Data Validation Package

September 2014 Groundwater, Surface Water, and Hydrant Sampling at the Riverton, Wyoming, Processing Site

December 2014

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Riverton, Wyoming, Processing Site

Sampling Period: September 8–12, 2014

This sampling event comprised sampling 18 monitoring wells, 9 surface water locations, and 9 domestic wells at the Riverton, Wyoming, Processing Site. Sampling and analyses were conducted as specified in the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites* (SAP) (LMS/PRO/S04351, continually updated). Water levels were measured at all sampled monitoring wells and 14 additional monitoring wells that were not sampled.

Sampling was also conducted in support of semiannual flushing of the alternate water supply system (AWSS) in accordance with the *Alternate Water Supply System Flushing Plan Riverton, Wyoming* (January 2013). Four domestic tap locations and eight hydrant locations on the AWSS were sampled. Domestic tap location 0814 was not sampled because the home was vacant and domestic well 0422 was not sampled because the house is gone. Two samples were collected at six of the eight hydrant locations – one sample 5 minutes into the flush and one sample at the end of the flush as specified in the plan. Only end-of-flush samples were collected at hydrant locations 0834 and 0843 because of the short flushing time.

Monitoring at hydrant and tap locations is performed to determine the effectiveness of the flushing program in reducing the naturally occurring radionuclide concentrations and maintaining them at acceptable levels. The flushing program is considered successful when (1) the combined radium-226 and radium-228 concentrations are below the Federal drinking water maximum contaminant level (MCL) of 5 picocuries per liter (pCi/L) and (2) the uranium concentrations at all locations are below the MCL of 0.03 milligram per liter (mg/L) in the post-flush samples. Although the radium-226 and radium-228 concentration (5.45 pCi/L) in the 5-minute sample collected from location 0821 exceeded the MCL, the end-of-flush sample radium-226 and radium-228 concentration was 3.09 pCi/L, which indicates the effectiveness of the flushing at this location. The overall effectiveness of the flushing program was demonstrated, with the post-flushing combined radium-226 and radium-228 concentrations less than the MCL, and maximum observed uranium concentration of 0.0001 mg/L.

Concentrations of molybdenum and uranium in samples collected from semi-confined aquifer monitoring wells were below their respective U.S. Environmental Protection Agency (EPA) (Title 40 *Code of Federal Regulations* [CFR] Part 192) groundwater standard.

The EPA groundwater standards for molybdenum and uranium were exceeded in samples collected from surficial aquifer monitoring wells listed in Table 1. Time-concentration graphs are included in the Data Presentation section.

Table 1. Riverton Wells with Samples that Equaled or Exceeded EPA Groundwater Standards in September 2014

Analyte	Standard [a]	Location	Concentration in mg/L
Molybdenum	0.1	0707	0.98
		0716	0.13
		0722R	0.14
		0789	0.64
Uranium	0.044	0707	0.82
		0716	0.22
		0718	0.10
		0722R	0.91
		0789	1.7

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.

Results from domestic wells (Table 2) did not indicate any impacts from the Riverton site. Concentrations of molybdenum in samples collected from domestic wells were two orders of magnitude below the EPA groundwater standard, and uranium concentrations in samples collected from domestic wells were one to three orders of magnitude below the drinking water standard.

Table 2. Concentrations of Molybdenum and Uranium in Samples from Domestic Wells

Analyte	Standard [a]	Location	Concentration in mg/L
Molybdenum	0.1	0405	0.005
		0430	0.002
		0436	0.003
		0460	0.003
		0828	0.003
		0841	0.004
		0842	0.002
Uranium	0.03	0405	0.00003
		0430	0.00004
		0436	0.00010
		0460	0.00005
		0828	0.00010
		0841	0.0021
		0842	0.00037

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A (molybdenum) and EPA's National Primary Drinking Water Regulations (uranium).

Surface water uranium results were compared to the statistical background threshold value (BTV) derived using historical data from the Little Wind River location 0794, which is located upstream of the site and represents background conditions. After first determining that the data were normally distributed and free of outliers, the BTV was calculated as the 95 percent upper

simultaneous limit from a data set containing 29 observations collected since 1997. As shown in Table 3, the benchmark value was exceeded only in the oxbow lake (0747), which was formed by a shift in the river path in 1994. Hydraulic and water quality data indicate that the oxbow lake is fed by the discharge of contaminated groundwater; therefore, elevated concentrations are expected. At the time of this sampling event, water was not flowing from the river into the lake. All other surface water locations had uranium concentrations below the benchmark value, which indicates minimal site-related impact on the water quality of the Little Wind River and of the other surface water features. Time-concentration graphs of molybdenum and uranium results at all surface water locations are included in the Data Presentation section.

Table 3. Comparison of Surface Water Concentrations (September 2014) to BTVs

Location		Uranium Concentration (mg/L)
BTV		**0.011**
0794	Little Wind River, BTV Location	0.0064
0796	Little Wind River	0.0053
0811	Little Wind River	0.0049
0812	Little Wind River	0.0059
0747	Oxbow Lake	0.170
0810	Constructed Wetlands	0.0056
0822	West Side Irrigation Ditch	0.0042
0823	Gravel Pit Pond	0.0072
0749	Sulfuric acid plant ditch	0.0004

The sulfate concentration (630 mg/L) at the ditch that discharges from the Chemtrade sulfuric acid plant (location 0749) remains lower than that observed in previous years. This is a result of a process change made by Chemtrade prior to the June 2013 sampling event. Reduced sulfate is also evident downstream, in the west side irrigation ditch (340 mg/L at location 0822).

Sam Campbell

12/15/2014

Sam Campbell, Site Lead
The S.M. Stoller Corporation,
a wholly owned subsidiary of
Huntington Ingalls Industries

Date

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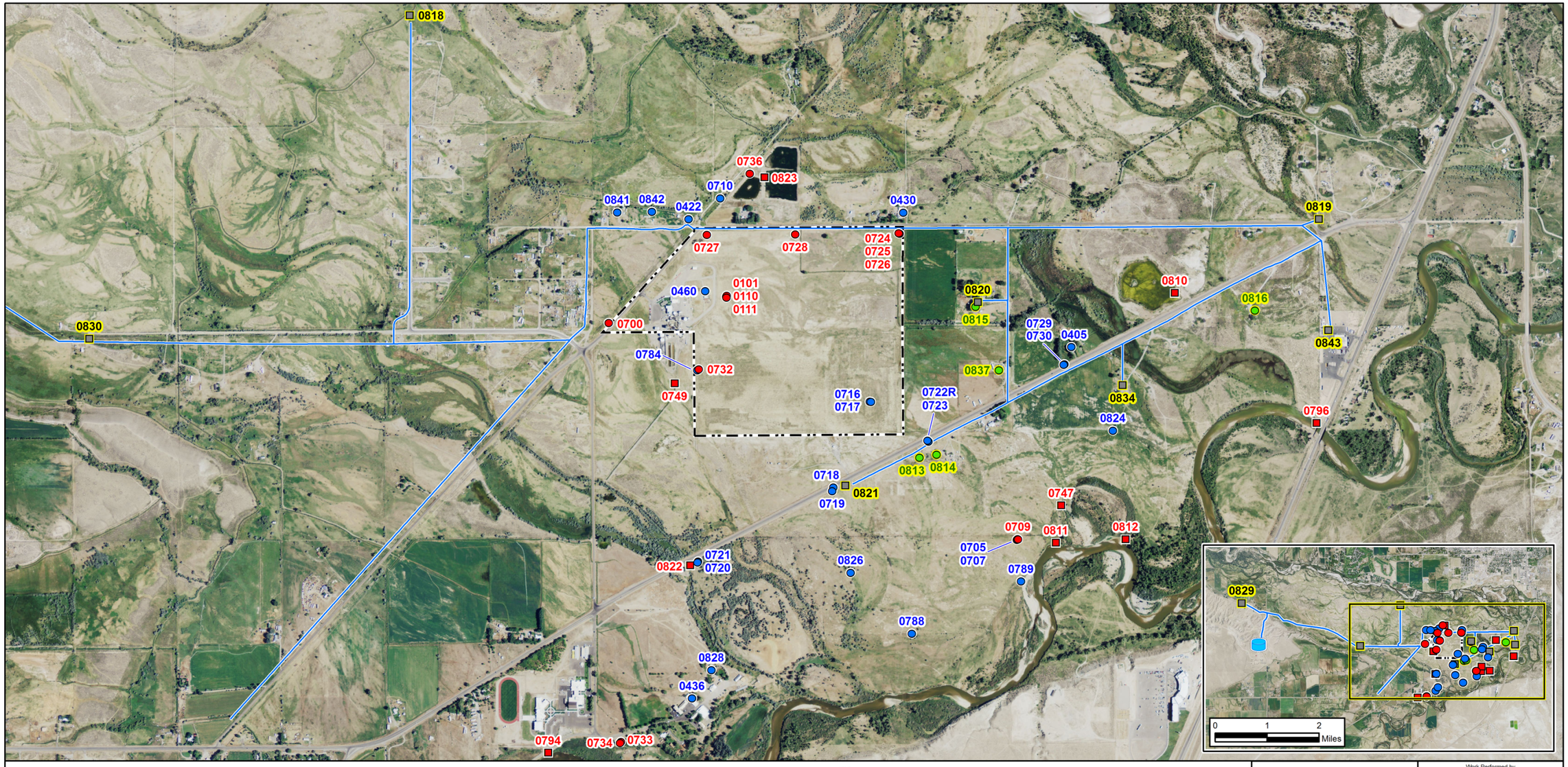

Riverton, Wyoming, Sample Location Map

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Riverton, Wyoming	**Date(s) of Water Sampling**	September 8–12, 2014
Date(s) of Verification	November 18, 2014	**Name of Verifier**	Stephen Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Work Order letter dated August 11, 2014. Alternate Water Supply System Flushing Plan Riverton, Wyoming.
2. Were the sampling locations specified in the planning documents sampled?	No	AWSS tap location 0814 was not sampled because the house was vacant, and domestic well 0422 was not sampled because the house was gone.
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed on September 5, 2014.
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicate samples were collected from locations 0722R, 0789, and 0819.
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):	14096457
Sample Event:	September 8-12, 2014
Site(s):	Riverton, Wyoming
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1409291
Analysis:	Metals, Wet Chemistry, and Radiochemistry
Validator:	Stephen Donivan
Review Date:	November 17, 2014

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/POL/S04325, continually updated) "Standard Practice for Validation of Environmental Data." The procedure was applied at Level 3, Data Validation. 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
Chloride	MIS-A-045	SW-846 9056	SW-846 9056
Metals: Ca, K, Mg, Mn, Na	LMM-01	SW-846 3005A	SW-846 6010B
Metals: Mo, U	LMM-02	SW-846 3005A	SW-846 6020A
Radium-226	GPC-A-018	PA SOP712	PA SOP724
Radium-228	GPC-A-020	PA SOP749	PA SOP724
Sulfate	MIS-A-045	SW-846 9056	SW-846 9056

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.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 58 water samples on September 17, 2014, accompanied by a Chain of Custody form. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents had no errors or omissions.

Preservation and Holding Times

The sample shipment was received cool and intact with the temperature inside the iced cooler at 0.4 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Table 5. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1409291-5	0460	Manganese	U	Less than 5 times the calibration blank
1409291-13	0720	Manganese	U	Less than 5 times the calibration blank
1409291-24	0794	Molybdenum	J	Less than 5 times the equipment blank
1409291-24	0794	Uranium	J	Serial dilution result
1409291-25	0796	Molybdenum	J	Less than 5 times the equipment blank
1409291-25	0796	Uranium	J	Less than 5 times the equipment blank
1409291-26	0810	Molybdenum	J	Less than 5 times the equipment blank
1409291-26	0810	Uranium	J	Less than 5 times the equipment blank
1409291-27	0811	Molybdenum	J	Less than 5 times the equipment blank
1409291-27	0811	Uranium	J	Less than 5 times the equipment blank
1409291-28	0812	Molybdenum	J	Less than 5 times the equipment blank
1409291-28	0812	Uranium	J	Less than 5 times the equipment blank
1409291-40	0822	Uranium	J	Less than 5 times the equipment blank
1409291-41	0823	Molybdenum	J	Less than 5 times the equipment blank
1409291-44	0828	Manganese	U	Less than 5 times the calibration blank
1409291-44	0828	Potassium	U	Less than 5 times the calibration blank
1409291-55	Equipment Blank	Calcium	U	Less than 5 times the calibration blank
1409291-55	Equipment Blank	Magnesium	U	Less than 5 times the calibration blank
1409291-55	Equipment Blank	Manganese	U	Less than 5 times the calibration blank
1409291-55	Equipment Blank	Sodium	U	Less than 5 times the calibration blank

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all metal and wet chemical 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.

For radiochemical analytes (those measured by radiometric counting) the MDL and PQL are not applicable, and these results are evaluated using the minimum detectable concentration (MDC), Decision Level Concentration (DLC), and Determination Limit (DL). The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC 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, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a "U" flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as 3 times the MDC. Results not previously "U" qualified that are less than the DL are qualified with a "J" flag as estimated values.

The reported MDLs for all metal and wet chemical analytes, and MDCs for radiochemical 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 and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Method SW-846 6010, Metals
Calibrations for calcium, potassium, magnesium, and manganese were performed on September 26 and 29, 2014. The calibration curve generated using four calibration standards had correlation coefficient values that 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 with all calibration checks meeting 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, Molybdenum, Uranium
Calibrations for molybdenum and uranium were performed on September 26, 2014, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting 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
The calibrations for chloride and sulfate were performed using five calibration standards on August 4, 2014. The calibration curve correlation coefficient values were greater than 0.995 and the absolute value of the intercepts was less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria.

Radium-226
Instrument calibration was performed August 20, 2013. Daily instrument checks performed October 15, 2014, met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Radium-228
Instrument calibration was performed May 8, 2013. Daily instrument checks performed on October 10 and 13, 2014, met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Method and Calibration Blanks

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

Metals and Wet Chemistry
All method blank and calibration blank results associated with the samples were below the PQLs for all analytes. All method, initial calibration, and continuing calibration blank results associated with the samples were below the PQLs.

In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

Radiochemistry
The radium-226 and radium-228 method blank results were below the DLC.

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 samples are used to measure method performance in the sample matrix. The spike recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the non-radiochemical sample replicates and matrix spike replicates were less than 20 percent for results that are greater than 5 times the PQL, indicating acceptable precision. The radiochemical relative error ratio (calculated using the one-sigma total propagated uncertainty) for the laboratory control sample replicates was less than three, indicating 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. The serial dilution results met the acceptance criteria with the following exception. The uranium result for the serial dilution prepared from sample 0794 did not meet the acceptance criteria. The associated sample uranium 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. The analytical report included the MDL (MDC for radiochemistry) and PQL for all analytes and all required supporting documentation.

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. All peak integrations were satisfactory.

Electronic Data Deliverable (EDD) File

The EDD file arrived on October 20, 2014. 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 files to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 14096457 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 11/17/2014

Project: Riverton **Analysis Type:** ☑ Metals ☑ General Chem ☑ Rad ☐ Organics

# of Samples: 58 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody

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

Sample

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

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There were 3 duplicates evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 14096457 **Lab Code:** PAR **Date Due:** 10/15/2014

Matrix: Water **Site Code:** RVT01 **Date Completed:** 10/20/2014

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	09/26/2014	0.0000	1.0000	OK	OK	OK	101.0	107.0	96.0	5.0	100.0	1.0	105.0
Calcium	ICP/ES	09/26/2014					OK	101.0	100.0	101.0	0.0	104.0	5.0	104.0
Calcium	ICP/ES	09/26/2014					OK	108.0				112.0	2.0	109.0
Calcium	ICP/ES	09/29/2014	0.0000	1.0000	OK	OK			102.0	106.0	1.0			
Magnesium	ICP/ES	09/26/2014	0.0000	1.0000	OK	OK	OK	103.0	105.0	100.0	4.0	103.0	0.0	102.0
Magnesium	ICP/ES	09/26/2014					OK	103.0	103.0	104.0	0.0	107.0	2.0	103.0
Magnesium	ICP/ES	09/26/2014					OK	107.0				110.0	2.0	105.0
Magnesium	ICP/ES	09/29/2014	0.0000	1.0000	OK	OK			100.0	102.0	1.0			
Manganese	ICP/ES	09/26/2014	0.0000	1.0000	OK	OK	OK	104.0	104.0	99.0	4.0	93.0	5.0	104.0
Manganese	ICP/ES	09/26/2014					OK	103.0	103.0	103.0	0.0	100.0	3.0	108.0
Manganese	ICP/ES	09/26/2014					OK	105.0				101.0	2.0	108.0
Manganese	ICP/ES	09/29/2014	0.0000	1.0000	OK	OK			99.0	100.0	1.0			
Molybdenum	ICP/MS	09/26/2014	0.0000	1.0000	OK	OK	OK	106.0	107.0	107.0	0.0			96.0
Molybdenum	ICP/MS	09/26/2014					OK	104.0	109.0	116.0	6.0			83.0
Molybdenum	ICP/MS	09/26/2014					OK	102.0	109.0	111.0	1.0			97.0
Potassium	ICP/ES	09/26/2014	0.0000	1.0000	OK	OK	OK	101.0	111.0	109.0	2.0			84.0
Potassium	ICP/ES	09/26/2014					OK	101.0	112.0	113.0	1.0			82.0
Potassium	ICP/ES	09/26/2014					OK	102.0						82.0

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 14096457 **Lab Code:** PAR **Date Due:** 10/15/2014

Matrix: Water **Site Code:** RVT01 **Date Completed:** 10/20/2014

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								
Potassium	ICP/ES	09/29/2014	0.0000	1.0000	OK	OK			116.0	116.0	0.0			
Sodium	ICP/ES	09/26/2014	0.0000	1.0000	OK	OK	OK	98.0	106.0	102.0	2.0		1.0	86.0
Sodium	ICP/ES	09/26/2014					OK	98.0	101.0	103.0	1.0		2.0	86.0
Sodium	ICP/ES	09/26/2014					OK	101.0					0.0	87.0
Sodium	ICP/ES	09/29/2014	0.0000	1.0000	OK	OK			104.0	106.0	1.0			
Uranium	ICP/MS	09/26/2014	0.0000	1.0000	OK	OK	OK	98.0	100.0	106.0	5.0		18.0	100.0
Uranium	ICP/MS	09/26/2014					OK	94.0	101.0	108.0	4.0		9.0	100.0
Uranium	ICP/MS	09/26/2014					OK	94.0	104.0	105.0	1.0		3.0	102.0

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 14096457 **Lab Code:** PAR **Date Due:** 10/15/2014

Matrix: Water **Site Code:** RVT01 **Date Completed:** 10/20/2014

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate RER
0813	Radium-226	10/15/2014			96.8			
0815	Radium-226	10/15/2014			95.9			
0816	Radium-226	10/15/2014			97.3			
0818	Radium-226	10/15/2014			96.9			
0818	Radium-226	10/15/2014			96.3			
0819	Radium-226	10/15/2014			93.1			
0819	Radium-226	10/15/2014			99.5			
0820	Radium-226	10/15/2014			99.2			
0820	Radium-226	10/15/2014			91.9			
0821	Radium-226	10/15/2014			92.7			
0821	Radium-226	10/15/2014			96.2			
0829	Radium-226	10/15/2014			96.9			
0829	Radium-226	10/15/2014			99.7			
0830	Radium-226	10/15/2014			96.5			
0830	Radium-226	10/15/2014			96.4			
0834	Radium-226	10/15/2014			99.0			
0837	Radium-226	10/15/2014			95.1			
0843	Radium-226	10/15/2014			96.9			
2469	Radium-226	10/15/2014			98.3			
0819	Radium-226	10/15/2014			99.7			0.27
Blank_Spike	Radium-226	10/15/2014			95.3	104.00		
Blank	Radium-226	10/15/2014	0.1220	U	101.0			
0813	Radium-228	10/10/2014			97.3			
0815	Radium-228	10/10/2014			103.0			
0816	Radium-228	10/10/2014			97.1			
0818	Radium-228	10/10/2014			96.0			
0818	Radium-228	10/10/2014			103.0			
0819	Radium-228	10/10/2014			96.3			
0819	Radium-228	10/10/2014			94.4			
0820	Radium-228	10/10/2014			97.8			
0820	Radium-228	10/10/2014			95.6			
0821	Radium-228	10/10/2014			95.3			

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 14096457 **Lab Code:** PAR **Date Due:** 10/15/2014

Matrix: Water **Site Code:** RVT01 **Date Completed:** 10/20/2014

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate RER
0821	Radium-228	10/10/2014			97.2			
0829	Radium-228	10/10/2014			95.3			
0829	Radium-228	10/10/2014			102.0			
0830	Radium-228	10/10/2014			96.7			
0830	Radium-228	10/10/2014			103.0			
0834	Radium-228	10/10/2014			96.7			
0819	Radium-228	10/10/2014			95.1			0.95
Blank_Spike	Radium-228	10/10/2014			98.6	82.90		
Blank	Radium-228	10/10/2014	0.2240	U	94.7			
0837	Radium-228	10/13/2014			94.2			
0843	Radium-228	10/13/2014			93.1			
2469	Radium-228	10/13/2014			95.1			
Blank_Spike	Radium-228	10/13/2014			92.4	91.70		
Blank_Spike_Du	Radium-228	10/13/2014			91.4	93.70		0.12
Blank	Radium-228	10/13/2014	-0.1820	U	87.4			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 14096457 **Lab Code:** PAR **Date Due:** 10/15/2014

Matrix: Water **Site Code:** RVT01 **Date Completed:** 10/20/2014

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
CHLORIDE	09/19/2014			OK	OK	OK	103.00	95.0	97.0	1.00	
CHLORIDE	09/23/2014			OK	OK	OK	102.00	100.0	99.0	1.00	
SULFATE	09/19/2014	0.000	0.9998	OK	OK	OK	99.00				
SULFATE	09/23/2014	0.000	1.0000	OK	OK	OK	100.00	103.0	99.0	2.00	

Sampling Quality Control Assessment

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

Sampling Protocol

Surface water locations were sampled using a peristaltic pump and tubing reel or container emersion. Monitoring wells were sampled using a peristaltic pump and dedicated tubing. Domestic wells (0405, 0430, 0431, 0436, 0460, 0828, 0841, and 0842) were sampled by filling bottles at the discharge point.

Sample results for all monitoring wells met the Category I or II 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. Wells 0705, 0719, and 0730 were classified as Category II and were further qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.

Equipment Blank Assessment

An equipment blank was collected after decontamination of the non-dedicated sampling equipment used at some surface water locations. Molybdenum and uranium were detected in the equipment blank. Associated sample results for these analytes that are less than 5 times the blank concentration are qualified with a "J" flag as estimated values.

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from locations 0722R, 0789, and 0819. For non-radiochemical measurements, the relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. The RPD is not used to evaluate results that are less than 5 times the PQL. For these results, the range should be no greater than the PQL. For radiochemical measurements, the relative error ratio (the ratio of the absolute difference between the sample and duplicate results and the sum of the 1-sigma uncertainties) is used to evaluate duplicate results and should be less than 3. All duplicate results met these criteria demonstrating acceptable overall precision.

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 Donivan — Stephen Donivan — 12-12-2014 — Date

Data Validation Lead: Stephen Donivan — Stephen Donivan — 12-12-2014 — 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.

Eleven analytical results were identified as potentially anomalous. Most of these data are radium-228 results from AWSS locations where an overall increase in radium-228 concentration was observed. There were no errors noted during the review of the data associated with these results and the data for this RIN are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2004
Laboratory: ALS Laboratory Group
RIN: 14096457
Report Date: 11/19/2014

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	
RVT01	0710	N001	09/10/2014	Molybdenum	0.00260		F	0.00240		F	0.00032	U	F	21	4	NA
RVT01	0718	N001	09/11/2014	Uranium	0.0990		F	0.297		F	0.110		F	22	0	No
RVT01	0720	N001	09/11/2014	Sulfate	89.0		F	760		F	96.0		F	21	0	NA
RVT01	0722R	N002	09/12/2014	Manganese	0.0240		F	0.0208		F	0.00011	U	F	15	3	NA
RVT01	0722R	N001	09/12/2014	Manganese	0.0240		F	0.0208		F	0.00011	U	F	15	3	NA
RVT01	0722R	N001	09/12/2014	Molybdenum	0.140		F	0.130		F	0.0530		F	15	0	No
RVT01	0722R	N002	09/12/2014	Uranium	0.850		F	0.759		F	0.250		F	15	0	No
RVT01	0722R	N001	09/12/2014	Uranium	0.910		F	0.759		F	0.250		F	15	0	No
RVT01	0729	N001	09/12/2014	Sulfate	34.0		F	160		F	52.0		F	22	0	No
RVT01	0730	N001	09/12/2014	Sulfate	110		FQ	310		FQ	120		FQ	21	0	NA
RVT01	0749	N001	09/10/2014	Molybdenum	0.0410			0.0242			0.00410			20	0	No
RVT01	0784	N001	09/10/2014	Manganese	1.30		F	1.000		F	0.190		F	18	0	No
RVT01	0813	N001	09/09/2014	Radium-228	1.92			1.15		J	0.320	U		9	5	Yes
RVT01	0813	N001	09/09/2014	Uranium	0.00005	B		0.00011		J	0.000089	B	U	10	5	No
RVT01	0815	N001	09/09/2014	Radium-226	1.06			0.736	U		-0.36	U		9	5	NA
RVT01	0815	N001	09/09/2014	Radium-228	1.29			0.889		J	0.488		J	9	3	Yes
RVT01	0815	N001	09/09/2014	Uranium	0.00004	B		0.00012		U	0.000066	B	U	10	5	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2004
Laboratory: ALS Laboratory Group
RIN: 14096457
Report Date: 11/19/2014

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	
RVT01	0816	N001	09/09/2014	Radium-228	1.75			1.41		J	0.338		U	8	4	No
RVT01	0816	N001	09/09/2014	Uranium	0.00004	B		0.00011		U	0.000063	B	U	10	5	No
RVT01	0818	N001	09/09/2014	Uranium	0.00004	B		0.00021	U		0.000059	B	U	21	10	NA
RVT01	0819	N001	09/09/2014	Radium-228	2.37			2.33			0.560	U		19	5	NA
RVT01	0819	N001	09/09/2014	Uranium	0.00003	B		0.00021	U		0.000063	B	U	19	9	No
RVT01	0820	N001	09/09/2014	Uranium	0.00004	B		0.00021	U		0.000065	B	U	18	9	No
RVT01	0820	N002	09/09/2014	Uranium	0.00003	B		0.00021	U		0.000065	B	U	18	9	No
RVT01	0821	N001	09/09/2014	Radium-226	2.41			1.64			0.135	U		20	9	Yes
RVT01	0821	N002	09/09/2014	Radium-228	1.98			1.73		J	0.420	U		20	3	No
RVT01	0821	N001	09/09/2014	Radium-228	3.04			1.73		J	0.420	U		20	3	Yes
RVT01	0821	N001	09/09/2014	Uranium	0.00006	B		0.00021	U		0.000064	B	U	20	9	NA
RVT01	0821	N002	09/09/2014	Uranium	0.00004	B		0.00021	U		0.000064	B	U	20	9	NA
RVT01	0822	N001	09/11/2014	Molybdenum	0.0120			0.00970			0.00160			20	0	No
RVT01	0824	N001	09/11/2014	Manganese	0.0430		F	0.0270		F	0.00042	B	UF	15	3	Yes
RVT01	0829	N002	09/09/2014	Radium-228	2.17			1.88			0.378		J	16	9	Yes
RVT01	0829	N001	09/09/2014	Radium-228	2.85			1.88			0.378		J	16	9	Yes
RVT01	0829	N002	09/09/2014	Uranium	0.00004	B		0.00011			0.000066	B	U	16	6	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2004
Laboratory: ALS Laboratory Group
RIN: 14096457
Report Date: 11/19/2014

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	
RVT01	0829	N001	09/09/2014	Uranium	0.00005	B		0.00011			0.000066	B	U	16	6	No
RVT01	0830	N001	09/09/2014	Radium-228	2.60			1.25		J	0.534		J	16	5	Yes
RVT01	0830	N002	09/09/2014	Radium-228	2.25			1.25		J	0.534		J	16	5	Yes
RVT01	0830	N001	09/09/2014	Uranium	0.00004	B		0.00012			0.00007	B	U	16	7	No
RVT01	0830	N002	09/09/2014	Uranium	0.00005	B		0.00012			0.00007	B	U	16	7	No
RVT01	0834	N001	09/09/2014	Radium-228	2.01			1.08		J	0.473		J	9	4	Yes
RVT01	0834	N001	09/09/2014	Uranium	0.00003	B		0.00012			0.000062	B	U	9	4	No
RVT01	0837	N001	09/09/2014	Radium-228	2.05			0.754		J	0.400	U		6	2	Yes
RVT01	0837	N001	09/09/2014	Uranium	0.00004	B		0.00011			0.00008	B		7	0	No
RVT01	0842	N001	09/10/2014	Sulfate	140			170			150			6	0	No

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

NA: Data are not normally or lognormally distributed.

Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0405 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	-	58			#		
Calcium	mg/L	09/11/2014	N001	-	7.6			#	0.012	
Chloride	mg/L	09/11/2014	N001	-	28			#	2	
Dissolved Oxygen	mg/L	09/11/2014	N001	-	3.12			#		
Magnesium	mg/L	09/11/2014	N001	-	0.07	B		#	0.013	
Manganese	mg/L	09/11/2014	N001	-	0.0048	B		#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	-	0.0049			#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	-	4.4			#		
pH	s.u.	09/11/2014	N001	-	8.97			#		
Potassium	mg/L	09/11/2014	N001	-	0.51	B		#	0.11	
Sodium	mg/L	09/11/2014	N001	-	180			#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	-	961			#		
Sulfate	mg/L	09/11/2014	N001	-	350			#	5	
Temperature	C	09/11/2014	N001	-	9.93			#		
Turbidity	NTU	09/11/2014	N001	-	2.54			#		
Uranium	mg/L	09/11/2014	N001	-	0.00003	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0430 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	-	166			#		
Calcium	mg/L	09/11/2014	N001	-	4			#	0.012	
Chloride	mg/L	09/11/2014	N001	-	9.7			#	1	
Dissolved Oxygen	mg/L	09/11/2014	N001	-	2.11			#		
Magnesium	mg/L	09/11/2014	N001	-	0.056	B		#	0.013	
Manganese	mg/L	09/11/2014	N001	-	0.0065			#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	-	0.0023			#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	-	-63.6			#		
pH	s.u.	09/11/2014	N001	-	8.82			#		
Potassium	mg/L	09/11/2014	N001	-	0.51	B		#	0.11	
Sodium	mg/L	09/11/2014	N001	-	140			#	0.0066	
Specific Conductance	umhos /cm	09/11/2014	N001	-	728			#		
Sulfate	mg/L	09/11/2014	N001	-	180			#	2.5	
Temperature	C	09/11/2014	N001	-	11.73			#		
Turbidity	NTU	09/11/2014	N001	-	1.39			#		
Uranium	mg/L	09/11/2014	N001	-	0.00004	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0431 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	-	260			#		
Calcium	mg/L	09/11/2014	N001	-	250			#	0.012	
Chloride	mg/L	09/11/2014	N001	-	170			#	4	
Dissolved Oxygen	mg/L	09/11/2014	N001	-	5.65			#		
Magnesium	mg/L	09/11/2014	N001	-	54			#	0.013	
Manganese	mg/L	09/11/2014	N001	-	0.15			#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	-	0.0038			#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	-	7.7			#		
pH	s.u.	09/11/2014	N001	-	7.14			#		
Potassium	mg/L	09/11/2014	N001	-	63			#	0.11	
Sodium	mg/L	09/11/2014	N001	-	140			#	0.0066	
Specific Conductance	umhos /cm	09/11/2014	N001	-	1961			#		
Sulfate	mg/L	09/11/2014	N001	-	640			#	10	
Temperature	C	09/11/2014	N001	-	12.12			#		
Turbidity	NTU	09/11/2014	N001	-	0.89			#		
Uranium	mg/L	09/11/2014	N001	-	0.016			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0436 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	-	154			#		
Calcium	mg/L	09/11/2014	N001	-	3.8			#	0.012	
Chloride	mg/L	09/11/2014	N001	-	15			#	2	
Dissolved Oxygen	mg/L	09/11/2014	N001	-	1.83			#		
Magnesium	mg/L	09/11/2014	N001	-	0.08	B		#	0.013	
Manganese	mg/L	09/11/2014	N001	-	0.0067			#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	-	0.0031			#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	-	165			#		
pH	s.u.	09/11/2014	N001	-	8.88			#		
Potassium	mg/L	09/11/2014	N001	-	0.56	B		#	0.11	
Sodium	mg/L	09/11/2014	N001	-	170			#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	-	751			#		
Sulfate	mg/L	09/11/2014	N001	-	210			#	5	
Temperature	C	09/11/2014	N001	-	18.12			#		
Turbidity	NTU	09/11/2014	N001	-	0.83			#		
Uranium	mg/L	09/11/2014	N001	-	0.0001			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0460 WELL Sulfuric Acid Plant

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	-	160			#		
Calcium	mg/L	09/11/2014	N001	-	3.3			#	0.012	
Chloride	mg/L	09/11/2014	N001	-	11			#	1	
Dissolved Oxygen	mg/L	09/11/2014	N001	-	1.36			#		
Magnesium	mg/L	09/11/2014	N001	-	0.054	B		#	0.013	
Manganese	mg/L	09/11/2014	N001	-	0.0012	B	U	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	-	0.0032			#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	-	179			#		
pH	s.u.	09/11/2014	N001	-	8.76			#		
Potassium	mg/L	09/11/2014	N001	-	0.48	B		#	0.11	
Sodium	mg/L	09/11/2014	N001	-	130			#	0.0066	
Specific Conductance	umhos /cm	09/11/2014	N001	-	819			#		
Sulfate	mg/L	09/11/2014	N001	-	160			#	2.5	
Temperature	C	09/11/2014	N001	-	14.89			#		
Turbidity	NTU	09/11/2014	N001	-	1.21			#		
Uranium	mg/L	09/11/2014	N001	-	0.00005	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0705 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	38	-	48	61		FQ	#		
Calcium	mg/L	09/10/2014	N001	38	-	48	29		FQ	#	0.012	
Chloride	mg/L	09/10/2014	N001	38	-	48	54		FQ	#	2	
Dissolved Oxygen	mg/L	09/10/2014	N001	38	-	48	1.05		FQ	#		
Magnesium	mg/L	09/10/2014	N001	38	-	48	0.52	B	FQ	#	0.013	
Manganese	mg/L	09/10/2014	N001	38	-	48	0.0054		FQ	#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	38	-	48	0.0031		FQ	#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	38	-	48	190		FQ	#		
pH	s.u.	09/10/2014	N001	38	-	48	8.14		FQ	#		
Potassium	mg/L	09/10/2014	N001	38	-	48	0.91	B	FQ	#	0.11	
Sodium	mg/L	09/10/2014	N001	38	-	48	220		FQ	#	0.066	
Specific Conductance	umhos /cm	09/10/2014	N001	38	-	48	1197		FQ	#		
Sulfate	mg/L	09/10/2014	N001	38	-	48	420		FQ	#	5	
Temperature	C	09/10/2014	N001	38	-	48	8.91		FQ	#		
Turbidity	NTU	09/10/2014	N001	38	-	48	8.71		FQ	#		
Uranium	mg/L	09/10/2014	N001	38	-	48	0.00022		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0707 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	9.8	-	14.8	352		F	#		
Calcium	mg/L	09/10/2014	N001	9.8	-	14.8	370		F	#	0.012	
Chloride	mg/L	09/10/2014	N001	9.8	-	14.8	70		F	#	10	
Dissolved Oxygen	mg/L	09/10/2014	N001	9.8	-	14.8	0.33		F	#		
Magnesium	mg/L	09/10/2014	N001	9.8	-	14.8	110		F	#	0.013	
Manganese	mg/L	09/10/2014	N001	9.8	-	14.8	0.93		F	#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	9.8	-	14.8	0.98		F	#	0.0016	
Oxidation Reduction Potential	mV	09/10/2014	N001	9.8	-	14.8	144.9		F	#		
pH	s.u.	09/10/2014	N001	9.8	-	14.8	6.97		F	#		
Potassium	mg/L	09/10/2014	N001	9.8	-	14.8	20		F	#	0.11	
Sodium	mg/L	09/10/2014	N001	9.8	-	14.8	530		F	#	0.066	
Specific Conductance	umhos /cm	09/10/2014	N001	9.8	-	14.8	3713		F	#		
Sulfate	mg/L	09/10/2014	N001	9.8	-	14.8	2100		F	#	25	
Temperature	C	09/10/2014	N001	9.8	-	14.8	11.09		F	#		
Turbidity	NTU	09/10/2014	N001	9.8	-	14.8	0.78		F	#		
Uranium	mg/L	09/10/2014	N001	9.8	-	14.8	0.82		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0710 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	11.2	-	16.2	187		F	#		
Calcium	mg/L	09/10/2014	N001	11.2	-	16.2	56		F	#	0.012	
Chloride	mg/L	09/10/2014	N001	11.2	-	16.2	7.2		F	#	0.2	
Dissolved Oxygen	mg/L	09/10/2014	N001	11.2	-	16.2	0.06		F	#		
Magnesium	mg/L	09/10/2014	N001	11.2	-	16.2	13		F	#	0.013	
Manganese	mg/L	09/10/2014	N001	11.2	-	16.2	0.031		F	#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	11.2	-	16.2	0.0026		F	#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	11.2	-	16.2	43.3		F	#		
pH	s.u.	09/10/2014	N001	11.2	-	16.2	7.37		F	#		
Potassium	mg/L	09/10/2014	N001	11.2	-	16.2	1.7		F	#	0.11	
Sodium	mg/L	09/10/2014	N001	11.2	-	16.2	35		F	#	0.0066	
Specific Conductance	umhos /cm	09/10/2014	N001	11.2	-	16.2	456		F	#		
Sulfate	mg/L	09/10/2014	N001	11.2	-	16.2	91		F	#	0.5	
Temperature	C	09/10/2014	N001	11.2	-	16.2	12.6		F	#		
Turbidity	NTU	09/10/2014	N001	11.2	-	16.2	1.06		F	#		
Uranium	mg/L	09/10/2014	N001	11.2	-	16.2	0.003		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0716 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	9.78 - 14.78	288		F	#		
Calcium	mg/L	09/10/2014	N001	9.78 - 14.78	130		F	#	0.012	
Chloride	mg/L	09/10/2014	N001	9.78 - 14.78	38		F	#	2	
Dissolved Oxygen	mg/L	09/10/2014	N001	9.78 - 14.78	0.39		F	#		
Magnesium	mg/L	09/10/2014	N001	9.78 - 14.78	31		F	#	0.013	
Manganese	mg/L	09/10/2014	N001	9.78 - 14.78	0.34		F	#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	9.78 - 14.78	0.13		F	#	0.0016	
Oxidation Reduction Potential	mV	09/10/2014	N001	9.78 - 14.78	-22.4		F	#		
pH	s.u.	09/10/2014	N001	9.78 - 14.78	7.04		F	#		
Potassium	mg/L	09/10/2014	N001	9.78 - 14.78	6.7		F	#	0.11	
Sodium	mg/L	09/10/2014	N001	9.78 - 14.78	140		F	#	0.0066	
Specific Conductance	umhos /cm	09/10/2014	N001	9.78 - 14.78	1313		F	#		
Sulfate	mg/L	09/10/2014	N001	9.78 - 14.78	420		F	#	5	
Temperature	C	09/10/2014	N001	9.78 - 14.78	14.99		F	#		
Turbidity	NTU	09/10/2014	N001	9.78 - 14.78	3.53		F	#		
Uranium	mg/L	09/10/2014	N001	9.78 - 14.78	0.22		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0717 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	45.1	-	55.1	195		F	#		
Calcium	mg/L	09/10/2014	N001	45.1	-	55.1	96		F	#	0.012	
Chloride	mg/L	09/10/2014	N001	45.1	-	55.1	49		F	#	4	
Dissolved Oxygen	mg/L	09/10/2014	N001	45.1	-	55.1	0.21		F	#		
Magnesium	mg/L	09/10/2014	N001	45.1	-	55.1	6.5		F	#	0.013	
Manganese	mg/L	09/10/2014	N001	45.1	-	55.1	0.18		F	#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	45.1	-	55.1	0.008		F	#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	45.1	-	55.1	-35.8		F	#		
pH	s.u.	09/10/2014	N001	45.1	-	55.1	7.7		F	#		
Potassium	mg/L	09/10/2014	N001	45.1	-	55.1	1.6		F	#	0.11	
Sodium	mg/L	09/10/2014	N001	45.1	-	55.1	310		F	#	0.066	
Specific Conductance	umhos /cm	09/10/2014	N001	45.1	-	55.1	1716		F	#		
Sulfate	mg/L	09/10/2014	N001	45.1	-	55.1	700		F	#	10	
Temperature	C	09/10/2014	N001	45.1	-	55.1	12.01		F	#		
Turbidity	NTU	09/10/2014	N001	45.1	-	55.1	0.91		F	#		
Uranium	mg/L	09/10/2014	N001	45.1	-	55.1	0.00003	B	F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0718 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	18.24 - 23.24	292		F	#		
Calcium	mg/L	09/11/2014	N001	18.24 - 23.24	360		F	#	0.012	
Chloride	mg/L	09/11/2014	N001	18.24 - 23.24	110		F	#	10	
Dissolved Oxygen	mg/L	09/11/2014	N001	18.24 - 23.24	0.18		F	#		
Magnesium	mg/L	09/11/2014	N001	18.24 - 23.24	93		F	#	0.013	
Manganese	mg/L	09/11/2014	N001	18.24 - 23.24	0.44		F	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	18.24 - 23.24	0.076		F	#	0.0016	
Oxidation Reduction Potential	mV	09/11/2014	N001	18.24 - 23.24	-19.8		F	#		
pH	s.u.	09/11/2014	N001	18.24 - 23.24	7.09		F	#		
Potassium	mg/L	09/11/2014	N001	18.24 - 23.24	22		F	#	0.11	
Sodium	mg/L	09/11/2014	N001	18.24 - 23.24	680		F	#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	18.24 - 23.24	4393		F	#		
Sulfate	mg/L	09/11/2014	N001	18.24 - 23.24	2300		F	#	25	
Temperature	C	09/11/2014	N001	18.24 - 23.24	12.31		F	#		
Turbidity	NTU	09/11/2014	N001	18.24 - 23.24	0.79		F	#		
Uranium	mg/L	09/11/2014	N001	18.24 - 23.24	0.099		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0719 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	38.47 - 48.47	91		FQ	#		
Calcium	mg/L	09/11/2014	N001	38.47 - 48.47	82		FQ	#	0.012	
Chloride	mg/L	09/11/2014	N001	38.47 - 48.47	40		FQ	#	2	
Dissolved Oxygen	mg/L	09/11/2014	N001	38.47 - 48.47	0.57		FQ	#		
Magnesium	mg/L	09/11/2014	N001	38.47 - 48.47	3.5		FQ	#	0.013	
Manganese	mg/L	09/11/2014	N001	38.47 - 48.47	0.16		FQ	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	38.47 - 48.47	0.012		FQ	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	38.47 - 48.47	-70.1		FQ	#		
pH	s.u.	09/11/2014	N001	38.47 - 48.47	7.65		FQ	#		
Potassium	mg/L	09/11/2014	N001	38.47 - 48.47	1.7		FQ	#	0.11	
Sodium	mg/L	09/11/2014	N001	38.47 - 48.47	180		FQ	#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	38.47 - 48.47	1203		FQ	#		
Sulfate	mg/L	09/11/2014	N001	38.47 - 48.47	460		FQ	#	5	
Temperature	C	09/11/2014	N001	38.47 - 48.47	10.01		FQ	#		
Turbidity	NTU	09/11/2014	N001	38.47 - 48.47	1.97		FQ	#		
Uranium	mg/L	09/11/2014	N001	38.47 - 48.47	0.00038		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0720 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	7.94	-	12.94	219		F	#		
Calcium	mg/L	09/11/2014	N001	7.94	-	12.94	74		F	#	0.012	
Chloride	mg/L	09/11/2014	N001	7.94	-	12.94	3.9		F	#	1	
Dissolved Oxygen	mg/L	09/11/2014	N001	7.94	-	12.94	2.6		F	#		
Magnesium	mg/L	09/11/2014	N001	7.94	-	12.94	19		F	#	0.013	
Manganese	mg/L	09/11/2014	N001	7.94	-	12.94	0.00035	B	UF	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	7.94	-	12.94	0.0015		F	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	7.94	-	12.94	33.3		F	#		
pH	s.u.	09/11/2014	N001	7.94	-	12.94	7.29		F	#		
Potassium	mg/L	09/11/2014	N001	7.94	-	12.94	2.6		F	#	0.11	
Sodium	mg/L	09/11/2014	N001	7.94	-	12.94	28		F	#	0.0066	
Specific Conductance	umhos /cm	09/11/2014	N001	7.94	-	12.94	587		F	#		
Sulfate	mg/L	09/11/2014	N001	7.94	-	12.94	89		F	#	2.5	
Temperature	C	09/11/2014	N001	7.94	-	12.94	11.34		F	#		
Turbidity	NTU	09/11/2014	N001	7.94	-	12.94	1.44		F	#		
Uranium	mg/L	09/11/2014	N001	7.94	-	12.94	0.0046		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0721 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	44.43 - 54.43	95		F	#		
Calcium	mg/L	09/11/2014	N001	44.43 - 54.43	8.8		F	#	0.012	
Chloride	mg/L	09/11/2014	N001	44.43 - 54.43	24		F	#	2	
Dissolved Oxygen	mg/L	09/11/2014	N001	44.43 - 54.43	0.2		F	#		
Magnesium	mg/L	09/11/2014	N001	44.43 - 54.43	0.1	B	F	#	0.013	
Manganese	mg/L	09/11/2014	N001	44.43 - 54.43	0.0029	B	F	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	44.43 - 54.43	0.0025		F	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	44.43 - 54.43	53.2		F	#		
pH	s.u.	09/11/2014	N001	44.43 - 54.43	8.86		F	#		
Potassium	mg/L	09/11/2014	N001	44.43 - 54.43	0.52	B	F	#	0.11	
Sodium	mg/L	09/11/2014	N001	44.43 - 54.43	170		F	#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	44.43 - 54.43	856		F	#		
Sulfate	mg/L	09/11/2014	N001	44.43 - 54.43	270		F	#	5	
Temperature	C	09/11/2014	N001	44.43 - 54.43	9.43		F	#		
Turbidity	NTU	09/11/2014	N001	44.43 - 54.43	1.51		F	#		
Uranium	mg/L	09/11/2014	N001	44.43 - 54.43	0.0001		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0722R WELL Replacement well for destroyed well 0722.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/12/2014	N001	11.1 - 16.1	273		F	#		
Calcium	mg/L	09/12/2014	N001	11.1 - 16.1	410		F	#	0.012	
Calcium	mg/L	09/12/2014	N002	11.1 - 16.1	420		F	#	0.012	
Chloride	mg/L	09/12/2014	N001	11.1 - 16.1	37		F	#	4	
Chloride	mg/L	09/12/2014	N002	11.1 - 16.1	37		F	#	4	
Dissolved Oxygen	mg/L	09/12/2014	N001	11.1 - 16.1	0.51		F	#		
Magnesium	mg/L	09/12/2014	N001	11.1 - 16.1	38		F	#	0.013	
Magnesium	mg/L	09/12/2014	N002	11.1 - 16.1	38		F	#	0.013	
Manganese	mg/L	09/12/2014	N001	11.1 - 16.1	0.024		F	#	0.00011	
Manganese	mg/L	09/12/2014	N002	11.1 - 16.1	0.024		F	#	0.00011	
Molybdenum	mg/L	09/12/2014	N001	11.1 - 16.1	0.14		F	#	0.0016	
Molybdenum	mg/L	09/12/2014	N002	11.1 - 16.1	0.13		F	#	0.00032	
Oxidation Reduction Potential	mV	09/12/2014	N001	11.1 - 16.1	140.3		F	#		
pH	s.u.	09/12/2014	N001	11.1 - 16.1	6.4		F	#		
Potassium	mg/L	09/12/2014	N001	11.1 - 16.1	13		F	#	0.11	
Potassium	mg/L	09/12/2014	N002	11.1 - 16.1	12		F	#	0.11	
Sodium	mg/L	09/12/2014	N001	11.1 - 16.1	150		F	#	0.0066	
Sodium	mg/L	09/12/2014	N002	11.1 - 16.1	150		F	#	0.0066	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site

REPORT DATE: 11/19/2014

Location: 0722R WELL Replacement well for destroyed well 0722.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	09/12/2014	N001	11.1	-	16.1	2123		F	#		
Sulfate	mg/L	09/12/2014	N001	11.1	-	16.1	1100		F	#	10	
Sulfate	mg/L	09/12/2014	N002	11.1	-	16.1	1100		F	#	10	
Temperature	C	09/12/2014	N001	11.1	-	16.1	13.84		F	#		
Turbidity	NTU	09/12/2014	N001	11.1	-	16.1	0.39		F	#		
Uranium	mg/L	09/12/2014	N001	11.1	-	16.1	0.91		F	#	0.00015	
Uranium	mg/L	09/12/2014	N002	11.1	-	16.1	0.85		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0723 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/12/2014	N001	45.99 - 55.99	309		F	#		
Calcium	mg/L	09/12/2014	N001	45.99 - 55.99	280		F	#	0.012	
Chloride	mg/L	09/12/2014	N001	45.99 - 55.99	54		F	#	10	
Dissolved Oxygen	mg/L	09/12/2014	N001	45.99 - 55.99	0.18		F	#		
Magnesium	mg/L	09/12/2014	N001	45.99 - 55.99	10		F	#	0.013	
Manganese	mg/L	09/12/2014	N001	45.99 - 55.99	0.34		F	#	0.00011	
Molybdenum	mg/L	09/12/2014	N001	45.99 - 55.99	0.00032	U	F	#	0.00032	
Oxidation Reduction Potential	mV	09/12/2014	N001	45.99 - 55.99	-3.4		F	#		
pH	s.u.	09/12/2014	N001	45.99 - 55.99	5.84		F	#		
Potassium	mg/L	09/12/2014	N001	45.99 - 55.99	3		F	#	0.11	
Sodium	mg/L	09/12/2014	N001	45.99 - 55.99	570		F	#	0.066	
Specific Conductance	umhos /cm	09/12/2014	N001	45.99 - 55.99	3240		F	#		
Sulfate	mg/L	09/12/2014	N001	45.99 - 55.99	1700		F	#	25	
Temperature	C	09/12/2014	N001	45.99 - 55.99	11.86		F	#		
Turbidity	NTU	09/12/2014	N001	45.99 - 55.99	0.95		F	#		
Uranium	mg/L	09/12/2014	N001	45.99 - 55.99	0.00004	B	F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0729 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/12/2014	N001	14.71 - 19.71	250		F	#		
Calcium	mg/L	09/12/2014	N001	14.71 - 19.71	71		F	#	0.012	
Chloride	mg/L	09/12/2014	N001	14.71 - 19.71	2.3		F	#	0.2	
Dissolved Oxygen	mg/L	09/12/2014	N001	14.71 - 19.71	0.19		F	#		
Magnesium	mg/L	09/12/2014	N001	14.71 - 19.71	18		F	#	0.013	
Manganese	mg/L	09/12/2014	N001	14.71 - 19.71	0.0052		F	#	0.00011	
Molybdenum	mg/L	09/12/2014	N001	14.71 - 19.71	0.0035		F	#	0.00032	
Oxidation Reduction Potential	mV	09/12/2014	N001	14.71 - 19.71	120.6		F	#		
pH	s.u.	09/12/2014	N001	14.71 - 19.71	7.25		F	#		
Potassium	mg/L	09/12/2014	N001	14.71 - 19.71	7		F	#	0.11	
Sodium	mg/L	09/12/2014	N001	14.71 - 19.71	20		F	#	0.0066	
Specific Conductance	umhos /cm	09/12/2014	N001	14.71 - 19.71	514		F	#		
Sulfate	mg/L	09/12/2014	N001	14.71 - 19.71	34		F	#	0.5	
Temperature	C	09/12/2014	N001	14.71 - 19.71	15.81		F	#		
Turbidity	NTU	09/12/2014	N001	14.71 - 19.71	5.79		F	#		
Uranium	mg/L	09/12/2014	N001	14.71 - 19.71	0.0036		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0730 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/12/2014	N001	38.62 - 48.62	314		FQ	#		
Calcium	mg/L	09/12/2014	N001	38.62 - 48.62	78		FQ	#	0.012	
Chloride	mg/L	09/12/2014	N001	38.62 - 48.62	6.2		FQ	#	2	
Dissolved Oxygen	mg/L	09/12/2014	N001	38.62 - 48.62	0.4		FQ	#		
Magnesium	mg/L	09/12/2014	N001	38.62 - 48.62	14		FQ	#	0.013	
Manganese	mg/L	09/12/2014	N001	38.62 - 48.62	0.048		FQ	#	0.00011	
Molybdenum	mg/L	09/12/2014	N001	38.62 - 48.62	0.0038		FQ	#	0.00032	
Oxidation Reduction Potential	mV	09/12/2014	N001	38.62 - 48.62	111		FQ	#		
pH	s.u.	09/12/2014	N001	38.62 - 48.62	7.42		FQ	#		
Potassium	mg/L	09/12/2014	N001	38.62 - 48.62	2.6		FQ	#	0.11	
Sodium	mg/L	09/12/2014	N001	38.62 - 48.62	89		FQ	#	0.0066	
Specific Conductance	umhos /cm	09/12/2014	N001	38.62 - 48.62	791		FQ	#		
Sulfate	mg/L	09/12/2014	N001	38.62 - 48.62	110		FQ	#	5	
Temperature	C	09/12/2014	N001	38.62 - 48.62	12.51		FQ	#		
Turbidity	NTU	09/12/2014	N001	38.62 - 48.62	2.25		FQ	#		
Uranium	mg/L	09/12/2014	N001	38.62 - 48.62	0.0049		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0784 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	1.65 - 6.65	176		F	#		
Calcium	mg/L	09/10/2014	N001	1.65 - 6.65	510		F	#	0.12	
Chloride	mg/L	09/10/2014	N001	1.65 - 6.65	16		F	#	5	
Dissolved Oxygen	mg/L	09/10/2014	N001	1.65 - 6.65	0.31		F	#		
Magnesium	mg/L	09/10/2014	N001	1.65 - 6.65	18		F	#	0.013	
Manganese	mg/L	09/10/2014	N001	1.65 - 6.65	1.3		F	#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	1.65 - 6.65	0.012		F	#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	1.65 - 6.65	-29.5		F	#		
pH	s.u.	09/10/2014	N001	1.65 - 6.65	7.2		F	#		
Potassium	mg/L	09/10/2014	N001	1.65 - 6.65	11		F	#	0.11	
Sodium	mg/L	09/10/2014	N001	1.65 - 6.65	380		F	#	0.066	
Specific Conductance	umhos /cm	09/10/2014	N001	1.65 - 6.65	2150		F	#		
Sulfate	mg/L	09/10/2014	N001	1.65 - 6.65	2000		F	#	12	
Temperature	C	09/10/2014	N001	1.65 - 6.65	16.6		F	#		
Turbidity	NTU	09/10/2014	N001	1.65 - 6.65	1.28		F	#		
Uranium	mg/L	09/10/2014	N001	1.65 - 6.65	0.0017		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0788 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	1.41 - 13.41	398		F	#		
Calcium	mg/L	09/11/2014	N001	1.41 - 13.41	280		F	#	0.012	
Chloride	mg/L	09/11/2014	N001	1.41 - 13.41	43		F	#	5	
Dissolved Oxygen	mg/L	09/11/2014	N001	1.41 - 13.41	0.25		F	#		
Magnesium	mg/L	09/11/2014	N001	1.41 - 13.41	74		F	#	0.013	
Manganese	mg/L	09/11/2014	N001	1.41 - 13.41	0.2		F	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	1.41 - 13.41	0.021		F	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	1.41 - 13.41	-22.4		F	#		
pH	s.u.	09/11/2014	N001	1.41 - 13.41	7.18		F	#		
Potassium	mg/L	09/11/2014	N001	1.41 - 13.41	12		F	#	0.11	
Sodium	mg/L	09/11/2014	N001	1.41 - 13.41	440		F	#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	1.41 - 13.41	3032		F	#		
Sulfate	mg/L	09/11/2014	N001	1.41 - 13.41	1400		F	#	12	
Temperature	C	09/11/2014	N001	1.41 - 13.41	9.83		F	#		
Turbidity	NTU	09/11/2014	N001	1.41 - 13.41	0.79		F	#		
Uranium	mg/L	09/11/2014	N001	1.41 - 13.41	0.043		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0789 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	6.2 - 18.2	447		F	#		
Calcium	mg/L	09/10/2014	N001	6.2 - 18.2	400		F	#	0.012	
Calcium	mg/L	09/10/2014	N002	6.2 - 18.2	420		F	#	0.012	
Chloride	mg/L	09/10/2014	N001	6.2 - 18.2	190		F	#	20	
Chloride	mg/L	09/10/2014	N002	6.2 - 18.2	190		F	#	20	
Dissolved Oxygen	mg/L	09/10/2014	N001	6.2 - 18.2	0.13		F	#		
Magnesium	mg/L	09/10/2014	N001	6.2 - 18.2	240		F	#	0.013	
Magnesium	mg/L	09/10/2014	N002	6.2 - 18.2	240		F	#	0.013	
Manganese	mg/L	09/10/2014	N001	6.2 - 18.2	0.79		F	#	0.00011	
Manganese	mg/L	09/10/2014	N002	6.2 - 18.2	0.79		F	#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	6.2 - 18.2	0.64		F	#	0.0032	
Molybdenum	mg/L	09/10/2014	N002	6.2 - 18.2	0.63		F	#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	6.2 - 18.2	117.8		F	#		
pH	s.u.	09/10/2014	N001	6.2 - 18.2	7.08		F	#		
Potassium	mg/L	09/10/2014	N001	6.2 - 18.2	31		F	#	0.11	
Potassium	mg/L	09/10/2014	N002	6.2 - 18.2	30		F	#	0.11	
Sodium	mg/L	09/10/2014	N001	6.2 - 18.2	1400		F	#	0.066	
Sodium	mg/L	09/10/2014	N002	6.2 - 18.2	1400		F	#	0.066	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0789 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	09/10/2014	N001	6.2	-	18.2	7579		F	#		
Sulfate	mg/L	09/10/2014	N001	6.2	-	18.2	4600		F	#	50	
Sulfate	mg/L	09/10/2014	N002	6.2	-	18.2	4600		F	#	50	
Temperature	C	09/10/2014	N001	6.2	-	18.2	11.59		F	#		
Turbidity	NTU	09/10/2014	N001	6.2	-	18.2	0.88		F	#		
Uranium	mg/L	09/10/2014	N001	6.2	-	18.2	1.7		F	#	0.00029	
Uranium	mg/L	09/10/2014	N002	6.2	-	18.2	1.6		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0824 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	9.5 - 14.5	349		F	#		
Calcium	mg/L	09/11/2014	N001	9.5 - 14.5	110		F	#	0.012	
Chloride	mg/L	09/11/2014	N001	9.5 - 14.5	6.2		F	#	2	
Dissolved Oxygen	mg/L	09/11/2014	N001	9.5 - 14.5	0.31		F	#		
Magnesium	mg/L	09/11/2014	N001	9.5 - 14.5	28		F	#	0.013	
Manganese	mg/L	09/11/2014	N001	9.5 - 14.5	0.043		F	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	9.5 - 14.5	0.0036		F	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	9.5 - 14.5	-10.8		F	#		
pH	s.u.	09/11/2014	N001	9.5 - 14.5	7.07		F	#		
Potassium	mg/L	09/11/2014	N001	9.5 - 14.5	7.1		F	#	0.11	
Sodium	mg/L	09/11/2014	N001	9.5 - 14.5	51		F	#	0.0066	
Specific Conductance	umhos /cm	09/11/2014	N001	9.5 - 14.5	828		F	#		
Sulfate	mg/L	09/11/2014	N001	9.5 - 14.5	100		F	#	5	
Temperature	C	09/11/2014	N001	9.5 - 14.5	12.81		F	#		
Turbidity	NTU	09/11/2014	N001	9.5 - 14.5	3.96		F	#		
Uranium	mg/L	09/11/2014	N001	9.5 - 14.5	0.012		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0826 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	6.6 - 11.6	352		F	#		
Calcium	mg/L	09/11/2014	N001	6.6 - 11.6	240		F	#	0.012	
Chloride	mg/L	09/11/2014	N001	6.6 - 11.6	36		F	#	5	
Dissolved Oxygen	mg/L	09/11/2014	N001	6.6 - 11.6	0.3		F	#		
Magnesium	mg/L	09/11/2014	N001	6.6 - 11.6	65		F	#	0.013	
Manganese	mg/L	09/11/2014	N001	6.6 - 11.6	2.1		F	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	6.6 - 11.6	0.022		F	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	6.6 - 11.6	90.6		F	#		
pH	s.u.	09/11/2014	N001	6.6 - 11.6	7.15		F	#		
Potassium	mg/L	09/11/2014	N001	6.6 - 11.6	11		F	#	0.11	
Sodium	mg/L	09/11/2014	N001	6.6 - 11.6	400		F	#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	6.6 - 11.6	2883		F	#		
Sulfate	mg/L	09/11/2014	N001	6.6 - 11.6	1400		F	#	12	
Temperature	C	09/11/2014	N001	6.6 - 11.6	9.85		F	#		
Turbidity	NTU	09/11/2014	N001	6.6 - 11.6	2.7		F	#		
Uranium	mg/L	09/11/2014	N001	6.6 - 11.6	0.042		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0828 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	-	147			#		
Calcium	mg/L	09/11/2014	N001	-	4			#	0.012	
Chloride	mg/L	09/11/2014	N001	-	14			#	2	
Dissolved Oxygen	mg/L	09/11/2014	N001	-	1.3			#		
Magnesium	mg/L	09/11/2014	N001	-	0.092	B		#	0.013	
Manganese	mg/L	09/11/2014	N001	-	0.0033	B	U	#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	-	0.0029			#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	-	134			#		
pH	s.u.	09/11/2014	N001	-	8.88			#		
Potassium	mg/L	09/11/2014	N001	-	0.62	B	U	#	0.11	
Sodium	mg/L	09/11/2014	N001	-	160			#	0.066	
Specific Conductance	umhos /cm	09/11/2014	N001	-	792			#		
Sulfate	mg/L	09/11/2014	N001	-	200			#	5	
Temperature	C	09/11/2014	N001	-	15.8			#		
Turbidity	NTU	09/11/2014	N001	-	0.87			#		
Uranium	mg/L	09/11/2014	N001	-	0.0001			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0841 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	-	183			#		
Calcium	mg/L	09/10/2014	N001	-	75			#	0.012	
Chloride	mg/L	09/10/2014	N001	-	18			#	1	
Dissolved Oxygen	mg/L	09/10/2014	N001	-	1.13			#		
Magnesium	mg/L	09/10/2014	N001	-	13			#	0.013	
Manganese	mg/L	09/10/2014	N001	-	0.084			#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	-	0.0035			#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	-	-48.5			#		
pH	s.u.	09/10/2014	N001	-	7.71			#		
Potassium	mg/L	09/10/2014	N001	-	2.9			#	0.11	
Sodium	mg/L	09/10/2014	N001	-	70			#	0.0066	
Specific Conductance	umhos /cm	09/10/2014	N001	-	673			#		
Sulfate	mg/L	09/10/2014	N001	-	180			#	2.5	
Temperature	C	09/10/2014	N001	-	23.85			#		
Turbidity	NTU	09/10/2014	N001	-	1.65			#		
Uranium	mg/L	09/10/2014	N001	-	0.0021			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0842 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	-	160			#		
Calcium	mg/L	09/10/2014	N001	-	60			#	0.012	
Chloride	mg/L	09/10/2014	N001	-	14			#	1	
Dissolved Oxygen	mg/L	09/10/2014	N001	-	4.62			#		
Magnesium	mg/L	09/10/2014	N001	-	6.7			#	0.013	
Manganese	mg/L	09/10/2014	N001	-	0.057			#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	-	0.0024			#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	-	111.2			#		
pH	s.u.	09/10/2014	N001	-	7.61			#		
Potassium	mg/L	09/10/2014	N001	-	0.84	B		#	0.11	
Sodium	mg/L	09/10/2014	N001	-	70			#	0.0066	
Specific Conductance	umhos /cm	09/10/2014	N001	-	552			#		
Sulfate	mg/L	09/10/2014	N001	-	140			#	2.5	
Temperature	C	09/10/2014	N001	-	14.38			#		
Turbidity	NTU	09/10/2014	N001	-	2.16			#		
Uranium	mg/L	09/10/2014	N001	-	0.00037			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0876 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	0	-	0	38			#		
Calcium	mg/L	09/10/2014	N001	0	-	0	5.3			#	0.012	
Chloride	mg/L	09/10/2014	N001	0	-	0	36			#	2	
Dissolved Oxygen	mg/L	09/10/2014	N001	0	-	0	0.92			#		
Magnesium	mg/L	09/10/2014	N001	0	-	0	0.067	B		#	0.013	
Manganese	mg/L	09/10/2014	N001	0	-	0	0.00097	B		#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	0	-	0	0.0042			#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	0	-	0	-8			#		
pH	s.u.	09/10/2014	N001	0	-	0	9.51			#		
Potassium	mg/L	09/10/2014	N001	0	-	0	0.42	B		#	0.11	
Sodium	mg/L	09/10/2014	N001	0	-	0	140			#	0.0066	
Specific Conductance	umhos /cm	09/10/2014	N001	0	-	0	703			#		
Sulfate	mg/L	09/10/2014	N001	0	-	0	260			#	5	
Temperature	C	09/10/2014	N001	0	-	0	16.06			#		
Turbidity	NTU	09/10/2014	N001	0	-	0	2.1			#		
Uranium	mg/L	09/10/2014	N001	0	-	0	0.00005	B		#	0.000029	

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.

Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site

REPORT DATE: 11/19/2014

Location: 0747 SURFACE LOCATION 8/26/97 State plane east changed from 594497.14 to an estimation close to river

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	0001	313			#		
Calcium	mg/L	09/10/2014	0001	120			#	0.012	
Chloride	mg/L	09/10/2014	0001	19			#	2	
Dissolved Oxygen	mg/L	09/10/2014	N001	8.48			#		
Magnesium	mg/L	09/10/2014	0001	41			#	0.013	
Manganese	mg/L	09/10/2014	0001	0.8			#	0.00011	
Molybdenum	mg/L	09/10/2014	0001	0.02			#	0.0016	
Oxidation Reduction Potential	mV	09/10/2014	N001	-3			#		
pH	s.u.	09/10/2014	N001	7.77			#		
Potassium	mg/L	09/10/2014	0001	9.6			#	0.11	
Sodium	mg/L	09/10/2014	0001	120			#	0.0066	
Specific Conductance	umhos/cm	09/10/2014	N001	1231			#		
Sulfate	mg/L	09/10/2014	0001	400			#	5	
Temperature	C	09/10/2014	N001	18.05			#		
Turbidity	NTU	09/10/2014	N001	162			#		
Uranium	mg/L	09/10/2014	0001	0.17			#	0.00015	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site

REPORT DATE: 11/19/2014

Location: 0749 SURFACE LOCATION 8/26/97 State plane east changed from 589532.71 to an estimation close to river

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	N001	106			#		
Calcium	mg/L	09/10/2014	N001	49			#	0.012	
Chloride	mg/L	09/10/2014	N001	16			#	2	
Dissolved Oxygen	mg/L	09/10/2014	N001	6.06			#		
Magnesium	mg/L	09/10/2014	N001	0.36	B		#	0.013	
Manganese	mg/L	09/10/2014	N001	0.011			#	0.00011	
Molybdenum	mg/L	09/10/2014	N001	0.041			#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	-41			#		
pH	s.u.	09/10/2014	N001	7.83			#		
Potassium	mg/L	09/10/2014	N001	1.8			#	0.11	
Sodium	mg/L	09/10/2014	N001	280			#	0.066	
Specific Conductance	umhos/cm	09/10/2014	N001	1125			#		
Sulfate	mg/L	09/10/2014	N001	630			#	5	
Temperature	C	09/10/2014	N001	24.36			#		
Turbidity	NTU	09/10/2014	N001	2.83			#		
Uranium	mg/L	09/10/2014	N001	0.00036			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site

REPORT DATE: 11/19/2014

Location: 0794 SURFACE LOCATION 8/26/97 State plane north changed from 844178.27 to an estimation close to river

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	0001	178			#		
Calcium	mg/L	09/11/2014	0001	80			#	0.012	
Chloride	mg/L	09/11/2014	0001	6			#	1	
Dissolved Oxygen	mg/L	09/11/2014	N001	8.41			#		
Magnesium	mg/L	09/11/2014	0001	29			#	0.013	
Manganese	mg/L	09/11/2014	0001	0.019			#	0.00011	
Molybdenum	mg/L	09/11/2014	0001	0.0014		J	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	135			#		
pH	s.u.	09/11/2014	N001	8.19			#		
Potassium	mg/L	09/11/2014	0001	2.8			#	0.11	
Sodium	mg/L	09/11/2014	0001	43			#	0.0066	
Specific Conductance	umhos/cm	09/11/2014	N001	709			#		
Sulfate	mg/L	09/11/2014	0001	210			#	2.5	
Temperature	C	09/11/2014	N001	10.52			#		
Turbidity	NTU	09/11/2014	N001	16.1			#		
Uranium	mg/L	09/11/2014	0001	0.0064	E	J	#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0796 SURFACE LOCATION Was possibly historically sampled ~900 ft E from current location

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/12/2014	N001	186			#		
Calcium	mg/L	09/12/2014	N001	81			#	0.012	
Chloride	mg/L	09/12/2014	N001	6			#	1	
Dissolved Oxygen	mg/L	09/12/2014	N001	9.02			#		
Magnesium	mg/L	09/12/2014	N001	29			#	0.013	
Manganese	mg/L	09/12/2014	N001	0.034			#	0.00011	
Molybdenum	mg/L	09/12/2014	N001	0.0013		J	#	0.00032	
Oxidation Reduction Potential	mV	09/12/2014	N001	224			#		
pH	s.u.	09/12/2014	N001	8.13			#		
Potassium	mg/L	09/12/2014	N001	2.9			#	0.11	
Sodium	mg/L	09/12/2014	N001	41			#	0.0066	
Specific Conductance	umhos/cm	09/12/2014	N001	659			#		
Sulfate	mg/L	09/12/2014	N001	200			#	2.5	
Temperature	C	09/12/2014	N001	6.5			#		
Turbidity	NTU	09/12/2014	N001	8.54			#		
Uranium	mg/L	09/12/2014	N001	0.0053		J	#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0810 SURFACE LOCATION Gravel Pit Pond

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/08/2014	N001	340			#		
Calcium	mg/L	09/08/2014	N001	23			#	0.012	
Chloride	mg/L	09/08/2014	N001	39			#	2	
Dissolved Oxygen	mg/L	09/08/2014	N001	10.64			#		
Magnesium	mg/L	09/08/2014	N001	92			#	0.013	
Manganese	mg/L	09/08/2014	N001	0.077			#	0.00011	
Molybdenum	mg/L	09/08/2014	N001	0.0016		J	#	0.00032	
Oxidation Reduction Potential	mV	09/08/2014	N001	121			#		
pH	s.u.	09/08/2014	N001	9.12			#		
Potassium	mg/L	09/08/2014	N001	18			#	0.11	
Sodium	mg/L	09/08/2014	N001	220			#	0.066	
Specific Conductance	umhos/cm	09/08/2014	N001	1585			#		
Sulfate	mg/L	09/08/2014	N001	480			#	5	
Temperature	C	09/08/2014	N001	21.26			#		
Turbidity	NTU	09/08/2014	N001	7.08			#		
Uranium	mg/L	09/08/2014	N001	0.0056		J	#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0811 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/10/2014	0001	178			#		
Calcium	mg/L	09/10/2014	0001	80			#	0.012	
Chloride	mg/L	09/10/2014	0001	5.9			#	1	
Dissolved Oxygen	mg/L	09/10/2014	N001	7.91			#		
Magnesium	mg/L	09/10/2014	0001	29			#	0.013	
Manganese	mg/L	09/10/2014	0001	0.016			#	0.00011	
Molybdenum	mg/L	09/10/2014	0001	0.0015		J	#	0.00032	
Oxidation Reduction Potential	mV	09/10/2014	N001	9.7			#		
pH	s.u.	09/10/2014	N001	8.37			#		
Potassium	mg/L	09/10/2014	0001	2.7			#	0.11	
Sodium	mg/L	09/10/2014	0001	40			#	0.0066	
Specific Conductance	umhos/cm	09/10/2014	N001	690			#		
Sulfate	mg/L	09/10/2014	0001	210			#	2.5	
Temperature	C	09/10/2014	N001	17.17			#		
Turbidity	NTU	09/10/2014	N001	17.9			#		
Uranium	mg/L	09/10/2014	0001	0.0049		J	#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0812 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	0001	174			#		
Calcium	mg/L	09/11/2014	0001	78			#	0.012	
Chloride	mg/L	09/11/2014	0001	6.1			#	1	
Dissolved Oxygen	mg/L	09/11/2014	N001	9.36			#		
Magnesium	mg/L	09/11/2014	0001	28			#	0.013	
Manganese	mg/L	09/11/2014	0001	0.023			#	0.00011	
Molybdenum	mg/L	09/11/2014	0001	0.0013		J	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	-48			#		
pH	s.u.	09/11/2014	N001	8.43			#		
Potassium	mg/L	09/11/2014	0001	2.7			#	0.11	
Sodium	mg/L	09/11/2014	0001	41			#	0.0066	
Specific Conductance	umhos/cm	09/11/2014	N001	740			#		
Sulfate	mg/L	09/11/2014	0001	210			#	2.5	
Temperature	C	09/11/2014	N001	10.46			#		
Turbidity	NTU	09/11/2014	N001	17.3			#		
Uranium	mg/L	09/11/2014	0001	0.0059		J	#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0822 SURFACE LOCATION west-side irrigation ditch

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/11/2014	N001	218			#		
Calcium	mg/L	09/11/2014	N001	91			#	0.012	
Chloride	mg/L	09/11/2014	N001	9.5			#	2	
Dissolved Oxygen	mg/L	09/11/2014	N001	8.8			#		
Magnesium	mg/L	09/11/2014	N001	16			#	0.013	
Manganese	mg/L	09/11/2014	N001	0.046			#	0.00011	
Molybdenum	mg/L	09/11/2014	N001	0.012			#	0.00032	
Oxidation Reduction Potential	mV	09/11/2014	N001	53.3			#		
pH	s.u.	09/11/2014	N001	8.01			#		
Potassium	mg/L	09/11/2014	N001	3.8			#	0.11	
Sodium	mg/L	09/11/2014	N001	130			#	0.0066	
Specific Conductance	umhos/cm	09/11/2014	N001	1060			#		
Sulfate	mg/L	09/11/2014	N001	340			#	5	
Temperature	C	09/11/2014	N001	10.06			#		
Turbidity	NTU	09/11/2014	N001	2.84			#		
Uranium	mg/L	09/11/2014	N001	0.0042		J	#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0823 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/08/2014	0001	163			#		
Calcium	mg/L	09/08/2014	0001	170			#	0.012	
Chloride	mg/L	09/08/2014	0001	200			#	4	
Dissolved Oxygen	mg/L	09/08/2014	N001	9.03			#		
Magnesium	mg/L	09/08/2014	0001	88			#	0.013	
Manganese	mg/L	09/08/2014	0001	0.29			#	0.00011	
Molybdenum	mg/L	09/08/2014	0001	0.0027		J	#	0.00032	
Oxidation Reduction Potential	mV	09/08/2014	N001	131.5			#		
pH	s.u.	09/08/2014	N001	8.29			#		
Potassium	mg/L	09/08/2014	0001	17			#	0.11	
Sodium	mg/L	09/08/2014	0001	320			#	0.066	
Specific Conductance	umhos/cm	09/08/2014	N001	2611			#		
Sulfate	mg/L	09/08/2014	0001	1100			#	10	
Temperature	C	09/08/2014	N001	19.15			#		
Turbidity	NTU	09/08/2014	N001	22.1			#		
Uranium	mg/L	09/08/2014	0001	0.0072			#	0.000029	

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.

Alternate Water Supply System
Quality Data

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General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0813 DOMESTIC SUPPLY

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.23			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	1.72			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	107.7			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.87			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	0.635			#	0.18	0.285
Radium-228	pCi/L	09/09/2014	N001	0	-	0	1.92			#	0.43	0.56
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	387			#		
Temperature	C	09/09/2014	N001	0	-	0	16.31			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	0.8			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00005	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0815 DOMESTIC SUPPLY

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.33			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	2.2			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	79.7			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.94			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	1.06			#	0.19	0.402
Radium-228	pCi/L	09/09/2014	N001	0	-	0	1.29			#	0.38	0.414
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	363			#		
Temperature	C	09/09/2014	N001	0	-	0	15.77			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	0.6			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0816 DOMESTIC SUPPLY

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.3			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	4.59			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	63.7			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.9			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	0.667			#	0.17	0.29
Radium-228	pCi/L	09/09/2014	N001	0	-	0	1.75			#	0.46	0.536
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	409			#		
Temperature	C	09/09/2014	N001	0	-	0	14.27			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	0.54			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0818 DOMESTIC SUPPLY, five minute flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.17			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	1.78			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	35.6			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.96			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	1.33			#	0.17	0.465
Radium-228	pCi/L	09/09/2014	N001	0	-	0	1.72			#	0.39	0.505
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	593			#		
Temperature	C	09/09/2014	N001	0	-	0	16.86			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	1.39			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0818 DOMESTIC SUPPLY, end of flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N002	0	-	0	1.3			#		
Dissolved Oxygen	mg/L	09/09/2014	N002	0	-	0	1.9			#		
Oxidation Reduction Potential	mV	09/09/2014	N002	0	-	0	52.2			#		
pH	s.u.	09/09/2014	N002	0	-	0	7.98			#		
Radium-226	pCi/L	09/09/2014	N002	0	-	0	1.14			#	0.17	0.418
Radium-228	pCi/L	09/09/2014	N002	0	-	0	2.26			#	0.33	0.606
Specific Conductance	umhos /cm	09/09/2014	N002	0	-	0	589			#		
Turbidity	NTU	09/09/2014	N002	0	-	0	2.19			#		
Uranium	mg/L	09/09/2014	N002	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0819 DOMESTIC SUPPLY, five minute flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N003	0	-	0	1.23			#		
Dissolved Oxygen	mg/L	09/09/2014	N003	0	-	0	2.2			#		
Oxidation Reduction Potential	mV	09/09/2014	N003	0	-	0	43.6			#		
pH	s.u.	09/09/2014	N003	0	-	0	8.01			#		
Radium-226	pCi/L	09/09/2014	N003	0	-	0	1.71			#	0.18	0.572
Radium-228	pCi/L	09/09/2014	N003	0	-	0	2.4			#	0.36	0.645
Specific Conductance	umhos /cm	09/09/2014	N003	0	-	0	587			#		
Temperature	C	09/09/2014	N003	0	-	0	15.54			#		
Turbidity	NTU	09/09/2014	N003	0	-	0	2.03			#		
Uranium	mg/L	09/09/2014	N003	0	-	0	0.00005	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0819 DOMESTIC SUPPLY, end of flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.28			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	2.67			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	44.7			#		
pH	s.u.	09/09/2014	N001	0	-	0	8.03			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	0.772			#	0.19	0.322
Radium-226	pCi/L	09/09/2014	N002	0	-	0	1.01			#	0.17	0.38
Radium-228	pCi/L	09/09/2014	N001	0	-	0	2.37			#	0.37	0.642
Radium-228	pCi/L	09/09/2014	N002	0	-	0	2.31			#	0.33	0.616
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	589			#		
Temperature	C	09/09/2014	N001	0	-	0	16.33			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	2.03			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00003	B		#	0.000029	
Uranium	mg/L	09/09/2014	N002	0	-	0	0.00073			#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0820 DOMESTIC SUPPLY, five minute flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.28			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	2.08			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	75.2			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.86			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	0.692			#	0.17	0.295
Radium-228	pCi/L	09/09/2014	N001	0	-	0	2			#	0.35	0.555
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	441			#		
Temperature	C	09/09/2014	N001	0	-	0	16.35			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	0.75			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0820 DOMESTIC SUPPLY, end of flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N002	0	-	0	1.28			#		
Dissolved Oxygen	mg/L	09/09/2014	N002	0	-	0	1.98			#		
Oxidation Reduction Potential	mV	09/09/2014	N002	0	-	0	85.5			#		
pH	s.u.	09/09/2014	N002	0	-	0	7.91			#		
Radium-226	pCi/L	09/09/2014	N002	0	-	0	0.797			#	0.17	0.331
Radium-228	pCi/L	09/09/2014	N002	0	-	0	2.17			#	0.39	0.603
Specific Conductance	umhos /cm	09/09/2014	N002	0	-	0	437			#		
Temperature	C	09/09/2014	N002	0	-	0	15.9			#		
Turbidity	NTU	09/09/2014	N002	0	-	0	0.67			#		
Uranium	mg/L	09/09/2014	N002	0	-	0	0.00003	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0821 DOMESTIC SUPPLY, five minute flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.26			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	1.57			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	35.3			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.96			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	2.41			#	0.18	0.75
Radium-228	pCi/L	09/09/2014	N001	0	-	0	3.04			#	0.38	0.789
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	508			#		
Temperature	C	09/09/2014	N001	0	-	0	15.49			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	3.11			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00006	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0821 DOMESTIC SUPPLY, end of flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N002	0	-	0	1.27			#		
Dissolved Oxygen	mg/L	09/09/2014	N002	0	-	0	1.75			#		
Oxidation Reduction Potential	mV	09/09/2014	N002	0	-	0	76.4			#		
pH	s.u.	09/09/2014	N002	0	-	0	7.92			#		
Radium-226	pCi/L	09/09/2014	N002	0	-	0	1.11			#	0.18	0.411
Radium-228	pCi/L	09/09/2014	N002	0	-	0	1.98			#	0.38	0.558
Specific Conductance	umhos /cm	09/09/2014	N002	0	-	0	467			#		
Temperature	C	09/09/2014	N002	0	-	0	16.74			#		
Turbidity	NTU	09/09/2014	N002	0	-	0	0.75			#		
Uranium	mg/L	09/09/2014	N002	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0829 DOMESTIC SUPPLY, five minute flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.27			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	2.71			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	169.4			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.79			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	1.04			#	0.18	0.393
Radium-228	pCi/L	09/09/2014	N001	0	-	0	2.85			#	0.38	0.747
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	620			#		
Temperature	C	09/09/2014	N001	0	-	0	16.32			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	5.76			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00005	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0829 DOMESTIC SUPPLY, end of flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N002	0 - 0	1.32			#		
Dissolved Oxygen	mg/L	09/09/2014	N002	0 - 0	2.99			#		
Oxidation Reduction Potential	mV	09/09/2014	N002	0 - 0	147.3			#		
pH	s.u.	09/09/2014	N002	0 - 0	7.95			#		
Radium-226	pCi/L	09/09/2014	N002	0 - 0	1.22			#	0.17	0.435
Radium-228	pCi/L	09/09/2014	N002	0 - 0	2.17			#	0.37	0.595
Specific Conductance	umhos /cm	09/09/2014	N002	0 - 0	605			#		
Temperature	C	09/09/2014	N002	0 - 0	15.91			#		
Turbidity	NTU	09/09/2014	N002	0 - 0	1.58			#		
Uranium	mg/L	09/09/2014	N002	0 - 0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0830 DOMESTIC SUPPLY, five minute flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.31			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	2.33			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	120.9			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.96			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	1.09			#	0.18	0.408
Radium-228	pCi/L	09/09/2014	N001	0	-	0	2.6			#	0.38	0.693
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	593			#		
Temperature	C	09/09/2014	N001	0	-	0	15.62			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	1.87			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0830 DOMESTIC SUPPLY, end of flush sample

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N002	0 - 0	1.33			#		
Dissolved Oxygen	mg/L	09/09/2014	N002	0 - 0	2.15			#		
Oxidation Reduction Potential	mV	09/09/2014	N002	0 - 0	38.6			#		
pH	s.u.	09/09/2014	N002	0 - 0	7.99			#		
Radium-226	pCi/L	09/09/2014	N002	0 - 0	0.812			#	0.19	0.335
Radium-228	pCi/L	09/09/2014	N002	0 - 0	2.25			#	0.39	0.617
Specific Conductance	umhos /cm	09/09/2014	N002	0 - 0	589			#		
Temperature	C	09/09/2014	N002	0 - 0	16.15			#		
Turbidity	NTU	09/09/2014	N002	0 - 0	1.22			#		
Uranium	mg/L	09/09/2014	N002	0 - 0	0.00005	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0834 DOMESTIC SUPPLY

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.11			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	2.5			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	101.8			#		
pH	s.u.	09/09/2014	N001	0	-	0	8			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	1.09			#	0.18	0.406
Radium-228	pCi/L	09/09/2014	N001	0	-	0	2.01			#	0.36	0.559
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	339			#		
Temperature	C	09/09/2014	N001	0	-	0	16.17			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	0.62			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00003	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0837 DOMESTIC SUPPLY Domestic System, Tap Location

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.28			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	2.39			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	100.7			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.74			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	1.11			#	0.19	0.415
Radium-228	pCi/L	09/09/2014	N001	0	-	0	2.05			#	0.32	0.555
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	452			#		
Temperature	C	09/09/2014	N001	0	-	0	15.14			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	0.78			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00004	B		#	0.000029	

General Water Quality Data by Location (USEE105) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014
Location: 0843 DOMESTIC SUPPLY

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chlorine, Total Residual	mg/L	09/09/2014	N001	0	-	0	1.23			#		
Dissolved Oxygen	mg/L	09/09/2014	N001	0	-	0	1.82			#		
Oxidation Reduction Potential	mV	09/09/2014	N001	0	-	0	55.2			#		
pH	s.u.	09/09/2014	N001	0	-	0	7.98			#		
Radium-226	pCi/L	09/09/2014	N001	0	-	0	1.31			#	0.17	0.462
Radium-228	pCi/L	09/09/2014	N001	0	-	0	2.43			#	0.34	0.644
Specific Conductance	umhos /cm	09/09/2014	N001	0	-	0	589			#		
Temperature	C	09/09/2014	N001	0	-	0	15.46			#		
Turbidity	NTU	09/09/2014	N001	0	-	0	2.36			#		
Uranium	mg/L	09/09/2014	N001	0	-	0	0.00005	B		#	0.000029	

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.

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: 14096457
Report Date: 11/19/2014

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Calcium	RVT01	0999	09/10/2014	N001	mg/L	0.19	B	U	0.012		E
Chloride	RVT01	0999	09/10/2014	N001	mg/L	0.2	U		0.2		E
Magnesium	RVT01	0999	09/10/2014	N001	mg/L	0.085	B	U	0.013		E
Manganese	RVT01	0999	09/10/2014	N001	mg/L	0.00028	B	U	0.00011		E
Molybdenum	RVT01	0999	09/10/2014	N001	mg/L	0.00073	B		0.00032		E
Potassium	RVT01	0999	09/10/2014	N001	mg/L	0.11	U		0.11		E
Sodium	RVT01	0999	09/10/2014	N001	mg/L	0.63	B	U	0.0066		E
Sulfate	RVT01	0999	09/10/2014	N001	mg/L	0.5	U		0.5		E
Uranium	RVT01	0999	09/10/2014	N001	mg/L	0.0014			0.000029		E

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

SAMPLE TYPES:

E	Equipment Blank.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0101	O	4946.58	09/11/2014	08:39:00	10.89	4935.69
0110	O	4950.19	09/11/2014	08:37:00	13.89	4936.3
0111	O	4946.87	09/11/2014	08:40:00	10.61	4936.26
0700	U	4951.38	09/11/2014	09:20:00	6.82	4944.56
0705	D	4930.8	09/10/2014	08:10:01	7.08	4923.72
0707	D	4931	09/10/2014	08:40:59	6.19	4924.81
0709	D	4930.7	09/10/2014	07:45:00	7.22	4923.48
0710	U	4947.9	09/10/2014	13:50:13	6.67	4941.23
0716	O	4939.12	09/10/2014	16:50:12	9.76	4929.36
0717	O	4938.8	09/10/2014	17:25:02	9.28	4929.52
0718	D	4937.6	09/11/2014	15:55:53	9.14	4928.46
0719	D	4937.55	09/11/2014	15:35:30	8.73	4928.82
0720	C	4940.46	09/11/2014	12:00:45	5.11	4935.35
0721	C	4940.47	09/11/2014	11:45:51	8.64	4931.83
0722R		4937.06	09/12/2014	09:50:29	9.89	4927.17
0723	D	4936.01	09/12/2014	10:35:56	8.64	4927.37
0724	U	4941.36	09/11/2014	09:06:00	7.89	4933.47
0725	U	4941.66	09/11/2014	09:17:00	8.13	4933.53
0726	U	4942	09/11/2014	09:18:00	8.18	4933.82
0727	U	4951.69	09/11/2014	08:42:00	10.81	4940.88
0728	U	4946.01	09/11/2014	09:01:00	9.08	4936.93
0729	D	4932.75	09/12/2014	08:40:48	6.48	4926.27
0730	D	4933.08	09/12/2014	08:55:53	7.15	4925.93
0732	U	4945.07	09/10/2014	18:22:00	8.85	4936.22
0733	U	4946.76	09/11/2014	10:02:00	5.09	4941.67
0734	U	4946.08	09/11/2014	10:12:00	6.6	4939.48
0736	U	4946	09/08/2014	18:51:00	7.95	4938.05
0784	U	4945.45	09/10/2014	18:35:15	7.38	4938.07

STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 11/19/2014

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0788	C	4935.09	09/11/2014	15:00:52	9.62	4925.47
0789	D	4933.66	09/10/2014	10:20:47	9.5	4924.16
0824		4928.27	09/11/2014	17:25:02	6.3	4921.97
0826		4936.98	09/11/2014	14:00:08	8.64	4928.34

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

Time-Concentration Graphs

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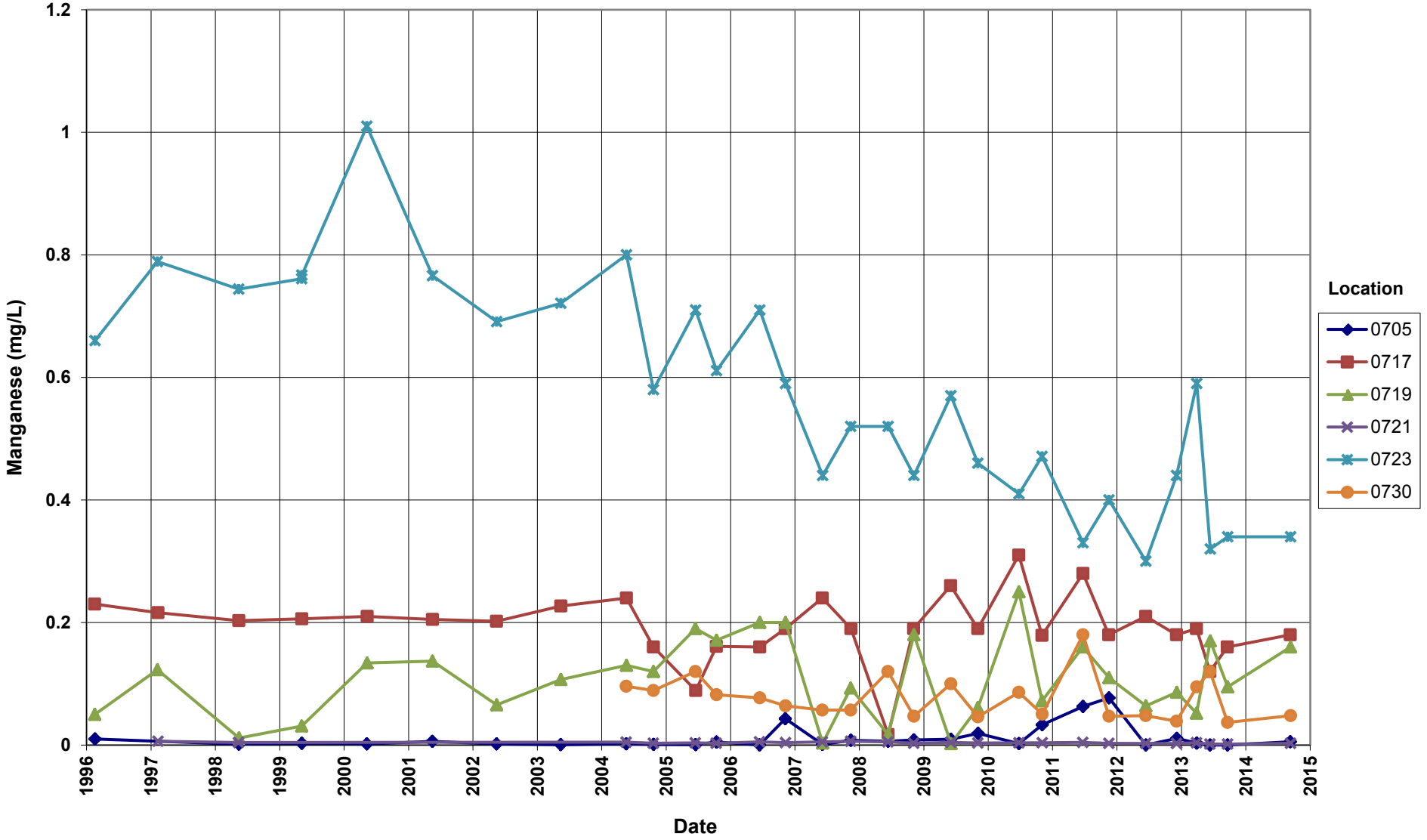
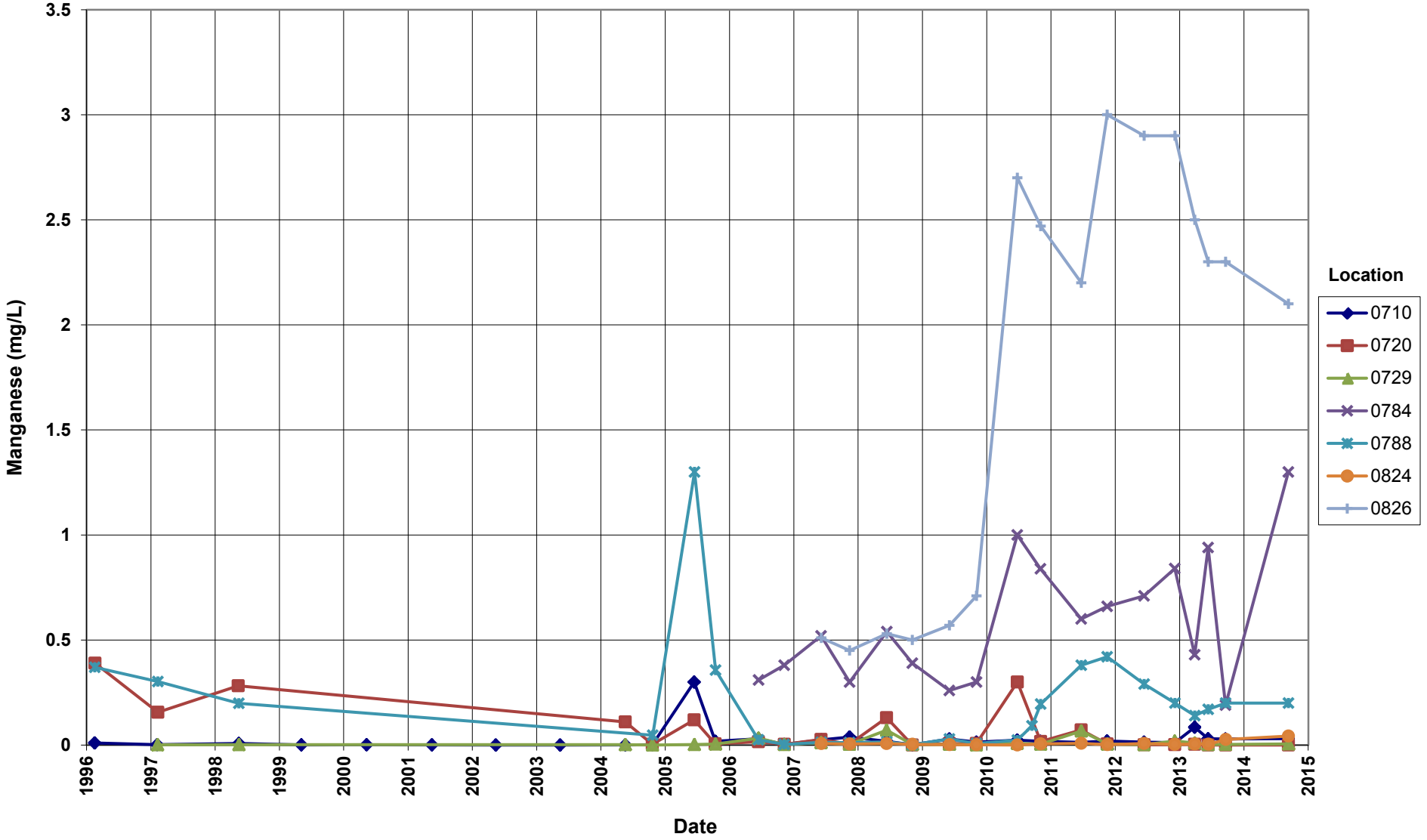
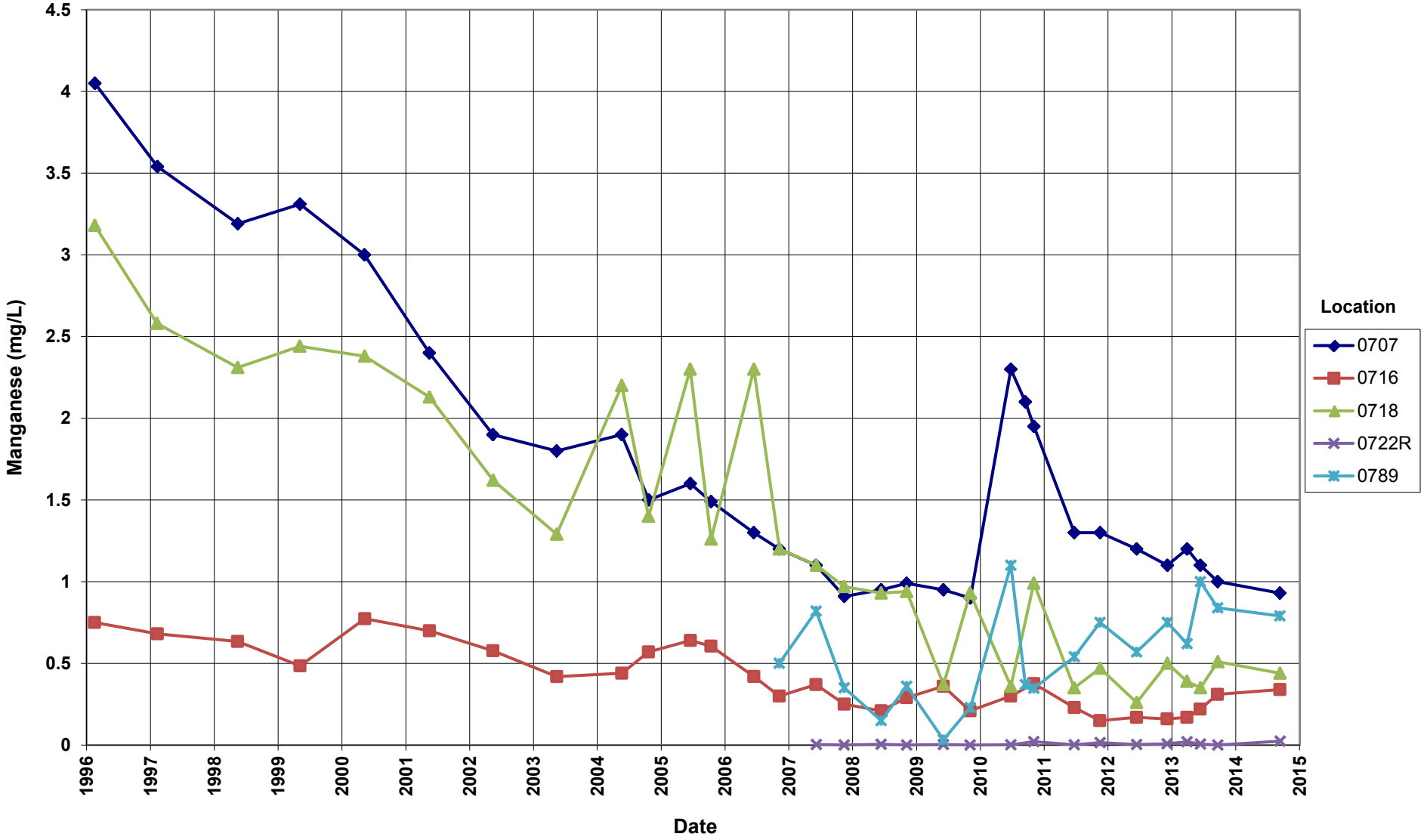
Riverton Processing Site
Manganese Concentration
Semi-Confined Aquifer Locations



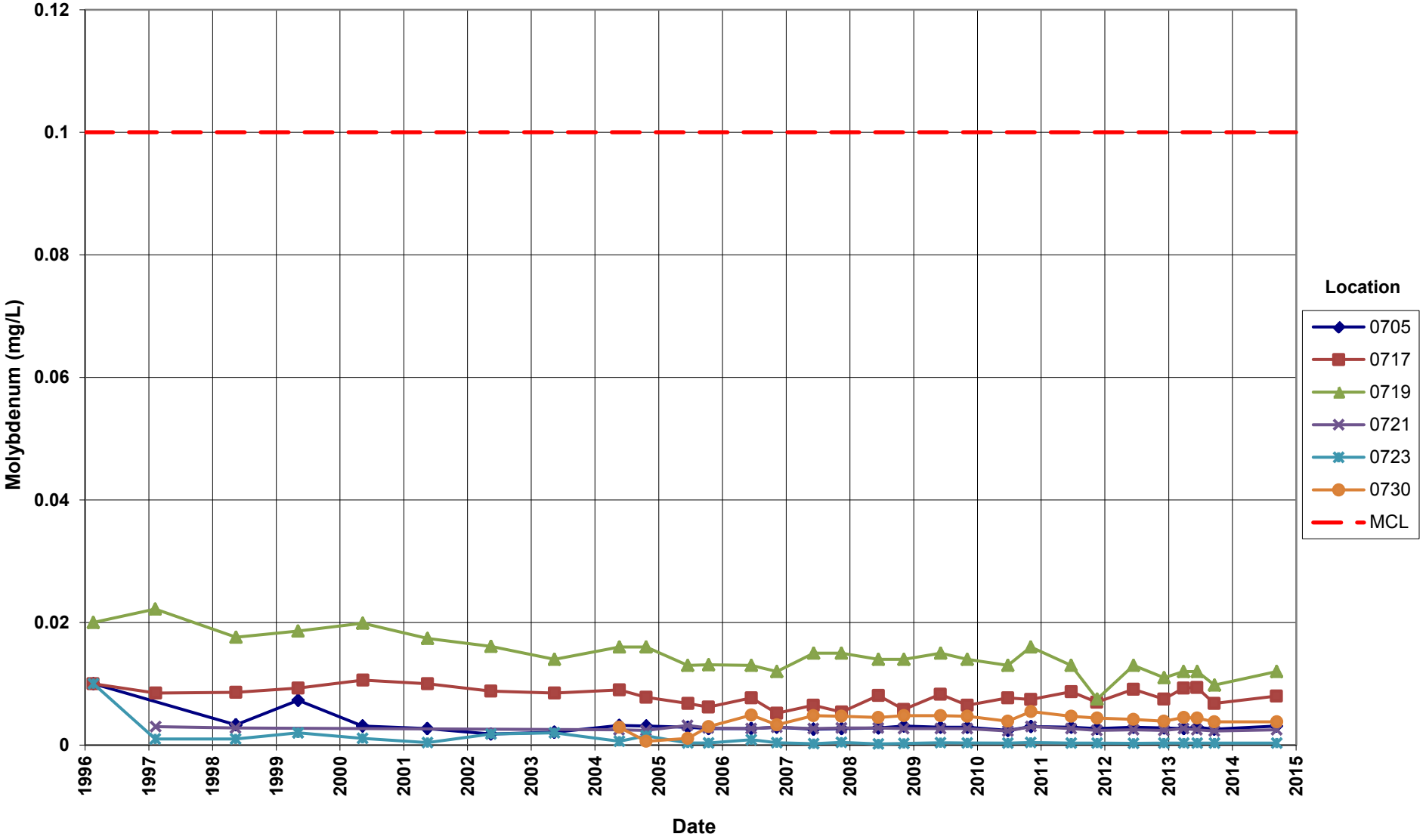
Riverton Processing Site
Manganese Concentration
Surficial Aquifer Locations



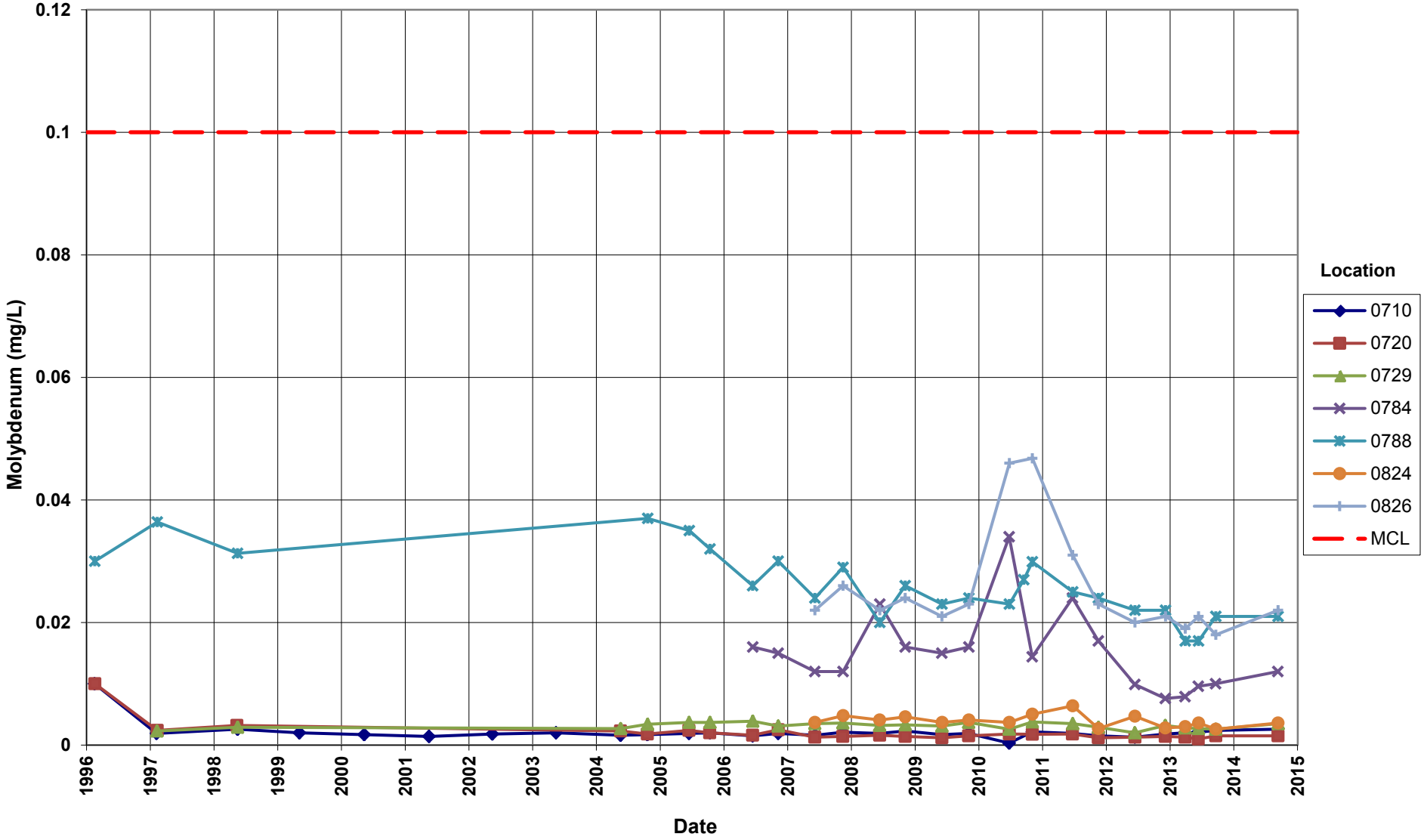
Riverton Processing Site
Manganese Concentration
Surficial Aquifer Locations



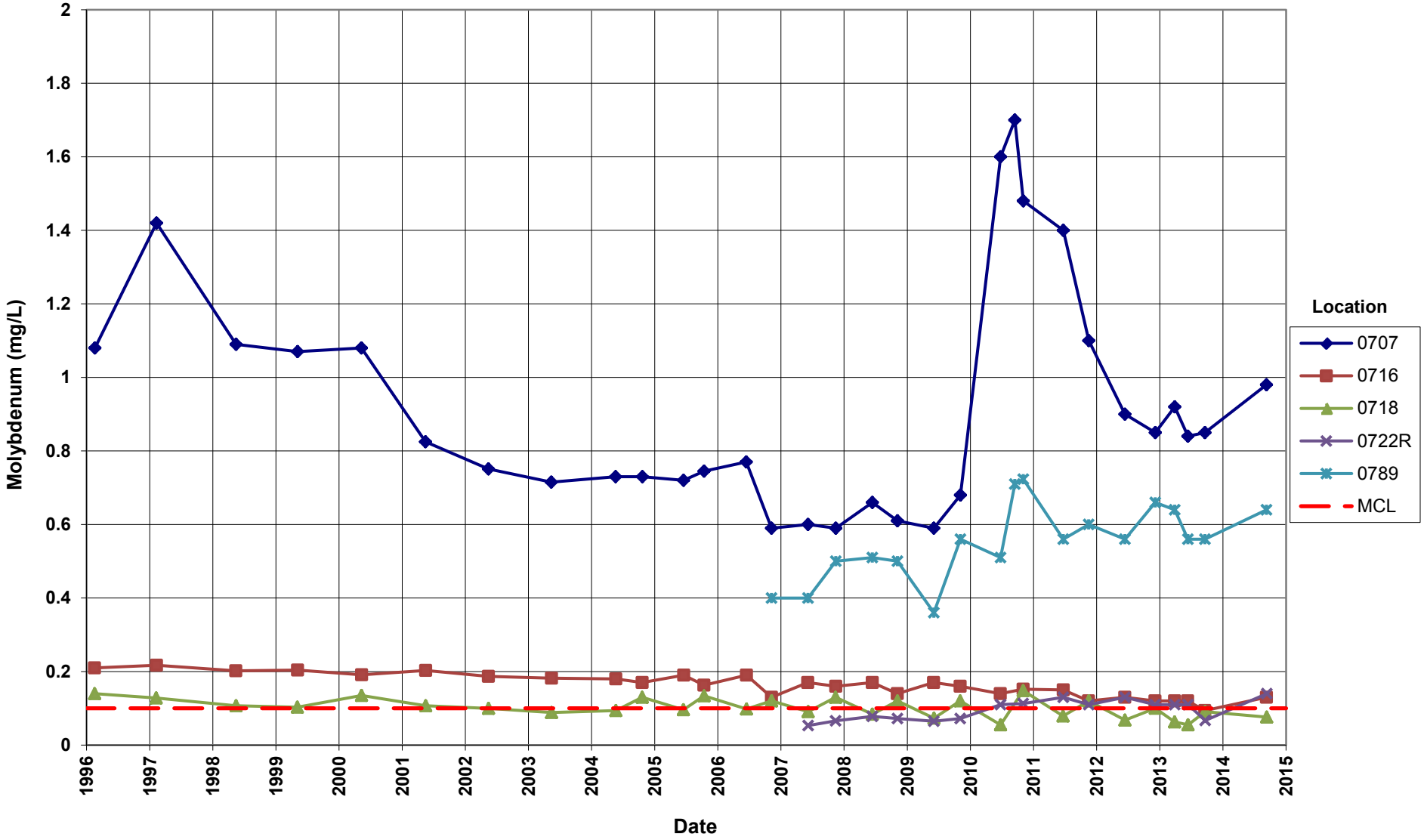
Riverton Processing Site
Molybdenum Concentration
Semi-confined Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L



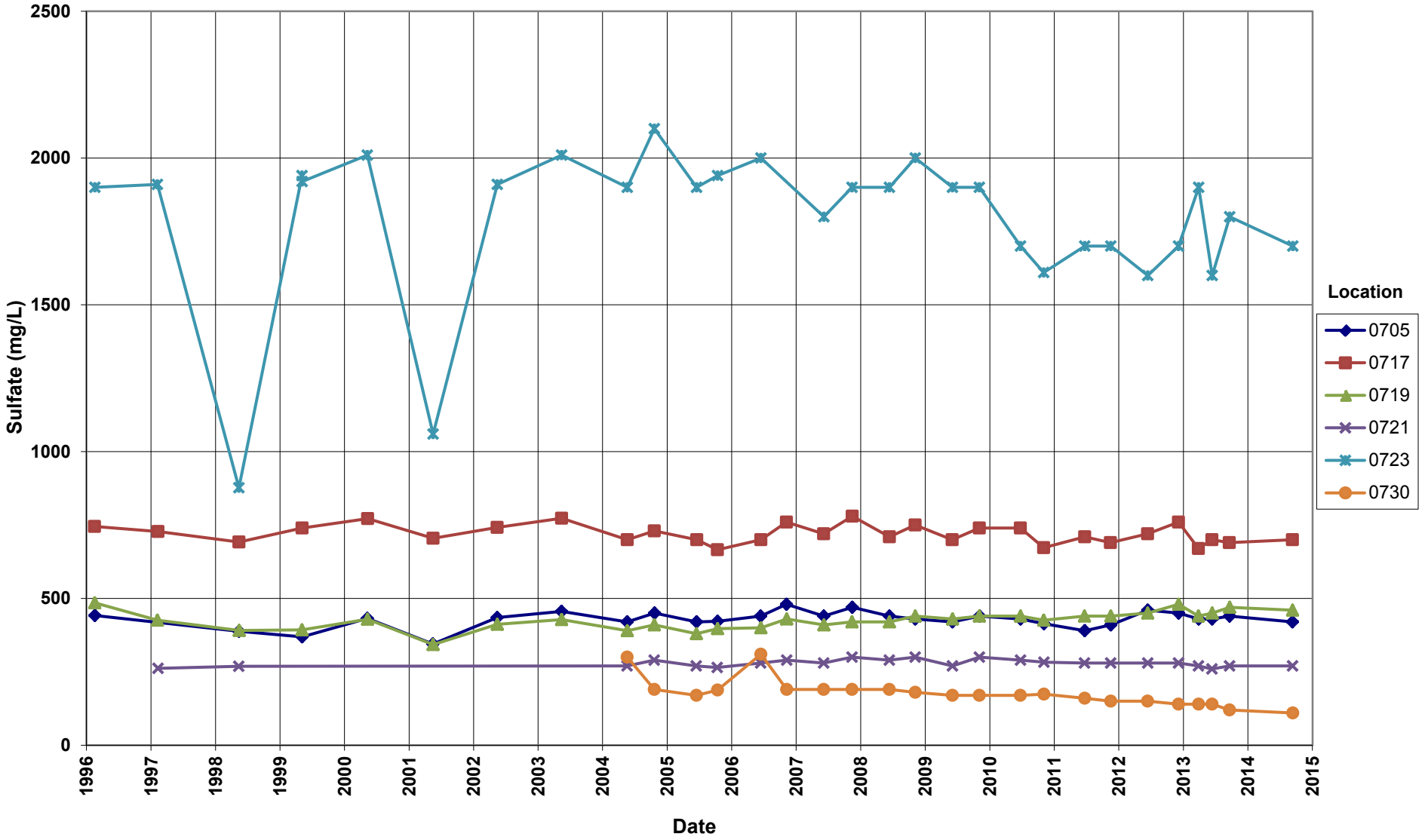
Riverton Processing Site
Molybdenum Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L



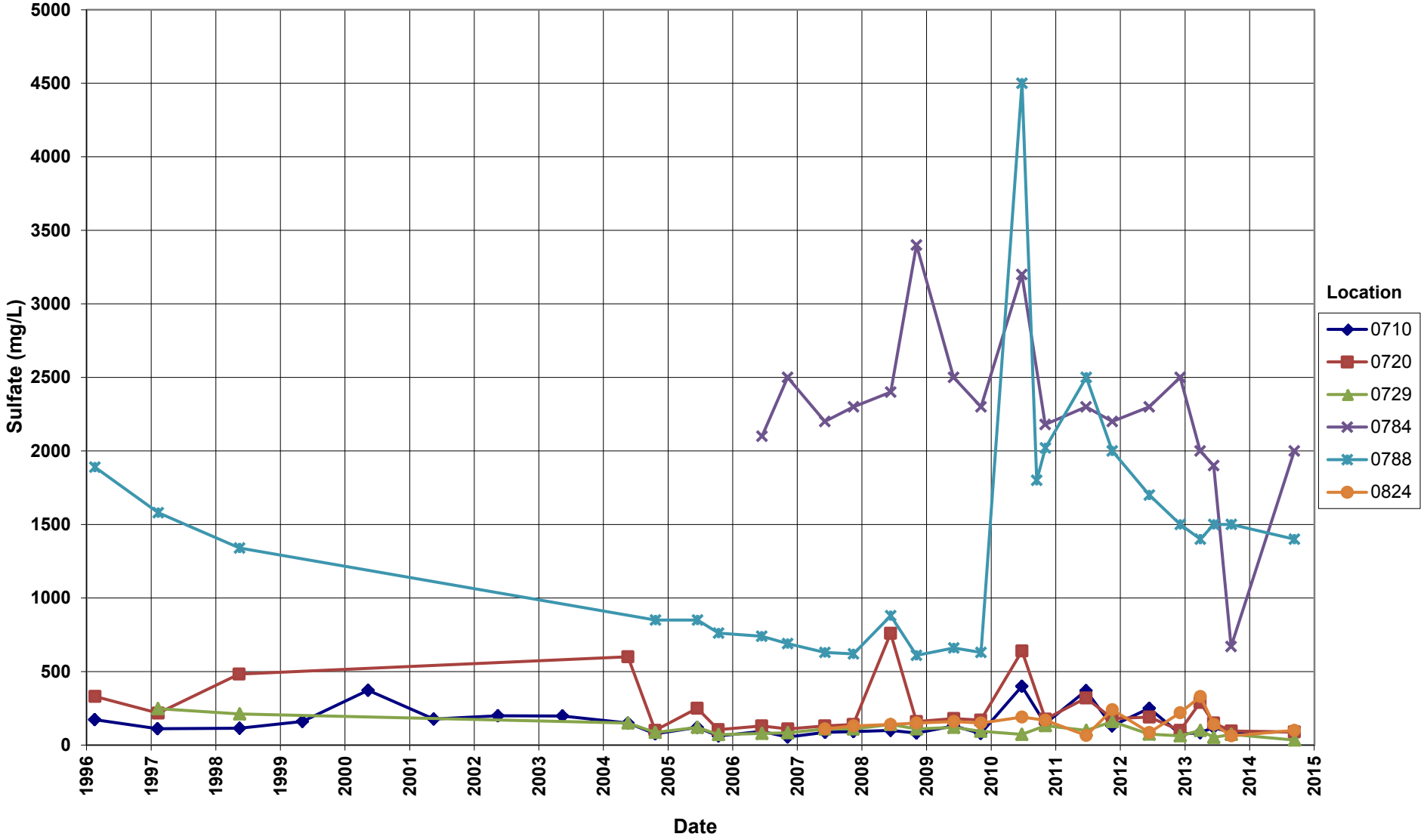
Riverton Processing Site
Molybdenum Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L



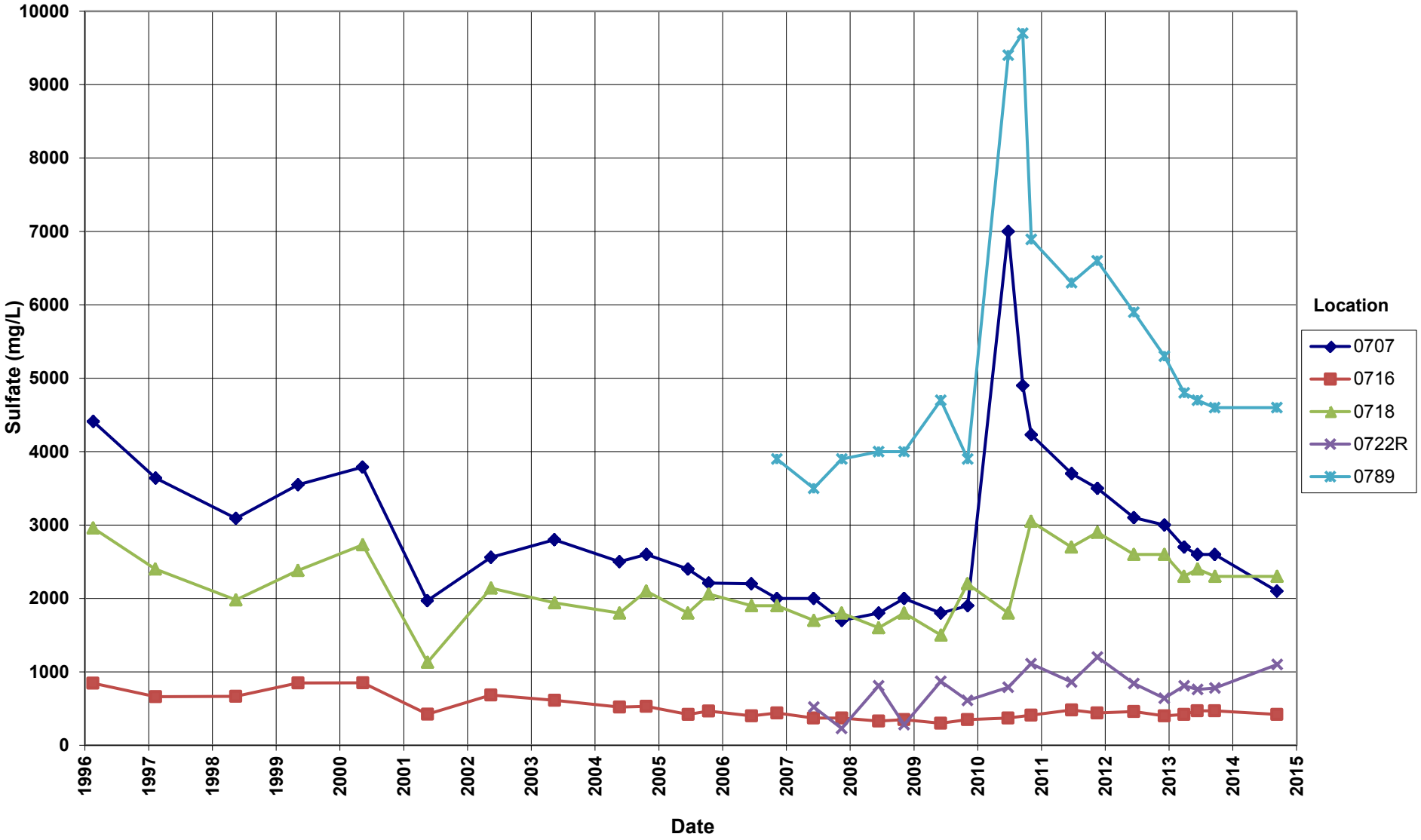
Riverton Processing Site
Sulfate Concentration
Semi-Confined Aquifer Locations



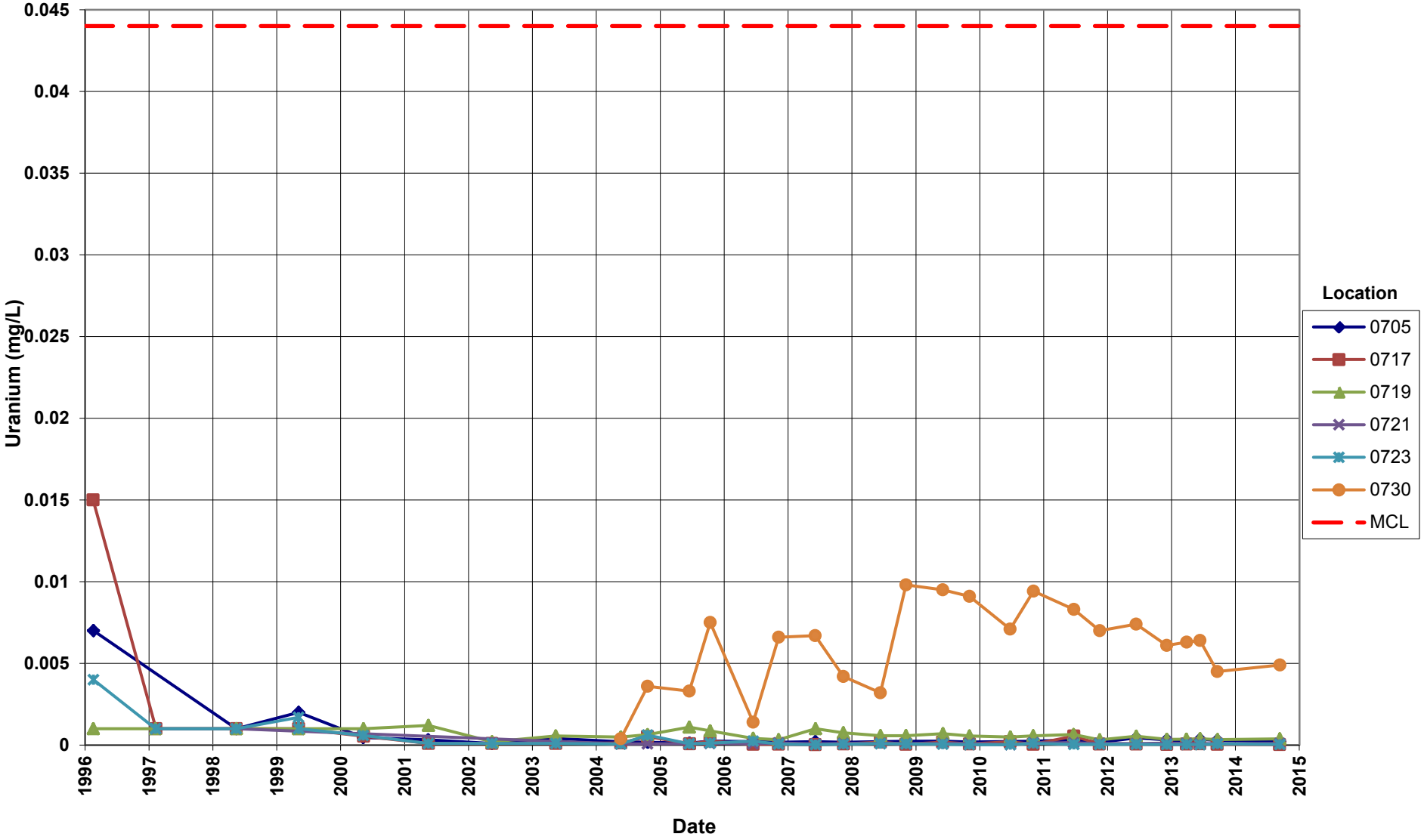
Riverton Processing Site
Sulfate Concentration
Surficial Aquifer Locations



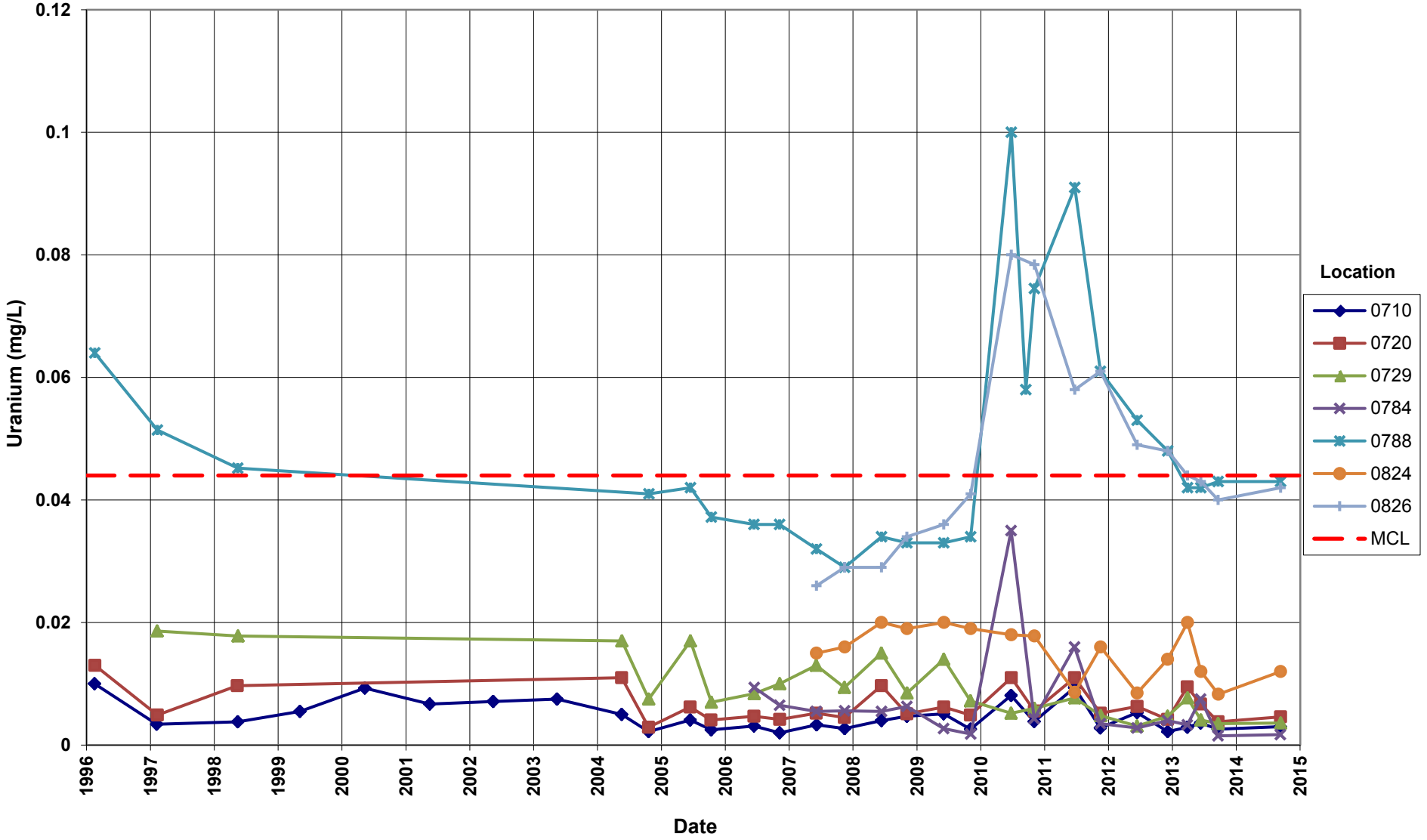
Riverton Processing Site
Sulfate Concentration
Surficial Aquifer Locations



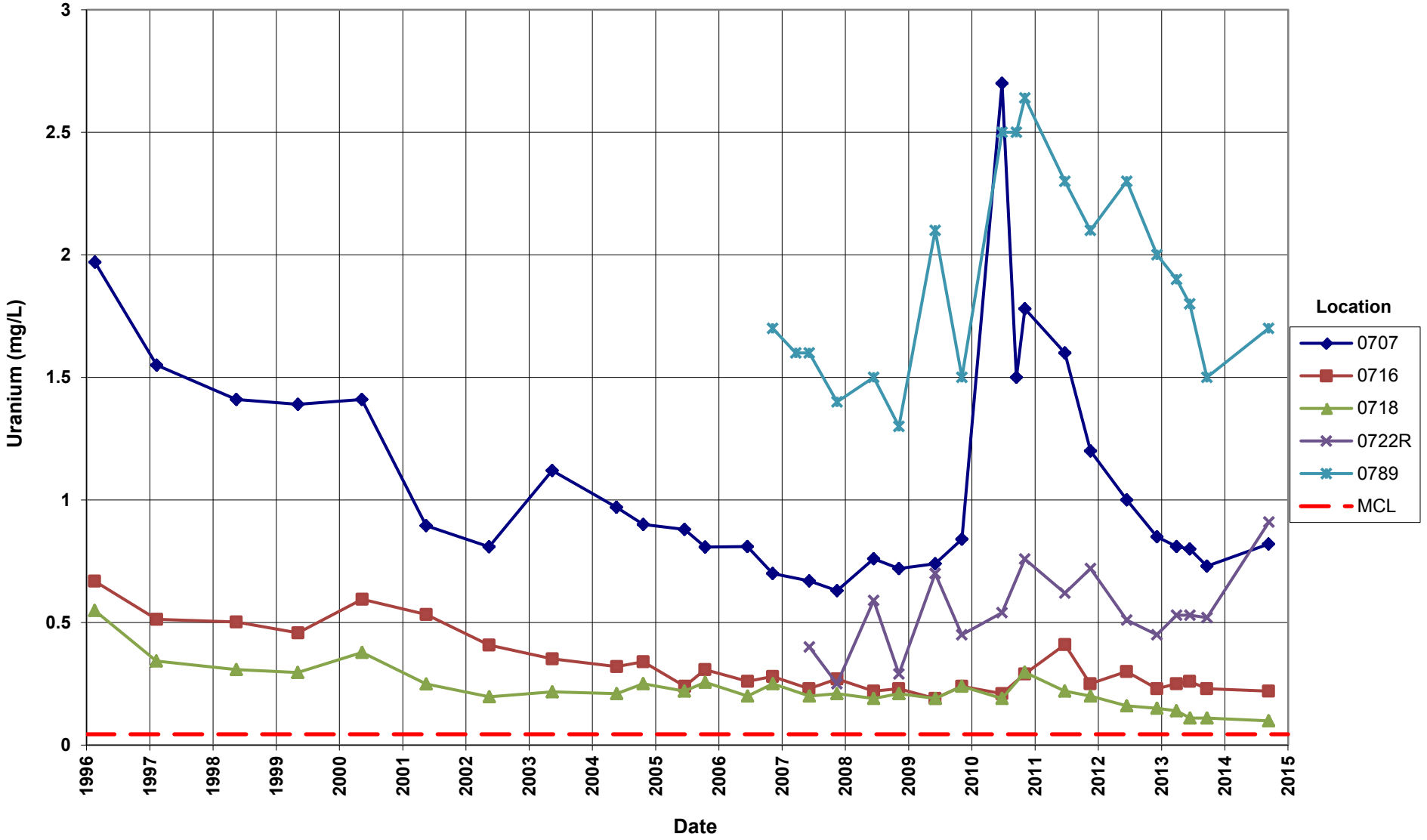
Riverton Processing Site
Uranium Concentration
Semi-Confined Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L



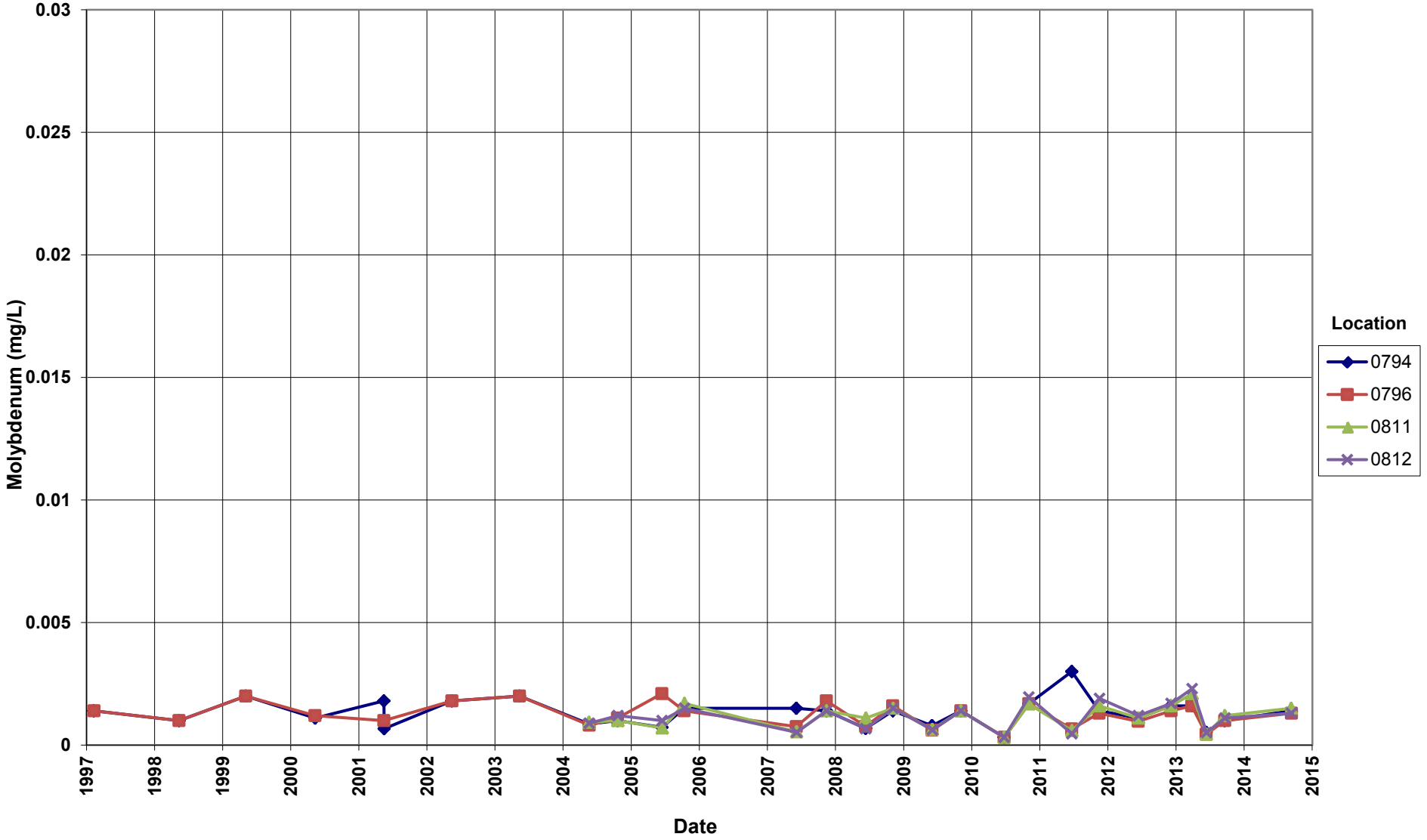
Riverton Processing Site
Uranium Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L



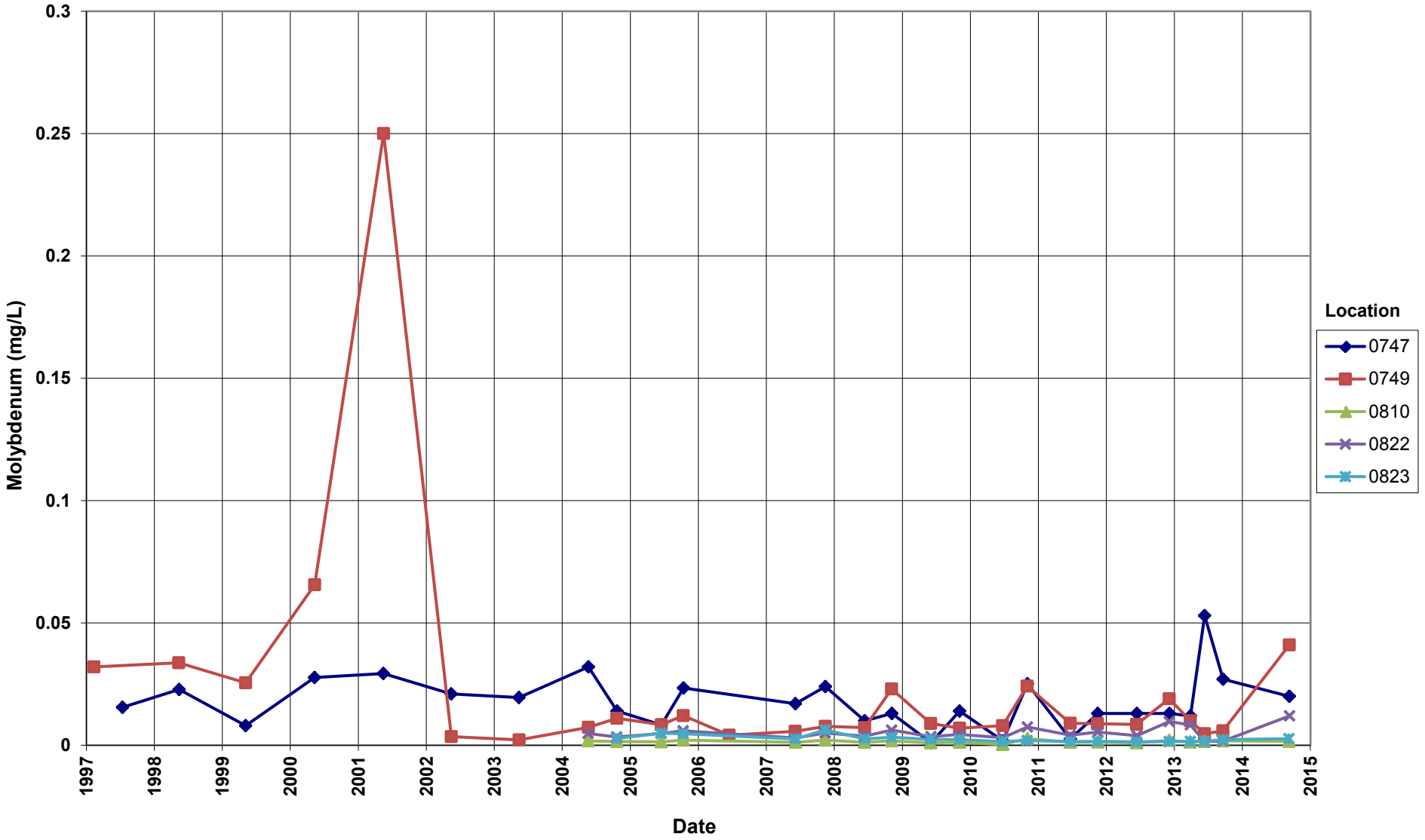
Riverton Processing Site
Uranium Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L



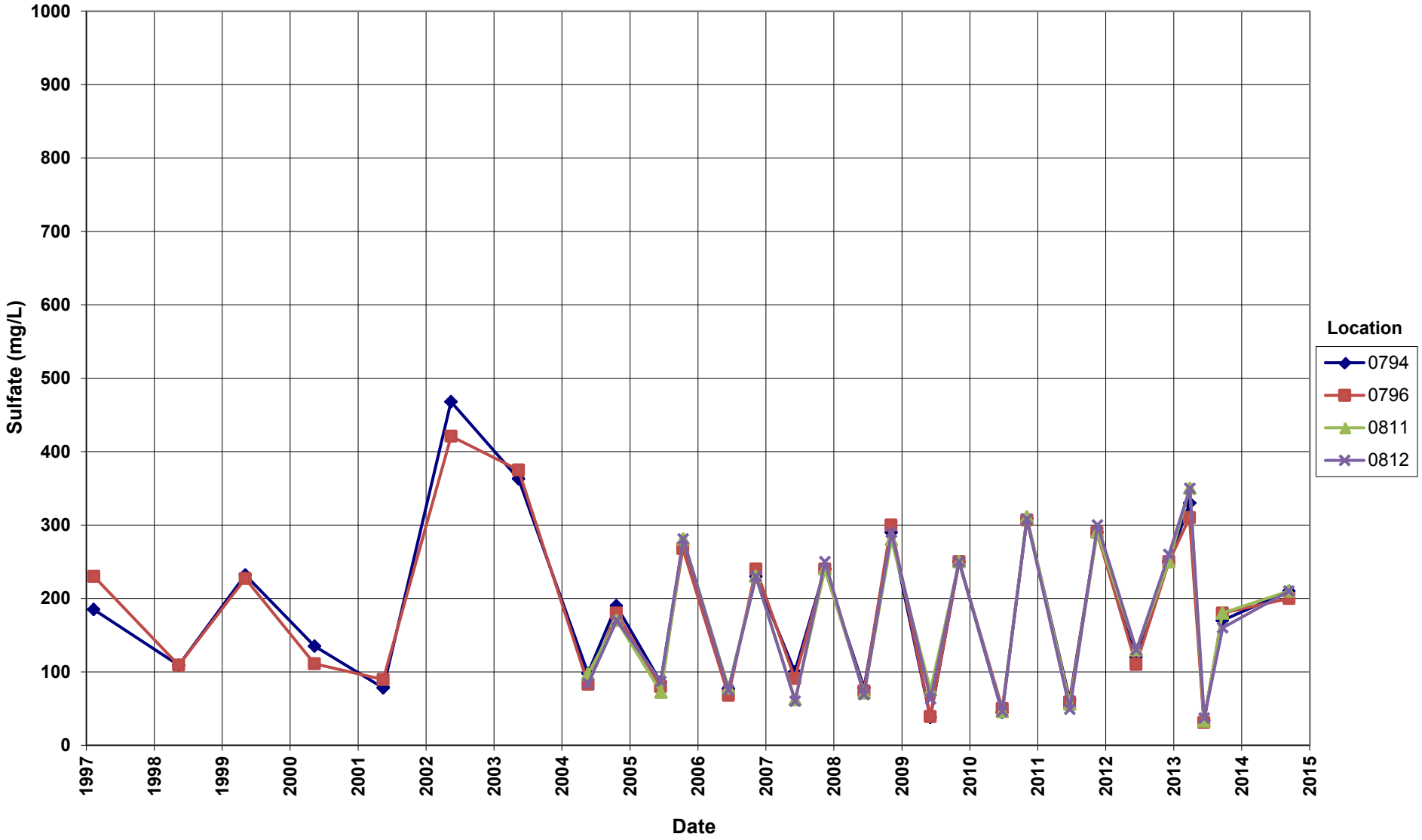
Riverton Processing Site
Molybdenum Concentration
Little Wind River Surface Water Locations



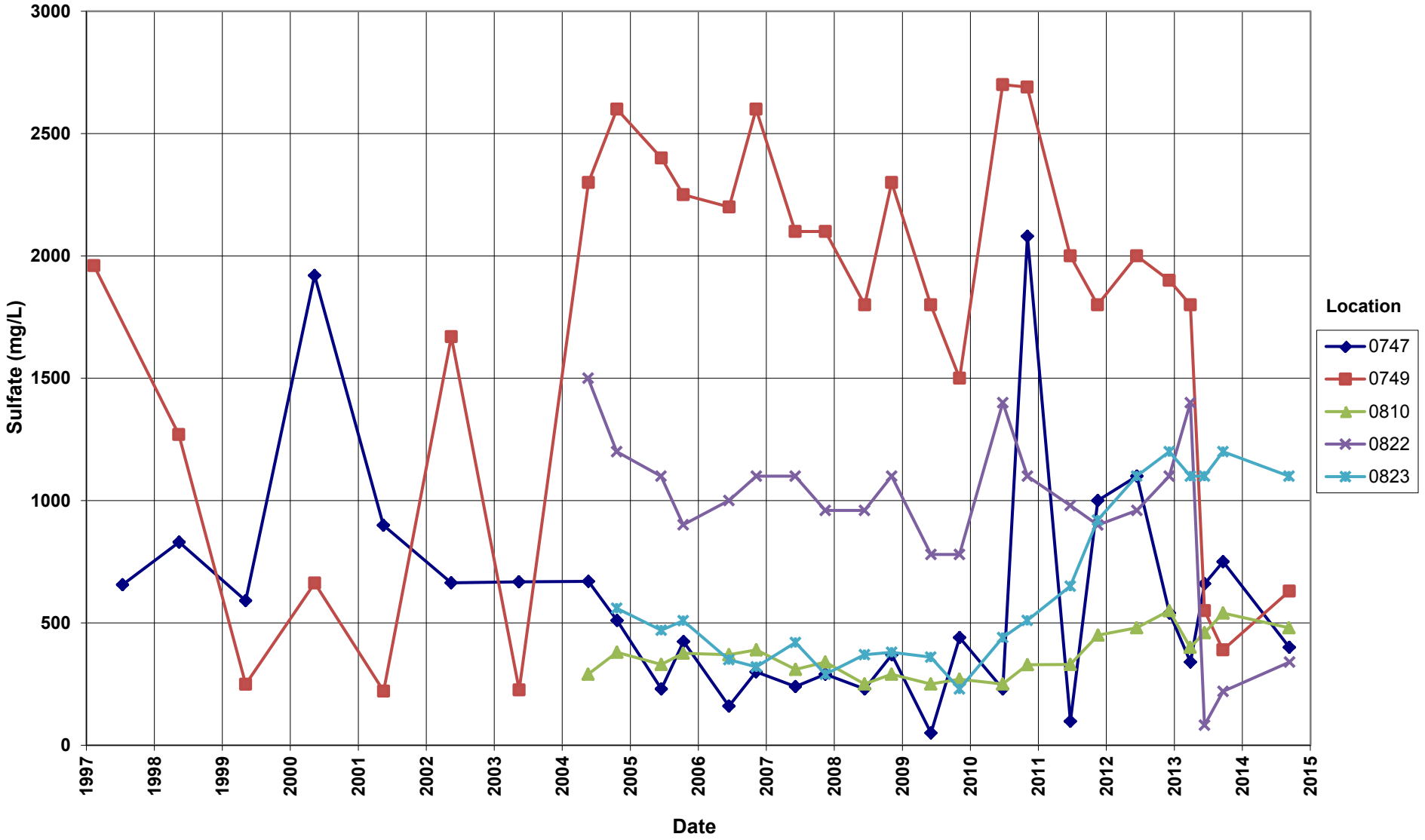
Riverton Processing Site
Molybdenum Concentration
Oxbow Lake, Wetlands, Ditch & Pond Surface Water Locations



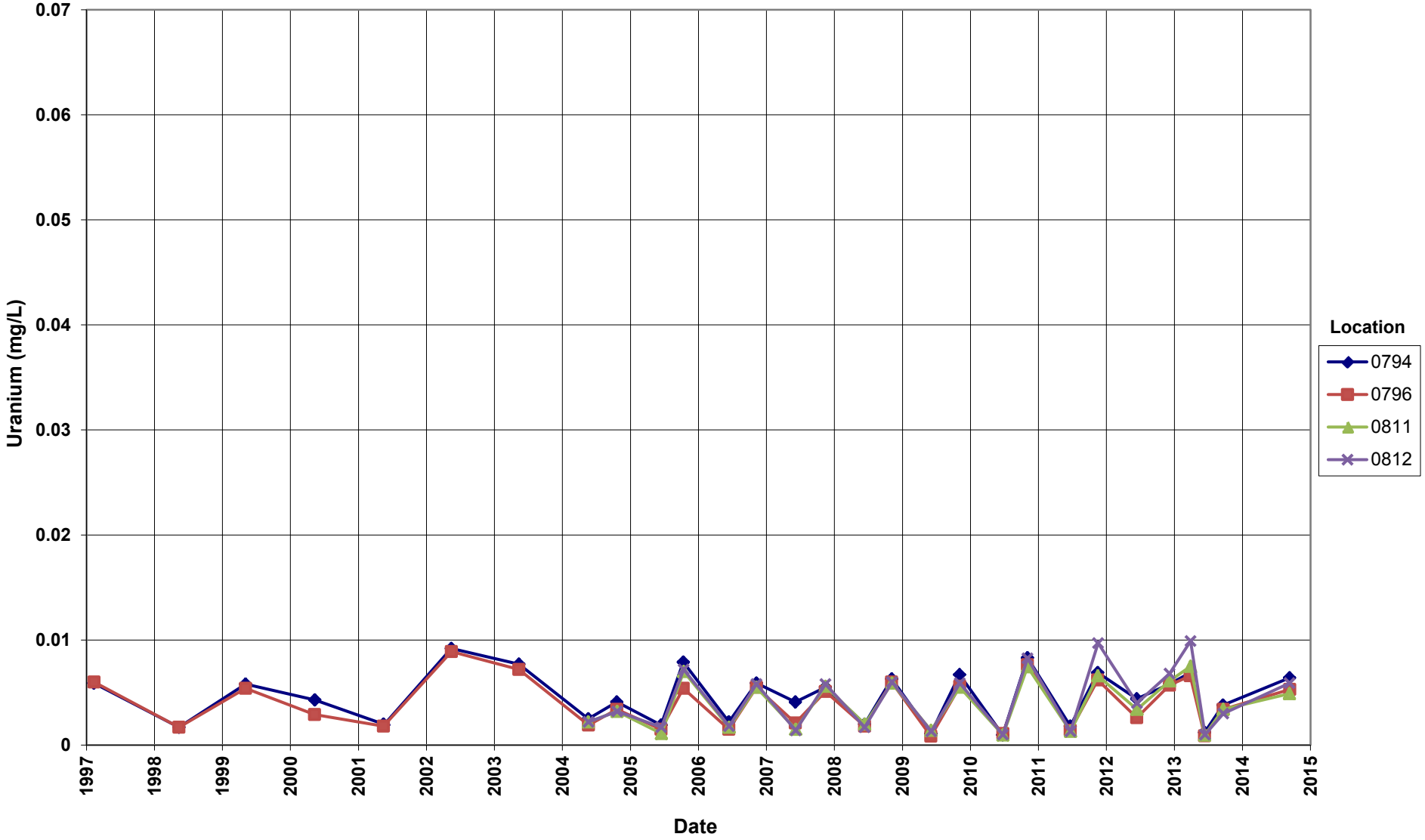
Riverton Processing Site
Sulfate Concentration
Little Wind River Surface Water Locations



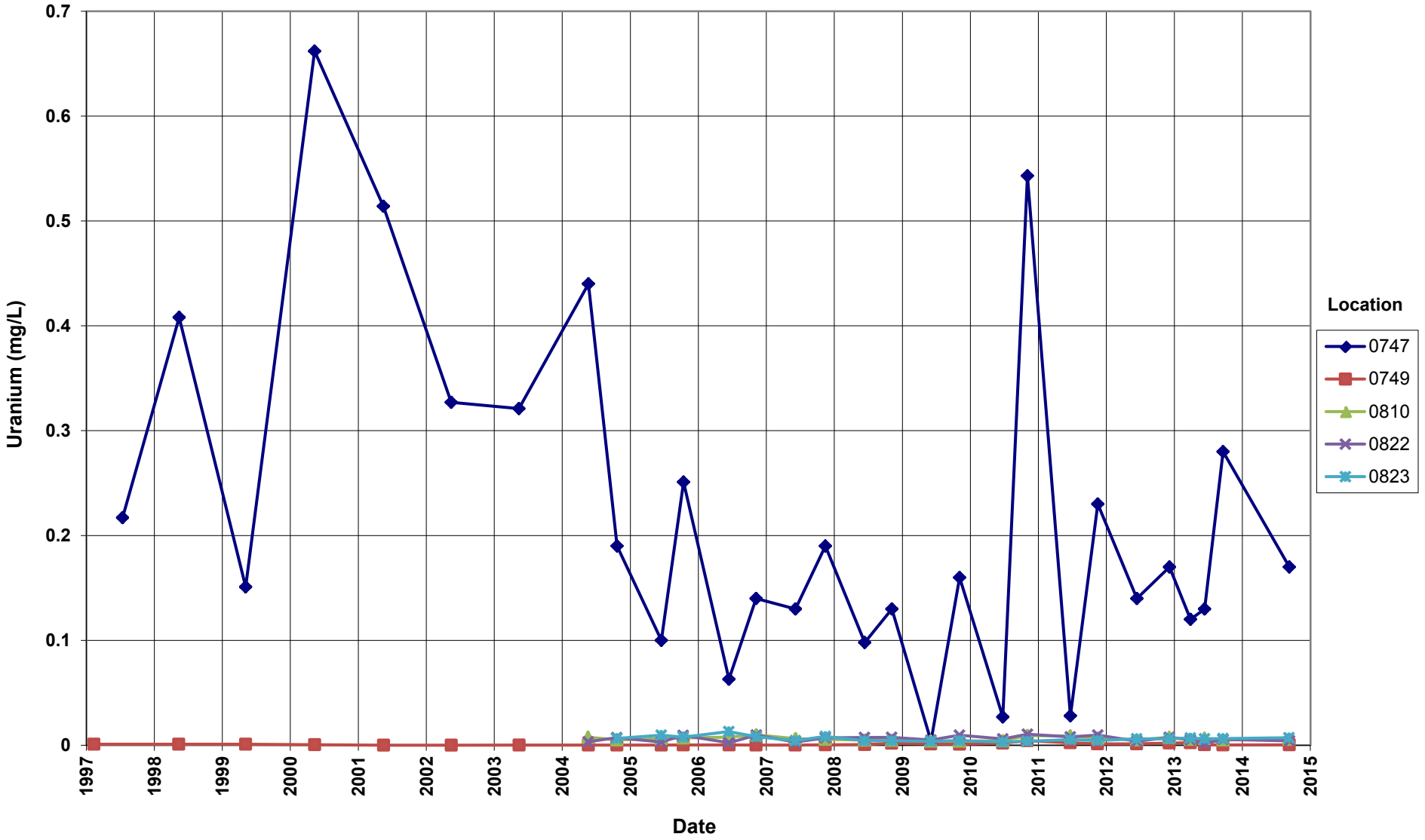
Riverton Processing Site
Sulfate Concentration
Oxbow Lake, Wetlands, Ditch & Pond Surface Water Locations



Riverton Processing Site
Uranium Concentration
Little Wind River Surface Water Locations



Riverton Processing Site
Uranium Concentration
Oxbow Lake, Wetlands, Ditch & Pond Surface Water Locations



Attachment 3
Sampling and Analysis Work Order

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Stoller

August 11, 2014

Task Assignment 501
Control Number 14-0802

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

SUBJECT: Contract No. DE-LM0000415, The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries (Stoller)
Task Assignment 501 LTS&M 1
September 2014 Environmental Sampling at the Riverton, Wyoming, Processing Site

REFERENCE: Task Assignment 501, 2-501-1-02-117-402, Riverton, Wyoming, Processing Site

Dear Mr. Dam:

The purpose of this letter is to inform you of the upcoming sampling event at Riverton, Wyoming. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Riverton processing site. Water quality data will be collected from monitoring wells, domestic wells, and surface locations; flushing of the Alternate Water Supply System also will occur at this site as part of the routine environmental sampling currently scheduled to begin the week of September 8, 2014.

The following lists show the monitoring wells (with zone of completion), surface locations, domestic wells, and water supply system locations scheduled to be sampled during this event.

Monitoring Wells*

705 Se	716 Sf	719 Se	721 Se	723 Se	730 Se	788 Sf	824 Sf
707 Sf	717 Se	720 Sf	722R Sf	729 Sf	784 Sf	789 Sf	826 Sf
710 Sf	718 Sf						

*NOTE: Se = Semi-confined sandstone; Sf = surficial

Surface Locations

747	794	796	810	811	812	822	823

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

749

Domestic Wells

405	422	430	436	460	828	841	842

Alternate Water Supply System

813	815	818	820	829	834	837	843
814	816	819	821	830			

Alternate Water Supply System samples will be collected as directed in the *Alternate Water Supply System Flushing Plan Riverton, Wyoming.* All remaining 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) 248-6654 if you have any questions.

Sincerely,

Sam Campbell

Sam Campbell
Site Lead

SC/lcg/lb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Sam Campbell, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
EDD Delivery
rc-grand.junction
File: RVT 410.02(A)

Sampling Frequencies for Locations at Riverton, Wyoming

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
101					X	WL only
110					X	WL only
111					X	WL only
700					X	WL only
702					X	Data logger
705			X			
707			X			Data logger
709					X	WL only; Data logger
710			X			
716			X			
717			X			
718			X			
719			X			
720			X			
721			X			
722R			X			Data logger
723			X			
724					X	WL only
725					X	WL only
726					X	WL only
727					X	WL only
728					X	WL only
729			X			
730			X			
732					X	WL only
733					X	WL only
734					X	WL only
736					X	WL only
784			X			
788			X			
789			X			Data logger
824			X			
826			X			Data logger
Surface Locations						
747			X			
749			X			
794			X			
796			X			
810			X			Gravel pit
811			X			Little Wind River
812			X			Little Wind River
822			X			
823			X			

Sampling Frequencies for Locations at Riverton, Wyoming

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Domestic Wells						
405			X			921 Rendezvous Road
422			X			10 Whitetail Drive
430			X			204 Goes in Lodge Road
436			X			33 St Stephens Road
460			X			140 Goes in Lodge Road
828			X			33 St Stephens Road
841			X			22 Whitetail Dr
842			X			14 Whitetail Dr
Alternate Water Supply System						
813		X				
814		X				
815		X				
816		X				
818		X				
819		X				
820		X				
821		X				
829		X				
830		X				
834		X				
837		X				
843		X				

Notes:
Annual groundwater and surface water sampling conducted in September.
Semiannual hydrant flushing and sampling conducted in October and April.

Constituent Sampling Breakdown

Site	Riverton					
Analyte	**Groundwater**	**Surface Water**	**AWSS**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	138	36	38			
Field Measurements						
Alkalinity	X	X				
Dissolved Oxygen	X	X	X			
Redox Potential	X	X	X			
Residual Chlorine			X			
pH	X	X	X			
Specific Conductance	X	X	X			
Turbidity	X	X	X			
Temperature	X	X	X			
Laboratory Measurements						
Aluminum						
Ammonia as N (NH_3-N)						
Calcium	X	X		5	SW-846 6010	LMM-01
Chloride	X	X		0.5	SW-846 9056	MIS-A-039
Chromium						
Gross Alpha						
Gross Beta						
Iron						
Lead						
Magnesium	X	X		5	SW-846 6010	LMM-01
Manganese	X	X		0.005	SW-846 6010	LMM-01
Molybdenum	X	X		0.003	SW-846 6020	LMM-02
Nickel						
Nickel-63						
Nitrate + Nitrite as N (NO_3+NO_2)-N						
Potassium	X	X		1	SW-846 6010	LMM-01
Radium-226			X	1 pCi/L	Gas Proportional Counter	GPC-A-018
Radium-228			X	1 pCi/L	Gas Proportional Counter	GPC-A-020
Selenium						
Silica						
Sodium	X	X		1	SW-846 6010	LMM-01
Strontium						
Sulfate	X	X		0.5	SW-846 9056	MIS-A-044
Sulfide						
Total Dissolved Solids						
Total Organic Carbon						
Uranium	X	X	X	0.0001	SW-846 6020	LMM-02

Constituent Sampling Breakdown

Site	Riverton					
Analyte	**Groundwater**	**Surface Water**	**AWSS**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Vanadium						
Zinc						
Total No. of Analytes	9	9	3			

Notes: 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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Stoller

Memorandum

DATE: September 25, 2014

TO: Distribution

FROM: Sam Campbell

SUBJECT: Trip Report

Site: Riverton, Wyoming, Processing Site.

Dates of Sampling Event: September 8 to September 12, 2014

Team Members: Gretchen Baer (Stoller), Sam Campbell (Stoller), Ray Johnson (Stoller), Susan Kamp (Stoller), Dave Peterson (Stoller), Bill Dam (DOE), Josh Linard (DOE), and Sharon Bone from the Stanford Linear Accelerator Center (SLAC).

Number of Locations Sampled: Routine water samples were collected from 8 alternate water supply system (AWSS) hydrants, 4 AWSS taps, 18 monitoring wells, 9 surface water locations, and 9 domestic wells.

Sediment samples were collected at three locations in the Oxbow Lake and one location near the Little Wind River by SLAC personnel as part of a regional study to assess naturally reduced zones. Ad-hoc soil samples and/or field measurements were obtained from locations near the Little Wind River by Stoller/DOE personnel. In addition, vertical profiles of specific conductance and temperature were conducted by Stoller personnel in numerous monitoring wells as part of the AS&T variation study.

Locations Not Sampled/Reason: AWSS tap location 0814 was not sampled because the house was vacant, and domestic well 0422 was not sampled because the house was gone.

Location Specific Information: Monitoring wells 0705, 0719, and 0730 were purged and sampled using Category II criteria; all other monitoring wells were purged and sampled using Category I criteria.

Flow in the Little Wind River was seasonably low and river water was not flowing into the Oxbow Lake at the time of sampling.

A new domestic well was installed within the institutional control boundary at 160 Goes in Lodge Road. With homeowner permission, the well was sampled, and GPS coordinates were collected. Location ID 0876 was assigned to this well. The owner noted that the well is 175 feet deep.

A sample was collected from domestic well 0431, which is approximately 10 feet deep and used to water livestock. GPS coordinates were collected at this well.

While sampling domestic well 0430, the owner stated the field across Goes-In-Lodge Road is over irrigated causing floods in his basement. Irrigation typically occurs for several days, which causes groundwater levels to rise. The cross-gradient location of this irrigated field could also have an effect on groundwater flow and dilution of contaminant concentrations on the eastern side of the former mill site.

WREQC personnel informed DOE that an existing domestic well inside the IC boundary located at 907 Rendezvous Road was recently connected to two trailer residences. WREQC researched the well and found that it was permitted with the State Engineer's office. The permit shows the well was drilled to a depth of 406 feet (confined aquifer), and, therefore, is not likely contaminated (assuming proper well construction). Bill Dam spoke to the owner who would not provide her full name and declined a request to collect a water sample from the well. She had the well tested two years ago and said the water is drinking water quality, but she declined to share the results or inform DOE on what was tested. The owner's grandson lives in one of the trailers. DOE also samples the AWSS at three of the other trailers on the property where a relative of a WREQC employee (Zack) lives.

The sample collected from surface-water location 0811 was collected from a small flowing side-channel (Figure 1).

Figure 1. Surface-Water Sampling at Location 0811.

It was noted during the variation study that specific conductance varied with depth in monitoring well 0709. To determine if the higher specific conductance zone could be attributed to cement grout contamination, water was collected through a peristaltic pump and pH measured at a depth

of 107 feet, which was the depth with the highest specific conductance. The pH measured at that depth was 11.3, which indicates that grout contamination is likely.

Hydrant Flushing: At all AWSS tap locations, a calculated minimum volume was purged from the tap before collecting samples. **A** summary of the hydrant flushing is displayed in Table 1 and hydrant flushing is shown in Figure 2.

Table 1. Hydrant Flushing Summary.

Hydrant Location	Flushing Volume Required (gal)	Total Volume Flushed (gal)	Flushing Time (min)	Average Flow Rate (gpm)	Average Velocity (ft/sec)
0829	20,477	21,880	26.83	815	5.2
0830	33,728	33,985	66.00	515	3.3
0818	20,259	14,225	22.58	630	7.1
0819	42,703	46,650	78.25	596	3.8
0843	2,644	2,665	8.15	327	3.7
0821	16,855	17,590	31.23	563	6.4
0820	4,803	5,085	13.08	389	4.4
0834	969	1,750	3.92	447	5.1

Figure 2. Hydrant Flushing at Location 0829.

Field Variance: The required flushing volume was not obtained at hydrant 0818 because the flushing volume was misread on the spreadsheet.

Access Issues: Site access training was provided by Chem Trade so team members were able to access the former mill site area that is owned by Chem Trade.

Well Inspection Summary: All monitoring wells were in good condition.

Requisition Number Assigned: All samples were assigned to requisition index number (RIN) 14096457 and were shipped to the ALS Laboratory Group on September 16, 2014.

Water Level Measurements: Water levels were measured at all sampled monitoring wells and 14 additional monitoring wells. A summary of data downloads from pressure transducers is shown in Table 2.

Table 2. Pressure Transducer Summary.

Well ID	Downloaded in the Field?	Comments
0101	Yes	
0707	Yes	
0710	Yes	
0716	No	Transducer connected, but could not download. Test is still running with good battery life. Will attempt to download next field trip.
0722R	Yes	Transducer pulled – may be reinstalled at a later date with a shorter cable that is better suited for a flush-mount well.
0729	No	Would not connect. Transducer pulled and taken back to the office. Download was unsuccessful at the office – instrument sustained water damage.
0789	Yes	
0826	No	Would not connect. Transducer pulled and taken back to the office. Downloaded successfully back at the office.

Equipment: All equipment functioned properly.

Quality Control Sample Cross Reference: The false identifications assigned to the quality control samples are displayed in Table 3.

Table 3. Quality Control Samples

False ID	True ID	Sample Type	Ticket Number	Additional Information
2469	0819	Duplicate	MKT 251	AWSS hydrant
2175	0789	Duplicate	MKT 235	Monitoring well
2353	Equipment blank	Equipment blank	MKT 239	Collected after surface water location 0747. Also associated with locations 0794, 0796, 0810, 0811, 0812, 0822, 0823
2433	0722R	Duplicate	MKT 240	Monitoring well

Stakeholder/Regulatory: Wind River Environmental Quality Commission (WREQC) representatives (Ricki Trosper and Steve Babits) observed water and sediment sampling activities and collected co-samples at selected hydrant, monitoring well, and surface water locations.

Flushing activities were conducted in conjunction with Northern Arapaho utility personnel Floyd Addison and Daryl Hutchinson. The new utility director, Mike Quiver, observed activities at several locations.

A local campsite/homestead was established in the vicinity of surface-water location 0812 that restricts access to the location. Sampling personnel were able to gain permission and access to the sampling location, but access may be restricted in the future.

Tracey Beckler and Raven Oldman observed flushing and sampling activities at hydrant location 0821.

Institutional Controls

> **Fences, Gates, Locks:** No issues identified.
> **Signs:** The three warning signs installed around the oxbow lake were in place and in good condition.
> **Trespassing/Site Disturbances:** A new domestic well (0876) was installed within the Institutional Control boundary without notification from the State Engineer's Office.

Corrective Action Required/Taken: Further investigation is needed into new domestic well 0876 to determine if the institutional control is functioning properly that requires the State Engineer's Office to notify DOE if they receive an application for a well permit.

The flushing spreadsheet needs to be updated to include an indicator if the required flushing volume is not obtained.

Surface-water sampling location 0812 needs to be reevaluated for long-term sampling because of potential access issues.

The new contact information for domestic well 0876 needs to be forwarded to Dianna Osborne.

Sediment/Soil Sampling

SLAC Sampling

Sediment sampling was conducted at three locations in the oxbow lake and one location near the Little Wind River by Sharon Bone (SLAC). Two samples were collected at each sample location and placed in canning jars. One sample was sediment topped with lake/river water, and one sample was lake/river water only. Water samples were filtered later that day and placed in other

sample vials for analysis at SLAC. Coordinate data was collected with a GPS at each location (Figure 3). Following are details regarding the sediment samples:

- Oxbow east sample location (Sample 1, Figure 4), organic sediment in about two inches of water with abundant reeds and cattails.
- Oxbow west sample (Samples 2 and 3, Figure 5). Sample 2 was in about two inches of water and closer to the cut bank face. An organic layer was noted as quite thin (a few inches) with gravel at the bottom (Figure 6). Sample 3 was farther out in about six inches of water. A thicker organic layer with less of an apparent gravel bottom was noted.
- Hand augering near the Little Wind River close to well 0789 and MD-18 (mineral deposit sample) also found reduced organic layers, albeit very discontinuous. Sample 4 (Little Wind River) was collected at the river bank (Figure 7) with about one inch of river water. A reduced zone was noted several inches below the sand bar with a couple of inches of reduced organics. The borehole did not stay open readily for good depth and/or thickness measurements.

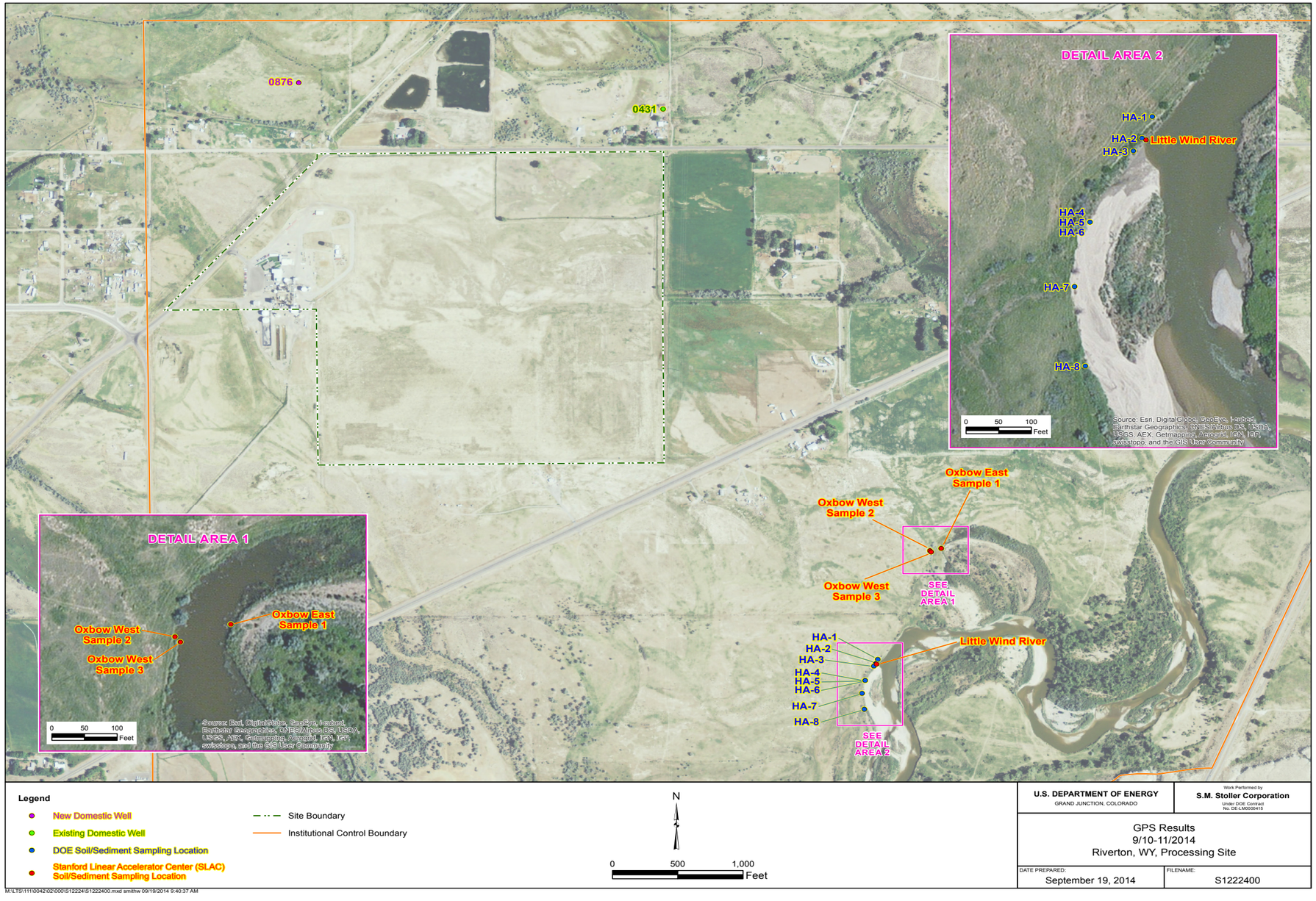

Figure 3. GPS Results for Domestic Wells and Sediment Sampling Locations.

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Figure 4. View of Oxbow-Lake-East Sample Location.

Figure 5. View of Oxbow-Lake-West Sample Location.

Figure 6. SLAC Sediment Sampling at the Oxbow Lake.

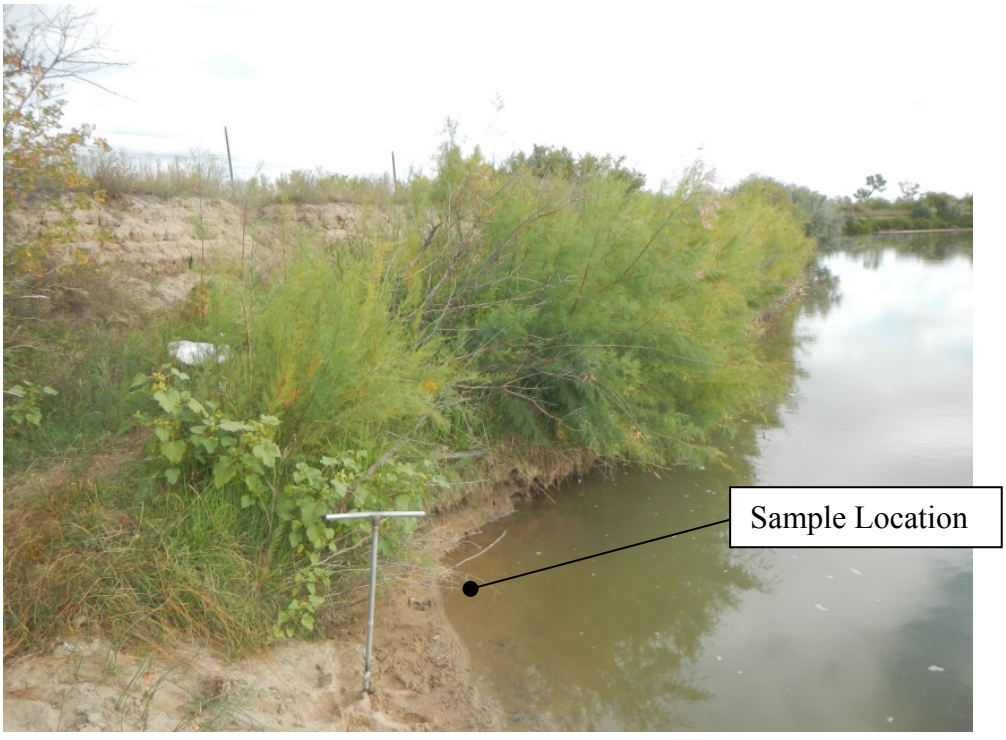

Figure 7. SLAC Little Wind River Location. DOE/Stoller Sediment Sampling

Hand augering was conducted at 8 locations in the vicinity of monitoring well 0789 near the Little Wind River (Figure 1). With a variety of holes, thin discontinuous layers of black reduced organics were found. Oxidized sediments occurred above the existing water table with mottled red/black zones at the capillary fringe. In all holes, the zone below the water table consisted of reduced sediments even in the sands, which had a distinct gray color. Photos of selected sediments are shown in Figures 8 through 13. Specific information collected from each borehole is displayed in Table 4. Note: After HA-1, weather conditions did not allow for thorough logging and sampling, so a combination conductivity and temperature probe was used to measure the water that filled the holes. Sediment samples were submitted to the Environmental Sciences Laboratory for uranium analysis after a 5 percent nitric acid extraction.

Figure 8. DOE Sediment Sampling Location HA-1.

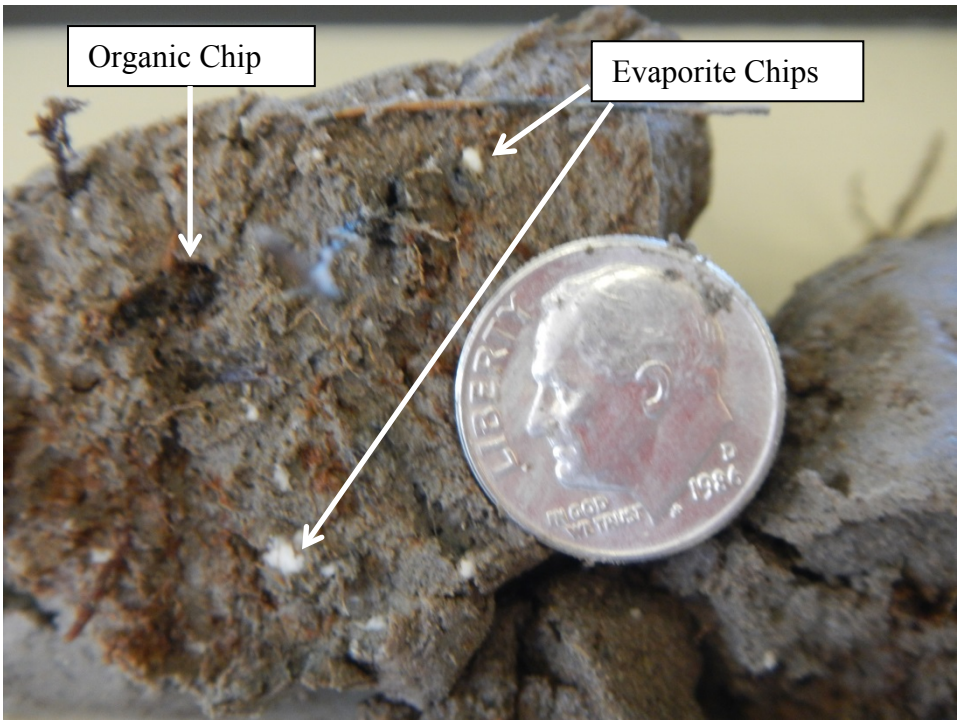

Figure 9. Organic and Evaporite Chips in DOE Sediment Location HA1-21.

Figure 10. Reduced Sand from Location HA-2.

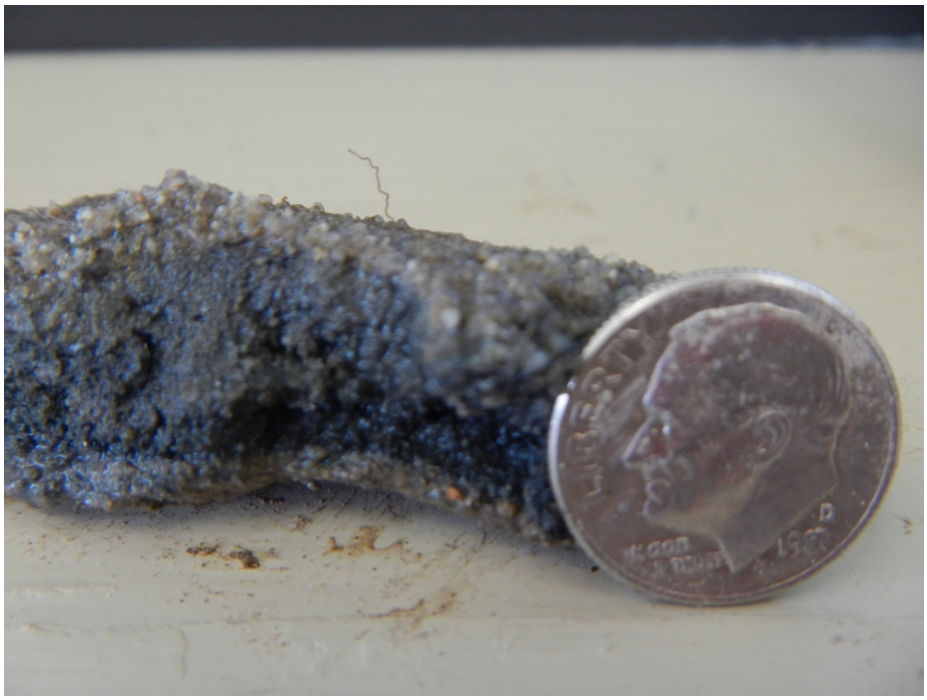

Figure 11. Sediment from Location HA-3 Showing Oxidized Rind after 5-Day Exposure to Air.

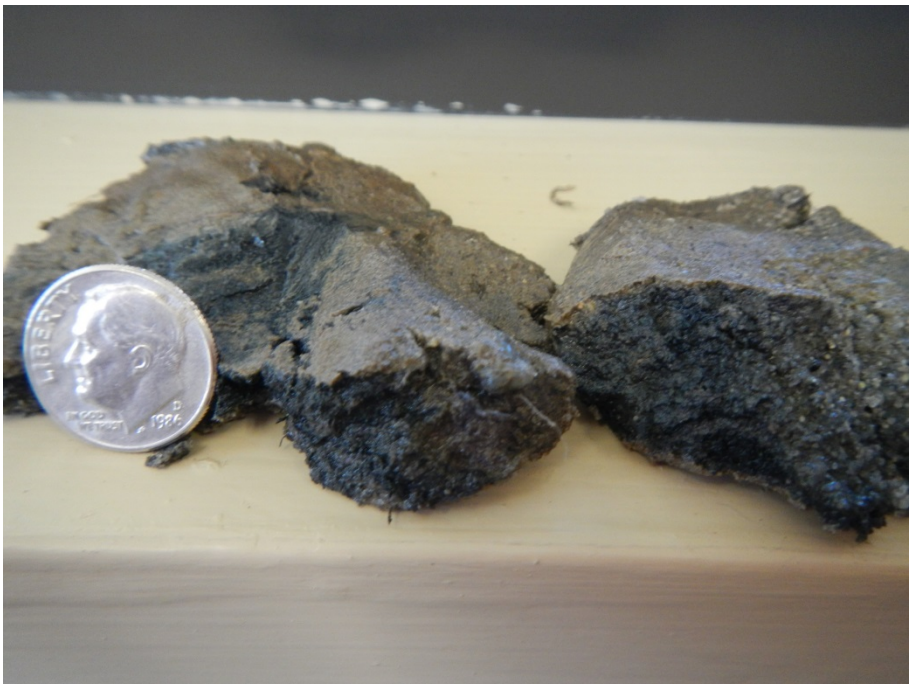

Figure 12. Sediment from Location HA-3-2.

Figure 13. Sediment from Location HA-3-3.

Table 4. DOE Sediment Sampling Information

Location ID	Total Depth (feet)	Temperature (°C)	Specific Conductance (µS/cm)	Comments
HA-1	2.2	-	-	Hit gravel layer before getting to the water table. Location was a small bench just above the river. Sediment was mostly oxidized with some black carbon "chips". Sampled at depths of 21" and 27". At 21" and 27" noted white evaporite chips along with some black organic chips (see photos). Sediment contained more sand at 27" just above the gravel layer.
HA-2	2.3	13.3	2,800	
HA-3	2.0	15.6	3,300	Samples HA-3-1, HA-3-2, HA-3-3 were collected. Numbers indicate deeper depth but not specific depth intervals (hole was collapsing). Leftover evaporite deposits nearby.
HA-4	1.0	13.5	7,000	HA-4, 5, and 6 where in close proximity going up the river bank (HA-4 closest to the sand bar and HA-6 highest up the bank). Could not put any hand auger holes in the sand bar because the sand was too dry for the borehole to stay open. There were no evaporite deposits on the sand bar, but remnant deposits were visible on the nearby cut bank at the top of the capillary fringe.
HA-5	1.3	14.5	8,350	
HA-6	2.6	14.9	8,600	
HA-7	2.5	12.9	7,400	
HA-8	3.0	12.4	11,800	

(SEC/lcg)

cc: (electronic)
Bill Dam, DOE
Josh Linard, DOE
Gretchen Baer, Stoller
Sam Campbell, Stoller
Steve Donivan, Stoller
Ray Johnson, Stoller
Judy Miller, Stoller
Keith Miller, Stoller
Michelle Morton, Stoller
Diana Osborne, Stoller
EDD Delivery

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