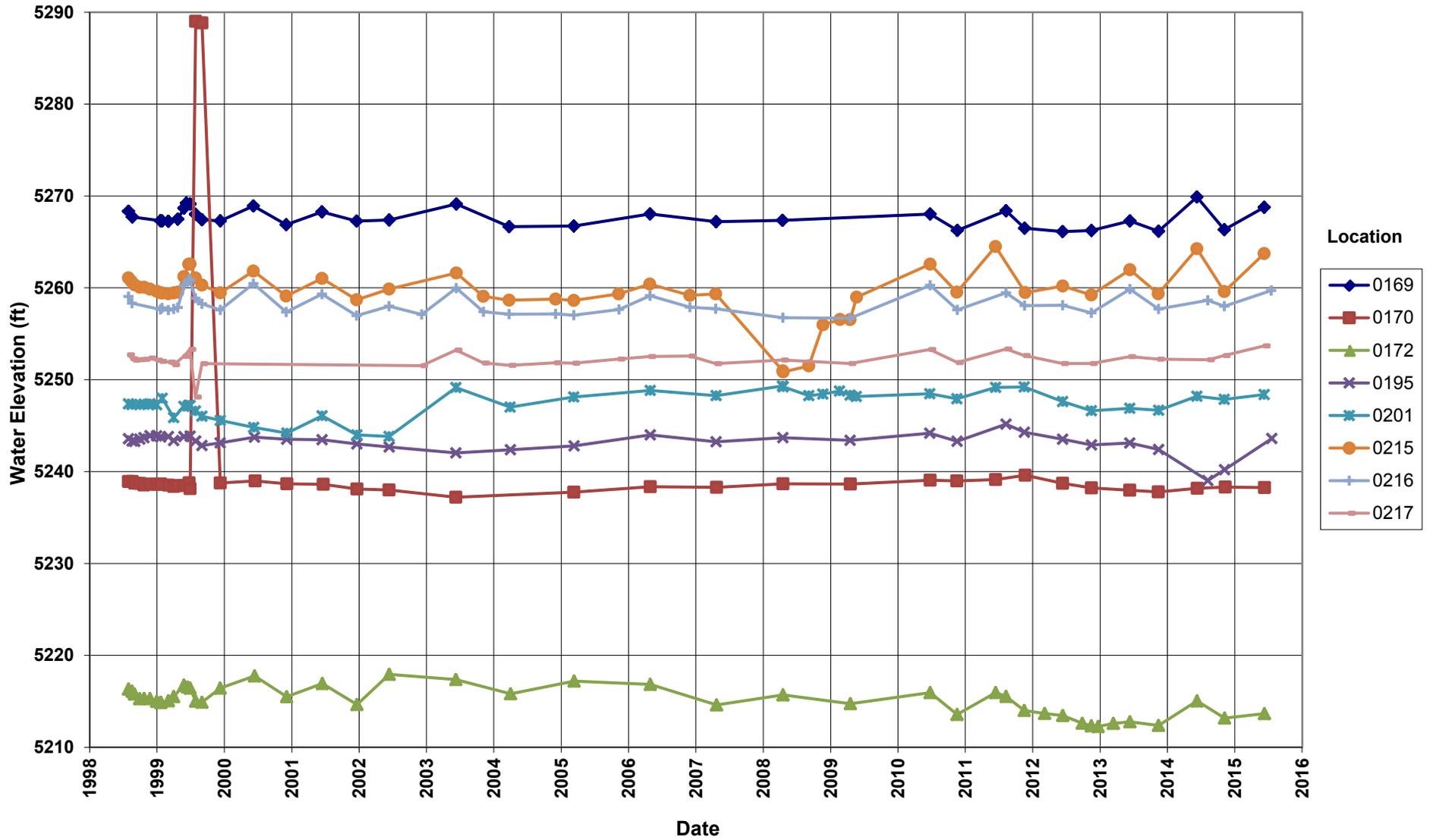
FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWNGRADIENT F OFFSITE
 N UNKNOWN O ONSITE U UPGRADIENT

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

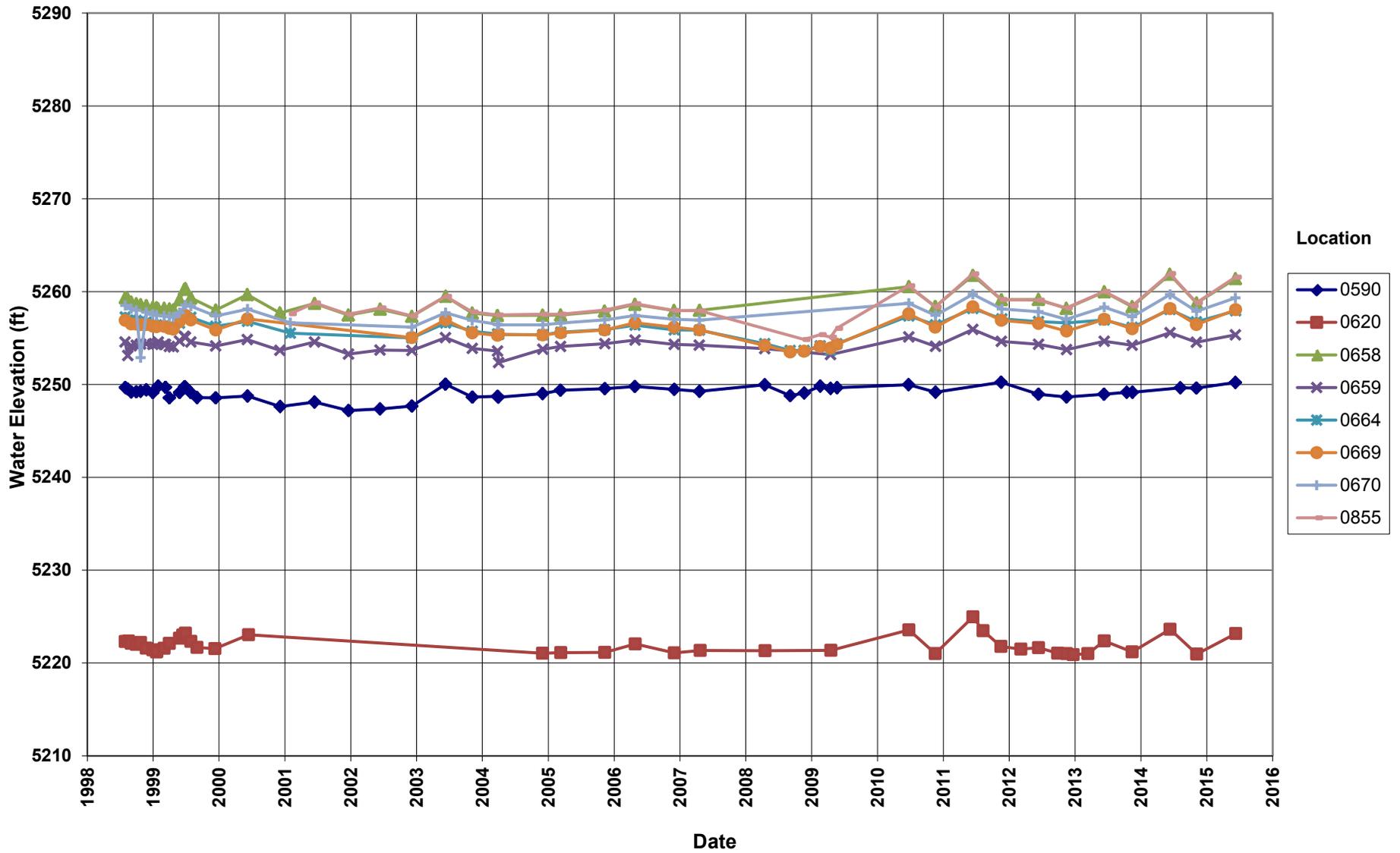
New Rifle Hydrographs

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Rifle New Processing Site Hydrograph



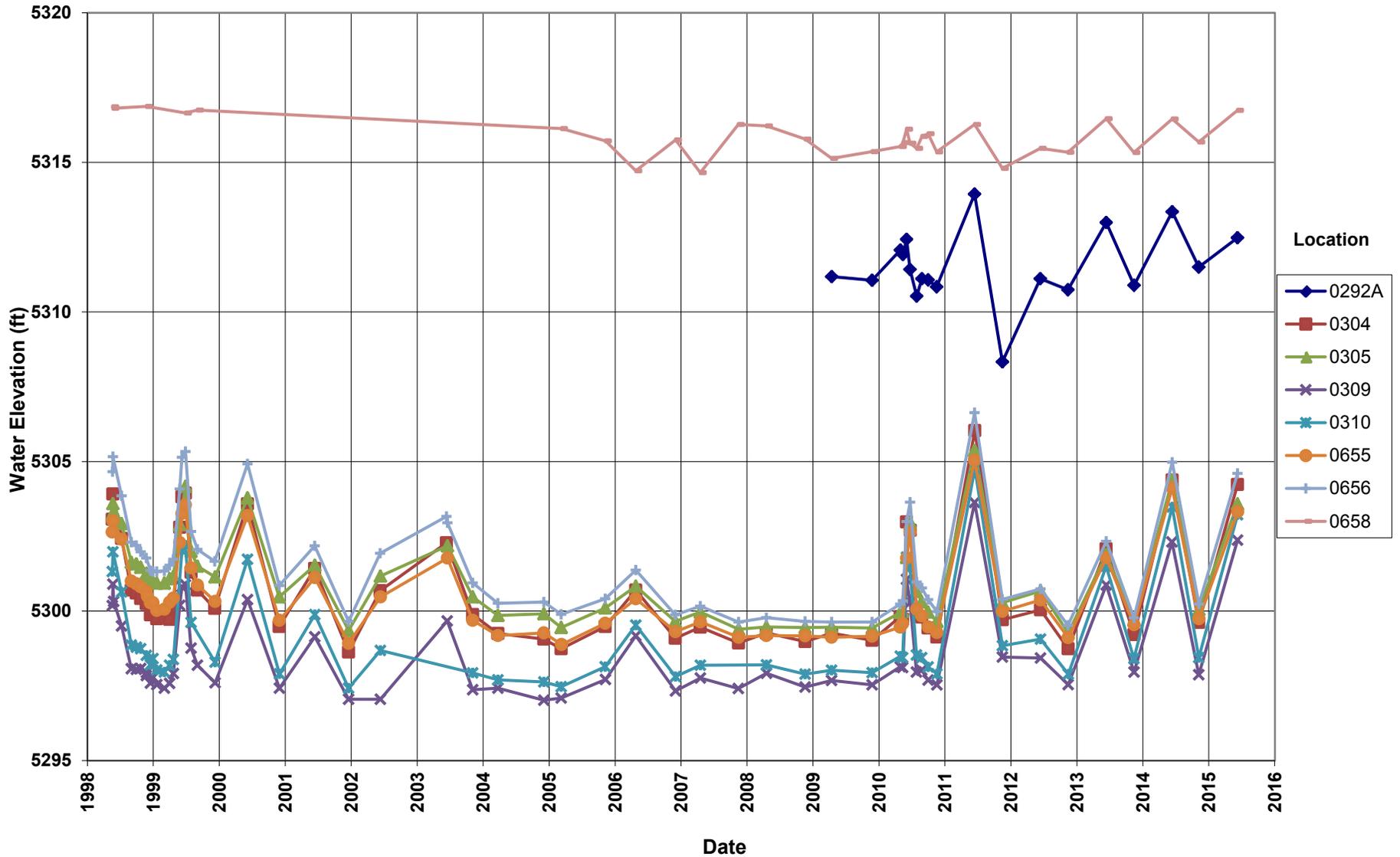
Rifle New Processing Site Hydrograph



Old Rifle Hydrograph

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Rifle Old Processing Site Hydrograph

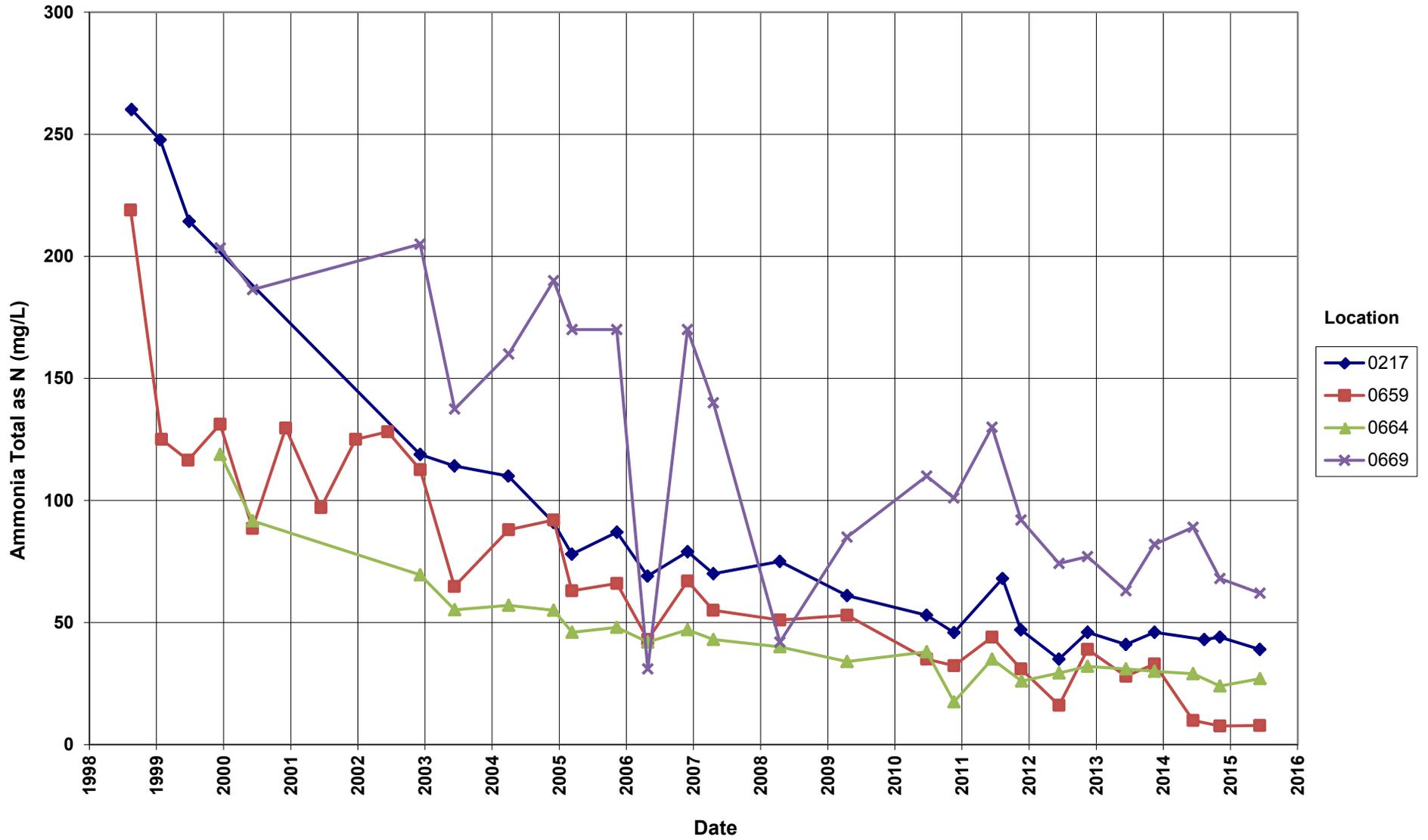


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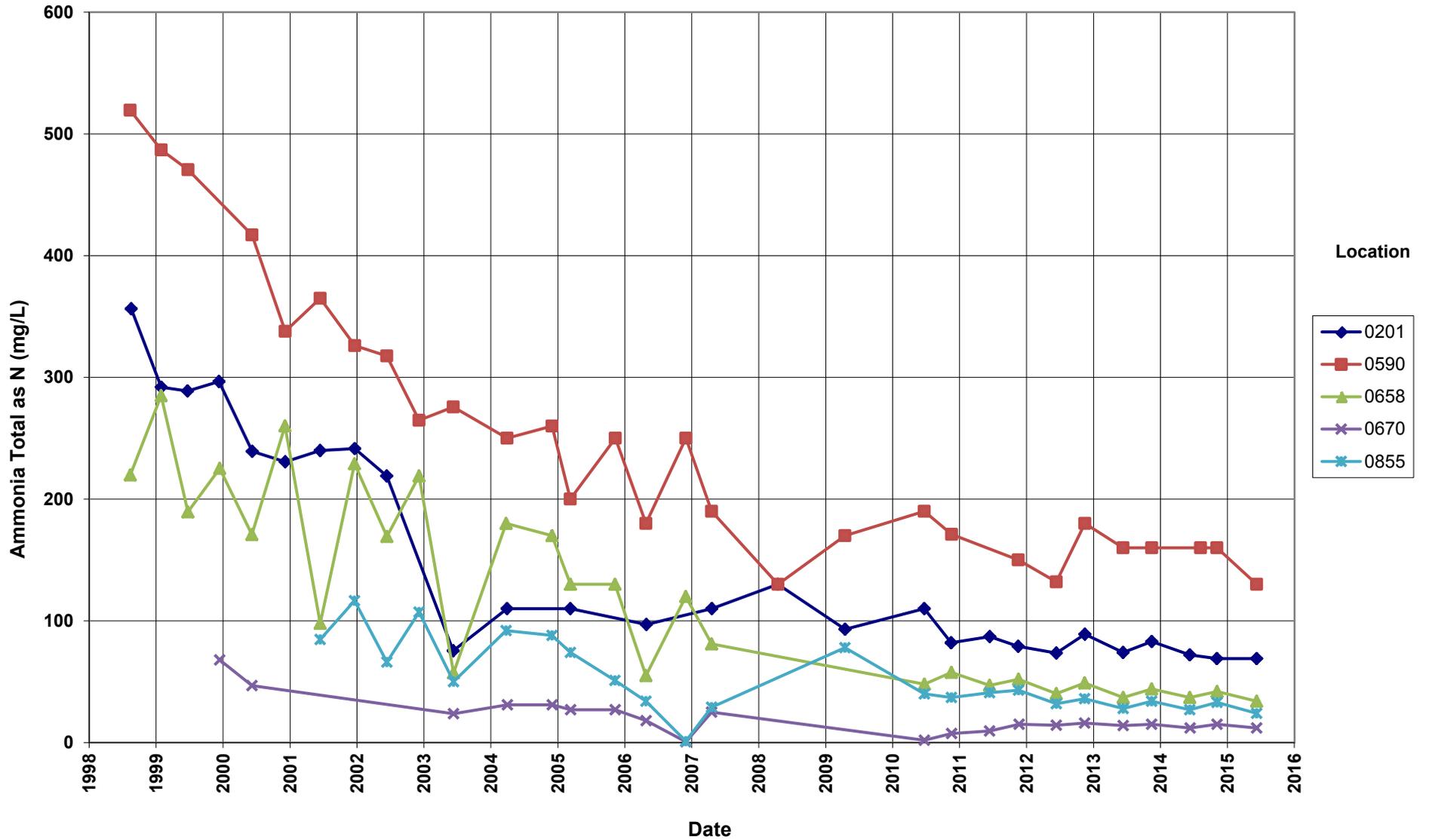
New Rifle Groundwater Time-Concentration Graphs

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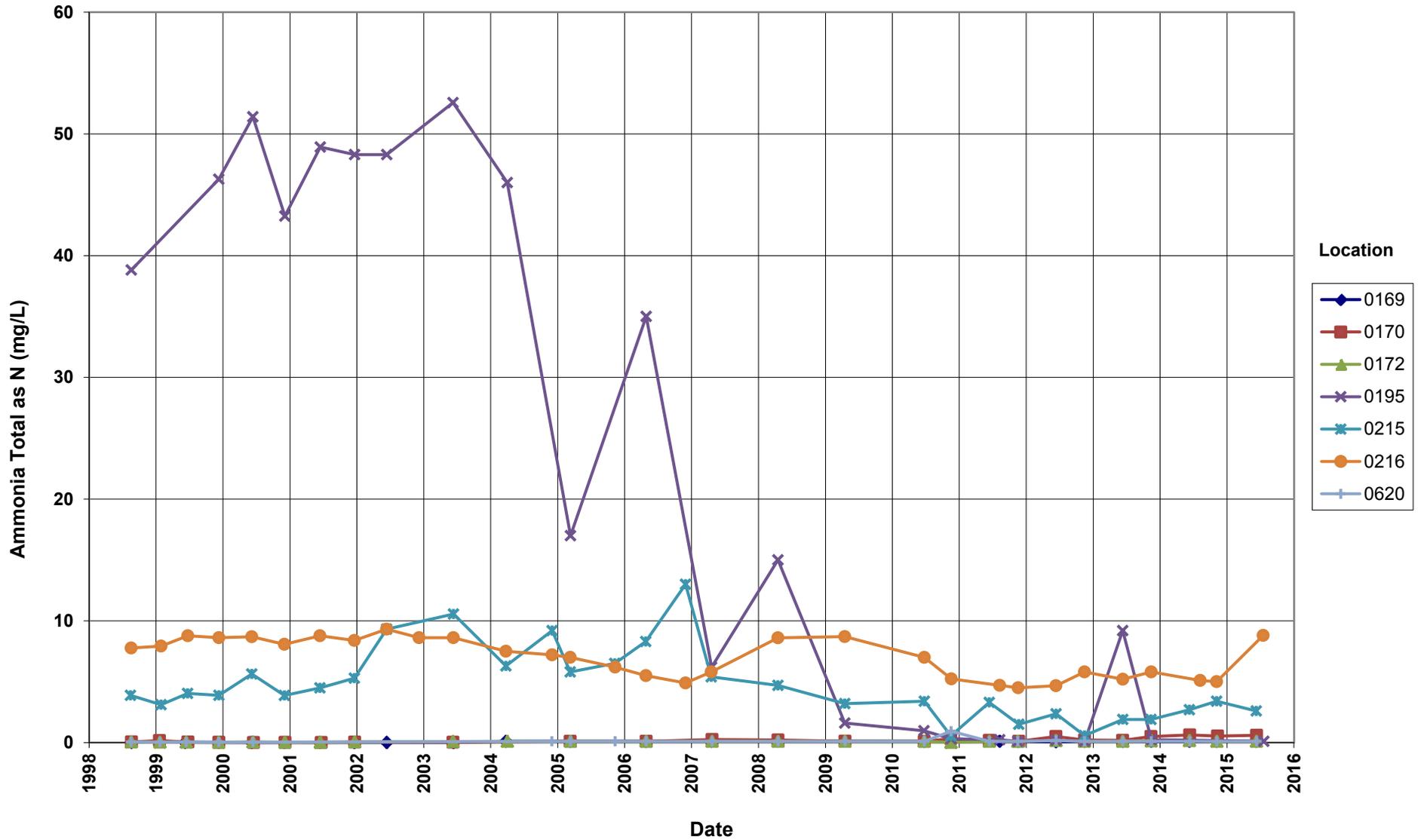
**Rifle New Processing Site
Ammonia Total as N Concentration
Point of Compliance Wells**



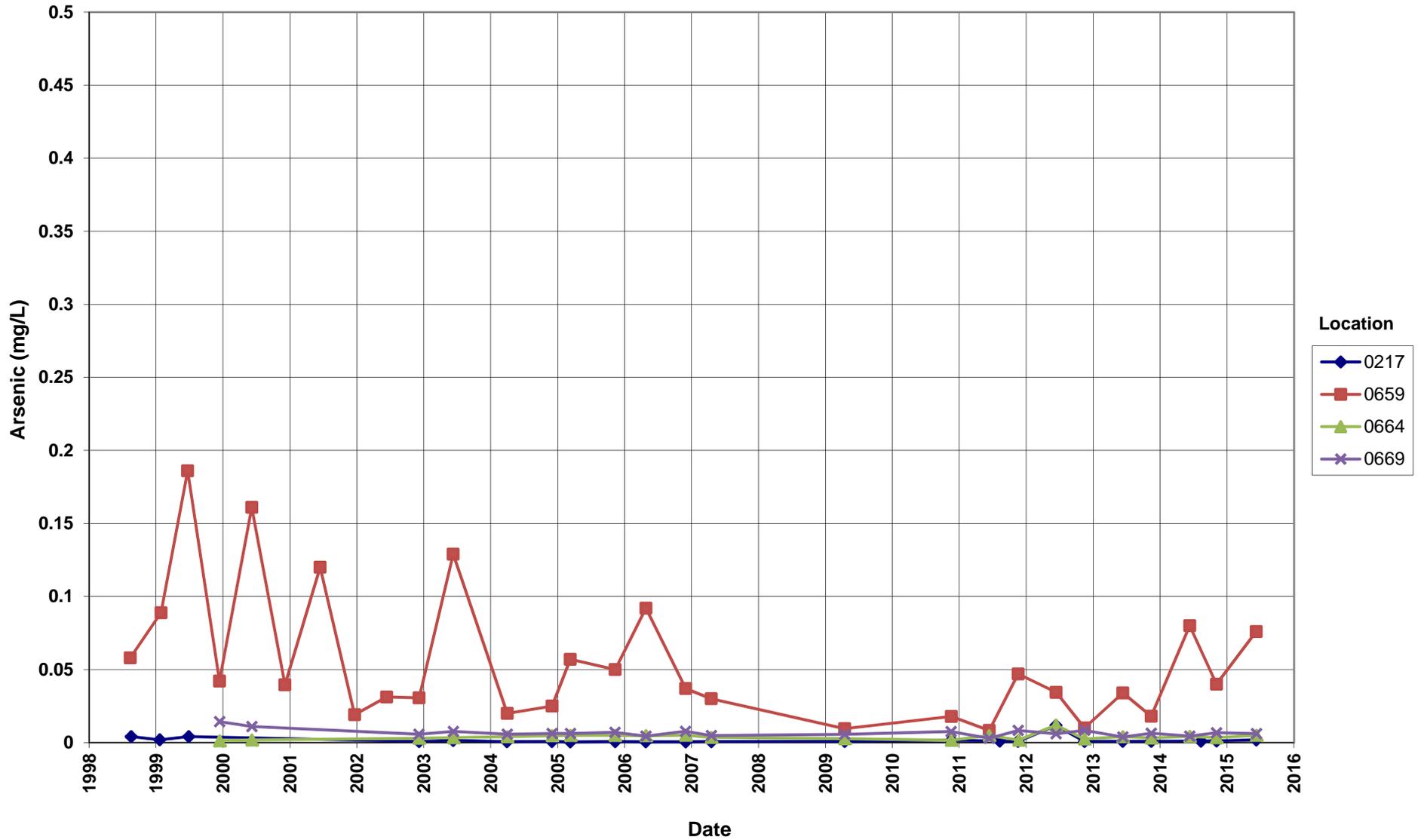
Rifle New Processing Site Ammonia Total as N Concentration



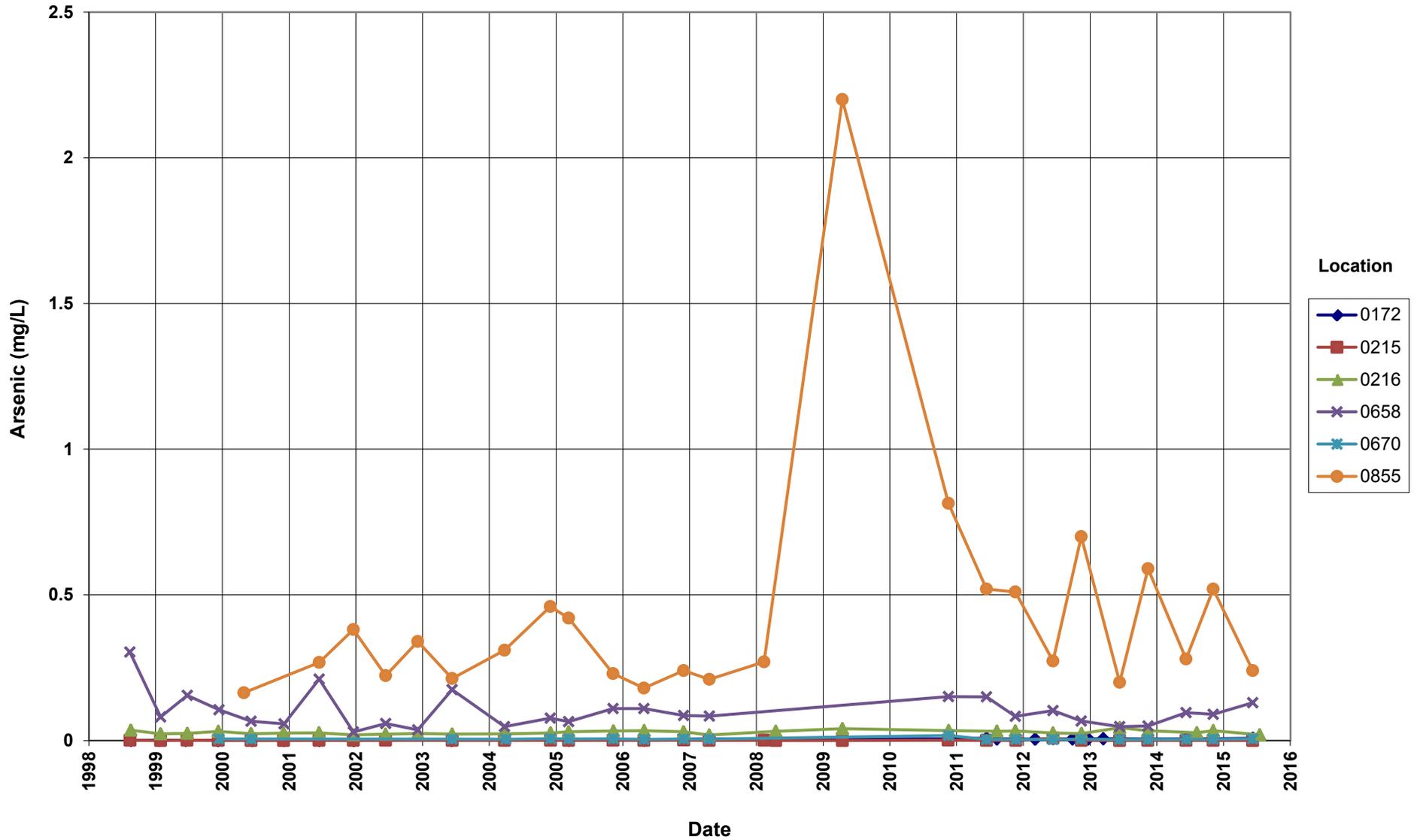
Rifle New Processing Site Ammonia Total as N Concentration



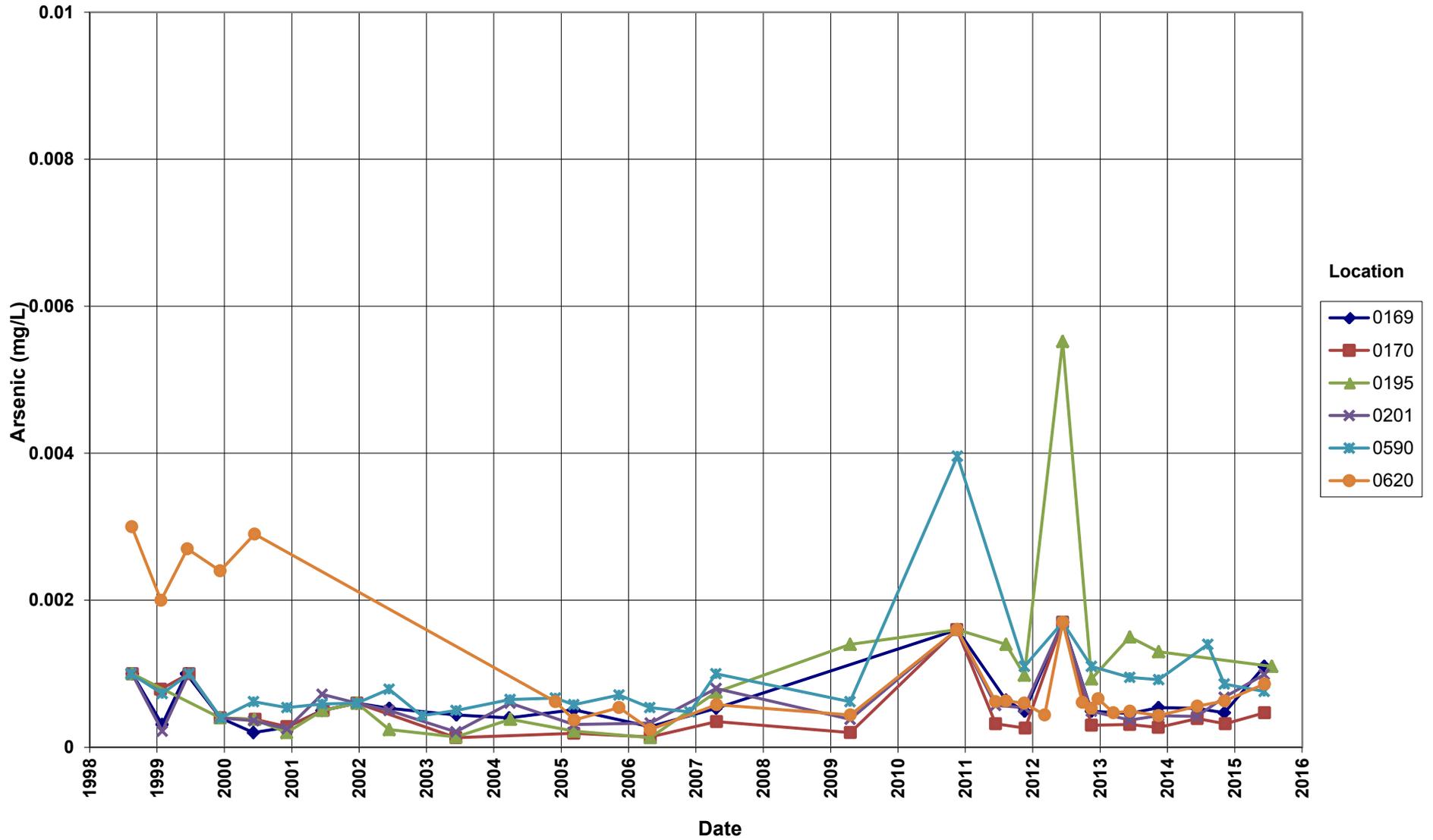
Rifle New Processing Site
Arsenic Concentration
Point of Compliance Wells



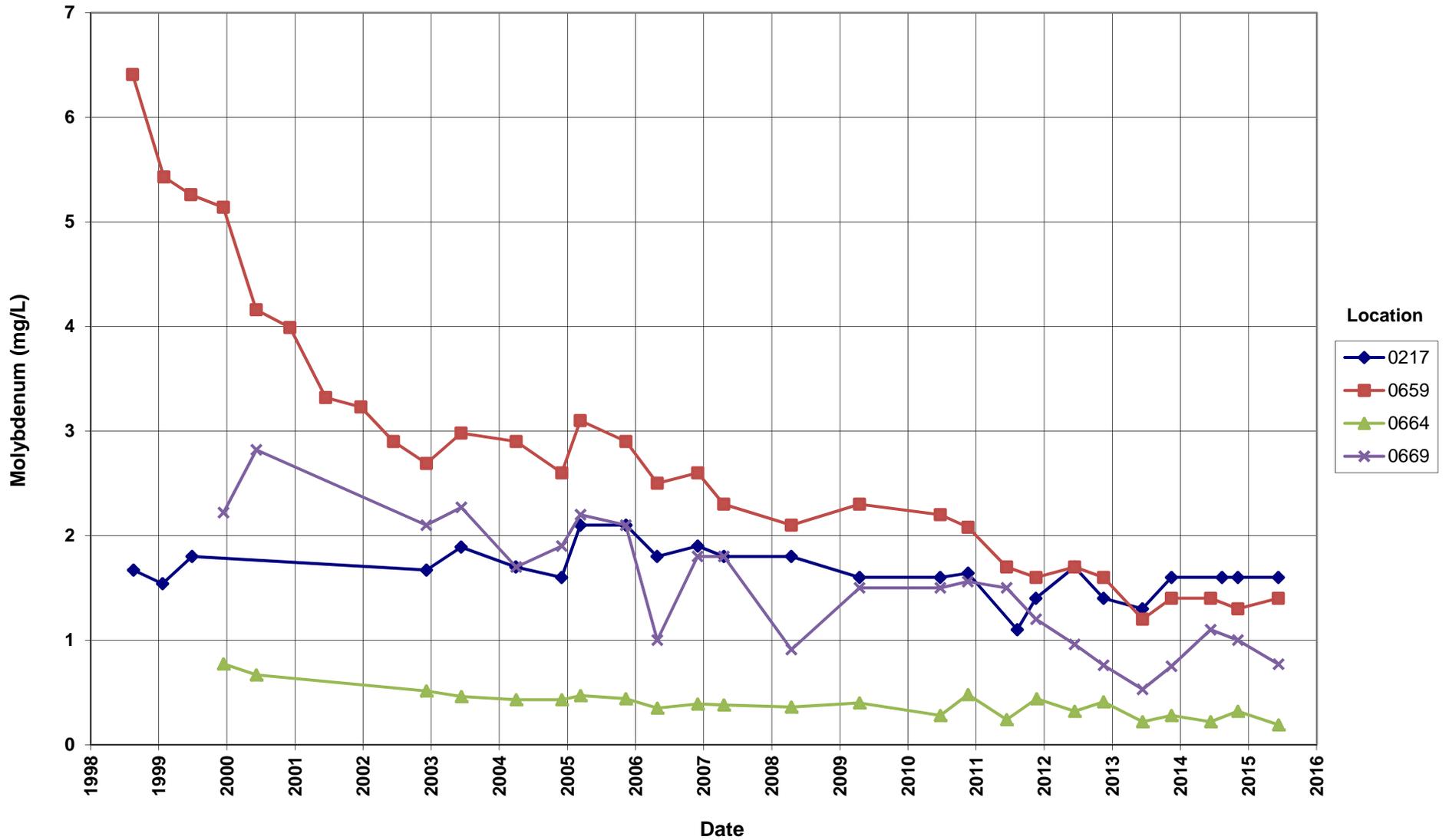
Rifle New Processing Site Arsenic Concentration



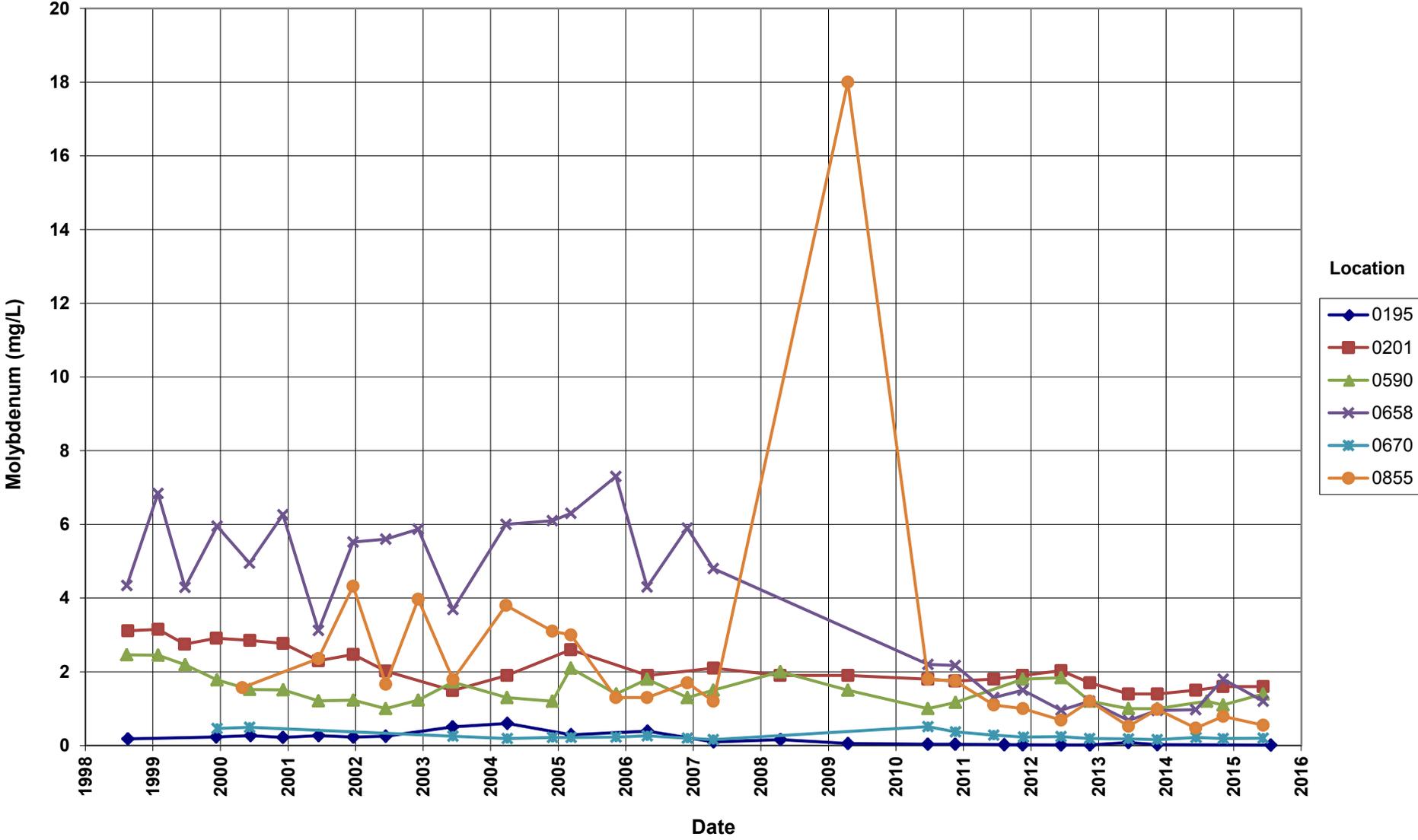
Rifle New Processing Site Arsenic Concentration



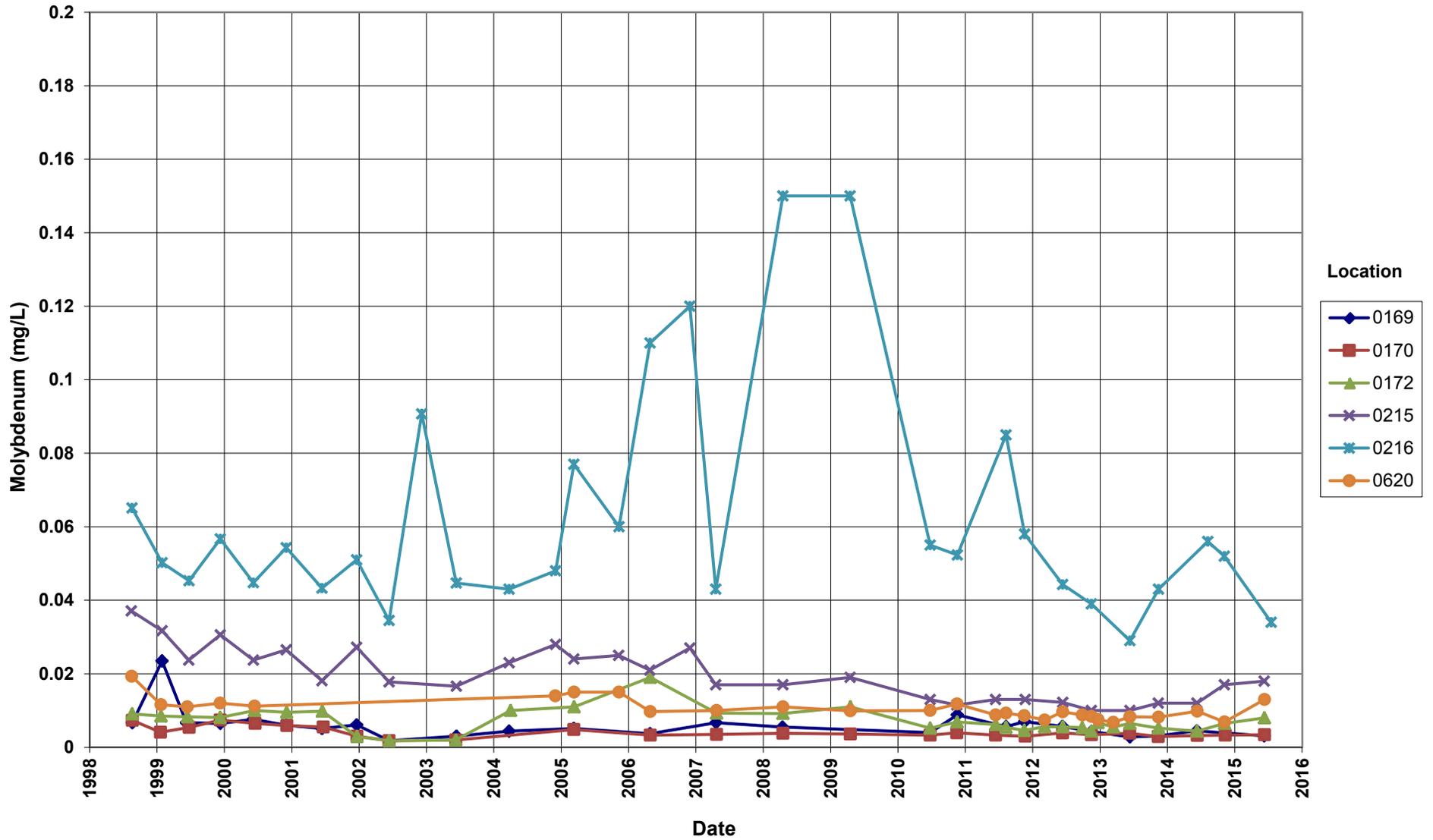
Rifle New Processing Site
Molybdenum Concentration
Point of Compliance Wells



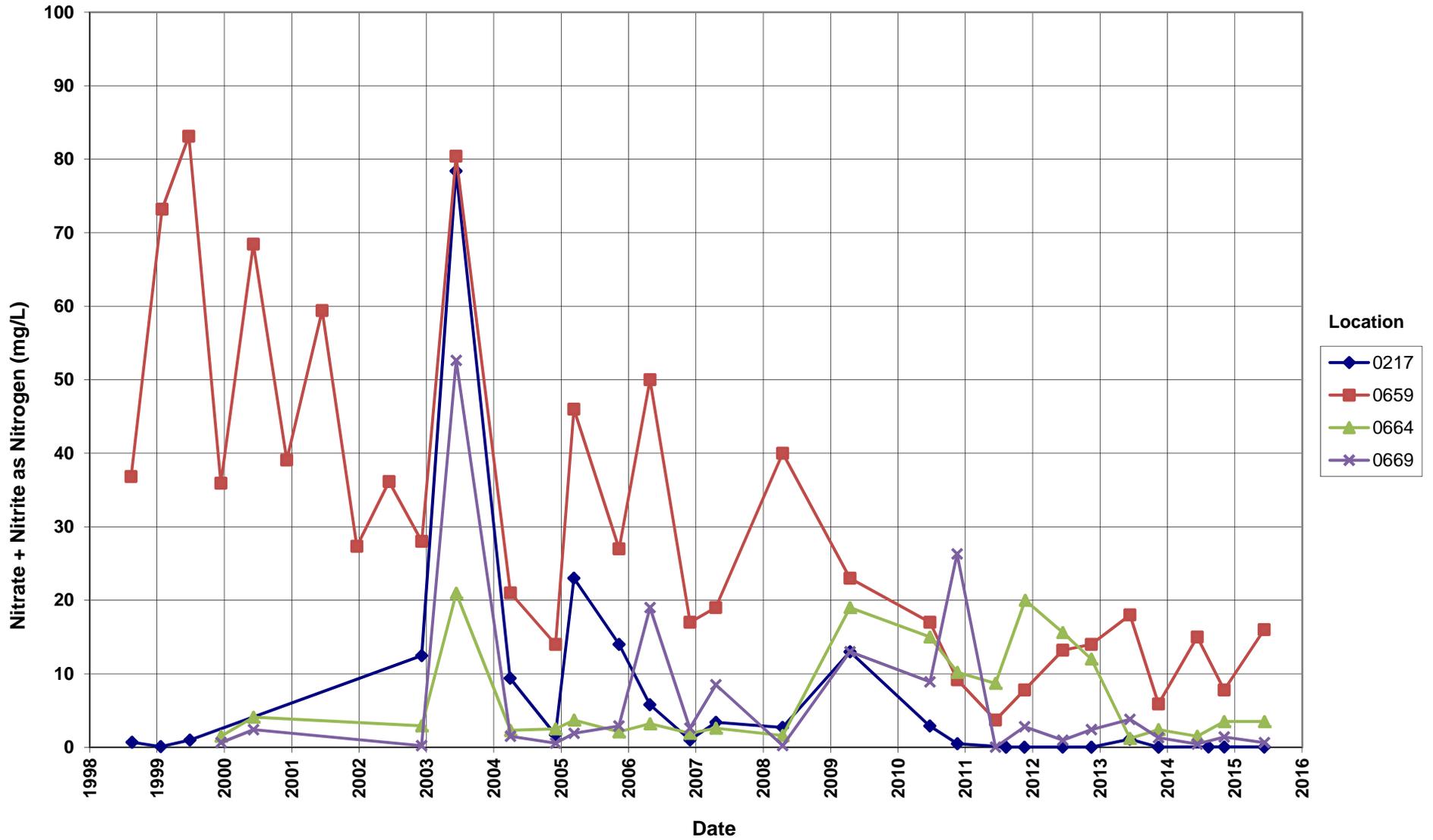
Rifle New Processing Site Molybdenum Concentration



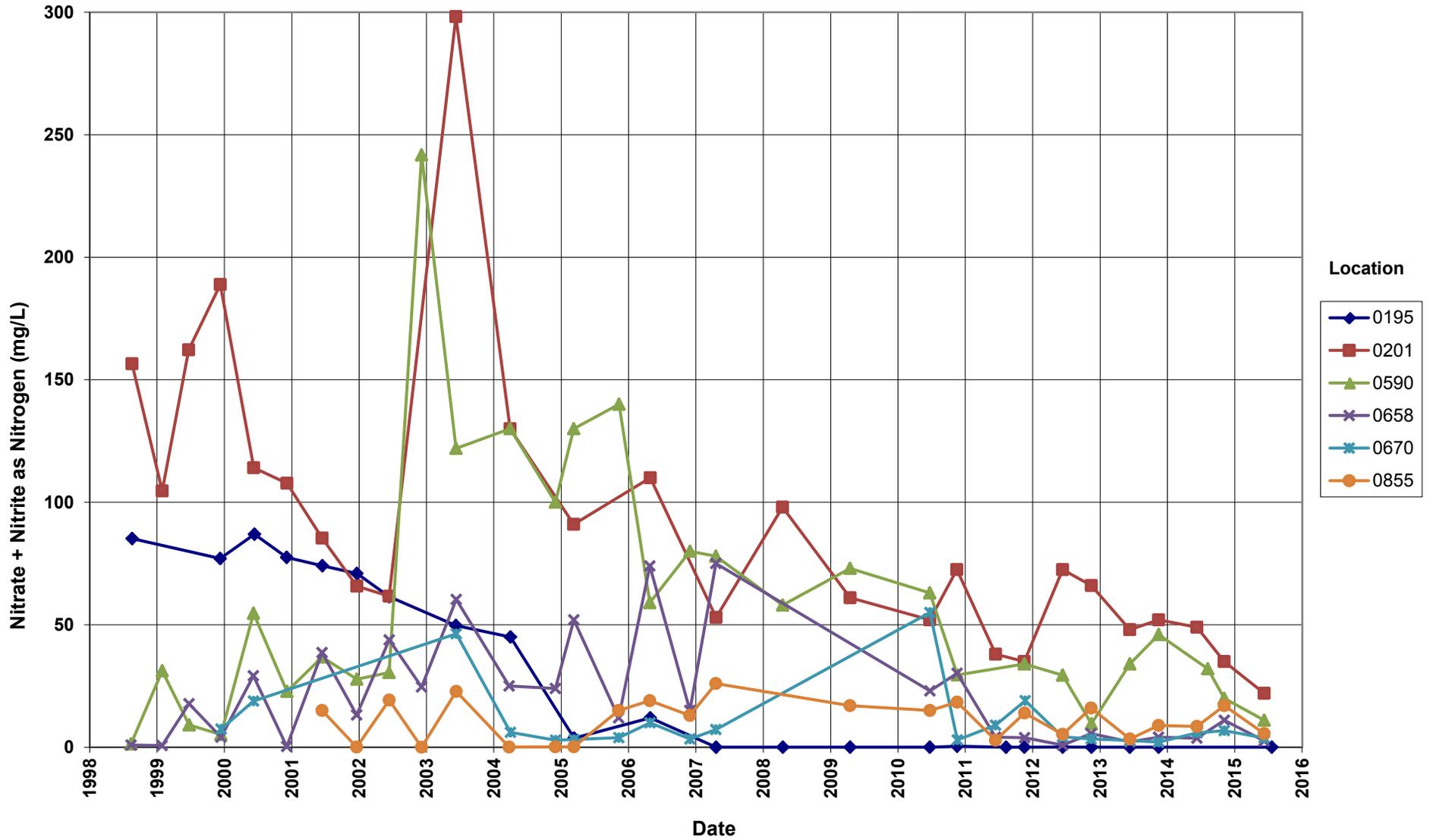
Rifle New Processing Site Molybdenum Concentration



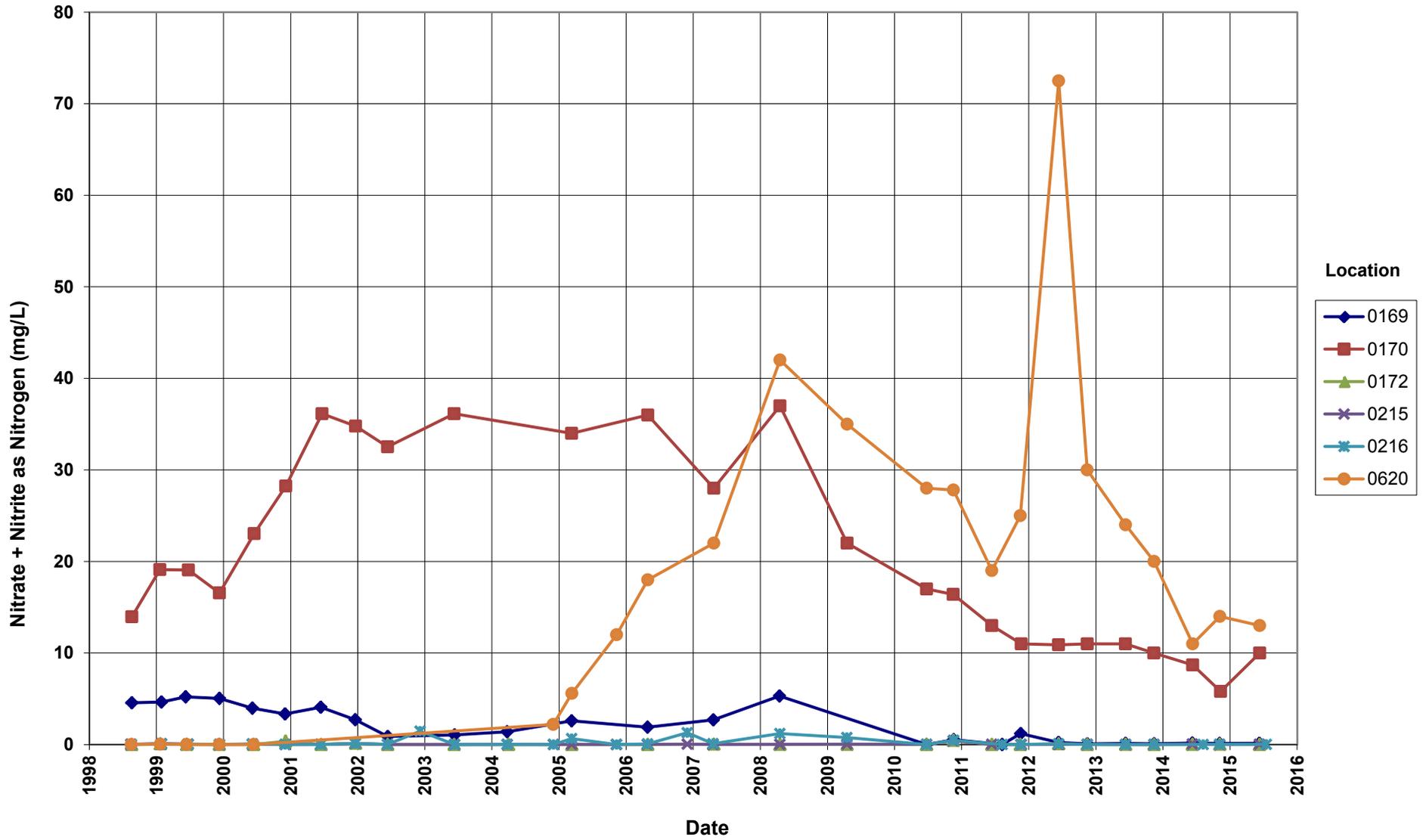
Rifle New Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Point of Compliance Wells



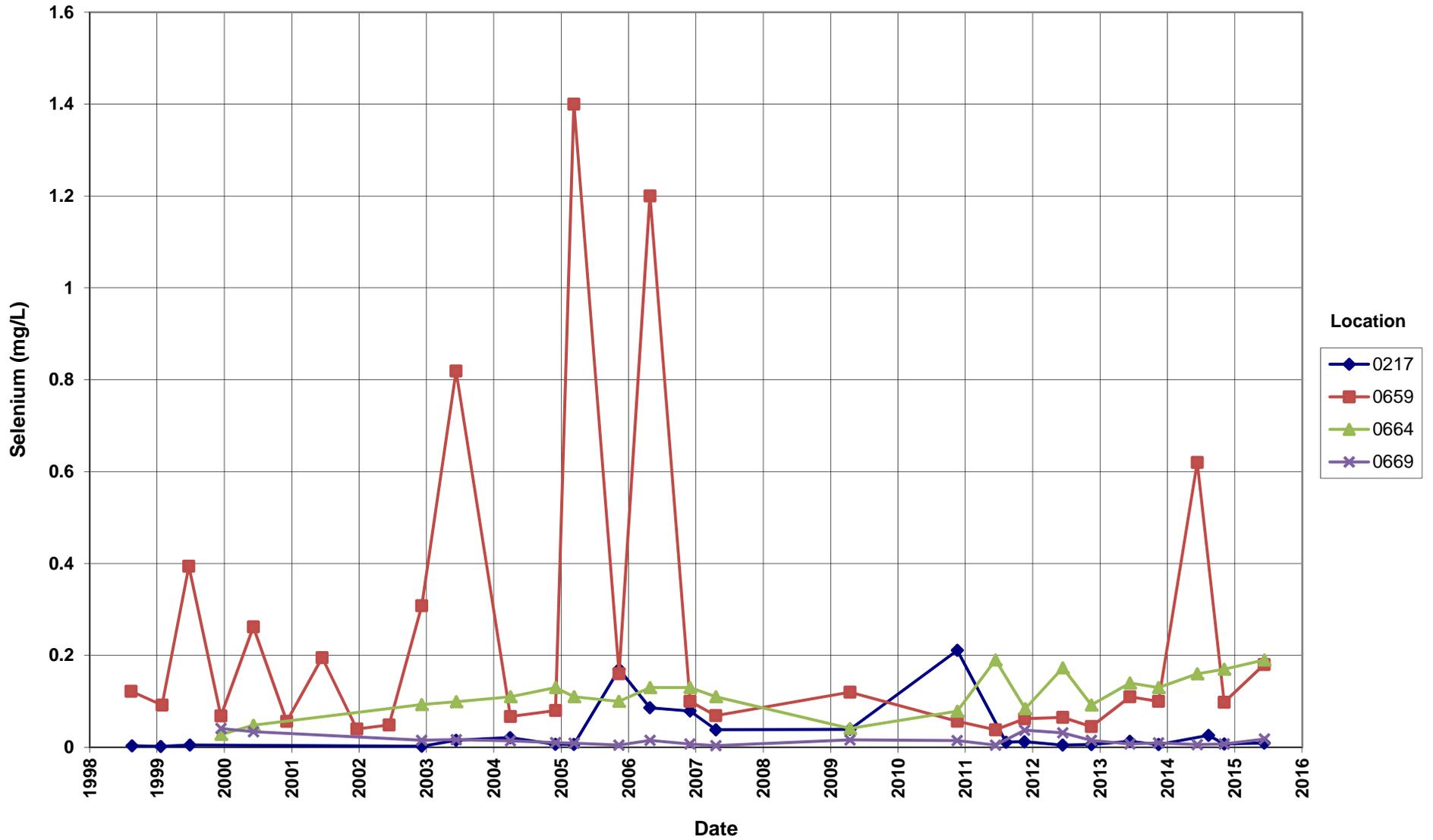
Rifle New Processing Site Nitrate + Nitrite as Nitrogen Concentration



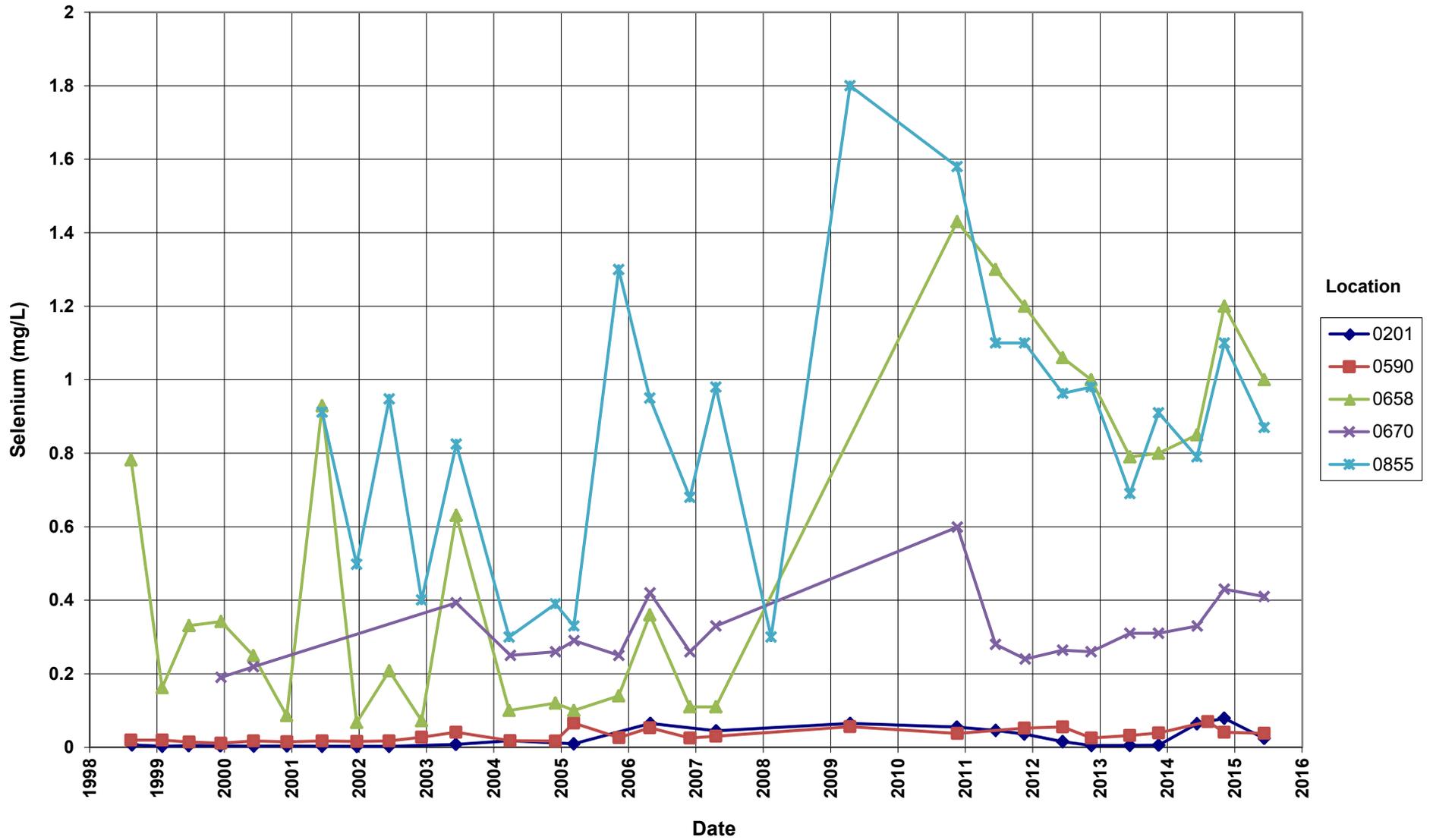
Rifle New Processing Site Nitrate + Nitrite as Nitrogen Concentration



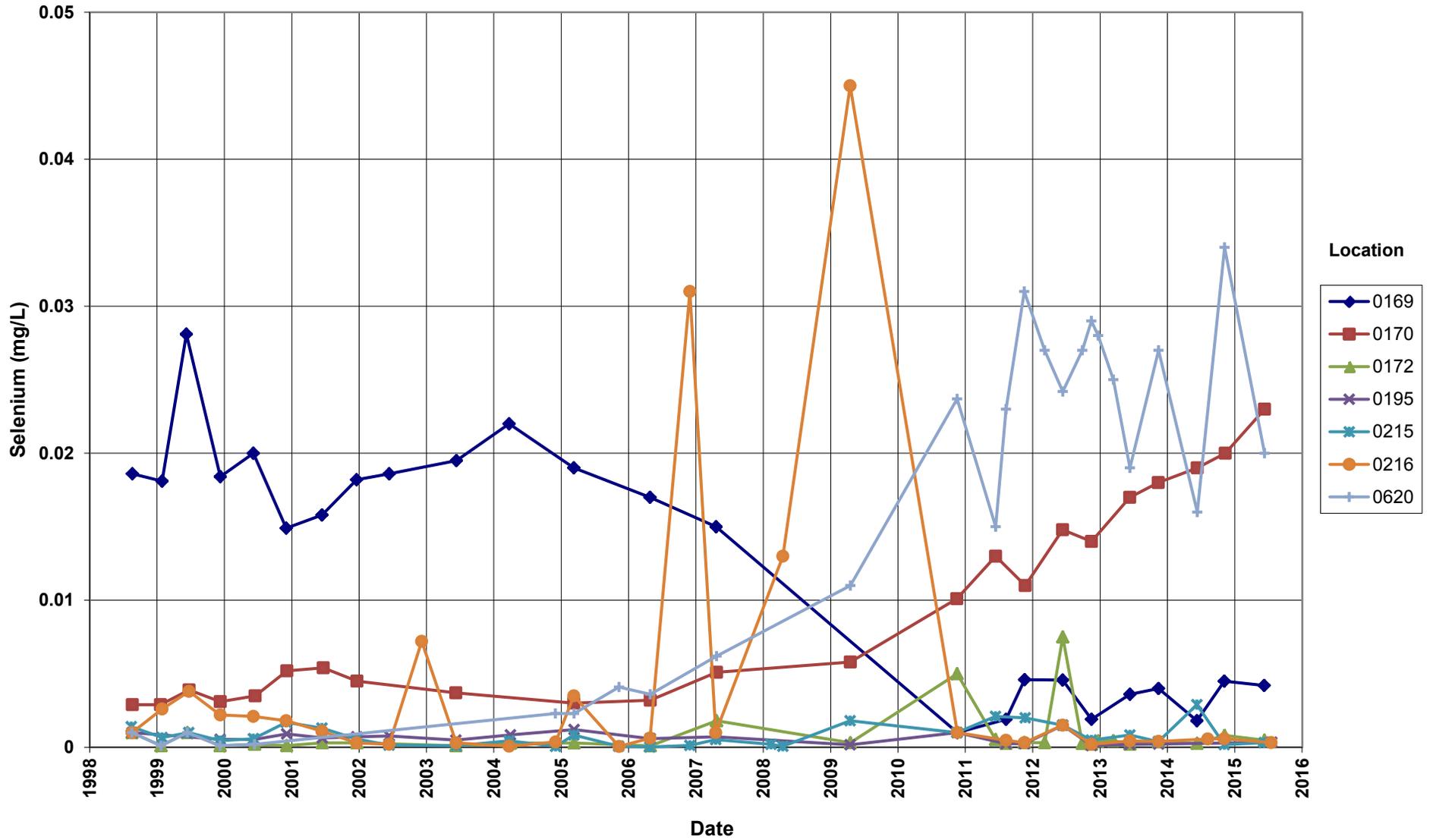
Rifle New Processing Site Selenium Concentration Point of Compliance Wells



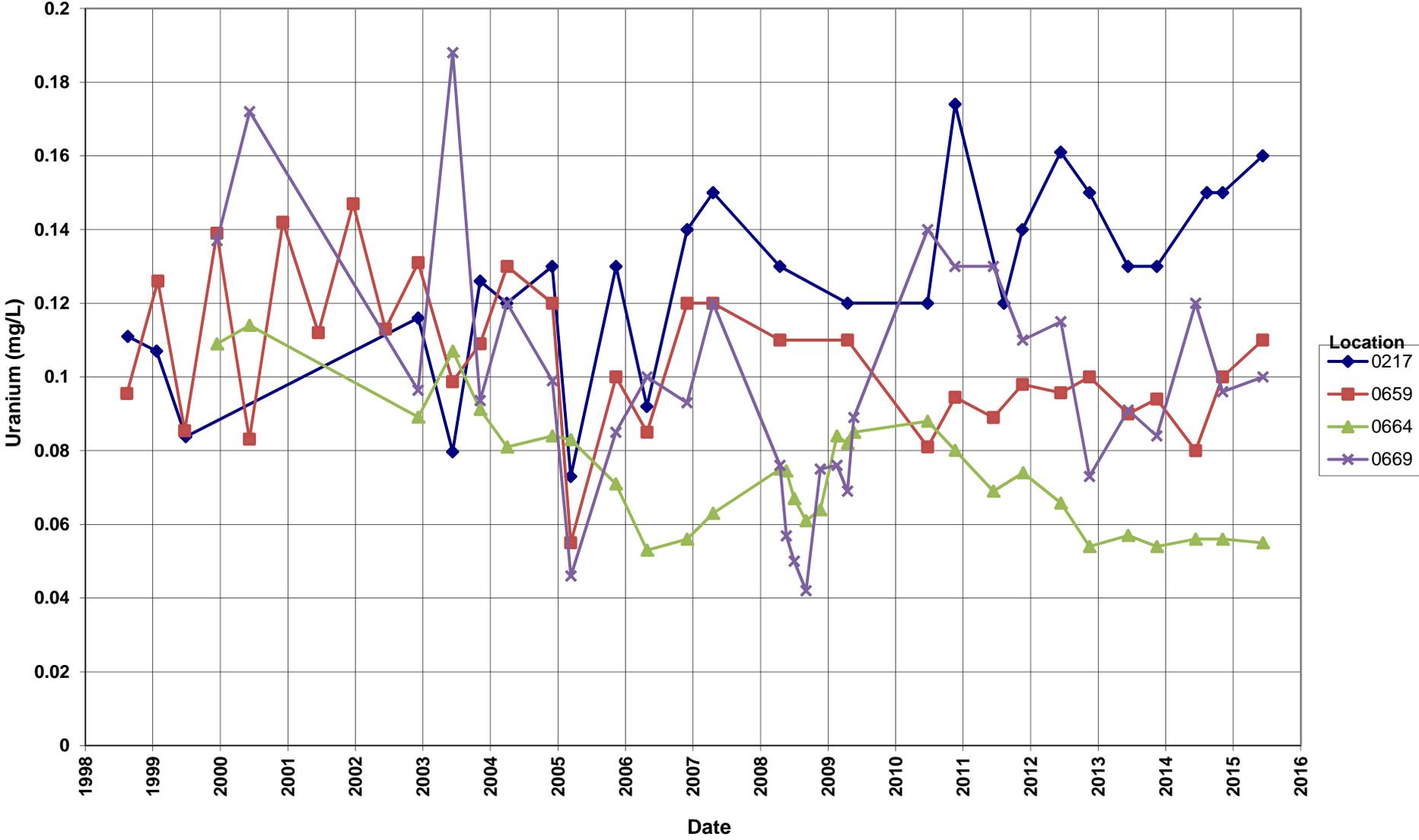
Rifle New Processing Site Selenium Concentration



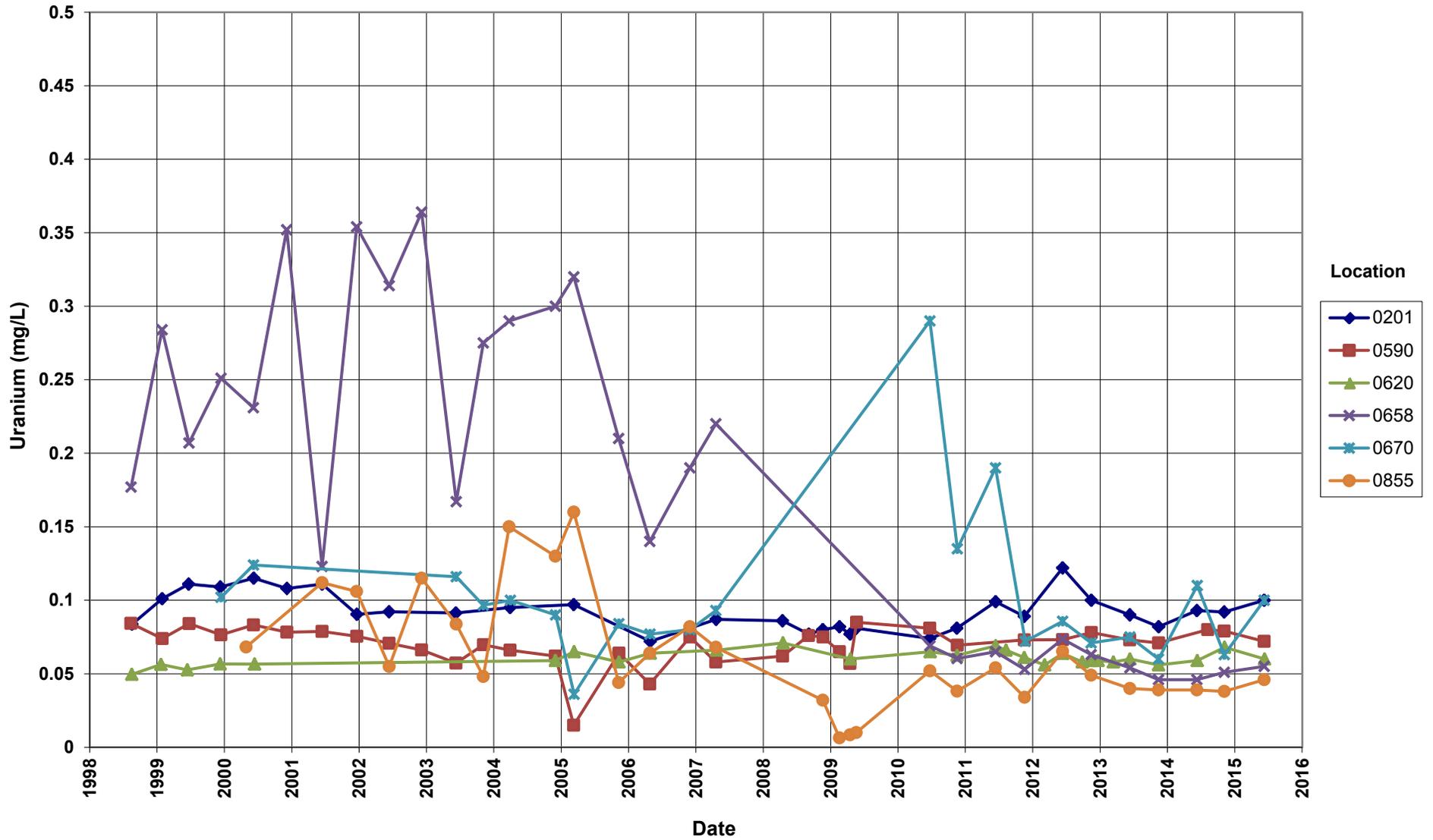
Rifle New Processing Site Selenium Concentration



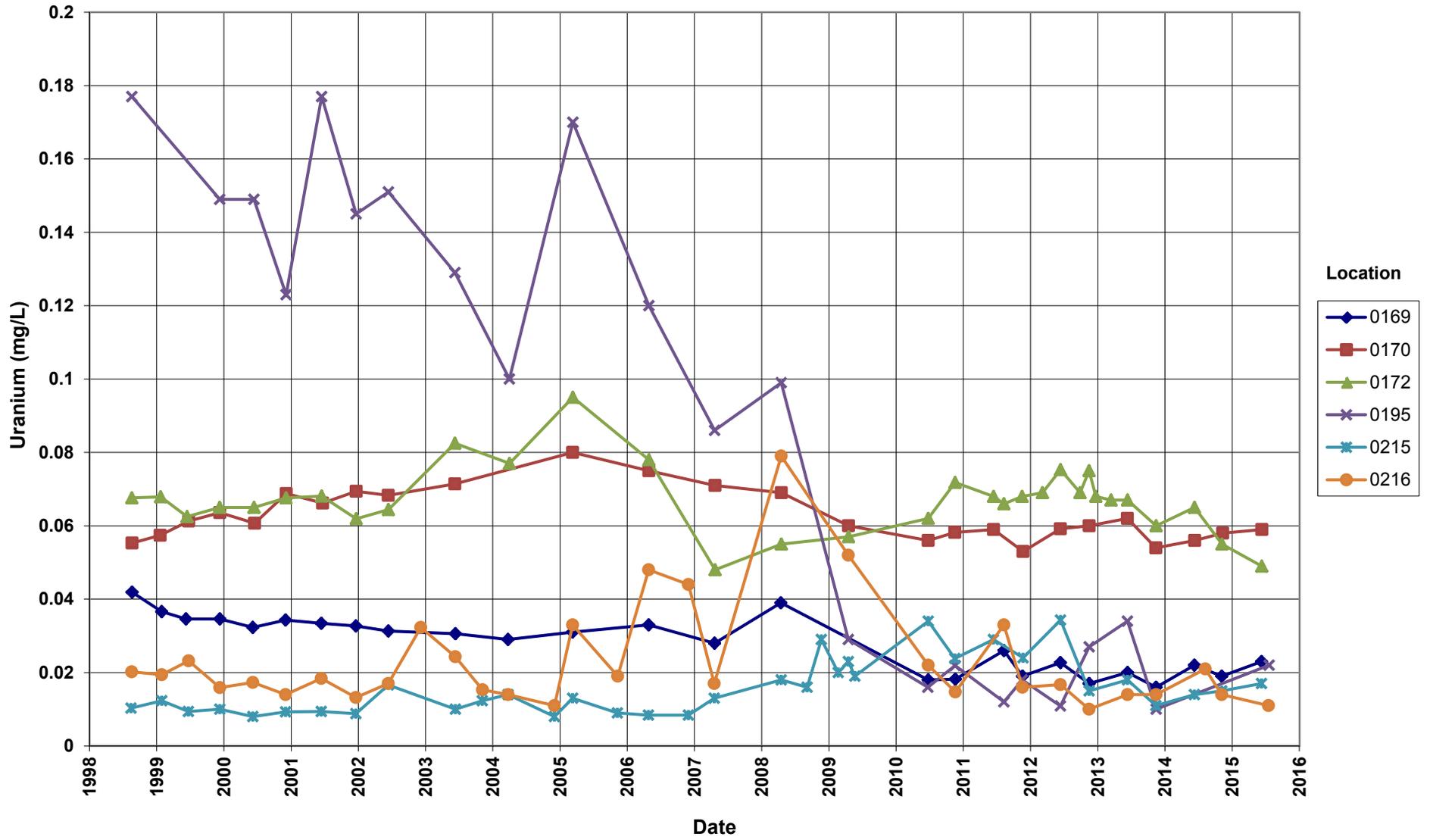
Rifle New Processing Site
Uranium Concentration
Point of Compliance Wells



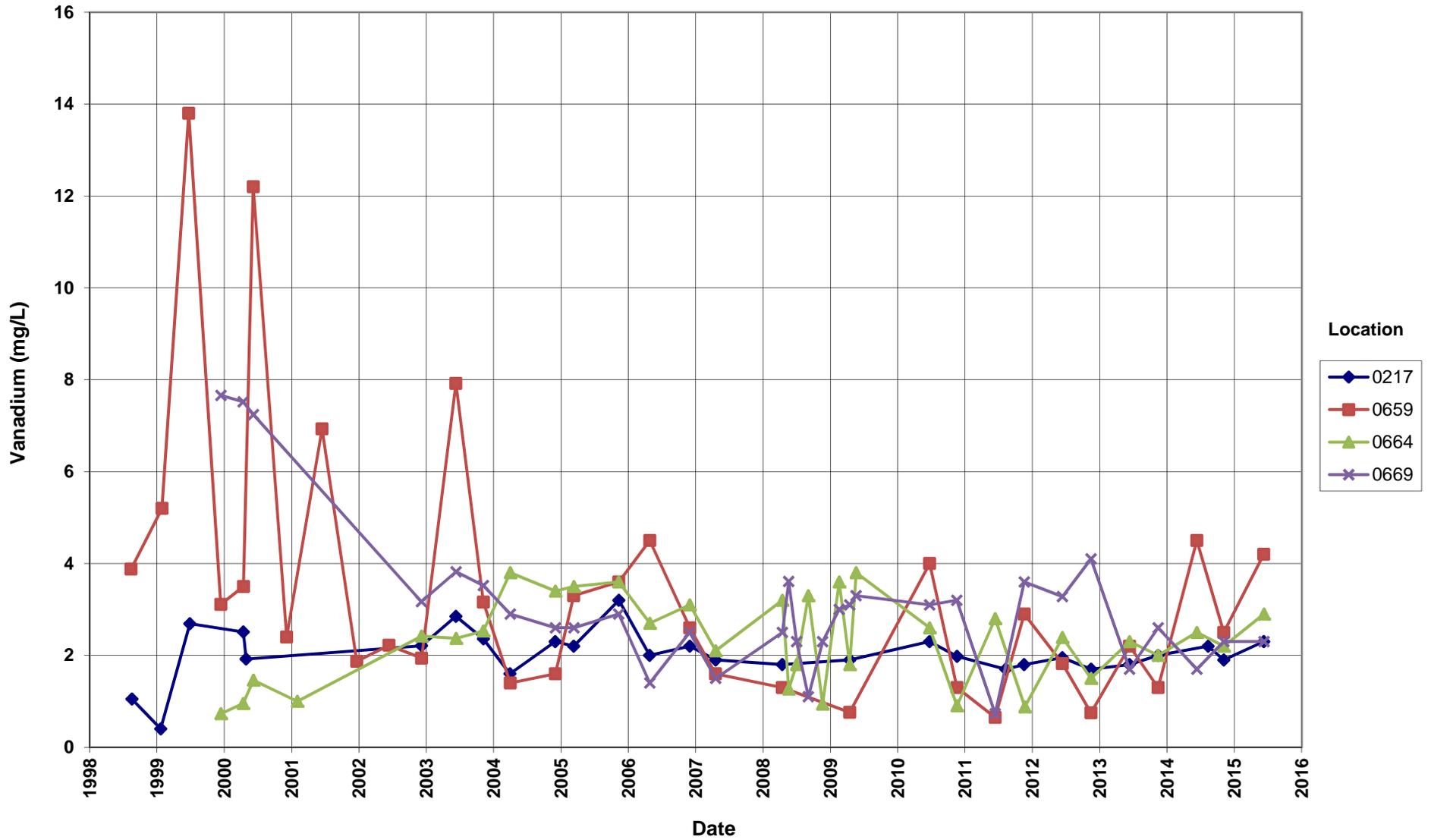
Rifle New Processing Site Uranium Concentration



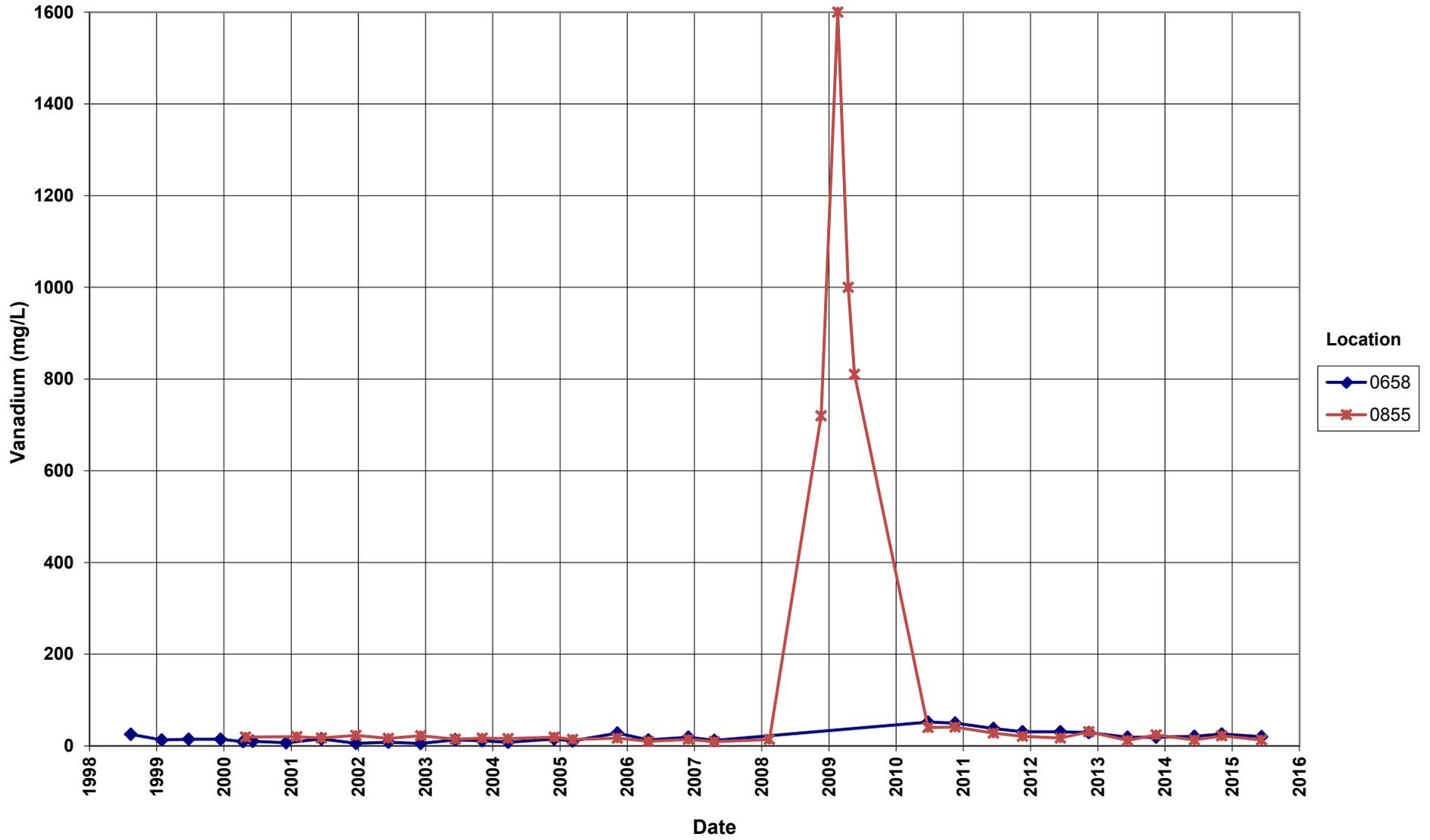
Rifle New Processing Site Uranium Concentration



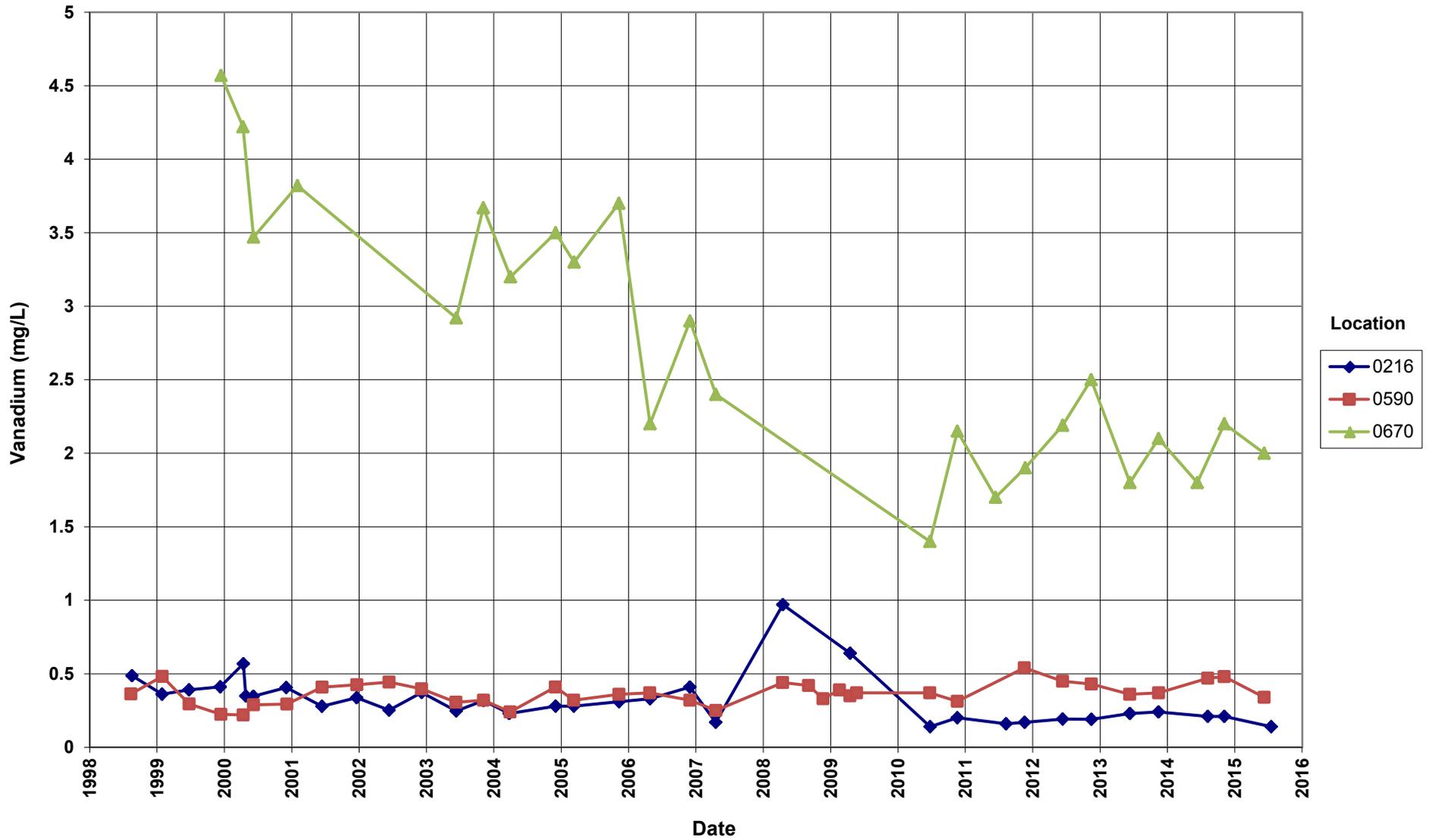
**Rifle New Processing Site
Vanadium Concentration
Point of Compliance Wells**
Alternate Concentration Limit (ACL) = 50 mg/L



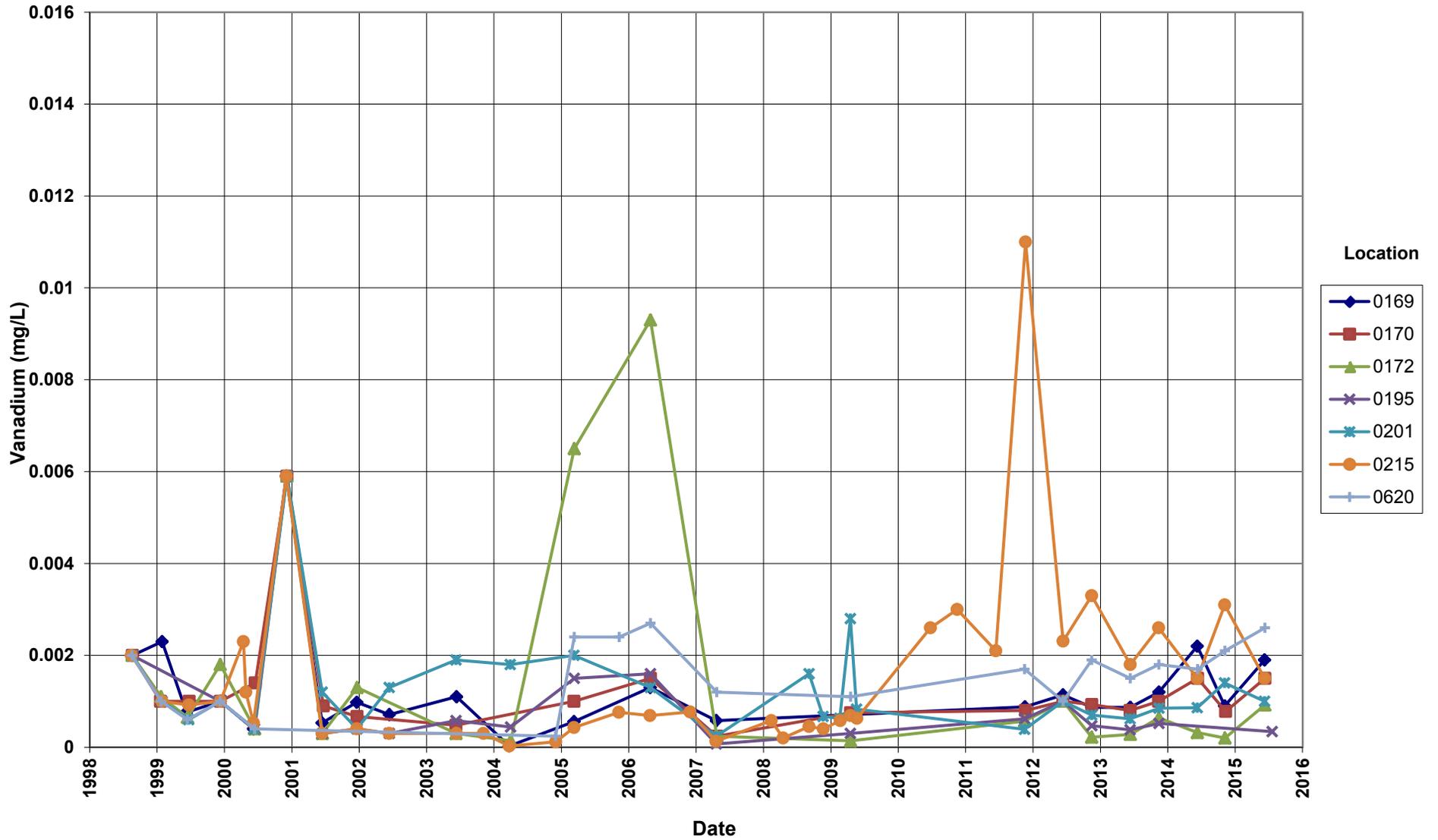
Rifle New Processing Site Vanadium Concentration



Rifle New Processing Site Vanadium Concentration



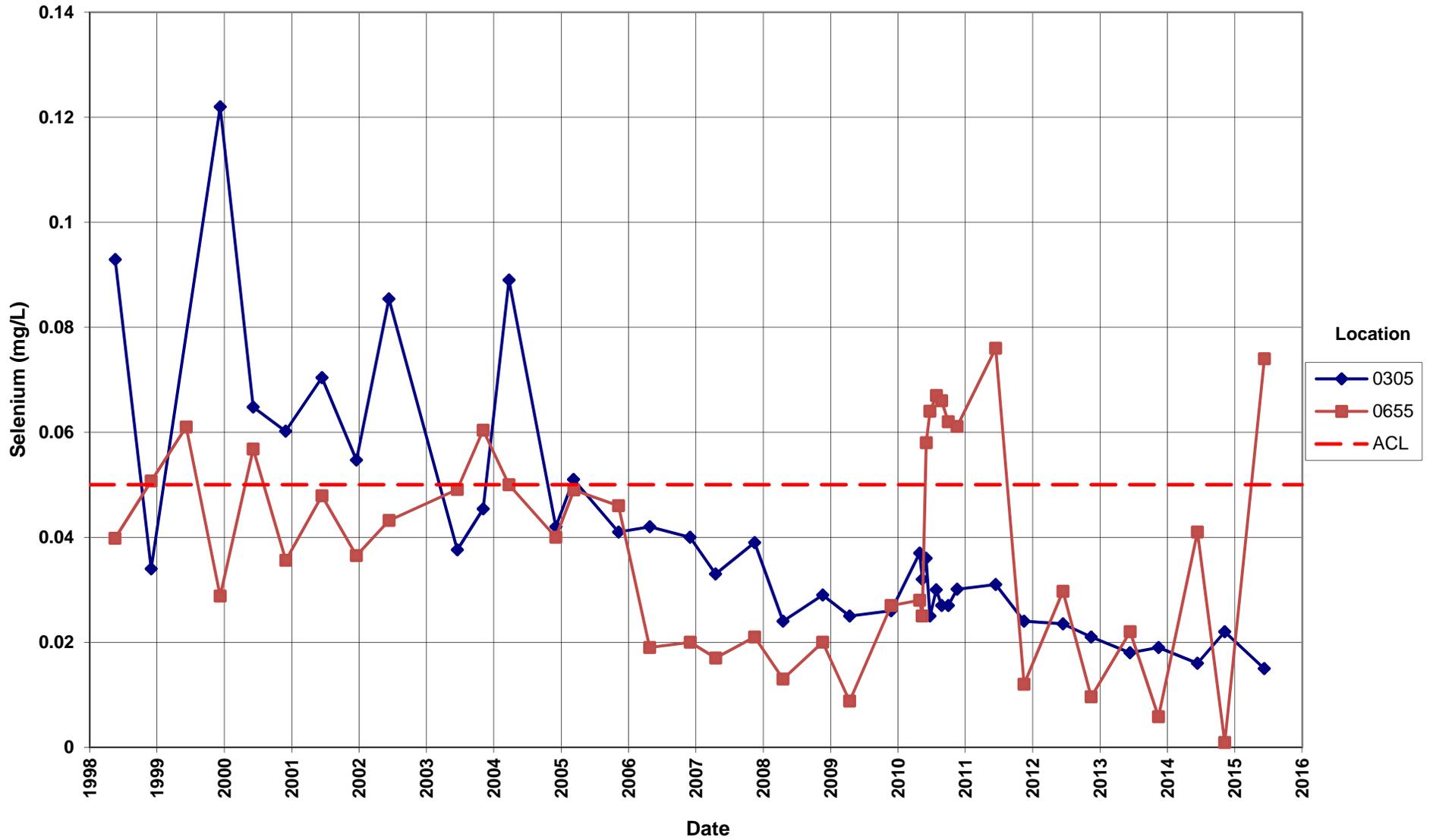
Rifle New Processing Site Vanadium Concentration



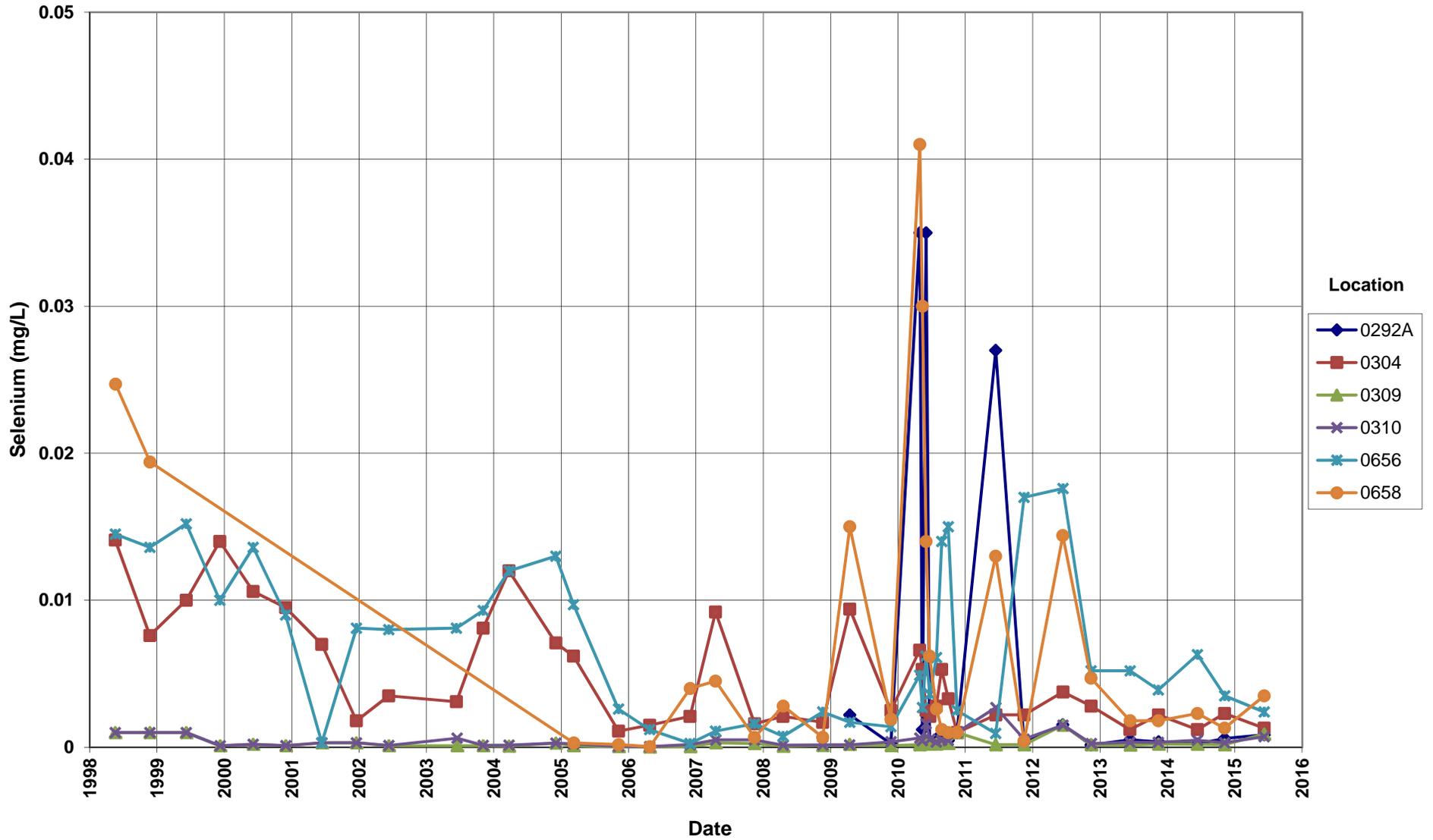
Old Rifle Groundwater Time-Concentration Graphs

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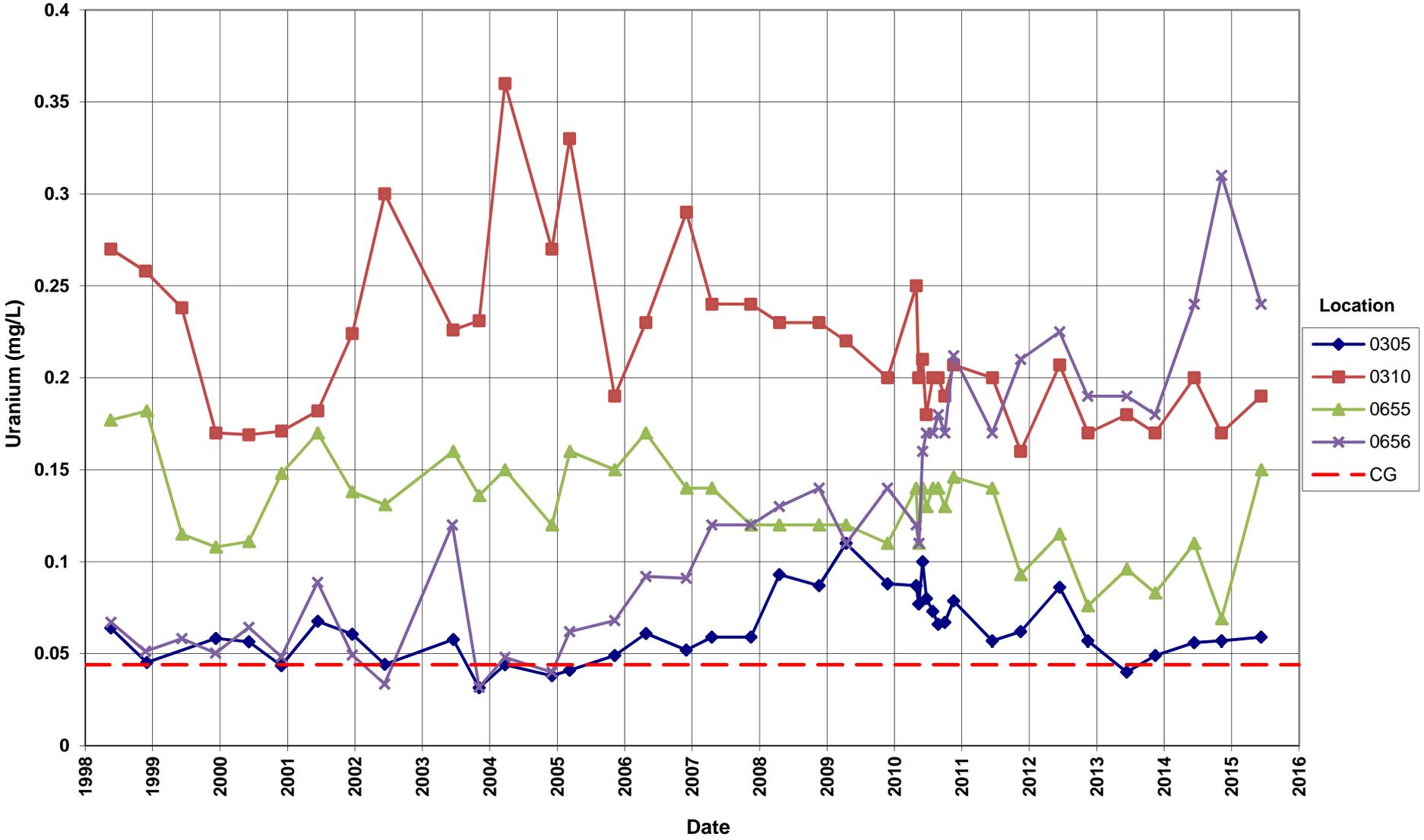
Rifle Old Processing Site
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



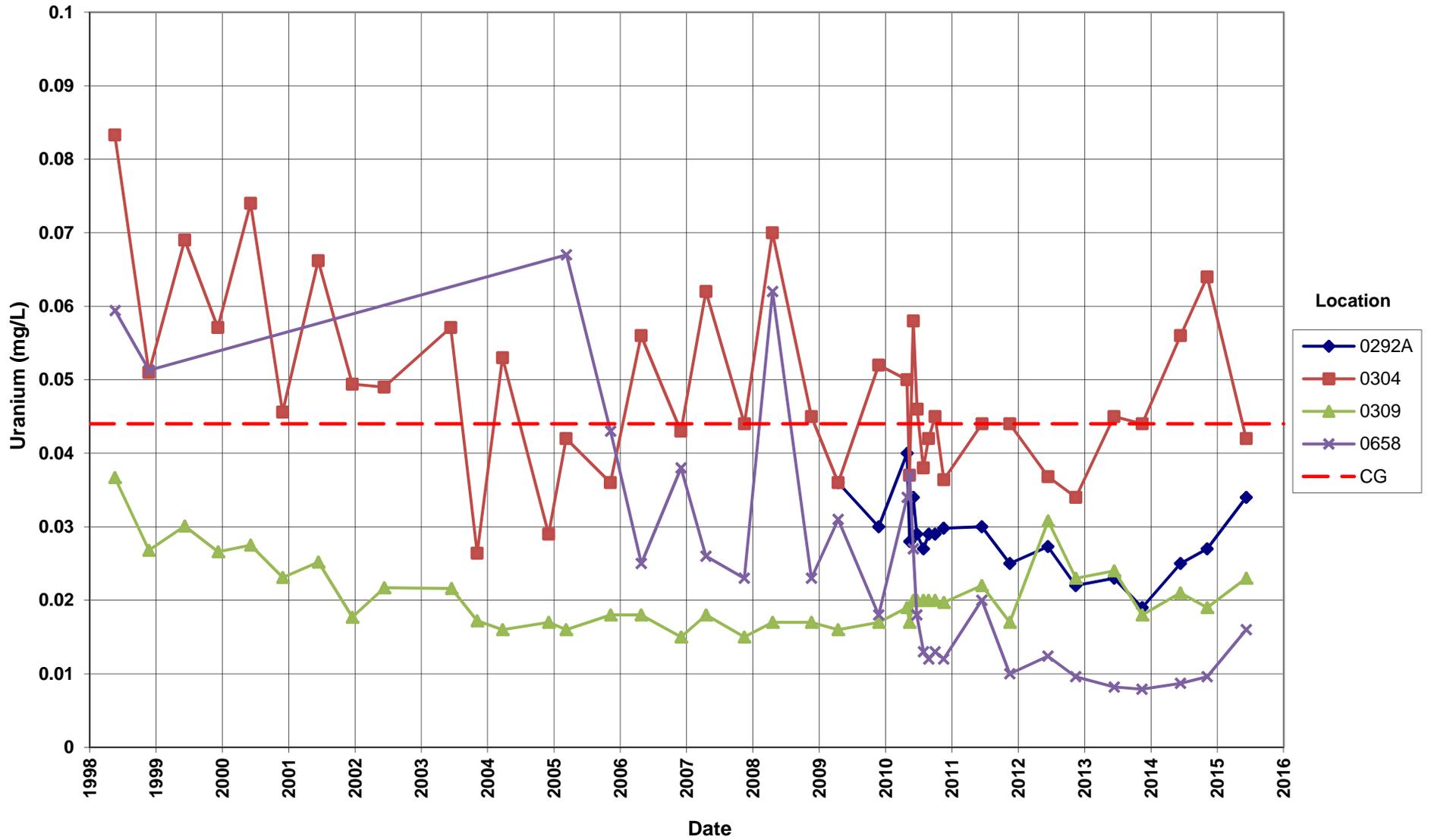
**Rifle Old Processing Site
Selenium Concentration**
Alternate Concentration Limit (ACL) = 0.05 mg/L



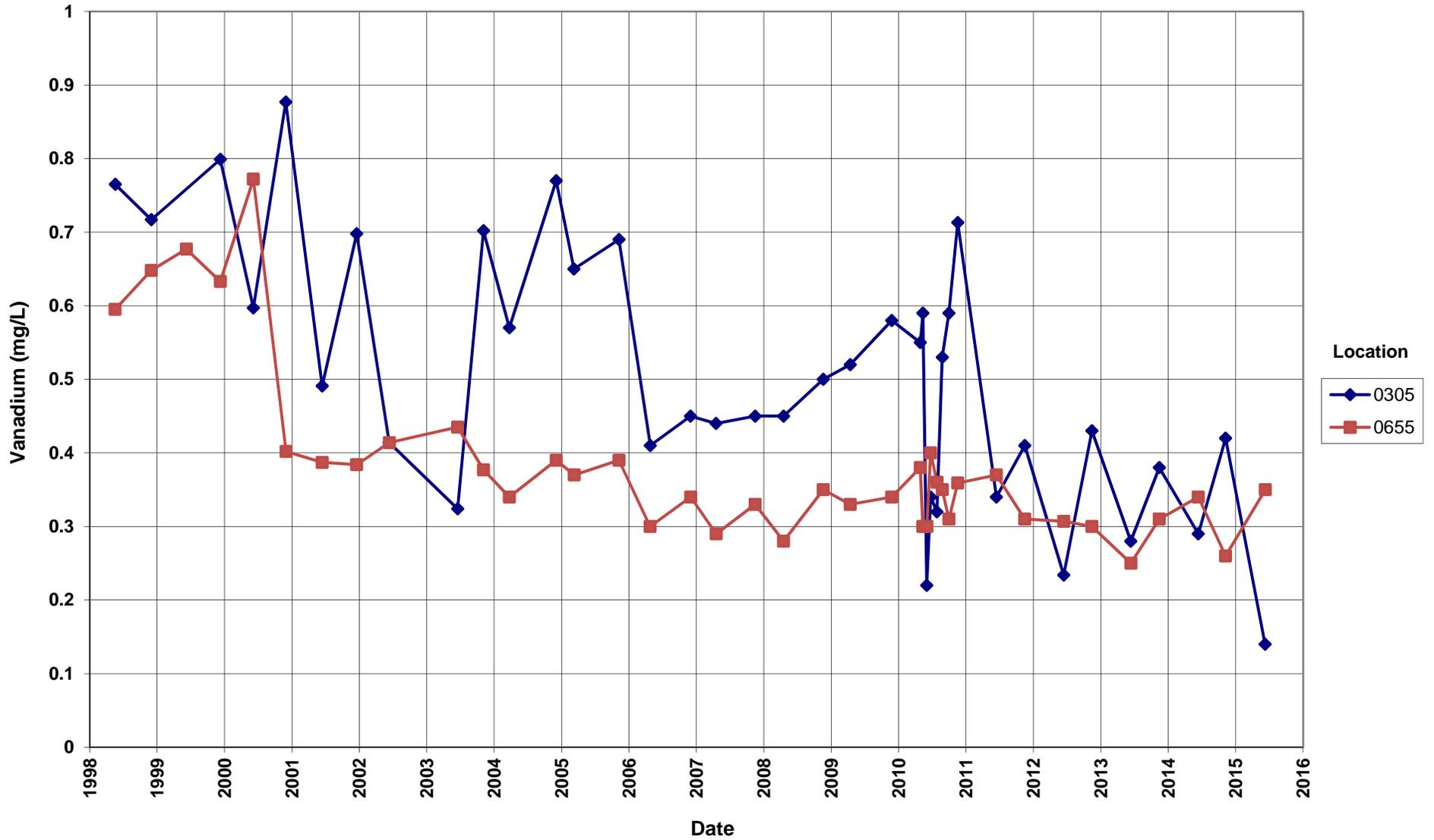
**Rifle Old Processing Site
Uranium Concentration**
Cleanup Goal (CG) = 0.044 mg/L



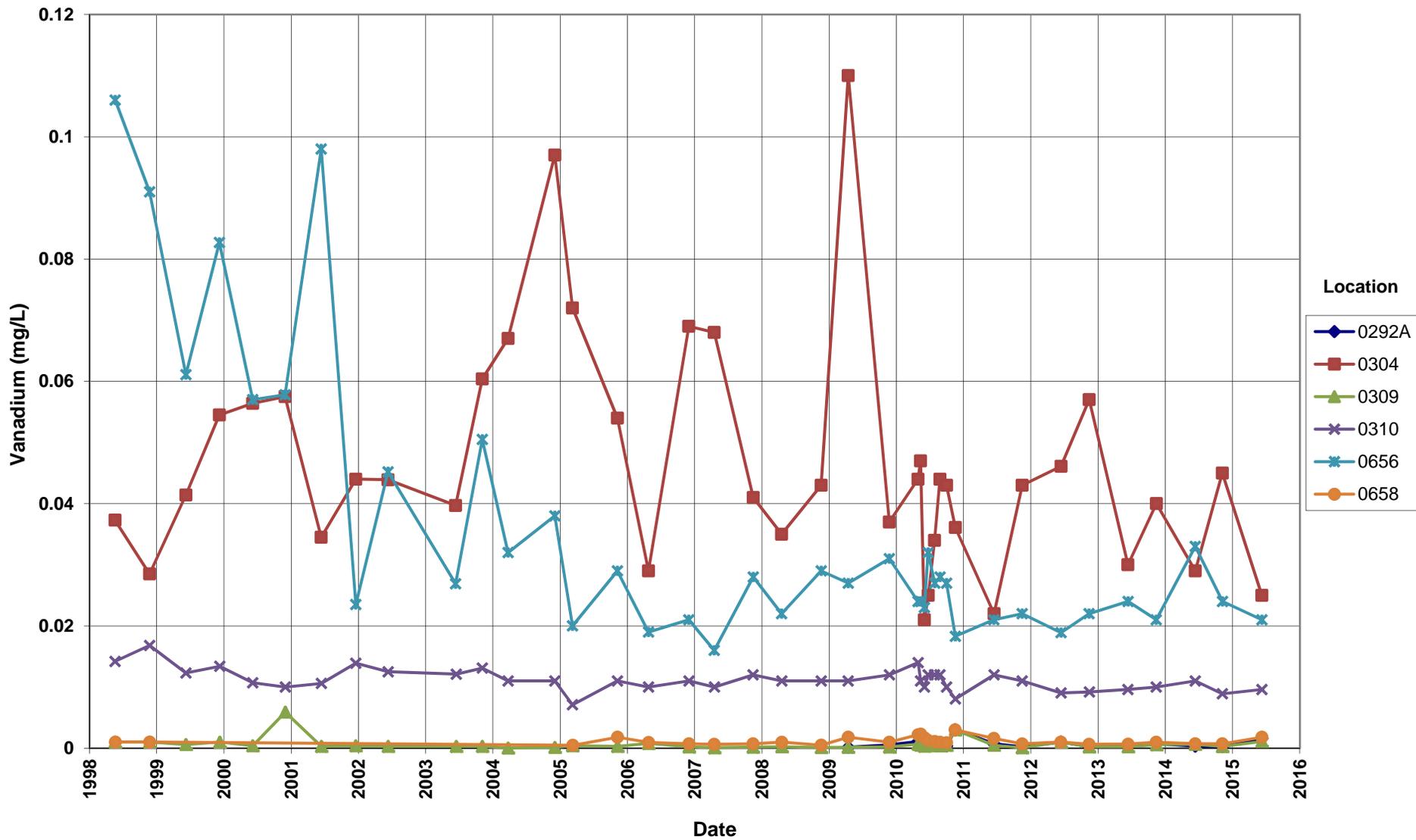
Rifle Old Processing Site
Uranium Concentration
Cleanup Goal (CG) = 0.044 mg/L



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



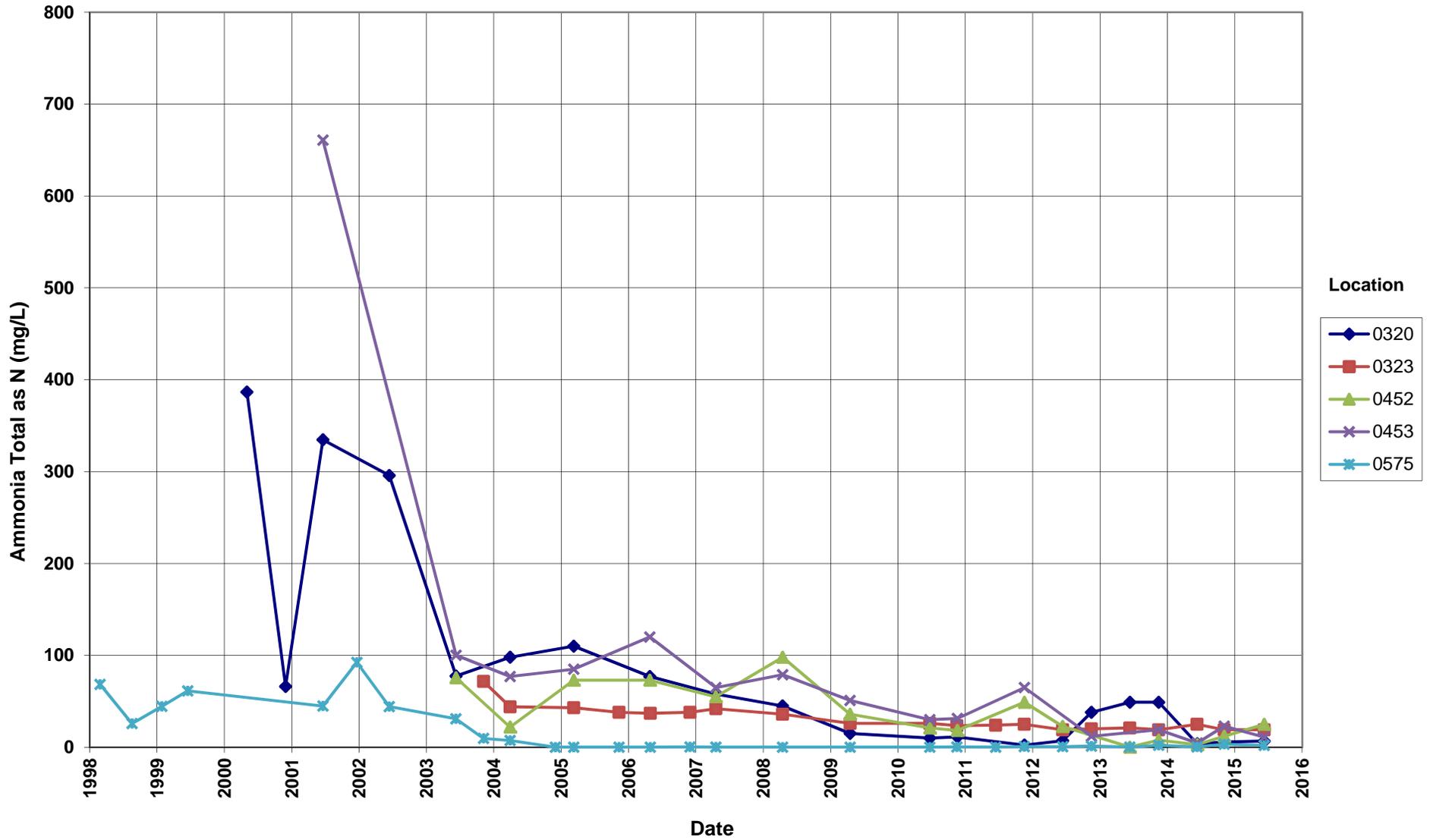
**Rifle Old Processing Site
Vanadium Concentration**
Alternate Concentration Limit (ACL) = 1.0 mg/L



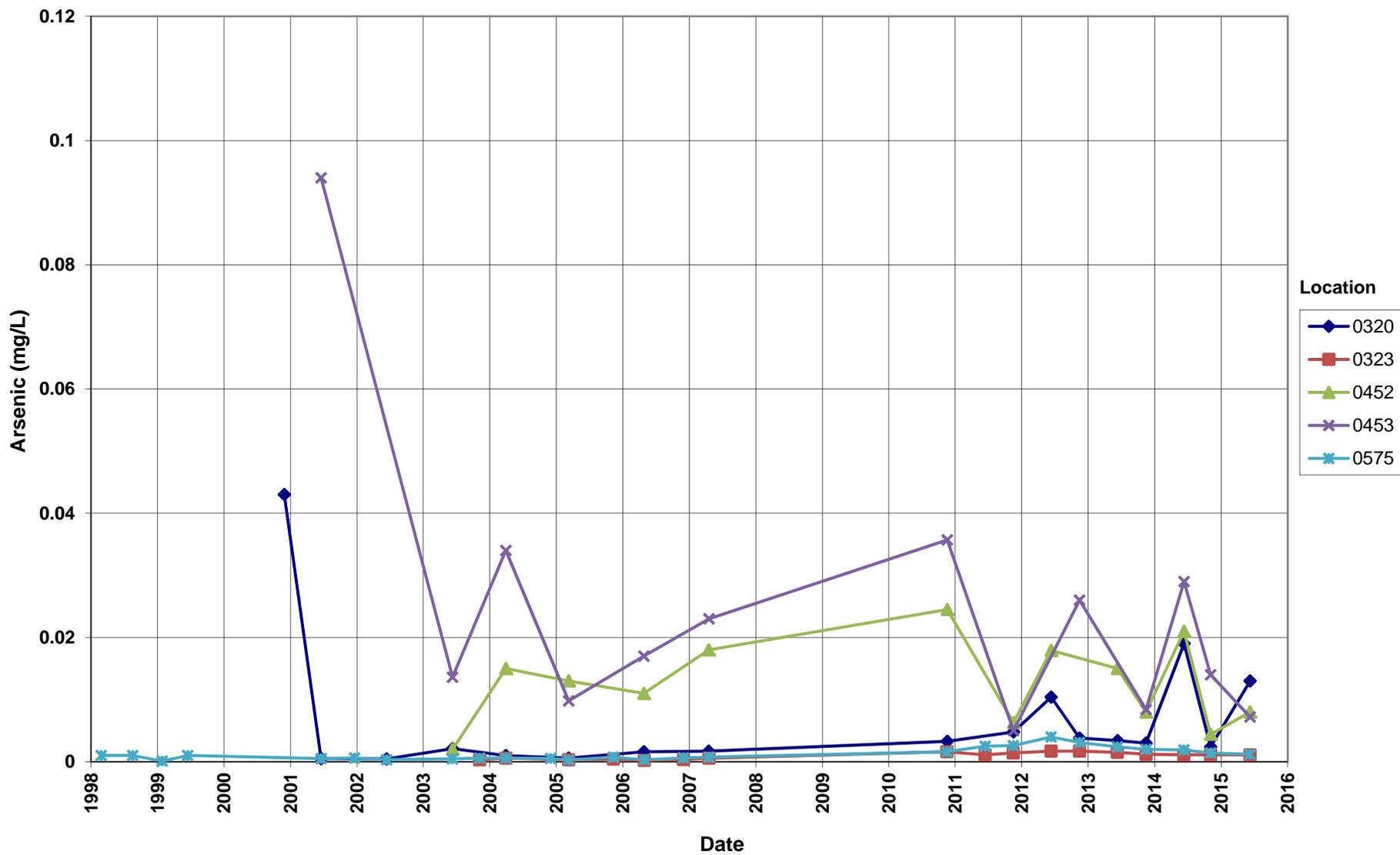
**New Rifle
Pond Locations
Time-Concentration Graphs**

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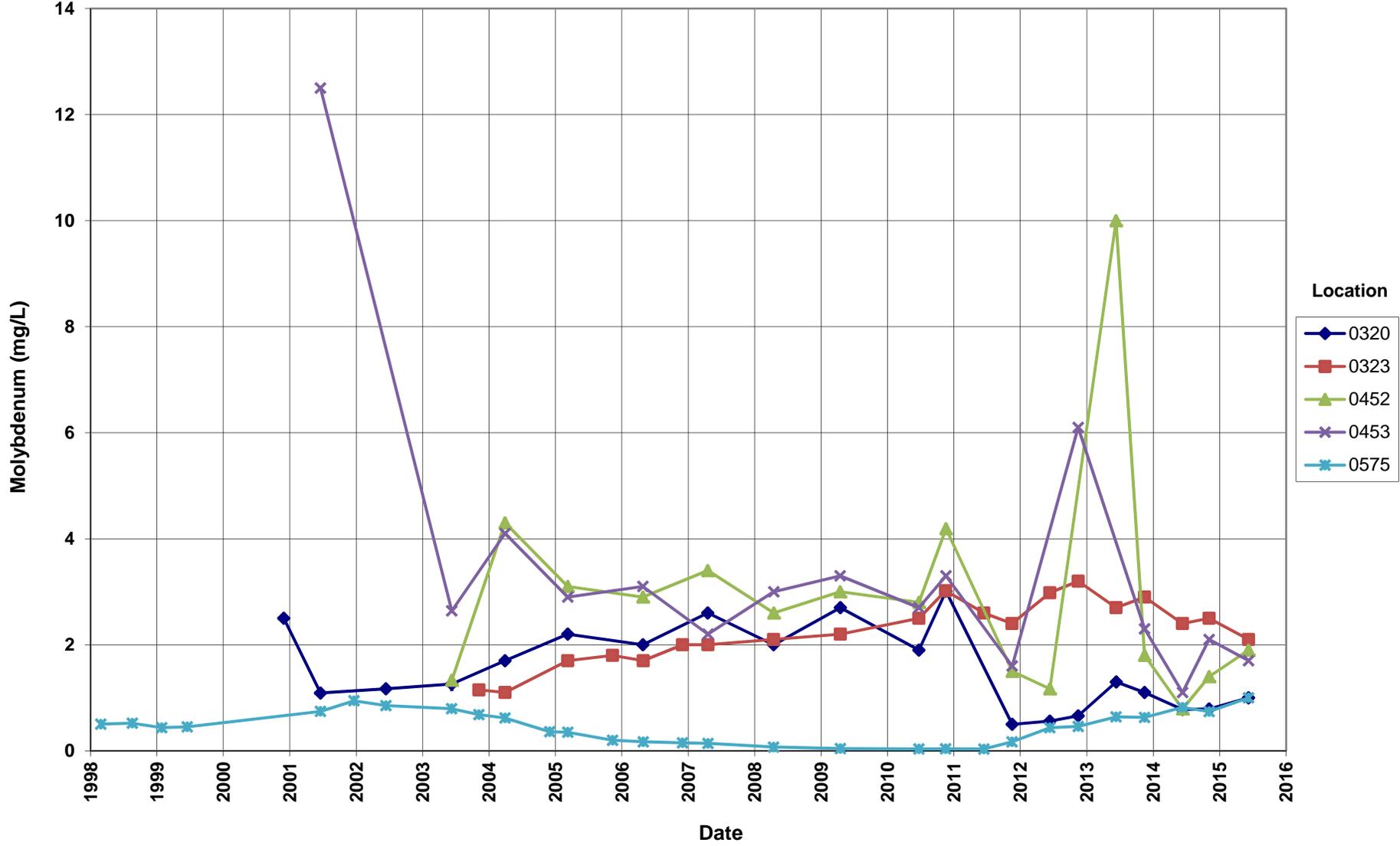
Rifle New Processing Site Ammonia Total as N Concentration



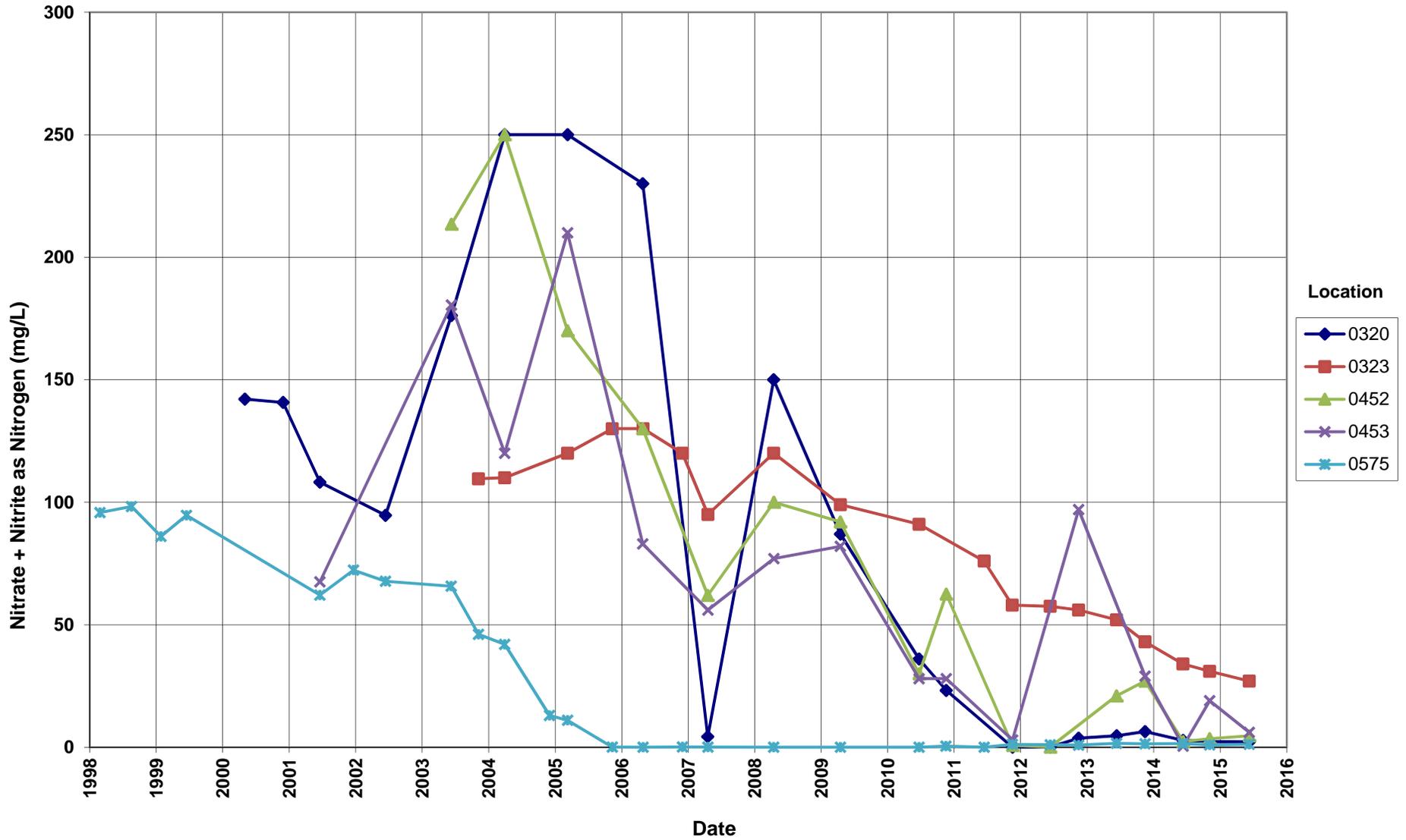
Rifle New Processing Site Arsenic Concentration



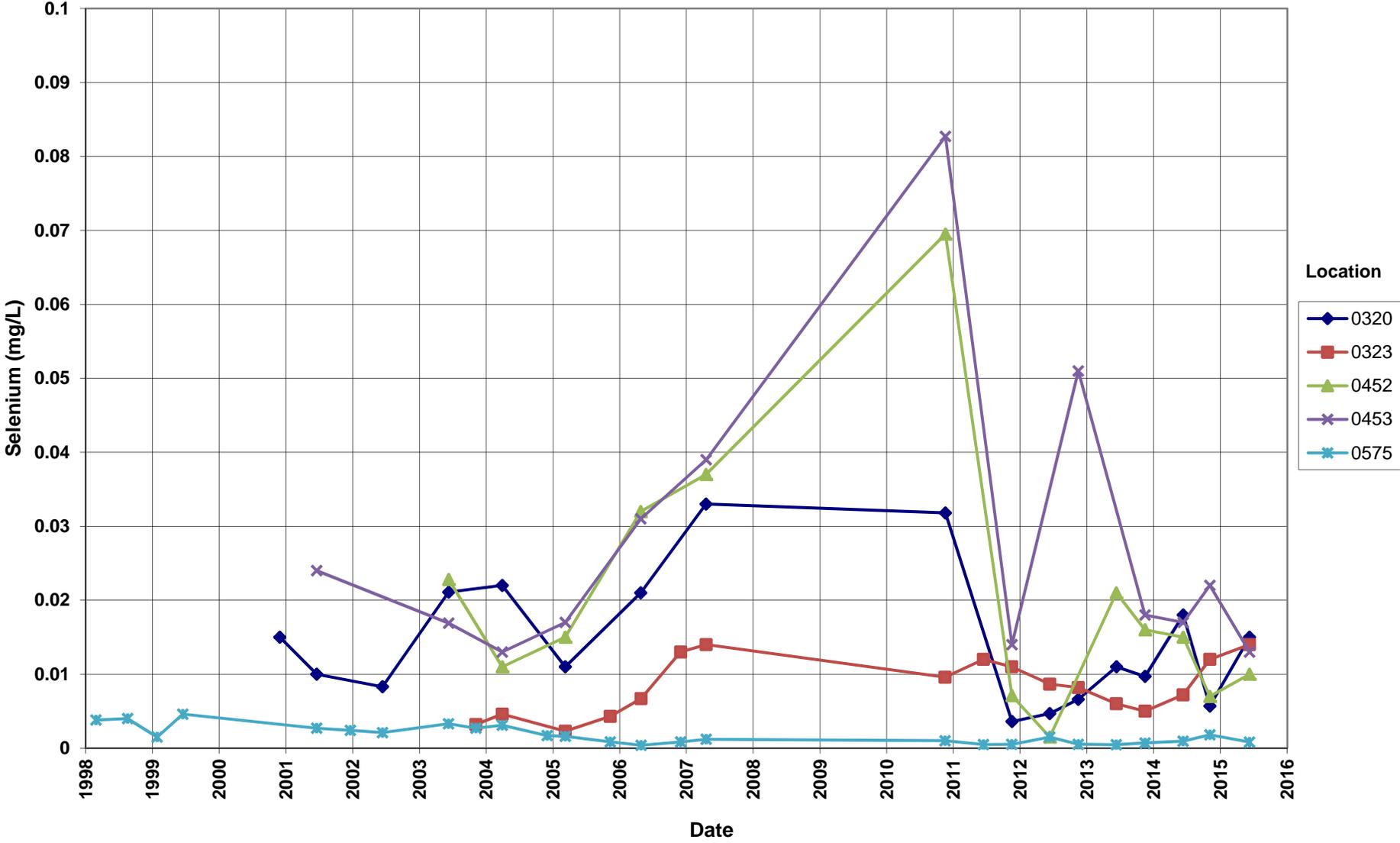
Rifle New Processing Site Molybdenum Concentration



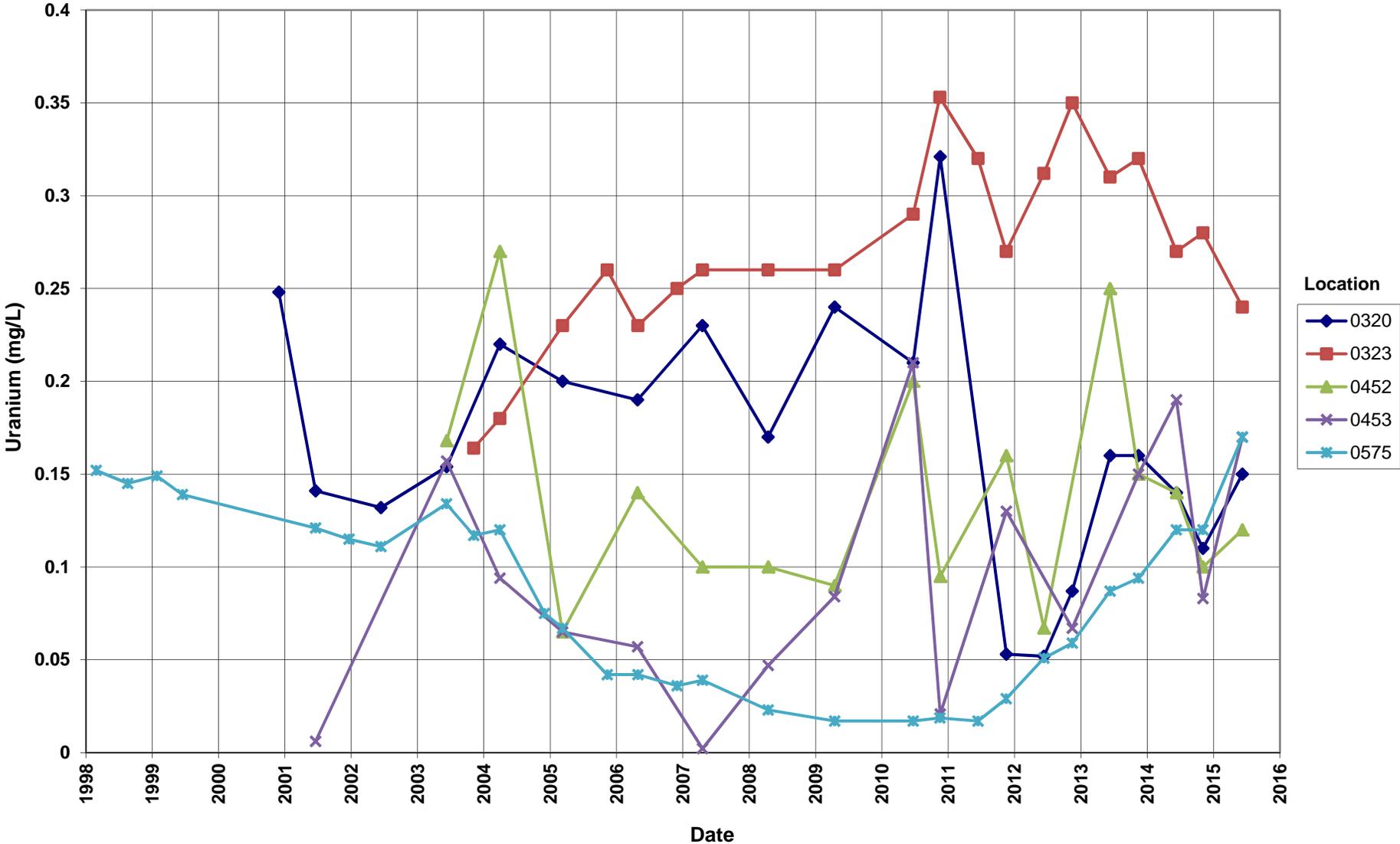
Rifle New Processing Site Nitrate + Nitrite as Nitrogen Concentration



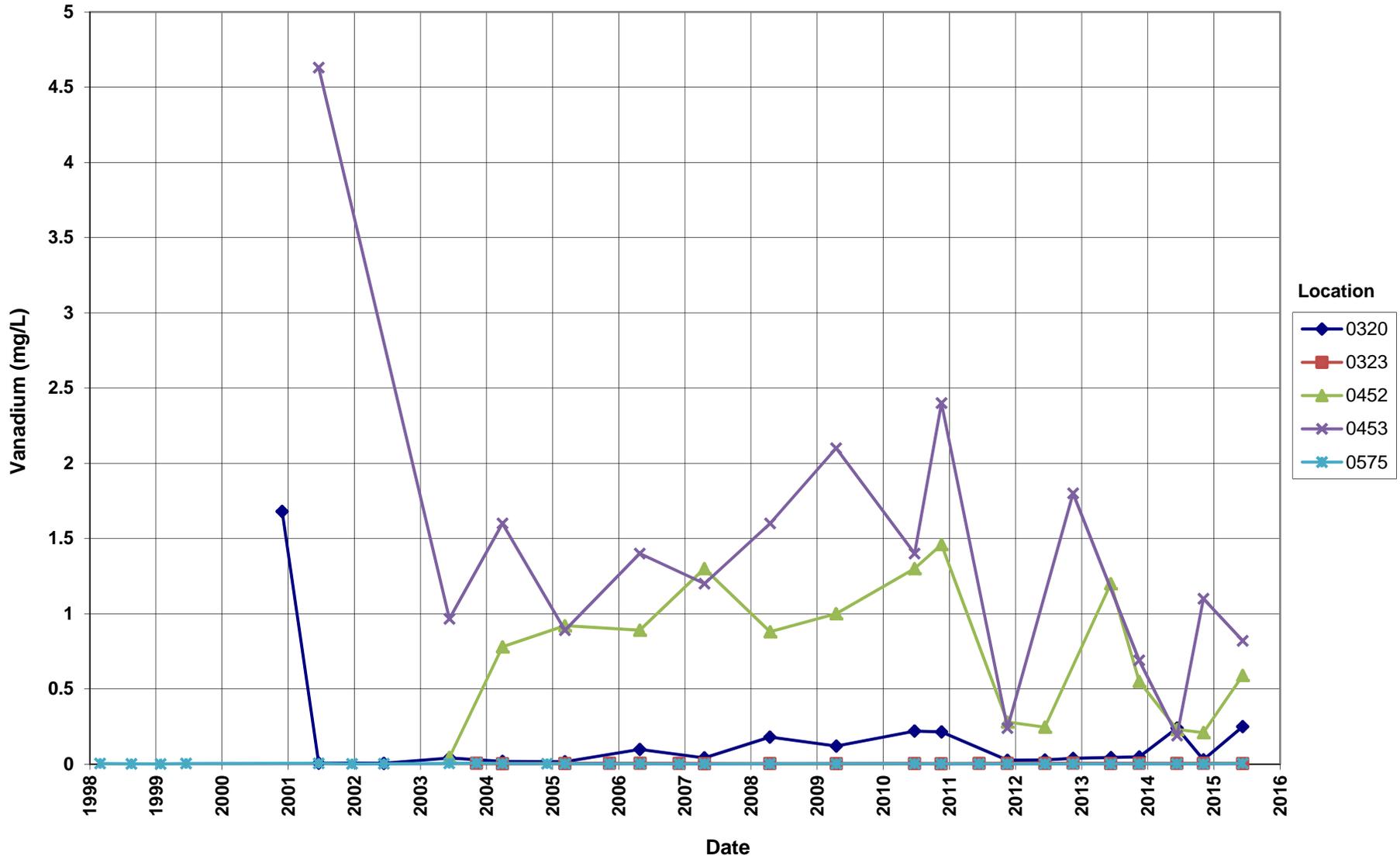
Rifle New Processing Site Selenium Concentration



Rifle New Processing Site Uranium Concentration



Rifle New Processing Site Vanadium Concentration

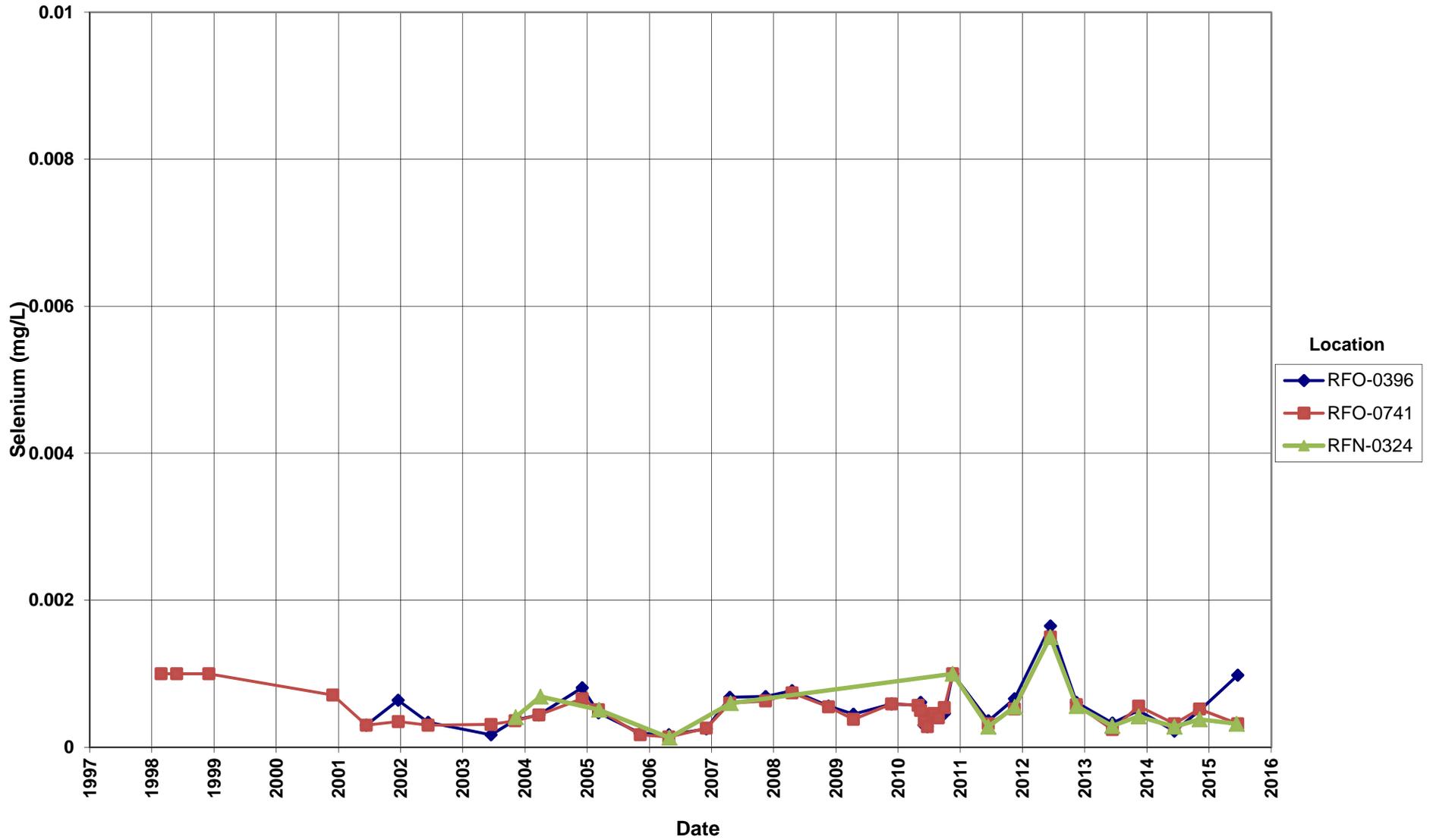


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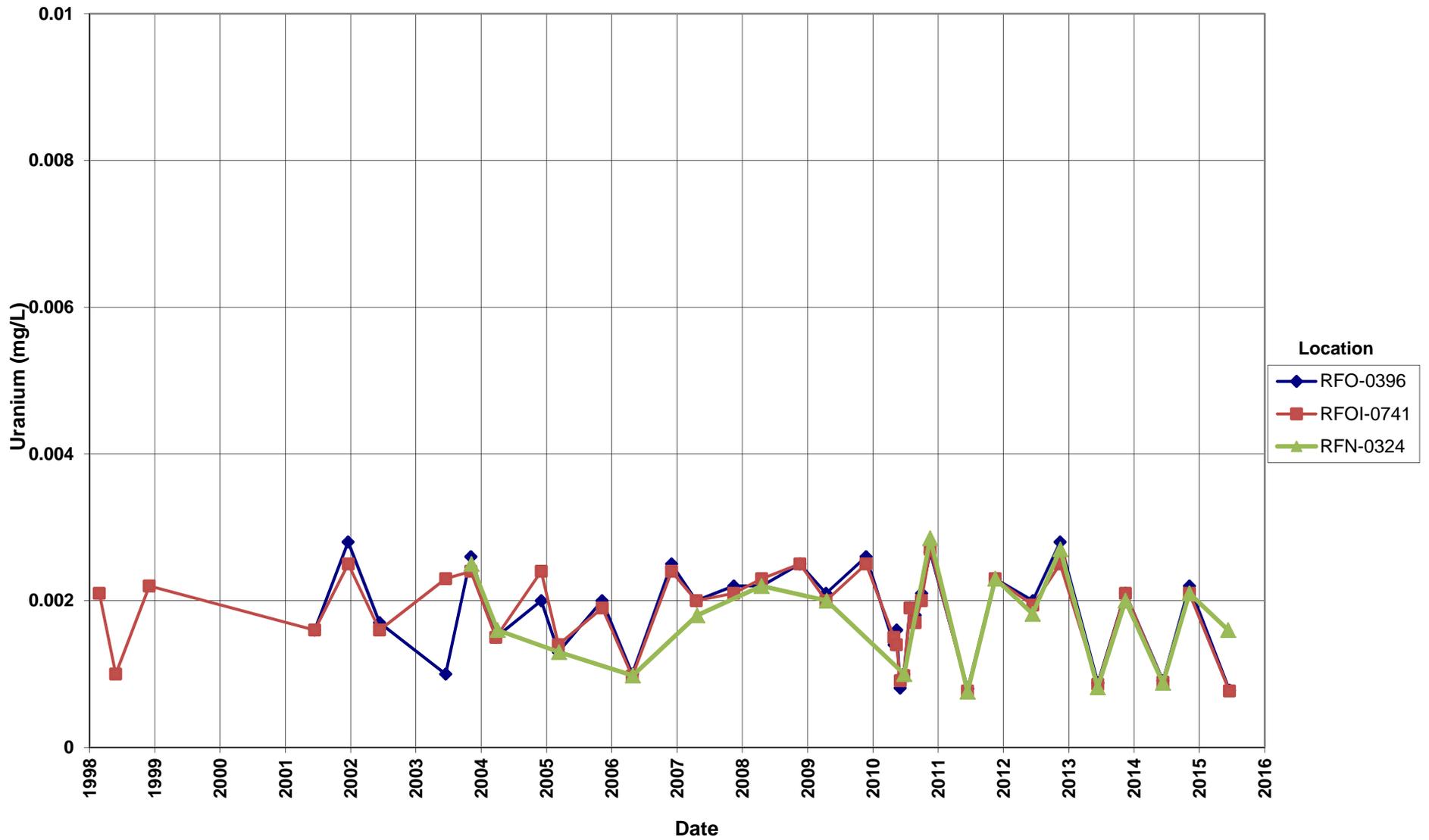
**New and Old Rifle River Locations
Time-Concentration Graphs**

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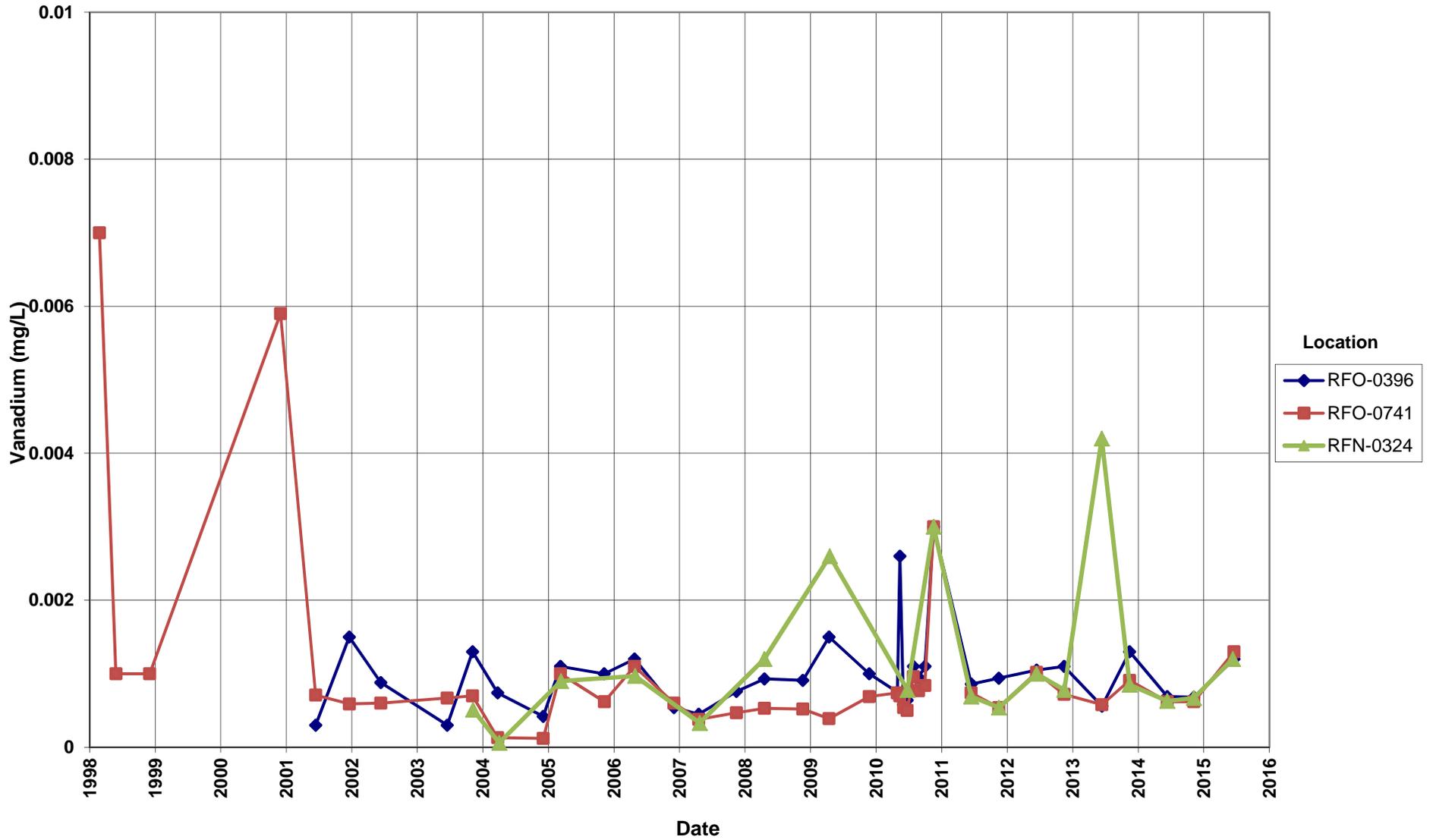
Rifle New and Old Processing Sites
River Locations
Selenium Concentration



Rifle New and Old Processing Sites
River Locations
Uranium Concentration



Rifle New and Old Processing Sites
River Locations
Vanadium Concentration



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Attachment 3
Sampling and Analysis Work Order

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Stoller Newport News Nuclear

May 26, 2015

Task Assignment 103
Control Number 15-0558

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-LM0000415, Stoller Newport News Nuclear, Inc. (SN3),
a wholly owned subsidiary of Huntington Ingalls Industries, Inc.
Task Assignment 103 LTS&M - UMTRCA TI & TII, D&D, Others, and AS&T
June 2015 Environmental Sampling at the Rifle, Colorado, Processing Sites

REFERENCE: Task Assignment 103, 3-103-1-02-116, Rifle, Colorado, Processing Sites

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at the Rifle, Colorado, sites. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the sites. Water quality data will be collected at these sites as part of the routine environmental sampling currently scheduled to begin the week of June 8, 2015.

The following lists show the monitoring wells and surface locations scheduled for sampling during this event.

MONITORING WELLS

New Rifle

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

Old Rifle

292A Al	304 Al	305 Al	309 Al	310 Al	655 Al	656 Al	658 Al
---------	--------	--------	--------	--------	--------	--------	--------

*NOTE: Al = Alluvium

SURFACE LOCATIONS

New Rifle

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

Old Rifle

294	395	396	398	741
-----	-----	-----	-----	-----

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES

2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

Richard Bush
Control Number 15-0558
Page 2

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

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

Sincerely,



Richard Dayvault
Site Lead

RD/lcg/lb

Enclosures (3)

cc: (electronic)

Christina Pennal, DOE
Richard Dayvault, SN3
Steve Donovan, SN3
Lauren Goodknight, SN3
Diana Osborne, SN3
EDD Delivery
rc-grand.junction
File: RFN 410.02(A)
File: RFO 410.02(A)

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

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

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

Constituent Sampling Breakdown

Site	Rifle				Required Detection Limit (mg/L)	Analytical Method	Line Item Code
	Groundwater	Surface Water					
Analyte							
Approx. No. Samples/yr	51	24					
Field Measurements							
Alkalinity	X	X					
Dissolved Oxygen							
Redox Potential	X	X					
pH	X	X					
Specific Conductance	X	X					
Turbidity	X						
Temperature	X	X					
Laboratory Measurements							
	*RFO	*RFN	RFO	RFN			
Aluminum							
Ammonia as N (NH3-N)		X		X	0.1	EPA 350.1	WCH-A-005
Arsenic		X		X	0.0001	SW-846 6020	LMM-02
Calcium	X	X	X	X	5	SW-846 6010	LMM-01
Chloride	X	X	X	X	0.5	SW-846 9056	MIS-A_039
Chromium							
Gross Alpha							
Gross Beta							
Iron							
Lead							
Magnesium	X	X	X	X	5	SW-846 6010	LMM-01
Manganese							
Molybdenum		X		X	0.003	SW-846 6020	LMM-02
Nickel							
Nickel-63							
Nitrate + Nitrite as N (NO3+NO2)-N	X	X	X	X	0.05	EPA 353.1	WCH-A-022
Potassium	X	X	X	X	1	SW-846 6010	LMM-01
Radium-226							
Radium-228							
Selenium	X	X	X	X	0.0001	SW-846 6020	LMM-02
Silica							
Sodium	X	X	X	X	1	SW-846 6010	LMM-01
Strontium							
Sulfate	X	X	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide							
Total Dissolved Solids							
Total Organic Carbon							
Uranium	X	X	X	X	0.0001	SW-846 6020	LMM-02
Vanadium	X	X	X	X	0.0003	SW-846 6020	LMM-02
Zinc							
Total No. of Analytes	10	13	10	13			

*RFN = New Rifle; *RFO = Old Rifle

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

Attachment 4 Trip Report

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Memorandum

DATE: August 3, 2015

TO: Dick Dayvault

FROM: David Atkinson

SUBJECT: Trip Report

Site: Rifle, Colorado, Old and New Processing Sites

Dates of Event: June 9 – June 18, 2015, July 17, 2015, and July 20, 2015

Team Members: David Atkinson, Gretchen Baer, Jennifer Graham, Alison Kuhlman, Rob Rice, and Eric Szabelski.

Number of Locations Sampled: Samples were collected at 36 of the 36 locations identified on the sampling notification letter dated May 26, 2015.

	Locations Sampled	Planned Locations
New Rifle Monitoring Wells	17	16
New Rifle Surface Water Locations	7	7
Old Rifle Monitoring Wells	8	8
Old Rifle Surface Water Locations	5	5

An additional sample was collected from New Rifle monitoring well 0609 as a result of well misidentification. As instructed by the site lead, the samples from this well were submitted to the laboratory.

Locations Not Sampled/Reason: None.

Location Specific Information:

Location IDs	Comments
RFO-0658	Water was very cloudy at first and slowly cleared.
RFN-0609	The well is under a fallen tree. The area around the well is flooded with standing water and water was about halfway up the protective casing on July 17.

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

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False ID	Ticket Number	True ID	Sample Type	Associated Matrix	Associated Samples
2548	NHR 460	RFN-0855	Duplicate	Groundwater	NA
2548	NIY 578	RFN-0216	Duplicate	Groundwater	NA
2551	NHR 477	RFO-0304	Duplicate	Groundwater	NA
2741	NHW 394	0999	Equipment Blank	Surface Water	RFN-0324, RFN-0326, RFO-0294, RFO-0396, and RFO-0741

Report Identification Number (RIN) Assigned: Samples for monitoring wells 0195, 0216, and 0609 were assigned to RIN 15077206. All other samples were assigned to RIN 15067100 (New Rifle) and 15067101 (Old Rifle). Field data sheets can be found in Crow\sms\15077206, Crow\sms\15067100, and Crow\sms\15067101 in the Field Data folders.

Sample Shipment: Samples for monitoring wells 0195, 0216, and 0609 were shipped overnight via FedEx from Grand Junction, CO, to ALS Laboratory Group in Fort Collins, CO, on July 21, 2015. All other samples were shipped overnight via FedEx from Grand Junction, CO, to ALS Laboratory Group in Fort Collins, CO, on June 22, 2015.

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

Well Inspection Summary: During sampling it was discovered that New Rifle monitoring well 0609 was mistaken for well 0195. During two previous sampling events the samples submitted for location 0195 had actually been collected from location 0609. Samples submitted for this event were collected from the correct location, data from previous samples will be revised as needed.

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

Field Variance: Turbidity less than 10 NTUs could not be reached at the Category I wells RFN-0664, RFN-0195, and RFN-0609; the samples were filtered.

Equipment: All equipment functioned properly.

Stakeholder/Regulatory: Nothing to note.

Institutional Controls:

Fences, Gates, Locks: All gates were locked and in good condition.

Signs: No issues observed.

Trespassing/Site Disturbances: None observed.

Disposal Cell/Drainage Structure Integrity: NA

Safety Issues: Surface water locations RFO-0741 and RFO-0396 were sampled with the supervision of railroad personnel to guarantee safety in crossing the railroad tracks.

Access Issues: Monitoring well locations 0195 and 0216 at the New Rifle site could not be sampled at the same time as the other monitoring wells due to standing water and marshy

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Dick Dayvault
August 3, 2015
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conditions in the area surrounding the wells. These locations were sampled on July 17, and July 20, 2015.

General Information: Nothing to note.

Immediate Actions Taken: On July 20, 2015, monitoring well RFN-0609 was re-labeled with clear, large, and visible print to prevent future misidentification.

Future Actions Required or Suggested: RFN-0609 might be added to future sampling events for the site. Consideration should be given to removing the large fallen tree surrounding the well.

(DA/lcg)

cc: (electronic)
Rich Bush, DOE
Dick Dayvault, SN3
Steve Donovan, SN3
EDD Delivery

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