Data Validation Package

June 2013
Groundwater and Surface Water Sampling at the Riverton, Wyoming, Processing Site

September 2013

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Contents

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Sampling Event Summary

Site: Riverton, Wyoming, Processing Site

Sampling Period: June 11–13, 2013

This quarterly event comprised sampling 20 monitoring wells, 9 surface water locations, and 8 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* (LMS/PRO/S04351, continually updated). Water levels were measured at all sampled monitoring wells and 13 additional monitoring wells that were not sampled.

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 Exceeded EPA Groundwater Standards in June 2013

Analyte	Standard[a]	Location	Concentration in mg/L
Molybdenum	0.1	0707	0.84
		0716	0.12
		0722R	0.11
		0789	0.52
Uranium	0.044	0707	0.80
		0716	0.26
		0718	0.11
		0722R	0.53
		0789	1.7

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.
mg/L = milligrams per liter

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	0.003
		0422	0.001
		0430	0.002
		0436	0.003
		0460	0.003
		0828	0.003
		0841	0.003
		0842	0.002
Uranium	0.03	0405	0.0001
		0422	0.003
		0430	0.0001
		0436	0.0001
		0460	0.0001
		0828	0.0001
		0841	0.003
		0842	0.0003

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A (molybdenum) and EPA's National Primary Drinking Water Regulations (uranium).
mg/L = milligrams per liter
ND = not detected

Surface water uranium results were compared to statistical benchmark values derived using historical data from the Little Wind River location 0794, which is located upstream of the site and represents background conditions. 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 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 (June 2013) to Benchmark

Location		Uranium Concentration (mg/L)
Benchmark		**0.010**
0794	Little Wind River, Benchmark Location	0.0012
0796	Little Wind River	0.0009
0811	Little Wind River	0.0010
0812	Little Wind River	0.0010
0747	Oxbow Lake	0.13
0810	Constructed Wetlands	0.0066
0822	West Side Irrigation Ditch	0.0016
0823	Gravel Pit Pond	0.0062
0749	Sulfuric acid plant ditch	0.0005

mg/L = milligrams per liter

The sample collected at the ditch that discharges from the Chemtrade sulfuric acid plant (0749) has a significantly reduced concentrations of sulfate (550 mg/L). This is a result of a process changed made by Chemtrade. Reduced sulfate is also evident downstream, in the west side irrigation ditch (82 mg/L at location 0822).

Water samples from location 0822 (west side irrigation ditch) were analyzed for radium-226 and radium-228 in response to potentially elevated concentrations of these constituents in the sediments within the ditch. The radium-226 and radium-228 were not detected, with concentrations less than the respective Decision Level Concentrations (DLC). Historically, the combined radium concentration at this location has been low, averaging 1.1 pico Curies per liter (pCi/L), indicating no impact to water quality in the ditch.

Sam Campbell
Site Lead, S.M. Stoller Corporation

8-29-2013
Date

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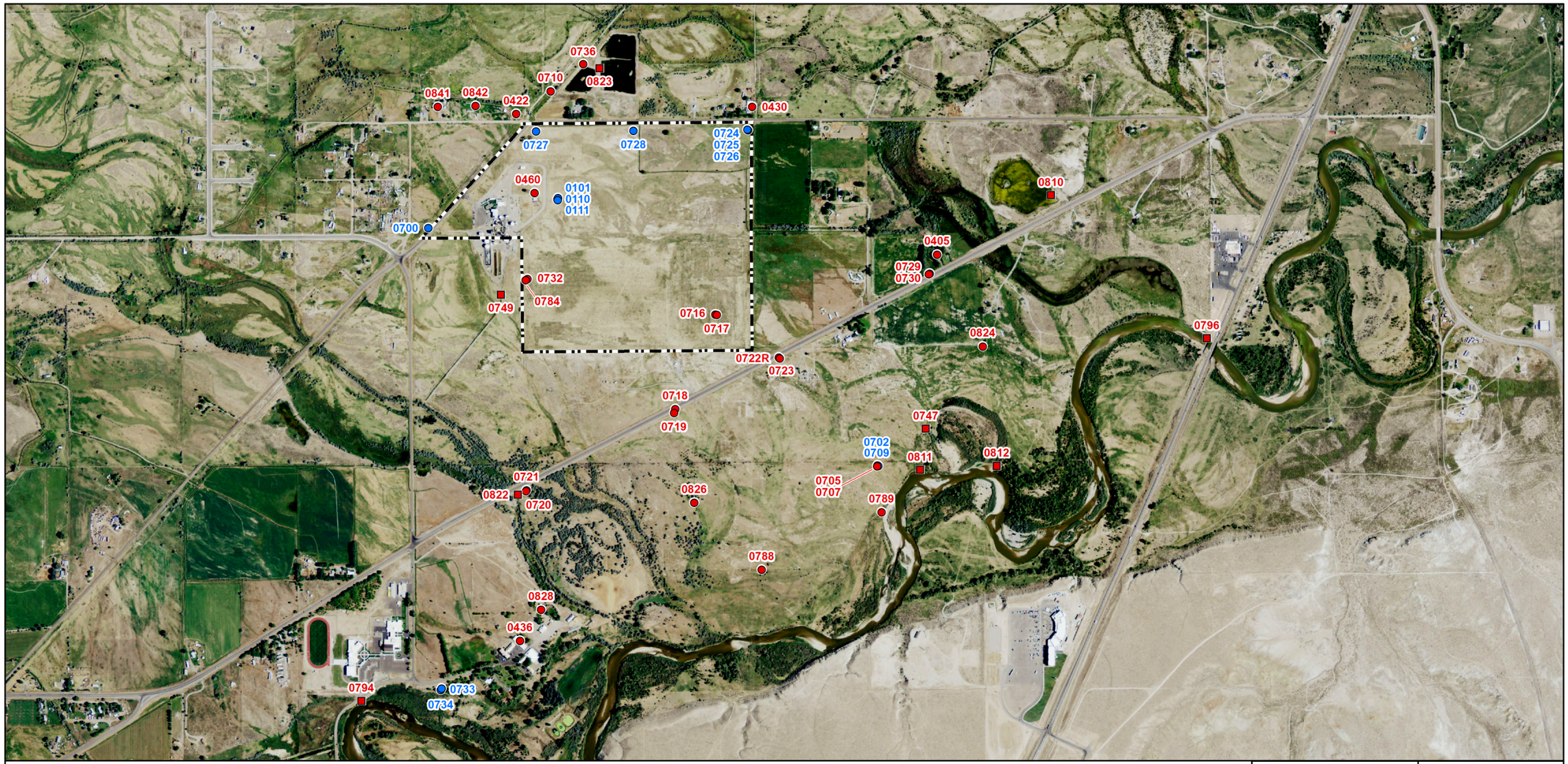

Riverton, Wyoming, Processing Site, Sample Location Map

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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**	June 11–13, 2013
Date(s) of Verification	August 1, 2013	**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 May 15, 2013.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed June 6, 2013.
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 0747 and 0789.
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):	13065379
Sample Event:	June 11-13, 2013
Site(s):	Riverton, Wyoming
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1306283
Analysis:	Metals, Wet Chemistry, and Radiochemistry
Validator:	Stephen Donivan
Review Date:	July 31, 2013

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
Dissolved Organic Carbon	WCH-A-024	EPA 415.1	EPA 415.1
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.

Table 5. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1306283-1	0405	Calcium	J	Serial dilution result
1306283-1	0405	Potassium	U	Less than 5 times the method blank
1306283-2	0422	Manganese	J	Negative calibration blanks
1306283-3	0430	Potassium	U	Less than 5 times the method blank
1306283-4	0436	Potassium	U	Less than 5 times the method blank
1306283-5	0460	Potassium	U	Less than 5 times the method blank
1306283-6	0705	Manganese	J	Negative calibration blanks
1306283-13	0720	Manganese	J	Negative calibration blanks
1306283-14	0721	Potassium	U	Less than 5 times the method blank
1306283-21	0747	Molybdenum	J	Field duplicate results
1306283-21	0747	Potassium	J	Serial dilution result
1306283-22	0749	Magnesium	U	Less than 5 times the method blank
1306283-27	0796	Manganese	J	Equipment blank result
1306283-35	0828	Magnesium	U	Less than 5 times the method blank
1306283-35	0828	Potassium	U	Less than 5 times the method blank
1306283-37	0842	Potassium	U	Less than 5 times the method blank
1306283-38	Equipment Blank	Calcium	U	Less than 5 times the method blank
1306283-38	Equipment Blank	Magnesium	U	Less than 5 times the method blank
1306283-38	Equipment Blank	Sodium	U	Less than 5 times the method blank
1306283-39	0747 Duplicate	Molybdenum	J	Field duplicate results

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 40 water samples on June 19, 2013, accompanied by a Chain of Custody (COC) form. The COC 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 0.2 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses with one exception. The dissolved organic carbon aliquot from location 0729 was received with a pH value of 6. The aliquot was acidified by the laboratory to a pH less than 2 and allowed to equilibrate prior to analysis. All samples were analyzed within the applicable holding times.

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.

EPA 415.1, Dissolved Organic Carbon
The calibration for dissolved organic carbon was performed using six calibration standards on June 27, 2013. The calibration curve correlation coefficient value was greater than 0.995 and the absolute value of the intercept 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.

Method SW-846 6010, Metals
Calibrations for iron and manganese were performed on June 26, 2013, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than or only slightly above 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 June 26, 2013, using four calibration standards. The calibration curve correlation coefficient values were greater than

0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency 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 April 3, 2013. The calibration curve correlation coefficient values were greater than 0.995 and the absolute value of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria.

Radium-226
Instrument calibration was performed in December 2012. Daily instrument checks performed on June 27, 2013, 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 in May 2013. Daily instrument checks performed on July 2, 2013, 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.

The manganese calibration and method blank results were negative, with absolute values greater than the MDL. Sample manganese results that are less than the PQL are qualified with a "J" flag as estimated values.

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 (MS/MSD) samples are used to measure method performance in the sample matrix. The spike recoveries met the acceptance criteria for all analytes evaluated. The sulfate matrix spike duplicate recovery from sample 0405 was below the laboratory acceptance criteria, but greater than the data validation limit of 75 percent, not requiring qualification.

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 exceptions. The results for the calcium serial dilution prepared from sample 0405 and the potassium serial dilution prepared from sample 0747 did not meet the acceptance criteria. The associated sample results are qualified with a “J” flag as estimated values.

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 July 11, 2013. 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: 13065379 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 07/30/2013

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

# of Samples: 40 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody

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

Sample

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

Select Quality Parameters

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

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 13065379 **Lab Code:** PAR **Date Due:** 07/17/2013

Matrix: Water **Site Code:** RVT01 **Date Completed:** 07/11/2013

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Calcium	ICP/ES	06/26/2013	0.0000	1.0000	OK	OK	OK	104.0	100.0	104.0	3.0	99.0	14.0	103.0
Calcium	ICP/ES	06/26/2013					OK	105.0	108.0	118.0	2.0	105.0	5.0	105.0
Magnesium	ICP/ES	06/26/2013	0.0000	1.0000	OK	OK	OK	103.0	97.0	100.0	3.0	100.0	5.0	102.0
Magnesium	ICP/ES	06/26/2013					OK	103.0	102.0	105.0	1.0	101.0		101.0
Manganese	ICP/ES	06/26/2013	0.0000	1.0000	OK	OK	OK	106.0	101.0	105.0	3.0	95.0	7.0	106.0
Manganese	ICP/ES	06/26/2013					OK	105.0	99.0	102.0	1.0	98.0		107.0
Molybdenum	ICP/MS	06/26/2013	0.0000	1.0000	OK	OK	OK	98.0	98.0	98.0	0.0	91.0		100.0
Molybdenum	ICP/MS	06/26/2013					OK	92.0	92.0	92.0	0.0			
Potassium	ICP/ES	06/26/2013	0.0000	1.0000	OK	OK	OK	106.0	114.0	117.0	3.0		11.0	85.0
Potassium	ICP/ES	06/26/2013					OK	105.0	103.0	103.0	0.0			86.0
Sodium	ICP/ES	06/26/2013	0.0000	1.0000	OK	OK	OK	102.0	90.0	93.0	1.0		0.0	88.0
Sodium	ICP/ES	06/26/2013					OK	102.0	111.0	101.0	2.0		3.0	90.0
Uranium	ICP/MS	06/26/2013	0.0000	1.0000	OK	OK	OK	105.0	105.0	108.0	3.0	102.0	5.0	100.0
Uranium	ICP/MS	06/26/2013					OK	104.0	85.0		3.0			

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 13065379 **Lab Code:** PAR **Date Due:** 07/17/2013

Matrix: Water **Site Code:** RVT01 **Date Completed:** 07/11/2013

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0822	Radium-226	06/27/2013			95.1			
Blank_Spike	Radium-226	06/27/2013			97.8	91.90		
Blank_Spike_Du	Radium-226	06/27/2013			97.9	80.40		1.40
Blank	Radium-226	06/27/2013	0.0040	U	94.8			
0822	Radium-228	07/02/2013			96.2			
Blank_Spike	Radium-228	07/02/2013			97.5	92.00		
Blank_Spike_Du	Radium-228	07/02/2013			97.6	102.00		1.20
Blank	Radium-228	07/02/2013	0.0480	U	96.7			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 13065379 **Lab Code:** PAR **Date Due:** 07/17/2013

Matrix: Water **Site Code:** RVT01 **Date Completed:** 07/11/2013

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
CHLORIDE	06/21/2013	0.000	0.9999	OK	OK	OK	98.00	98.0	97.0	1.00	
CHLORIDE	06/24/2013			OK	OK	OK	101.00				
CHLORIDE	06/25/2013							104.0	103.0	1.00	
Dissolved Organic Carbon	06/27/2013	0.000	0.9992	OK	OK	OK	102.00	107.0	108.0	1.00	
Dissolved Organic Carbon	06/28/2013			OK	OK	OK	102.00	103.0	103.0	0	
SULFATE	06/21/2013	0.000	0.9998	OK	OK	OK	94.00	86.0	84.0	1.00	
SULFATE	06/24/2013			OK	OK	OK	97.00				
SULFATE	06/25/2013							108.0	104.0	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. Monitoring wells were sampled using a peristaltic pump and dedicated tubing. Domestic wells (0405, 0422, 0430, 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. Manganese was detected in the equipment blank. Associated sample manganese results that are less than 5 times the blank concentration are qualified with a "J" flag as estimated values. The equipment blank results indicate adequate decontamination of the sampling equipment.

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from locations 0747 and 0789. For non-radiochemical measurements, the relative percent difference (RPD) 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 (RPD is NA on the Field Duplicates report), 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 precision, with the following exception. The duplicate results for molybdenum from location 0747 did not meet the acceptance criteria. The sample and duplicate molybdenum results are qualified with a "J" flag as estimated values.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13065379 **Lab Code:** PAR **Project:** Riverton **Validation Date:** 07/31/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1306283-38	SW6010	Manganese	1.4	B	0.11	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1306283-21	LHV 716	0747	580	1		
1306283-22	LHV 717	0749	9.1	1		
1306283-26	LHV 718	0794	10	1		
1306283-27	LHV 719	0796	3.7	1	B	J
1306283-28	LHV 720	0810	23	1		
1306283-29	LHV 721	0811	9.2	1		
1306283-30	LHV 722	0812	110	1		
1306283-31	LHV 723	0822	9	1		
1306283-32	LHV 724	0823	280	1		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13065379 **Lab Code:** PAR **Project:** Riverton **Validation Date:** 07/31/2013

Duplicate: 2353 **Sample:** 0747

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Calcium	110000			1	110000			1	0		UG/L
CHLORIDE	26			20	27			20	3.77		MG/L
Magnesium	51000			1	50000			1	1.98		UG/L
Manganese	580			1	570			1	1.74		UG/L
Molybdenum	15			50	53			100	NA		UG/L
Potassium	5900	E		1	5700			1	3.45		UG/L
Sodium	160000			10	150000			10	6.45		UG/L
SULFATE	630			20	660			20	4.65		MG/L
Uranium	130			50	130			100	0		UG/L

Duplicate: 2433 **Sample:** 0789

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Calcium	400000			1	410000			1	2.47		UG/L
CHLORIDE	250			100	250			100	0		MG/L
Dissolved Organic Carbon	17			2	15			1	12.50		MG/L
Magnesium	240000			1	240000			1	0		UG/L
Manganese	1000			1	1000			1	0		UG/L
Molybdenum	520			100	560			200	7.41		UG/L
Potassium	28000			1	28000			1	0		UG/L
Sodium	1400000			50	1300000			50	7.41		UG/L
SULFATE	4600			100	4700			100	2.15		MG/L
Uranium	1700			100	1800			200	5.71		UG/L

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the environmental 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 9-3-2013
Stephen Donivan

Data Validation Lead: Stephen Donivan 9-3-2013
Stephen Donivan

Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

The sulfate result from location 0822 was identified as potentially anomalous, much lower than the historical minimum. Additionally, the specific conductance measured at this location was significantly below the historical minimum, indicating a true shift in analyte concentrations. This is a result of a process change that has resulted is a significant reduction of sulfate concentration in the Chemtrade sulfuric acid plant discharge.

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2003
Laboratory: ALS Laboratory Group
RIN: 13065379
Report Date: 08/26/2013

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
RVT01	0717	N001	06/11/2013	Molybdenum	0.0094		F	0.0093		F	0.0052		F	20	0	No
RVT01	0718	N001	06/13/2013	Uranium	0.11		F	0.297		F	0.14		F	21	0	No
RVT01	0720	N001	06/11/2013	Molybdenum	0.001		F	0.0025		F	0.0012		F	19	2	No
RVT01	0721	N001	06/11/2013	Manganese	0.0017	B	F	0.0063		F	0.0027	B	F	20	2	No
RVT01	0721	N001	06/11/2013	Sulfate	260		F	300		F	265		F	20	0	No
RVT01	0729	N001	06/12/2013	Sulfate	52		F	160		F	63		F	20	0	No
RVT01	0749	0001	06/11/2013	Manganese	0.0091			0.153			0.01			19	0	No
RVT01	0784	N001	06/11/2013	Sulfate	1900		F	3400		F	2000		F	16	0	NA
RVT01	0794	0001	06/11/2013	Sulfate	34			363			38			20	0	No
RVT01	0796	0001	06/11/2013	Sulfate	31			375			39			20	0	No
RVT01	0810	0001	06/11/2013	Manganese	0.023			0.49			0.024			18	0	NA
RVT01	0811	0001	06/12/2013	Sulfate	33			350			46			19	0	No
RVT01	0811	0001	06/12/2013	Uranium	0.00095			0.0075			0.00096			19	0	No
RVT01	0812	0001	06/13/2013	Sulfate	37			350			46			19	0	No
RVT01	0822	N001	06/11/2013	Molybdenum	0.0016			0.0097			0.003			18	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2003
Laboratory: ALS Laboratory Group
RIN: 13065379
Report Date: 08/26/2013

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
RVT01	0822	N001	06/11/2013	Sulfate	82			1500			780			20	0	Yes
RVT01	0822	N001	06/11/2013	Uranium	0.0016			0.0105			0.0024			20	0	No
RVT01	0823	N001	06/11/2013	Manganese	0.28			0.17			0.0019	B		16	1	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.

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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: 08/26/2013
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	06/12/2013	N001	-	45			#		
Calcium	mg/L	06/12/2013	N001	-	7.1	E	J	#	0.012	
Chloride	mg/L	06/12/2013	N001	-	17			#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	-	3.02			#		
Magnesium	mg/L	06/12/2013	N001	-	0.23	B		#	0.013	
Manganese	mg/L	06/12/2013	N001	-	0.00073	B		#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	-	0.0032			#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	-	36.2			#		
pH	s.u.	06/12/2013	N001	-	8.23			#		
Potassium	mg/L	06/12/2013	N001	-	0.69	B	U	#	0.11	
Sodium	mg/L	06/12/2013	N001	-	160			#	0.066	
Specific Conductance	umhos /cm	06/12/2013	N001	-	948			#		
Sulfate	mg/L	06/12/2013	N001	-	270	N		#	2.5	
Temperature	C	06/12/2013	N001	-	15.75			#		
Turbidity	NTU	06/12/2013	N001	-	2.12			#		
Uranium	mg/L	06/12/2013	N001	-	0.00005	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
Location: 0422 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As $CaCO_3$)	mg/L	06/12/2013	N001	-	183			#		
Calcium	mg/L	06/12/2013	N001	-	67			#	0.012	
Chloride	mg/L	06/12/2013	N001	-	7.5			#	0.4	
Dissolved Oxygen	mg/L	06/12/2013	N001	-	3.68			#		
Magnesium	mg/L	06/12/2013	N001	-	15			#	0.013	
Manganese	mg/L	06/12/2013	N001	-	0.00011	U	J	#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	-	0.0013			#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	-	86.9			#		
pH	s.u.	06/12/2013	N001	-	6.89			#		
Potassium	mg/L	06/12/2013	N001	-	2.5			#	0.11	
Sodium	mg/L	06/12/2013	N001	-	32			#	0.0066	
Specific Conductance	umhos /cm	06/12/2013	N001	-	546			#		
Sulfate	mg/L	06/12/2013	N001	-	82			#	1	
Temperature	C	06/12/2013	N001	-	11.72			#		
Turbidity	NTU	06/12/2013	N001	-	1.28			#		
Uranium	mg/L	06/12/2013	N001	-	0.0032			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	-	65			#		
Calcium	mg/L	06/11/2013	N001	-	4.3			#	0.012	
Chloride	mg/L	06/11/2013	N001	-	9.6			#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	-	1.76			#		
Magnesium	mg/L	06/11/2013	N001	-	0.21	B		#	0.013	
Manganese	mg/L	06/11/2013	N001	-	0.0019	B		#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	-	0.0022			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	-	31.6			#		
pH	s.u.	06/11/2013	N001	-	8.08			#		
Potassium	mg/L	06/11/2013	N001	-	0.69	B	U	#	0.11	
Sodium	mg/L	06/11/2013	N001	-	130			#	0.066	
Specific Conductance	umhos /cm	06/11/2013	N001	-	768			#		
Sulfate	mg/L	06/11/2013	N001	-	180			#	2.5	
Temperature	C	06/11/2013	N001	-	12.92			#		
Turbidity	NTU	06/11/2013	N001	-	4.3			#		
Uranium	mg/L	06/11/2013	N001	-	0.00004	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	-	158			#		
Calcium	mg/L	06/11/2013	N001	-	3.7			#	0.012	
Chloride	mg/L	06/11/2013	N001	-	13			#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	-	3.24			#		
Magnesium	mg/L	06/11/2013	N001	-	0.22	B		#	0.013	
Manganese	mg/L	06/11/2013	N001	-	0.00083	B		#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	-	0.0029			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	-	164.9			#		
pH	s.u.	06/11/2013	N001	-	8.24			#		
Potassium	mg/L	06/11/2013	N001	-	0.67	B	U	#	0.11	
Sodium	mg/L	06/11/2013	N001	-	140			#	0.066	
Specific Conductance	umhos /cm	06/11/2013	N001	-	784			#		
Sulfate	mg/L	06/11/2013	N001	-	200			#	2.5	
Temperature	C	06/11/2013	N001	-	19.91			#		
Turbidity	NTU	06/11/2013	N001	-	4			#		
Uranium	mg/L	06/11/2013	N001	-	0.00006	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
Location: 0460 WELL Koch 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	06/11/2013	N001	-	147			#		
Calcium	mg/L	06/11/2013	N001	-	3.5			#	0.012	
Chloride	mg/L	06/11/2013	N001	-	11			#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	-	3.2			#		
Magnesium	mg/L	06/11/2013	N001	-	0.2	B		#	0.013	
Manganese	mg/L	06/11/2013	N001	-	0.00068	B		#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	-	0.0028			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	-	89.9			#		
pH	s.u.	06/11/2013	N001	-	8.25			#		
Potassium	mg/L	06/11/2013	N001	-	0.63	B	U	#	0.11	
Sodium	mg/L	06/11/2013	N001	-	150			#	0.0066	
Specific Conductance	umhos /cm	06/11/2013	N001	-	712			#		
Sulfate	mg/L	06/11/2013	N001	-	160			#	2.5	
Temperature	C	06/11/2013	N001	-	14.05			#		
Turbidity	NTU	06/11/2013	N001	-	2.5			#		
Uranium	mg/L	06/11/2013	N001	-	0.00008	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	44.95 - 44.95	62		FQ	#		
Calcium	mg/L	06/12/2013	0001	44.95 - 44.95	34		FQ	#	0.012	
Chloride	mg/L	06/12/2013	0001	44.95 - 44.95	54		FQ	#	2	
Dissolved Organic Carbon	mg/L	06/12/2013	0001	44.95 - 44.95	1.9		FQ	#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	44.95 - 44.95	3.16		FQ	#		
Magnesium	mg/L	06/12/2013	0001	44.95 - 44.95	0.8	B	FQ	#	0.013	
Manganese	mg/L	06/12/2013	0001	44.95 - 44.95	0.00011	U	FQJ	#	0.00011	
Molybdenum	mg/L	06/12/2013	0001	44.95 - 44.95	0.0029		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	44.95 - 44.95	58		FQ	#		
pH	s.u.	06/12/2013	N001	44.95 - 44.95	7.81		FQ	#		
Potassium	mg/L	06/12/2013	0001	44.95 - 44.95	1.1		FQ	#	0.11	
Sodium	mg/L	06/12/2013	0001	44.95 - 44.95	180		FQ	#	0.066	
Specific Conductance	umhos /cm	06/12/2013	N001	44.95 - 44.95	1247		FQ	#		
Sulfate	mg/L	06/12/2013	0001	44.95 - 44.95	430		FQ	#	5	
Temperature	C	06/12/2013	N001	44.95 - 44.95	9.92		FQ	#		
Turbidity	NTU	06/12/2013	N001	44.95 - 44.95	24.4		FQ	#		
Uranium	mg/L	06/12/2013	0001	44.95 - 44.95	0.00035		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	11.4 - 11.4	312		F	#		
Calcium	mg/L	06/12/2013	N001	11.4 - 11.4	450		F	#	0.012	
Chloride	mg/L	06/12/2013	N001	11.4 - 11.4	81		F	#	10	
Dissolved Organic Carbon	mg/L	06/12/2013	N001	11.4 - 11.4	5.6		F	#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	11.4 - 11.4	0.99		F	#		
Magnesium	mg/L	06/12/2013	N001	11.4 - 11.4	130		F	#	0.013	
Manganese	mg/L	06/12/2013	N001	11.4 - 11.4	1.1		F	#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	11.4 - 11.4	0.84		F	#	0.0016	
Oxidation Reduction Potential	mV	06/12/2013	N001	11.4 - 11.4	100.1		F	#		
pH	s.u.	06/12/2013	N001	11.4 - 11.4	6.42		F	#		
Potassium	mg/L	06/12/2013	N001	11.4 - 11.4	21		F	#	0.11	
Sodium	mg/L	06/12/2013	N001	11.4 - 11.4	550		F	#	0.33	
Specific Conductance	umhos /cm	06/12/2013	N001	11.4 - 11.4	4789		F	#		
Sulfate	mg/L	06/12/2013	N001	11.4 - 11.4	2600		F	#	25	
Temperature	C	06/12/2013	N001	11.4 - 11.4	9.1		F	#		
Turbidity	NTU	06/12/2013	N001	11.4 - 11.4	3.18		F	#		
Uranium	mg/L	06/12/2013	N001	11.4 - 11.4	0.8		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	14.75	-	14.75	186		F	#		
Calcium	mg/L	06/11/2013	N001	14.75	-	14.75	69		F	#	0.012	
Chloride	mg/L	06/11/2013	N001	14.75	-	14.75	12		F	#	1	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	14.75	-	14.75	1.6		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	14.75	-	14.75	0.67		F	#		
Magnesium	mg/L	06/11/2013	N001	14.75	-	14.75	16		F	#	0.013	
Manganese	mg/L	06/11/2013	N001	14.75	-	14.75	0.03		F	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	14.75	-	14.75	0.0021		F	#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	14.75	-	14.75	50.6		F	#		
pH	s.u.	06/11/2013	N001	14.75	-	14.75	6.83		F	#		
Potassium	mg/L	06/11/2013	N001	14.75	-	14.75	2		F	#	0.11	
Sodium	mg/L	06/11/2013	N001	14.75	-	14.75	45		F	#	0.0066	
Specific Conductance	umhos /cm	06/11/2013	N001	14.75	-	14.75	663		F	#		
Sulfate	mg/L	06/11/2013	N001	14.75	-	14.75	120		F	#	2.5	
Temperature	C	06/11/2013	N001	14.75	-	14.75	8.46		F	#		
Turbidity	NTU	06/11/2013	N001	14.75	-	14.75	2.57		F	#		
Uranium	mg/L	06/11/2013	N001	14.75	-	14.75	0.0036		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	10.03 - 10.03	273		F	#		
Calcium	mg/L	06/11/2013	N001	10.03 - 10.03	150		F	#	0.012	
Chloride	mg/L	06/11/2013	N001	10.03 - 10.03	47		F	#	2	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	10.03 - 10.03	4		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	10.03 - 10.03	1.78		F	#		
Magnesium	mg/L	06/11/2013	N001	10.03 - 10.03	33		F	#	0.013	
Manganese	mg/L	06/11/2013	N001	10.03 - 10.03	0.22		F	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	10.03 - 10.03	0.12		F	#	0.0016	
Oxidation Reduction Potential	mV	06/11/2013	N001	10.03 - 10.03	34.6		F	#		
pH	s.u.	06/11/2013	N001	10.03 - 10.03	6.68		F	#		
Potassium	mg/L	06/11/2013	N001	10.03 - 10.03	6.5		F	#	0.11	
Sodium	mg/L	06/11/2013	N001	10.03 - 10.03	150		F	#	0.0066	
Specific Conductance	umhos /cm	06/11/2013	N001	10.03 - 10.03	1493		F	#		
Sulfate	mg/L	06/11/2013	N001	10.03 - 10.03	470		F	#	5	
Temperature	C	06/11/2013	N001	10.03 - 10.03	11.1		F	#		
Turbidity	NTU	06/11/2013	N001	10.03 - 10.03	2.73		F	#		
Uranium	mg/L	06/11/2013	N001	10.03 - 10.03	0.26		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	47.1	-	47.1	190		F	#		
Calcium	mg/L	06/11/2013	N001	47.1	-	47.1	96		F	#	0.012	
Chloride	mg/L	06/11/2013	N001	47.1	-	47.1	50		F	#	4	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	47.1	-	47.1	3.1		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	47.1	-	47.1	1.55		F	#		
Magnesium	mg/L	06/11/2013	N001	47.1	-	47.1	6.5		F	#	0.013	
Manganese	mg/L	06/11/2013	N001	47.1	-	47.1	0.12		F	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	47.1	-	47.1	0.0094		F	#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	47.1	-	47.1	19.6		F	#		
pH	s.u.	06/11/2013	N001	47.1	-	47.1	7.24		F	#		
Potassium	mg/L	06/11/2013	N001	47.1	-	47.1	1.7		F	#	0.11	
Sodium	mg/L	06/11/2013	N001	47.1	-	47.1	290		F	#	0.066	
Specific Conductance	umhos /cm	06/11/2013	N001	47.1	-	47.1	1873		F	#		
Sulfate	mg/L	06/11/2013	N001	47.1	-	47.1	700		F	#	10	
Temperature	C	06/11/2013	N001	47.1	-	47.1	11.7		F	#		
Turbidity	NTU	06/11/2013	N001	47.1	-	47.1	2.77		F	#		
Uranium	mg/L	06/11/2013	N001	47.1	-	47.1	0.00008	B	F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/13/2013	N001	13.02	-	13.02	269		F	#		
Calcium	mg/L	06/13/2013	N001	13.02	-	13.02	350		F	#	0.012	
Chloride	mg/L	06/13/2013	N001	13.02	-	13.02	130		F	#	10	
Dissolved Organic Carbon	mg/L	06/13/2013	N001	13.02	-	13.02	8.9		F	#	1	
Dissolved Oxygen	mg/L	06/13/2013	N001	13.02	-	13.02	0.78		F	#		
Magnesium	mg/L	06/13/2013	N001	13.02	-	13.02	88		F	#	0.013	
Manganese	mg/L	06/13/2013	N001	13.02	-	13.02	0.35		F	#	0.00011	
Molybdenum	mg/L	06/13/2013	N001	13.02	-	13.02	0.055		F	#	0.0016	
Oxidation Reduction Potential	mV	06/13/2013	N001	13.02	-	13.02	103.6		F	#		
pH	s.u.	06/13/2013	N001	13.02	-	13.02	6.54		F	#		
Potassium	mg/L	06/13/2013	N001	13.02	-	13.02	20		F	#	0.11	
Sodium	mg/L	06/13/2013	N001	13.02	-	13.02	620		F	#	0.33	
Specific Conductance	umhos /cm	06/13/2013	N001	13.02	-	13.02	4538		F	#		
Sulfate	mg/L	06/13/2013	N001	13.02	-	13.02	2400		F	#	25	
Temperature	C	06/13/2013	N001	13.02	-	13.02	10.1		F	#		
Turbidity	NTU	06/13/2013	N001	13.02	-	13.02	4.72		F	#		
Uranium	mg/L	06/13/2013	N001	13.02	-	13.02	0.11		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/13/2013	N001	37.34	-	37.34	95		FQ	#		
Calcium	mg/L	06/13/2013	N001	37.34	-	37.34	82		FQ	#	0.012	
Chloride	mg/L	06/13/2013	N001	37.34	-	37.34	40		FQ	#	2	
Dissolved Organic Carbon	mg/L	06/13/2013	N001	37.34	-	37.34	2.2		FQ	#	1	
Dissolved Oxygen	mg/L	06/13/2013	N001	37.34	-	37.34	0.82		FQ	#		
Magnesium	mg/L	06/13/2013	N001	37.34	-	37.34	3.4		FQ	#	0.013	
Manganese	mg/L	06/13/2013	N001	37.34	-	37.34	0.17		FQ	#	0.00011	
Molybdenum	mg/L	06/13/2013	N001	37.34	-	37.34	0.012		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/13/2013	N001	37.34	-	37.34	58.3		FQ	#		
pH	s.u.	06/13/2013	N001	37.34	-	37.34	6.83		FQ	#		
Potassium	mg/L	06/13/2013	N001	37.34	-	37.34	1.6		FQ	#	0.11	
Sodium	mg/L	06/13/2013	N001	37.34	-	37.34	150		FQ	#	0.066	
Specific Conductance	umhos /cm	06/13/2013	N001	37.34	-	37.34	1205		FQ	#		
Sulfate	mg/L	06/13/2013	N001	37.34	-	37.34	450		FQ	#	5	
Temperature	C	06/13/2013	N001	37.34	-	37.34	11.06		FQ	#		
Turbidity	NTU	06/13/2013	N001	37.34	-	37.34	4.19		FQ	#		
Uranium	mg/L	06/13/2013	N001	37.34	-	37.34	0.00039		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	7.94	-	7.94	259		F	#		
Calcium	mg/L	06/11/2013	N001	7.94	-	7.94	88		F	#	0.012	
Chloride	mg/L	06/11/2013	N001	7.94	-	7.94	6.1		F	#	1	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	7.94	-	7.94	2		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	7.94	-	7.94	0.7		F	#		
Magnesium	mg/L	06/11/2013	N001	7.94	-	7.94	22		F	#	0.013	
Manganese	mg/L	06/11/2013	N001	7.94	-	7.94	0.00043	B	FJ	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	7.94	-	7.94	0.001		F	#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	7.94	-	7.94	47.3		F	#		
pH	s.u.	06/11/2013	N001	7.94	-	7.94	6.71		F	#		
Potassium	mg/L	06/11/2013	N001	7.94	-	7.94	3.1		F	#	0.11	
Sodium	mg/L	06/11/2013	N001	7.94	-	7.94	42		F	#	0.0066	
Specific Conductance	umhos /cm	06/11/2013	N001	7.94	-	7.94	723		F	#		
Sulfate	mg/L	06/11/2013	N001	7.94	-	7.94	150		F	#	2.5	
Temperature	C	06/11/2013	N001	7.94	-	7.94	9.49		F	#		
Turbidity	NTU	06/11/2013	N001	7.94	-	7.94	2.16		F	#		
Uranium	mg/L	06/11/2013	N001	7.94	-	7.94	0.0067		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	45.13 - 45.13	92		F	#		
Calcium	mg/L	06/11/2013	N001	45.13 - 45.13	8.8		F	#	0.012	
Chloride	mg/L	06/11/2013	N001	45.13 - 45.13	24		F	#	1	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	45.13 - 45.13	1.2		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	45.13 - 45.13	0.75		F	#		
Magnesium	mg/L	06/11/2013	N001	45.13 - 45.13	0.25	B	F	#	0.013	
Manganese	mg/L	06/11/2013	N001	45.13 - 45.13	0.0017	B	F	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	45.13 - 45.13	0.0025		F	#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	45.13 - 45.13	12.3		F	#		
pH	s.u.	06/11/2013	N001	45.13 - 45.13	8.23		F	#		
Potassium	mg/L	06/11/2013	N001	45.13 - 45.13	0.56	B	UF	#	0.11	
Sodium	mg/L	06/11/2013	N001	45.13 - 45.13	150		F	#	0.066	
Specific Conductance	umhos /cm	06/11/2013	N001	45.13 - 45.13	884		F	#		
Sulfate	mg/L	06/11/2013	N001	45.13 - 45.13	260		F	#	2.5	
Temperature	C	06/11/2013	N001	45.13 - 45.13	11.27		F	#		
Turbidity	NTU	06/11/2013	N001	45.13 - 45.13	1.04		F	#		
Uranium	mg/L	06/11/2013	N001	45.13 - 45.13	0.00009	B	F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/13/2013	N001	13.42	-	13.42	252		F	#		
Calcium	mg/L	06/13/2013	N001	13.42	-	13.42	330		F	#	0.012	
Chloride	mg/L	06/13/2013	N001	13.42	-	13.42	33		F	#	4	
Dissolved Organic Carbon	mg/L	06/13/2013	N001	13.42	-	13.42	2.4		F	#	1	
Dissolved Oxygen	mg/L	06/13/2013	N001	13.42	-	13.42	1.88		F	#		
Magnesium	mg/L	06/13/2013	N001	13.42	-	13.42	31		F	#	0.013	
Manganese	mg/L	06/13/2013	N001	13.42	-	13.42	0.0065		F	#	0.00011	
Molybdenum	mg/L	06/13/2013	N001	13.42	-	13.42	0.11		F	#	0.0016	
Oxidation Reduction Potential	mV	06/13/2013	N001	13.42	-	13.42	49.7		F	#		
pH	s.u.	06/13/2013	N001	13.42	-	13.42	6.43		F	#		
Potassium	mg/L	06/13/2013	N001	13.42	-	13.42	9.7		F	#	0.11	
Sodium	mg/L	06/13/2013	N001	13.42	-	13.42	120		F	#	0.0066	
Specific Conductance	umhos /cm	06/13/2013	N001	13.42	-	13.42	1845		F	#		
Sulfate	mg/L	06/13/2013	N001	13.42	-	13.42	760		F	#	10	
Temperature	C	06/13/2013	N001	13.42	-	13.42	11.79		F	#		
Turbidity	NTU	06/13/2013	N001	13.42	-	13.42	3.28		F	#		
Uranium	mg/L	06/13/2013	N001	13.42	-	13.42	0.53		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/13/2013	N001	44.67	-	44.67	275		F	#		
Calcium	mg/L	06/13/2013	N001	44.67	-	44.67	280		F	#	0.012	
Chloride	mg/L	06/13/2013	N001	44.67	-	44.67	56		F	#	10	
Dissolved Organic Carbon	mg/L	06/13/2013	N001	44.67	-	44.67	3.9		F	#	1	
Dissolved Oxygen	mg/L	06/13/2013	N001	44.67	-	44.67	0.66		F	#		
Magnesium	mg/L	06/13/2013	N001	44.67	-	44.67	9.4		F	#	0.013	
Manganese	mg/L	06/13/2013	N001	44.67	-	44.67	0.32		F	#	0.00011	
Molybdenum	mg/L	06/13/2013	N001	44.67	-	44.67	0.00032	U	F	#	0.00032	
Oxidation Reduction Potential	mV	06/13/2013	N001	44.67	-	44.67	-19		F	#		
pH	s.u.	06/13/2013	N001	44.67	-	44.67	6.74		F	#		
Potassium	mg/L	06/13/2013	N001	44.67	-	44.67	3		F	#	0.11	
Sodium	mg/L	06/13/2013	N001	44.67	-	44.67	490		F	#	0.33	
Specific Conductance	umhos /cm	06/13/2013	N001	44.67	-	44.67	3488		F	#		
Sulfate	mg/L	06/13/2013	N001	44.67	-	44.67	1600		F	#	25	
Temperature	C	06/13/2013	N001	44.67	-	44.67	12.84		F	#		
Turbidity	NTU	06/13/2013	N001	44.67	-	44.67	2.14		F	#		
Uranium	mg/L	06/13/2013	N001	44.67	-	44.67	0.000029	U	F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	11.2	-	11.2	226		F	#		
Calcium	mg/L	06/12/2013	N001	11.2	-	11.2	76		F	#	0.012	
Chloride	mg/L	06/12/2013	N001	11.2	-	11.2	6.4		F	#	0.4	
Dissolved Organic Carbon	mg/L	06/12/2013	N001	11.2	-	11.2	4.7		F	#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	11.2	-	11.2	3.8		F	#		
Magnesium	mg/L	06/12/2013	N001	11.2	-	11.2	19		F	#	0.013	
Manganese	mg/L	06/12/2013	N001	11.2	-	11.2	0.0025	B	F	#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	11.2	-	11.2	0.0027		F	#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	11.2	-	11.2	39.1		F	#		
pH	s.u.	06/12/2013	N001	11.2	-	11.2	6.7		F	#		
Potassium	mg/L	06/12/2013	N001	11.2	-	11.2	7		F	#	0.11	
Sodium	mg/L	06/12/2013	N001	11.2	-	11.2	24		F	#	0.0066	
Specific Conductance	umhos /cm	06/12/2013	N001	11.2	-	11.2	574		F	#		
Sulfate	mg/L	06/12/2013	N001	11.2	-	11.2	52		F	#	1	
Temperature	C	06/12/2013	N001	11.2	-	11.2	13.66		F	#		
Turbidity	NTU	06/12/2013	N001	11.2	-	11.2	2.47		F	#		
Uranium	mg/L	06/12/2013	N001	11.2	-	11.2	0.0041		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	37.2	-	37.2	308		FQ	#		
Calcium	mg/L	06/12/2013	N001	37.2	-	37.2	94		FQ	#	0.012	
Chloride	mg/L	06/12/2013	N001	37.2	-	37.2	7.6		FQ	#	1	
Dissolved Organic Carbon	mg/L	06/12/2013	N001	37.2	-	37.2	3		FQ	#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	37.2	-	37.2	0.8		FQ	#		
Magnesium	mg/L	06/12/2013	N001	37.2	-	37.2	16		FQ	#	0.013	
Manganese	mg/L	06/12/2013	N001	37.2	-	37.2	0.12		FQ	#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	37.2	-	37.2	0.0044		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	37.2	-	37.2	23.2		FQ	#		
pH	s.u.	06/12/2013	N001	37.2	-	37.2	6.79		FQ	#		
Potassium	mg/L	06/12/2013	N001	37.2	-	37.2	2.9		FQ	#	0.11	
Sodium	mg/L	06/12/2013	N001	37.2	-	37.2	100		FQ	#	0.0066	
Specific Conductance	umhos /cm	06/12/2013	N001	37.2	-	37.2	911		FQ	#		
Sulfate	mg/L	06/12/2013	N001	37.2	-	37.2	140		FQ	#	2.5	
Temperature	C	06/12/2013	N001	37.2	-	37.2	14.3		FQ	#		
Turbidity	NTU	06/12/2013	N001	37.2	-	37.2	8.82		FQ	#		
Uranium	mg/L	06/12/2013	N001	37.2	-	37.2	0.0064		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
Location: 0732 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As $CaCO_3$)	mg/L	06/11/2013	N001	40.8	-	40.8	273		F	#		
Calcium	mg/L	06/11/2013	N001	40.8	-	40.8	520		F	#	0.12	
Chloride	mg/L	06/11/2013	N001	40.8	-	40.8	47		F	#	10	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	40.8	-	40.8	2.7		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	40.8	-	40.8	1.56		F	#		
Magnesium	mg/L	06/11/2013	N001	40.8	-	40.8	32		F	#	0.013	
Manganese	mg/L	06/11/2013	N001	40.8	-	40.8	0.53		F	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	40.8	-	40.8	0.028		F	#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	40.8	-	40.8	35.4		F	#		
pH	s.u.	06/11/2013	N001	40.8	-	40.8	6.63		F	#		
Potassium	mg/L	06/11/2013	N001	40.8	-	40.8	3.1		F	#	0.11	
Sodium	mg/L	06/11/2013	N001	40.8	-	40.8	250		F	#	0.066	
Specific Conductance	umhos /cm	06/11/2013	N001	40.8	-	40.8	3077		F	#		
Sulfate	mg/L	06/11/2013	N001	40.8	-	40.8	1600		F	#	25	
Temperature	C	06/11/2013	N001	40.8	-	40.8	12.07		F	#		
Turbidity	NTU	06/11/2013	N001	40.8	-	40.8	1.26		F	#		
Uranium	mg/L	06/11/2013	N001	40.8	-	40.8	0.0059		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
Location: 0736 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As $CaCO_3$)	mg/L	06/11/2013	N001	31.64 - 31.64	341		F	#		
Calcium	mg/L	06/11/2013	N001	31.64 - 31.64	310		F	#	0.012	
Chloride	mg/L	06/11/2013	N001	31.64 - 31.64	120		F	#	4	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	31.64 - 31.64	7		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	31.64 - 31.64	1.31		F	#		
Magnesium	mg/L	06/11/2013	N001	31.64 - 31.64	52		F	#	0.013	
Manganese	mg/L	06/11/2013	N001	31.64 - 31.64	0.32		F	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	31.64 - 31.64	0.0074		F	#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	31.64 - 31.64	5.5		F	#		
pH	s.u.	06/11/2013	N001	31.64 - 31.64	6.73		F	#		
Potassium	mg/L	06/11/2013	N001	31.64 - 31.64	6.6		F	#	0.11	
Sodium	mg/L	06/11/2013	N001	31.64 - 31.64	190		F	#	0.066	
Specific Conductance	umhos /cm	06/11/2013	N001	31.64 - 31.64	2326		F	#		
Sulfate	mg/L	06/11/2013	N001	31.64 - 31.64	890		F	#	10	
Temperature	C	06/11/2013	N001	31.64 - 31.64	11.51		F	#		
Turbidity	NTU	06/11/2013	N001	31.64 - 31.64	2.53		F	#		
Uranium	mg/L	06/11/2013	N001	31.64 - 31.64	0.016		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	7.04 - 7.04	175		F	#		
Calcium	mg/L	06/11/2013	N001	7.04 - 7.04	360		F	#	0.012	
Chloride	mg/L	06/11/2013	N001	7.04 - 7.04	19		F	#	2	
Dissolved Organic Carbon	mg/L	06/11/2013	N001	7.04 - 7.04	1.5		F	#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	7.04 - 7.04	1.55		F	#		
Magnesium	mg/L	06/11/2013	N001	7.04 - 7.04	13		F	#	0.013	
Manganese	mg/L	06/11/2013	N001	7.04 - 7.04	0.94		F	#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	7.04 - 7.04	0.0096		F	#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	7.04 - 7.04	25.8		F	#		
pH	s.u.	06/11/2013	N001	7.04 - 7.04	7.16		F	#		
Potassium	mg/L	06/11/2013	N001	7.04 - 7.04	11		F	#	0.11	
Sodium	mg/L	06/11/2013	N001	7.04 - 7.04	470		F	#	0.33	
Specific Conductance	umhos /cm	06/11/2013	N001	7.04 - 7.04	3549		F	#		
Sulfate	mg/L	06/11/2013	N001	7.04 - 7.04	1900		F	#	25	
Temperature	C	06/11/2013	N001	7.04 - 7.04	12.77		F	#		
Turbidity	NTU	06/11/2013	N001	7.04 - 7.04	1.32		F	#		
Uranium	mg/L	06/11/2013	N001	7.04 - 7.04	0.0075		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	13.51 - 13.51	400		F	#		
Calcium	mg/L	06/12/2013	N001	13.51 - 13.51	280		F	#	0.012	
Chloride	mg/L	06/12/2013	N001	13.51 - 13.51	53		F	#	10	
Dissolved Organic Carbon	mg/L	06/12/2013	N001	13.51 - 13.51	11		F	#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	13.51 - 13.51	0.62		F	#		
Magnesium	mg/L	06/12/2013	N001	13.51 - 13.51	70		F	#	0.013	
Manganese	mg/L	06/12/2013	N001	13.51 - 13.51	0.17		F	#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	13.51 - 13.51	0.017		F	#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	13.51 - 13.51	48.3		F	#		
pH	s.u.	06/12/2013	N001	13.51 - 13.51	6.72		F	#		
Potassium	mg/L	06/12/2013	N001	13.51 - 13.51	11		F	#	0.11	
Sodium	mg/L	06/12/2013	N001	13.51 - 13.51	410		F	#	0.33	
Specific Conductance	umhos /cm	06/12/2013	N001	13.51 - 13.51	3344		F	#		
Sulfate	mg/L	06/12/2013	N001	13.51 - 13.51	1500		F	#	25	
Temperature	C	06/12/2013	N001	13.51 - 13.51	11.48		F	#		
Turbidity	NTU	06/12/2013	N001	13.51 - 13.51	2.15		F	#		
Uranium	mg/L	06/12/2013	N001	13.51 - 13.51	0.042		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	6.2	-	18.2	477		F	#		
Calcium	mg/L	06/12/2013	N001	6.2	-	18.2	400		F	#	0.012	
Calcium	mg/L	06/12/2013	N002	6.2	-	18.2	410		F	#	0.012	
Chloride	mg/L	06/12/2013	N001	6.2	-	18.2	250		F	#	20	
Chloride	mg/L	06/12/2013	N002	6.2	-	18.2	250		F	#	20	
Dissolved Organic Carbon	mg/L	06/12/2013	N001	6.2	-	18.2	17		F	#	2	
Dissolved Organic Carbon	mg/L	06/12/2013	N002	6.2	-	18.2	15		F	#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	6.2	-	18.2	1.6		F	#		
Magnesium	mg/L	06/12/2013	N001	6.2	-	18.2	240		F	#	0.013	
Magnesium	mg/L	06/12/2013	N002	6.2	-	18.2	240		F	#	0.013	
Manganese	mg/L	06/12/2013	N001	6.2	-	18.2	1		F	#	0.00011	
Manganese	mg/L	06/12/2013	N002	6.2	-	18.2	1		F	#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	6.2	-	18.2	0.52		F	#	0.0032	
Molybdenum	mg/L	06/12/2013	N002	6.2	-	18.2	0.56		F	#	0.0064	
Oxidation Reduction Potential	mV	06/12/2013	N001	6.2	-	18.2	68.1		F	#		
pH	s.u.	06/12/2013	N001	6.2	-	18.2	6.59		F	#		
Potassium	mg/L	06/12/2013	N001	6.2	-	18.2	28		F	#	0.11	
Potassium	mg/L	06/12/2013	N002	6.2	-	18.2	28		F	#	0.11	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
Location: 0789 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sodium	mg/L	06/12/2013	N001	6.2	-	18.2	1400		F	#	0.33	
Sodium	mg/L	06/12/2013	N002	6.2	-	18.2	1300		F	#	0.33	
Specific Conductance	umhos /cm	06/12/2013	N001	6.2	-	18.2	8288		F	#		
Sulfate	mg/L	06/12/2013	N001	6.2	-	18.2	4600		F	#	50	
Sulfate	mg/L	06/12/2013	N002	6.2	-	18.2	4700		F	#	50	
Temperature	C	06/12/2013	N001	6.2	-	18.2	9.29		F	#		
Turbidity	NTU	06/12/2013	N001	6.2	-	18.2	0.91		F	#		
Uranium	mg/L	06/12/2013	N001	6.2	-	18.2	1.7		F	#	0.00029	
Uranium	mg/L	06/12/2013	N002	6.2	-	18.2	1.8		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/13/2013	N001	12.54 - 12.54	253		F	#		
Calcium	mg/L	06/13/2013	N001	12.54 - 12.54	94		F	#	0.012	
Chloride	mg/L	06/13/2013	N001	12.54 - 12.54	9.4		F	#	1	
Dissolved Organic Carbon	mg/L	06/13/2013	N001	12.54 - 12.54	4.6		F	#	1	
Dissolved Oxygen	mg/L	06/13/2013	N001	12.54 - 12.54	3.97		F	#		
Magnesium	mg/L	06/13/2013	N001	12.54 - 12.54	24		F	#	0.013	
Manganese	mg/L	06/13/2013	N001	12.54 - 12.54	0.0044	B	F	#	0.00011	
Molybdenum	mg/L	06/13/2013	N001	12.54 - 12.54	0.0036		F	#	0.00032	
Oxidation Reduction Potential	mV	06/13/2013	N001	12.54 - 12.54	36.9		F	#		
pH	s.u.	06/13/2013	N001	12.54 - 12.54	6.7		F	#		
Potassium	mg/L	06/13/2013	N001	12.54 - 12.54	6.6		F	#	0.11	
Sodium	mg/L	06/13/2013	N001	12.54 - 12.54	55		F	#	0.0066	
Specific Conductance	umhos /cm	06/13/2013	N001	12.54 - 12.54	822		F	#		
Sulfate	mg/L	06/13/2013	N001	12.54 - 12.54	140		F	#	2.5	
Temperature	C	06/13/2013	N001	12.54 - 12.54	13.07		F	#		
Turbidity	NTU	06/13/2013	N001	12.54 - 12.54	9.75		F	#		
Uranium	mg/L	06/13/2013	N001	12.54 - 12.54	0.012		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	9.21	-	9.21	226		F	#		
Calcium	mg/L	06/12/2013	N001	9.21	-	9.21	340		F	#	0.012	
Chloride	mg/L	06/12/2013	N001	9.21	-	9.21	45		F	#	10	
Dissolved Organic Carbon	mg/L	06/12/2013	N001	9.21	-	9.21	8.9		F	#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	9.21	-	9.21	0.6		F	#		
Magnesium	mg/L	06/12/2013	N001	9.21	-	9.21	87		F	#	0.013	
Manganese	mg/L	06/12/2013	N001	9.21	-	9.21	2.3		F	#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	9.21	-	9.21	0.021		F	#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	9.21	-	9.21	49.5		F	#		
pH	s.u.	06/12/2013	N001	9.21	-	9.21	6.65		F	#		
Potassium	mg/L	06/12/2013	N001	9.21	-	9.21	12		F	#	0.11	
Sodium	mg/L	06/12/2013	N001	9.21	-	9.21	400		F	#	0.066	
Specific Conductance	umhos /cm	06/12/2013	N001	9.21	-	9.21	3305		F	#		
Sulfate	mg/L	06/12/2013	N001	9.21	-	9.21	1600		F	#	25	
Temperature	C	06/12/2013	N001	9.21	-	9.21	10.3		F	#		
Turbidity	NTU	06/12/2013	N001	9.21	-	9.21	2.5		F	#		
Uranium	mg/L	06/12/2013	N001	9.21	-	9.21	0.043		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	-	158			#		
Calcium	mg/L	06/11/2013	N001	-	3.8			#	0.012	
Chloride	mg/L	06/11/2013	N001	-	13			#	1	
Dissolved Oxygen	mg/L	06/11/2013	N001	-	1.86			#		
Magnesium	mg/L	06/11/2013	N001	-	0.24	B	U	#	0.013	
Manganese	mg/L	06/11/2013	N001	-	0.0022	B		#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	-	0.003			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	-	56.1			#		
pH	s.u.	06/11/2013	N001	-	8.24			#		
Potassium	mg/L	06/11/2013	N001	-	0.72	B	U	#	0.11	
Sodium	mg/L	06/11/2013	N001	-	140			#	0.066	
Specific Conductance	umhos /cm	06/11/2013	N001	-	773			#		
Sulfate	mg/L	06/11/2013	N001	-	200			#	2.5	
Temperature	C	06/11/2013	N001	-	15.49			#		
Turbidity	NTU	06/11/2013	N001	-	2.39			#		
Uranium	mg/L	06/11/2013	N001	-	0.00011			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	-	178			#		
Calcium	mg/L	06/12/2013	N001	-	82			#	0.012	
Chloride	mg/L	06/12/2013	N001	-	19			#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	-	1.43			#		
Magnesium	mg/L	06/12/2013	N001	-	14			#	0.013	
Manganese	mg/L	06/12/2013	N001	-	0.097			#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	-	0.0032			#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	-	24.9			#		
pH	s.u.	06/12/2013	N001	-	6.94			#		
Potassium	mg/L	06/12/2013	N001	-	3.3			#	0.11	
Sodium	mg/L	06/12/2013	N001	-	70			#	0.0066	
Specific Conductance	umhos /cm	06/12/2013	N001	-	811			#		
Sulfate	mg/L	06/12/2013	N001	-	190			#	2.5	
Temperature	C	06/12/2013	N001	-	20.91			#		
Turbidity	NTU	06/12/2013	N001	-	4.35			#		
Uranium	mg/L	06/12/2013	N001	-	0.0028			#	0.000029	

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

REPORT DATE: 08/26/2013

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	06/12/2013	N001	-	183			#		
Calcium	mg/L	06/12/2013	N001	-	55			#	0.012	
Chloride	mg/L	06/12/2013	N001	-	16			#	1	
Dissolved Oxygen	mg/L	06/12/2013	N001	-	2.29			#		
Magnesium	mg/L	06/12/2013	N001	-	5.8			#	0.013	
Manganese	mg/L	06/12/2013	N001	-	0.048			#	0.00011	
Molybdenum	mg/L	06/12/2013	N001	-	0.0023			#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	-	87			#		
pH	s.u.	06/12/2013	N001	-	7.37			#		
Potassium	mg/L	06/12/2013	N001	-	0.85	B	U	#	0.11	
Sodium	mg/L	06/12/2013	N001	-	80			#	0.0066	
Specific Conductance	umhos /cm	06/12/2013	N001	-	669			#		
Sulfate	mg/L	06/12/2013	N001	-	160			#	2.5	
Temperature	C	06/12/2013	N001	-	17.16			#		

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

REPORT DATE: 08/26/2013

Location: 0842 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Turbidity	NTU	06/12/2013	N001	-	4.37			#		
Uranium	mg/L	06/12/2013	N001	-	0.00031			#	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: 08/26/2013
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 CaCO3)	mg/L	06/12/2013	0001	224			#		
Calcium	mg/L	06/12/2013	0001	110			#	0.012	
Calcium	mg/L	06/12/2013	0002	110			#	0.012	
Chloride	mg/L	06/12/2013	0001	26			#	4	
Chloride	mg/L	06/12/2013	0002	27			#	4	
Dissolved Oxygen	mg/L	06/12/2013	N001	5.18			#		
Magnesium	mg/L	06/12/2013	0001	51			#	0.013	
Magnesium	mg/L	06/12/2013	0002	50			#	0.013	
Manganese	mg/L	06/12/2013	0001	0.58			#	0.00011	
Manganese	mg/L	06/12/2013	0002	0.57			#	0.00011	
Molybdenum	mg/L	06/12/2013	0001	0.015		J	#	0.0016	
Molybdenum	mg/L	06/12/2013	0002	0.053		J	#	0.0032	
Oxidation Reduction Potential	mV	06/12/2013	N001	36.2			#		
pH	s.u.	06/12/2013	N001	6.68			#		
Potassium	mg/L	06/12/2013	0001	5.9	E	J	#	0.11	
Potassium	mg/L	06/12/2013	0002	5.7			#	0.11	
Sodium	mg/L	06/12/2013	0001	160			#	0.066	
Sodium	mg/L	06/12/2013	0002	150			#	0.066	

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

REPORT DATE: 08/26/2013

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
Specific Conductance	umhos/cm	06/12/2013	N001	1578			#		
Sulfate	mg/L	06/12/2013	0001	630			#	10	
Sulfate	mg/L	06/12/2013	0002	660			#	10	
Temperature	C	06/12/2013	N001	16.2			#		
Turbidity	NTU	06/12/2013	N001	171			#		
Uranium	mg/L	06/12/2013	0001	0.13			#	0.00015	
Uranium	mg/L	06/12/2013	0002	0.13			#	0.00029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	0001	185			#		
Calcium	mg/L	06/11/2013	0001	66			#	0.012	
Chloride	mg/L	06/11/2013	0001	14			#	2	
Dissolved Oxygen	mg/L	06/11/2013	N001	7.29			#		
Magnesium	mg/L	06/11/2013	0001	0.55	B	U	#	0.013	
Manganese	mg/L	06/11/2013	0001	0.0091			#	0.00011	
Molybdenum	mg/L	06/11/2013	0001	0.0047			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	44.5			#		
pH	s.u.	06/11/2013	N001	8.11			#		
Potassium	mg/L	06/11/2013	0001	3			#	0.11	
Sodium	mg/L	06/11/2013	0001	210			#	0.066	
Specific Conductance	umhos/cm	06/11/2013	N001	1391			#		
Sulfate	mg/L	06/11/2013	0001	550			#	5	
Temperature	C	06/11/2013	N001	24.6			#		
Turbidity	NTU	06/11/2013	N001	10.2			#		
Uranium	mg/L	06/11/2013	0001	0.00049			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	0001	57			#		
Calcium	mg/L	06/11/2013	0001	20			#	0.012	
Chloride	mg/L	06/11/2013	0001	1.8			#	0.2	
Dissolved Oxygen	mg/L	06/11/2013	N001	7.37			#		
Magnesium	mg/L	06/11/2013	0001	5.6			#	0.013	
Manganese	mg/L	06/11/2013	0001	0.01			#	0.00011	
Molybdenum	mg/L	06/11/2013	0001	0.00052	B		#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	-10			#		
pH	s.u.	06/11/2013	N001	7.75			#		
Potassium	mg/L	06/11/2013	0001	1			#	0.11	
Sodium	mg/L	06/11/2013	0001	7.5			#	0.0066	
Specific Conductance	umhos/cm	06/11/2013	N001	280			#		
Sulfate	mg/L	06/11/2013	0001	34			#	0.5	
Temperature	C	06/11/2013	N001	22.63			#		
Turbidity	NTU	06/11/2013	N001	86			#		
Uranium	mg/L	06/11/2013	0001	0.0012			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	0001	61			#		
Calcium	mg/L	06/11/2013	0001	20			#	0.012	
Chloride	mg/L	06/11/2013	0001	1.7			#	0.2	
Dissolved Oxygen	mg/L	06/11/2013	N001	6.67			#		
Magnesium	mg/L	06/11/2013	0001	5.4			#	0.013	
Manganese	mg/L	06/11/2013	0001	0.0037	B	J	#	0.00011	
Molybdenum	mg/L	06/11/2013	0001	0.00044	B		#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	156			#		
pH	s.u.	06/11/2013	N001	7			#		
Potassium	mg/L	06/11/2013	0001	1			#	0.11	
Sodium	mg/L	06/11/2013	0001	6.1			#	0.0066	
Specific Conductance	umhos/cm	06/11/2013	N001	248			#		
Sulfate	mg/L	06/11/2013	0001	31			#	0.5	
Temperature	C	06/11/2013	N001	16.48			#		
Turbidity	NTU	06/11/2013	N001	91.9			#		
Uranium	mg/L	06/11/2013	0001	0.00088			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	0001	268			#		
Calcium	mg/L	06/11/2013	0001	25			#	0.012	
Chloride	mg/L	06/11/2013	0001	38			#	4	
Dissolved Oxygen	mg/L	06/11/2013	N001	7.65			#		
Magnesium	mg/L	06/11/2013	0001	100			#	0.013	
Manganese	mg/L	06/11/2013	0001	0.023			#	0.00011	
Molybdenum	mg/L	06/11/2013	0001	0.0015			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	68.7			#		
pH	s.u.	06/11/2013	N001	8.37			#		
Potassium	mg/L	06/11/2013	0001	20			#	0.11	
Sodium	mg/L	06/11/2013	0001	190			#	0.066	
Specific Conductance	umhos/cm	06/11/2013	N001	1582			#		
Sulfate	mg/L	06/11/2013	0001	460			#	10	
Temperature	C	06/11/2013	N001	20.3			#		
Turbidity	NTU	06/11/2013	N001	12.6			#		
Uranium	mg/L	06/11/2013	0001	0.0066			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/12/2013	N001	48			#		
Calcium	mg/L	06/12/2013	0001	21			#	0.012	
Chloride	mg/L	06/12/2013	0001	1.7			#	0.2	
Dissolved Oxygen	mg/L	06/12/2013	N001	7.23			#		
Magnesium	mg/L	06/12/2013	0001	5.4			#	0.013	
Manganese	mg/L	06/12/2013	0001	0.0092			#	0.00011	
Molybdenum	mg/L	06/12/2013	0001	0.00044	B		#	0.00032	
Oxidation Reduction Potential	mV	06/12/2013	N001	39.8			#		
pH	s.u.	06/12/2013	N001	7.33			#		
Potassium	mg/L	06/12/2013	0001	1			#	0.11	
Sodium	mg/L	06/12/2013	0001	6.3			#	0.0066	
Specific Conductance	umhos/cm	06/12/2013	N001	184			#		
Sulfate	mg/L	06/12/2013	0001	33			#	0.5	
Temperature	C	06/12/2013	N001	16.06			#		
Turbidity	NTU	06/12/2013	N001	138			#		
Uranium	mg/L	06/12/2013	0001	0.00095			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/13/2013	N001	54			#		
Calcium	mg/L	06/13/2013	0001	22			#	0.012	
Chloride	mg/L	06/13/2013	0001	1.8			#	0.2	
Dissolved Oxygen	mg/L	06/13/2013	N001	7.71			#		
Magnesium	mg/L	06/13/2013	0001	6.1			#	0.013	
Manganese	mg/L	06/13/2013	0001	0.11			#	0.00011	
Molybdenum	mg/L	06/13/2013	0001	0.00051	B		#	0.00032	
Oxidation Reduction Potential	mV	06/13/2013	N001	51.4			#		
pH	s.u.	06/13/2013	N001	7.47			#		
Potassium	mg/L	06/13/2013	0001	1.1			#	0.11	
Sodium	mg/L	06/13/2013	0001	7.5			#	0.0066	
Specific Conductance	umhos/cm	06/13/2013	N001	461			#		
Sulfate	mg/L	06/13/2013	0001	37			#	0.5	
Temperature	C	06/13/2013	N001	16.27			#		
Turbidity	NTU	06/13/2013	N001	298			#		
Uranium	mg/L	06/13/2013	0001	0.001			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013
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	06/11/2013	N001	117			#		
Calcium	mg/L	06/11/2013	N001	40			#	0.012	
Chloride	mg/L	06/11/2013	N001	3.8			#	0.2	
Dissolved Oxygen	mg/L	06/11/2013	N001	6.88			#		
Magnesium	mg/L	06/11/2013	N001	9			#	0.013	
Manganese	mg/L	06/11/2013	N001	0.009			#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	0.0016			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	2.2			#		
pH	s.u.	06/11/2013	N001	7.81			#		
Potassium	mg/L	06/11/2013	N001	4.1			#	0.11	
Radium-226	pCi/L	06/11/2013	N001	0.35	U		#	0.35	0.263
Radium-228	pCi/L	06/11/2013	N001	0.32	U		#	0.32	0.205
Sodium	mg/L	06/11/2013	N001	33			#	0.0066	
Specific Conductance	umhos/cm	06/11/2013	N001	401			#		
Sulfate	mg/L	06/11/2013	N001	82			#	0.5	
Temperature	C	06/11/2013	N001	22.13			#		
Turbidity	NTU	06/11/2013	N001	8.65			#		
Uranium	mg/L	06/11/2013	N001	0.0016			#	0.000029	

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

REPORT DATE: 08/26/2013

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	06/11/2013	N001	89			#		
Calcium	mg/L	06/11/2013	N001	170			#	0.012	
Chloride	mg/L	06/11/2013	N001	220			#	10	
Dissolved Oxygen	mg/L	06/11/2013	N001	7.59			#		
Magnesium	mg/L	06/11/2013	N001	91			#	0.013	
Manganese	mg/L	06/11/2013	N001	0.28			#	0.00011	
Molybdenum	mg/L	06/11/2013	N001	0.0016			#	0.00032	
Oxidation Reduction Potential	mV	06/11/2013	N001	44.6			#		
pH	s.u.	06/11/2013	N001	7.85			#		
Potassium	mg/L	06/11/2013	N001	15			#	0.11	
Sodium	mg/L	06/11/2013	N001	300			#	0.066	
Specific Conductance	umhos/cm	06/11/2013	N001	2732			#		
Sulfate	mg/L	06/11/2013	N001	1100			#	25	
Temperature	C	06/11/2013	N001	25			#		

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

REPORT DATE: 08/26/2013

Location: 0823 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Turbidity	NTU	06/11/2013	N001	8.63			#		
Uranium	mg/L	06/11/2013	N001	0.0062			#	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.

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Equipment Blank Data

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BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)
RIN: 13065379
Report Date: 08/26/2013

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Calcium	RVT01	0999	06/11/2013	N001	mg/L	0.26	B	U	0.012		E
Chloride	RVT01	0999	06/11/2013	N001	mg/L	0.2	U		0.2		E
Magnesium	RVT01	0999	06/11/2013	N001	mg/L	0.18	B	U	0.013		E
Manganese	RVT01	0999	06/11/2013	N001	mg/L	0.0014	B		0.00011		E
Molybdenum	RVT01	0999	06/11/2013	N001	mg/L	0.00032	U		0.00032		E
Potassium	RVT01	0999	06/11/2013	N001	mg/L	0.22	B		0.11		E
Sodium	RVT01	0999	06/11/2013	N001	mg/L	0.42	B	U	0.0066		E
Sulfate	RVT01	0999	06/11/2013	N001	mg/L	0.5	U		0.5		E
Uranium	RVT01	0999	06/11/2013	N001	mg/L	0.000029	U		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: 08/26/2013

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	06/11/2013	13:45:00	10.51	4936.07
0110	O	4950.19	06/11/2013	13:48:00	13.26	4936.93
0111	O	4946.87	06/11/2013	13:38:00	9.97	4936.9
0700	U	4951.38	06/11/2013	13:53:00	6.5	4944.88
0702	D	4931	06/12/2013	09:29:00	5.91	4925.09
0705	D	4930.8	06/12/2013	10:35:38	5.91	4924.89
0707	D	4931	06/12/2013	09:20:13	5.35	4925.65
0709	D	4930.7	06/11/2013	16:18:00	5.02	4925.68
0710	U	4947.9	06/11/2013	09:00:30	5.84	4942.06
0716	O	4939.12	06/11/2013	12:25:47	9.18	4929.94
0717	O	4938.8	06/11/2013	12:55:57	8.79	4930.01
0718	D	4937.6	06/13/2013	08:00:50	8.09	4929.51
0719	D	4937.55	06/13/2013	07:30:31	7.73	4929.82
0720	C	4940.46	06/11/2013	17:10:41	5.29	4935.17
0721	C	4940.47	06/11/2013	17:30:02	8.02	4932.45
0722R		4937.06	06/13/2013	10:15:25	9.52	4927.54
0723	D	4936.01	06/13/2013	10:35:11	8.27	4927.74
0724	U	4941.36	06/11/2013	11:55:00	6.91	4934.45
0725	U	4941.66	06/11/2013	13:25:00	7.11	4934.55
0726	U	4942	06/11/2013	13:27:00	6.95	4935.05
0727	U	4951.69	06/11/2013	13:29:00	9.92	4941.77
0728	U	4946.01	06/11/2013	11:53:00	8.28	4937.73
0729	D	4932.75	06/12/2013	18:15:50	2.82	4929.93
0730	D	4933.08	06/12/2013	17:50:41	4.38	4928.7
0732	U	4945.07	06/11/2013	10:50:46	8.32	4936.75
0733	U	4946.76	06/11/2013	16:17:00	7.09	4939.67
0734	U	4946.08	06/11/2013	15:52:00	8.18	4937.9
0736	U	4946	06/11/2013	14:45:54	7.75	4938.25

STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 08/26/2013

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0784	U	4945.45	06/11/2013	10:20:48	6.89	4938.56
0788	C	4935.09	06/12/2013	14:45:34	8.41	4926.68
0789	D	4933.66	06/12/2013	11:15:49	7.98	4925.68
0824		4928.27	06/13/2013	12:25:42	5.24	4923.03
0826		4936.98	06/12/2013	13:25:10	7.42	4929.56

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

Time-Concentration Graphs

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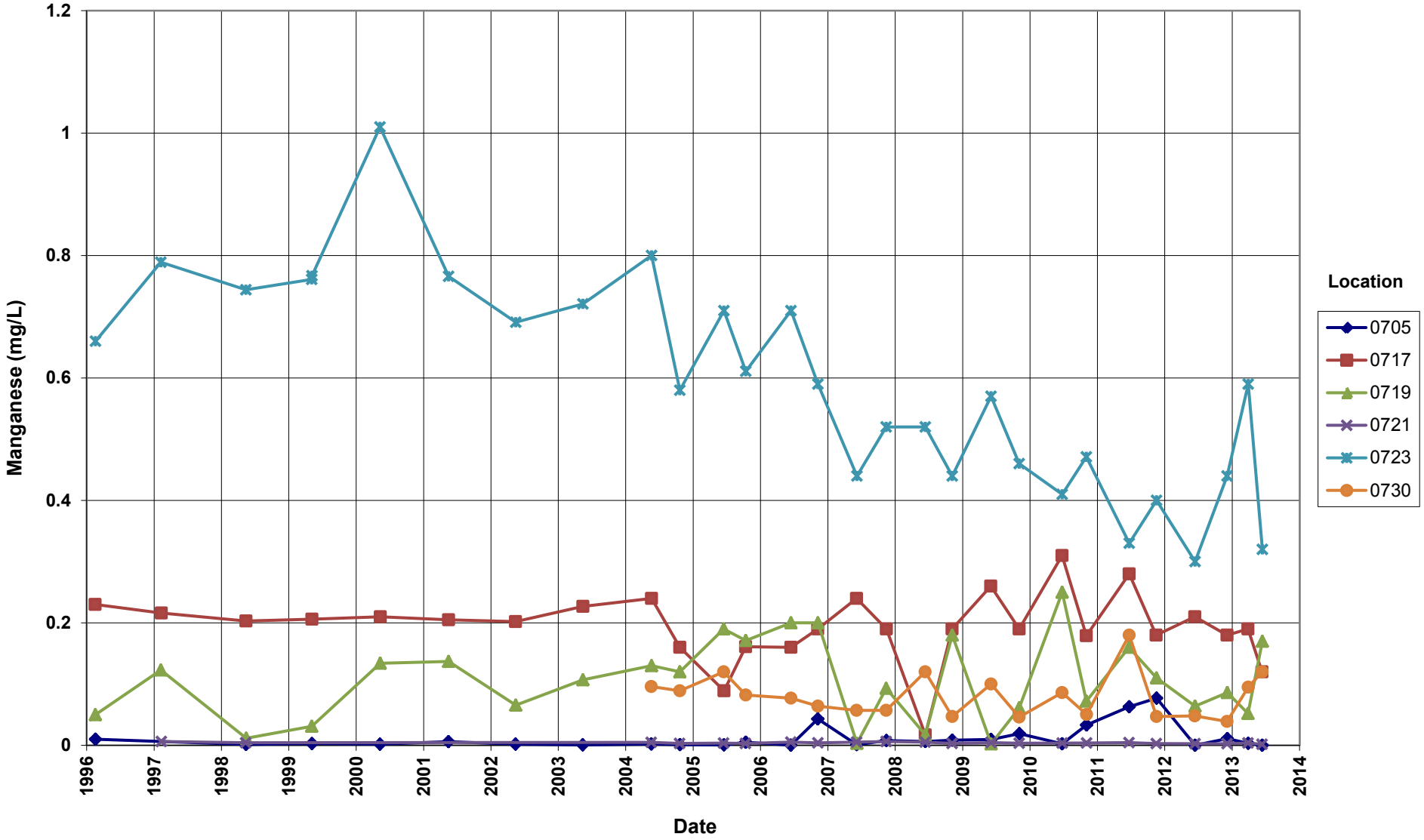
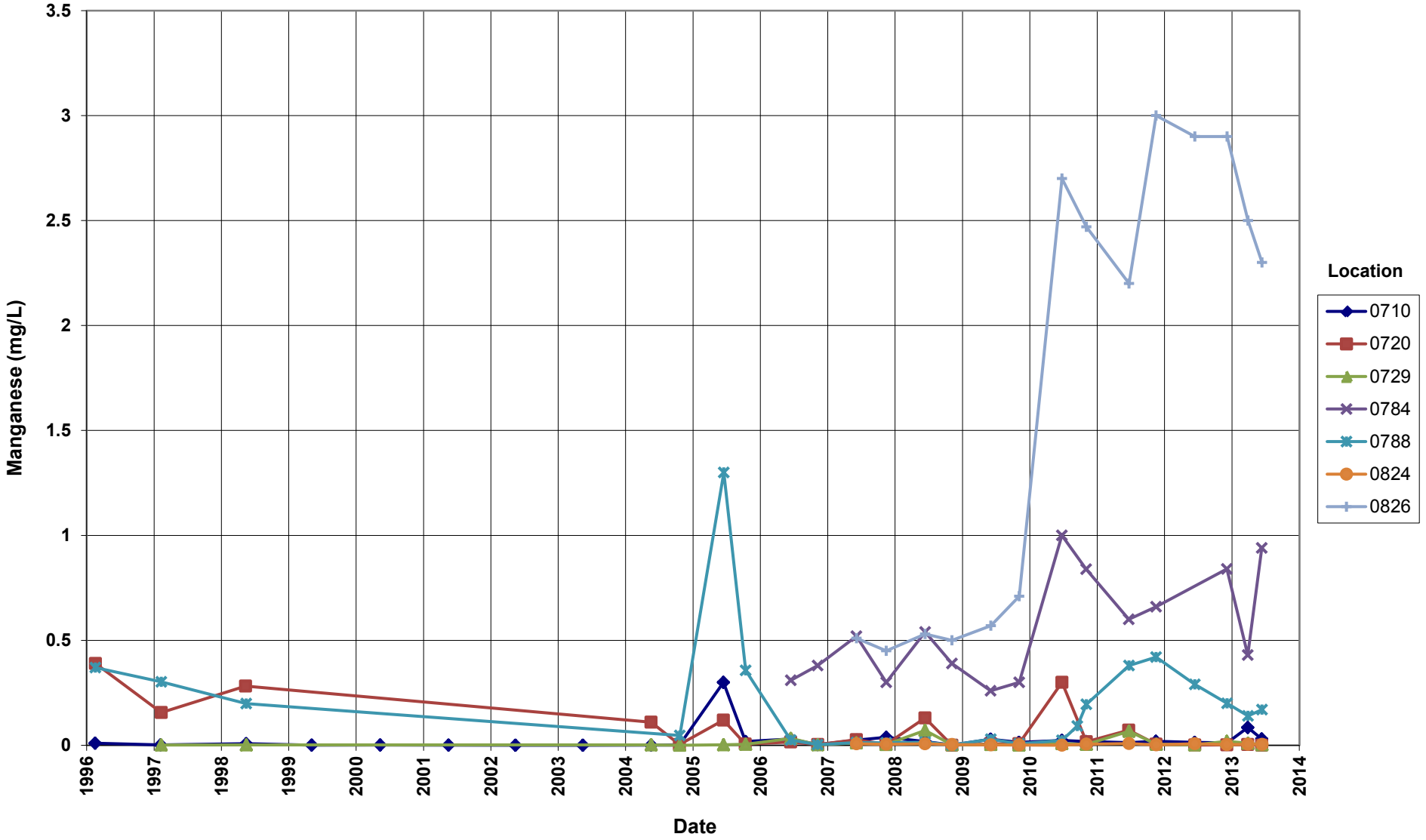
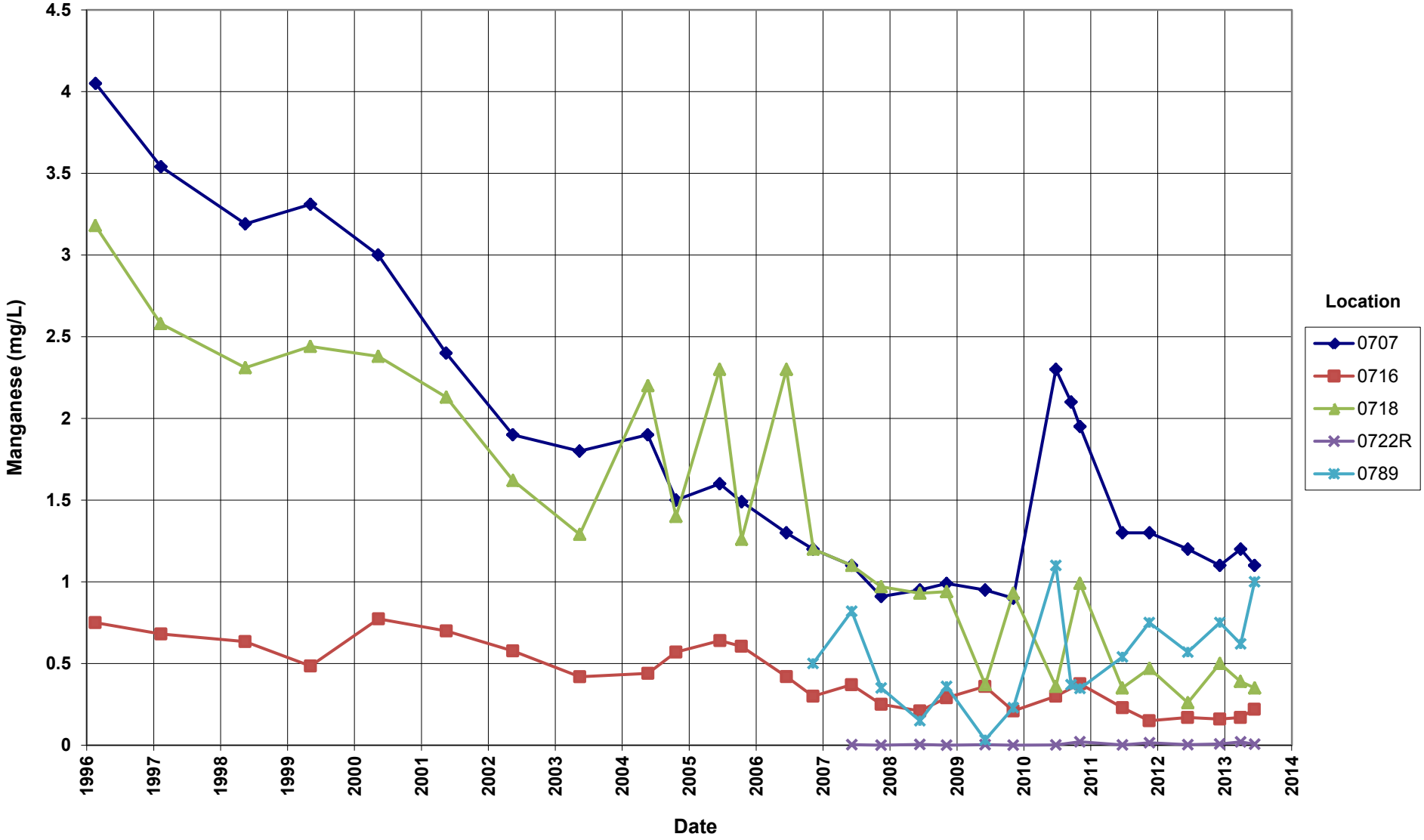
Riverton Processing Site
Manganese Concentration
Semi-Confined Aquifer Locations



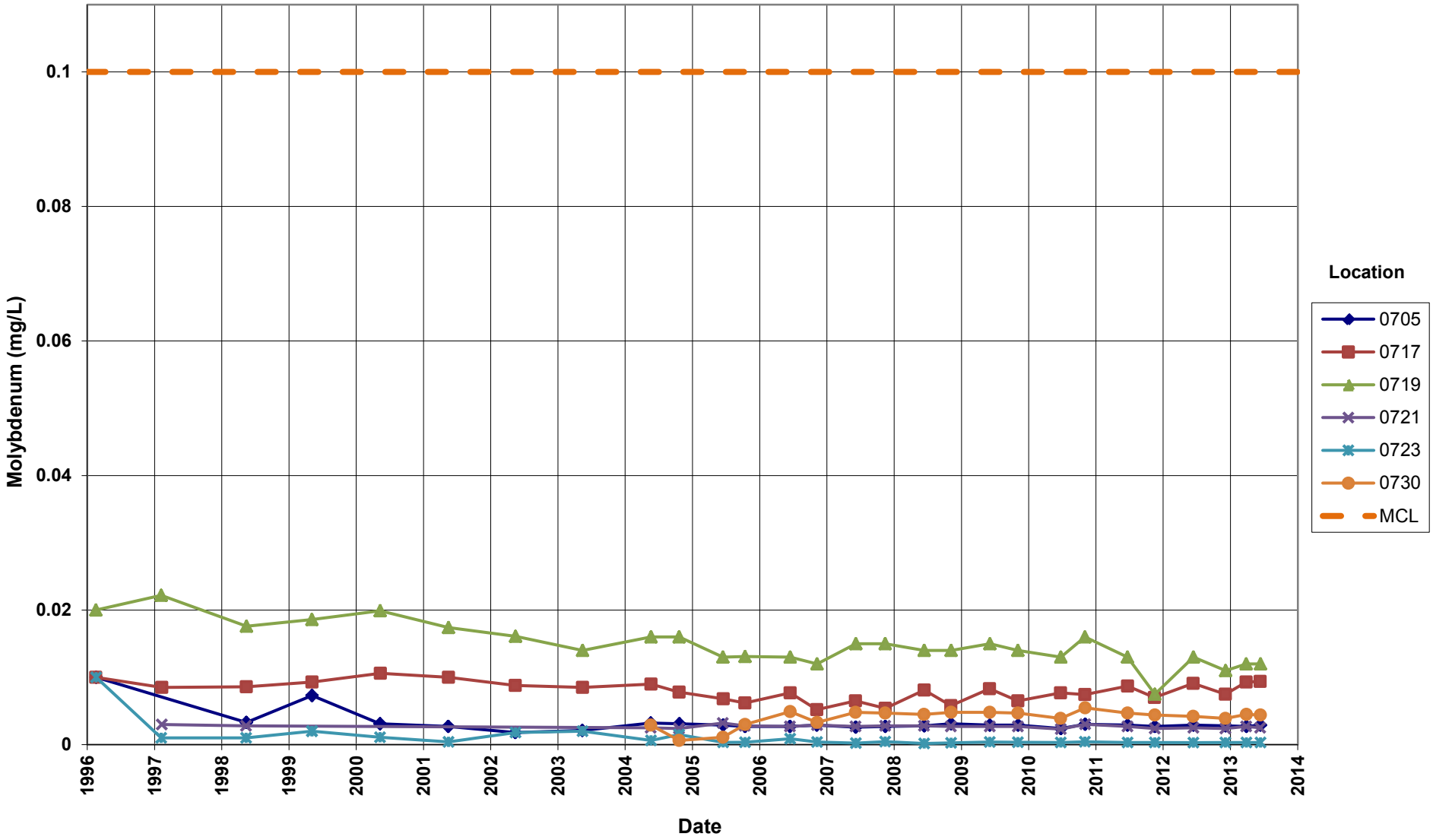
Riverton Processing Site
Manganese Concentration
Surficial Aquifer Locations



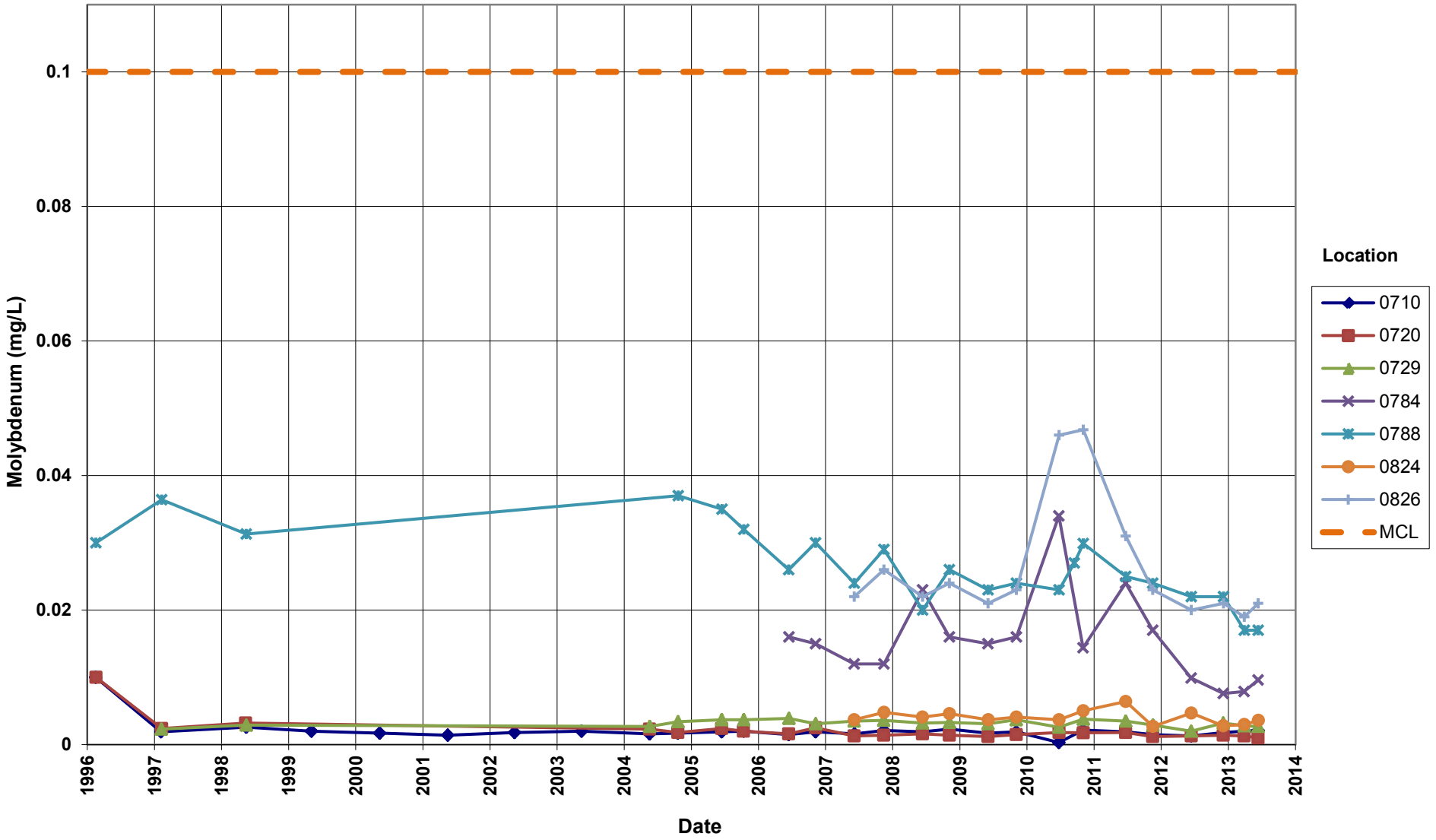
Riverton Processing Site
Manganese Concentration
Surficial Aquifer Locations



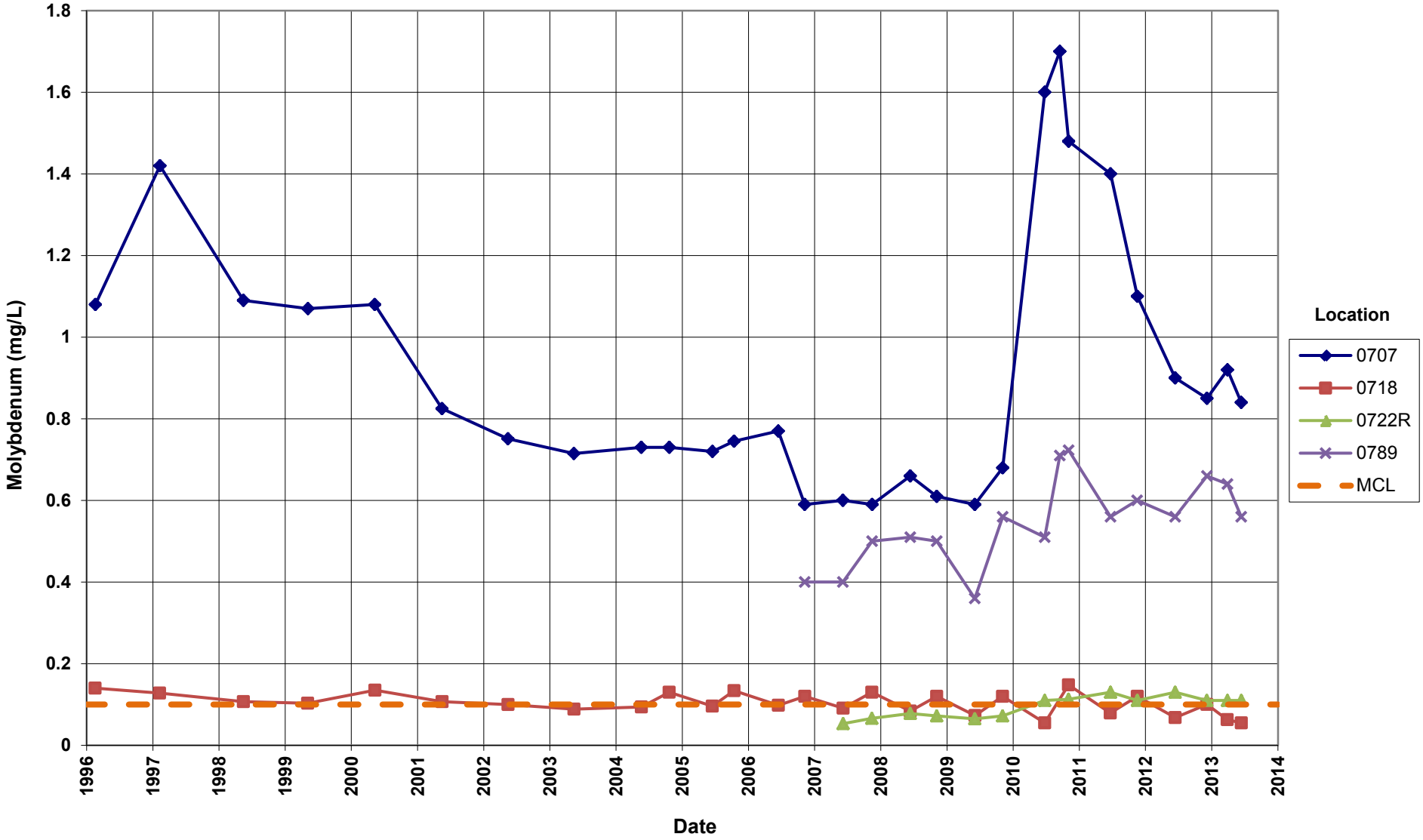
Riverton Processing Site
Molybdenum Concentration
Semi-confined Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L



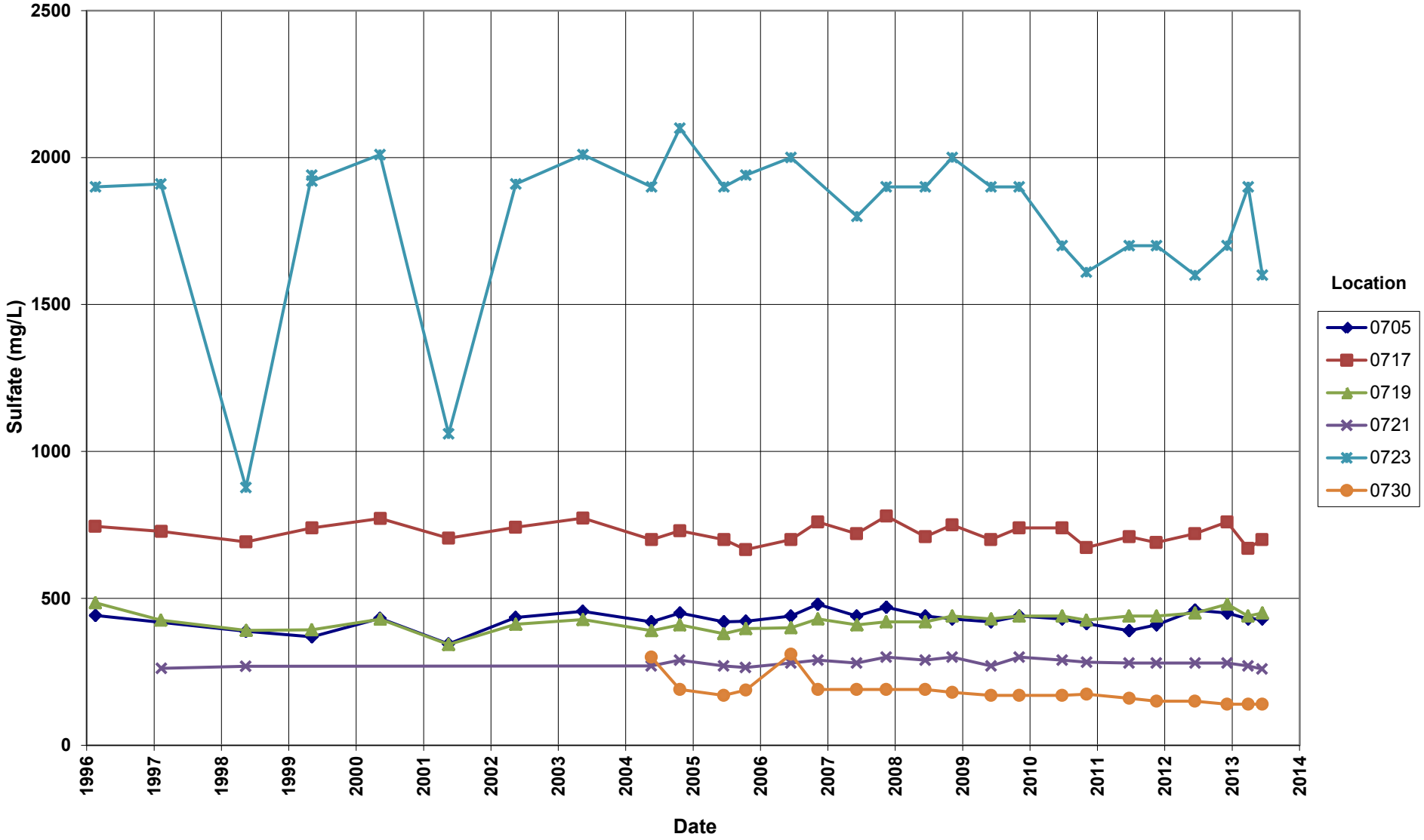
Riverton Processing Site
Molybdenum Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L



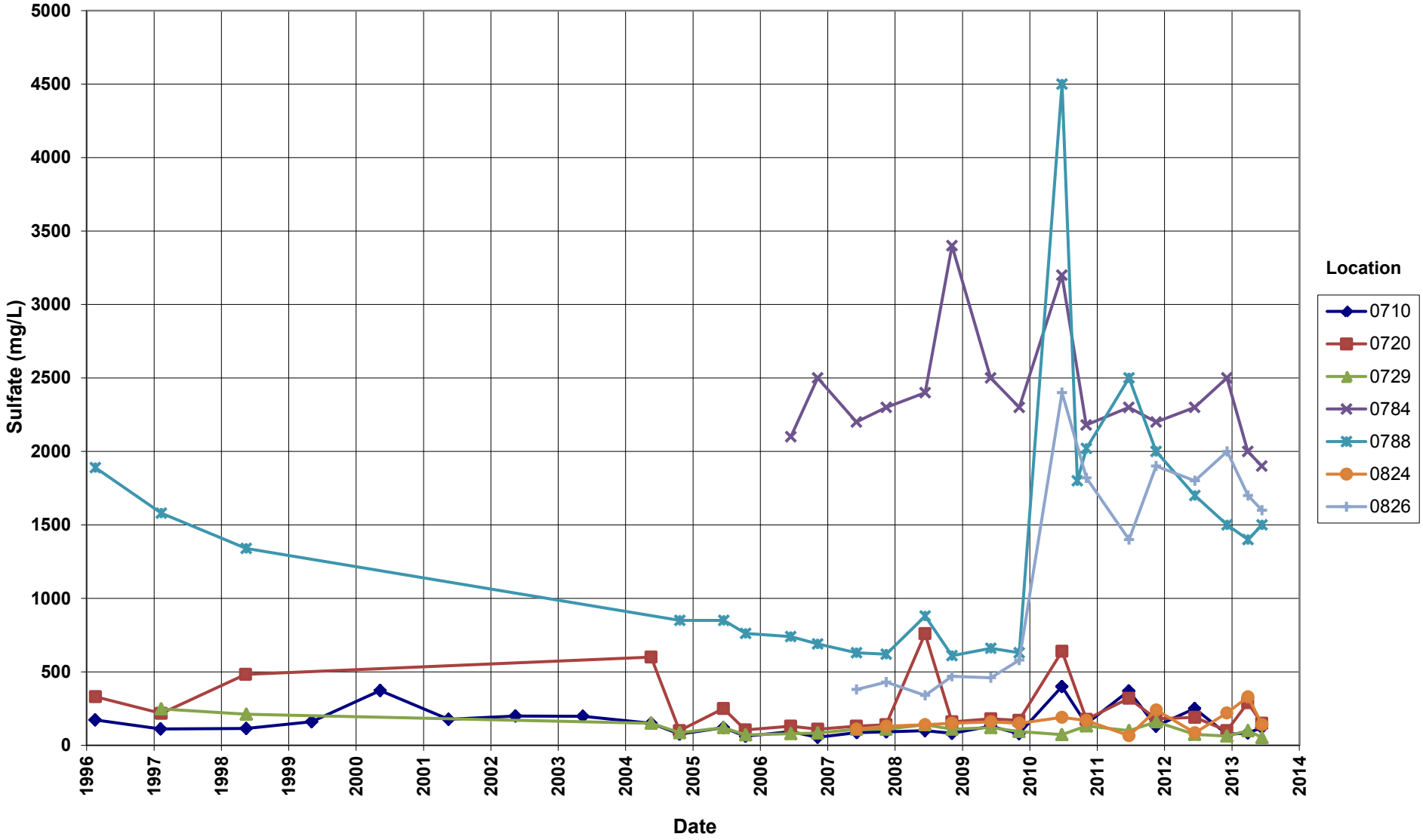
Riverton Processing Site
Molybdenum Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L



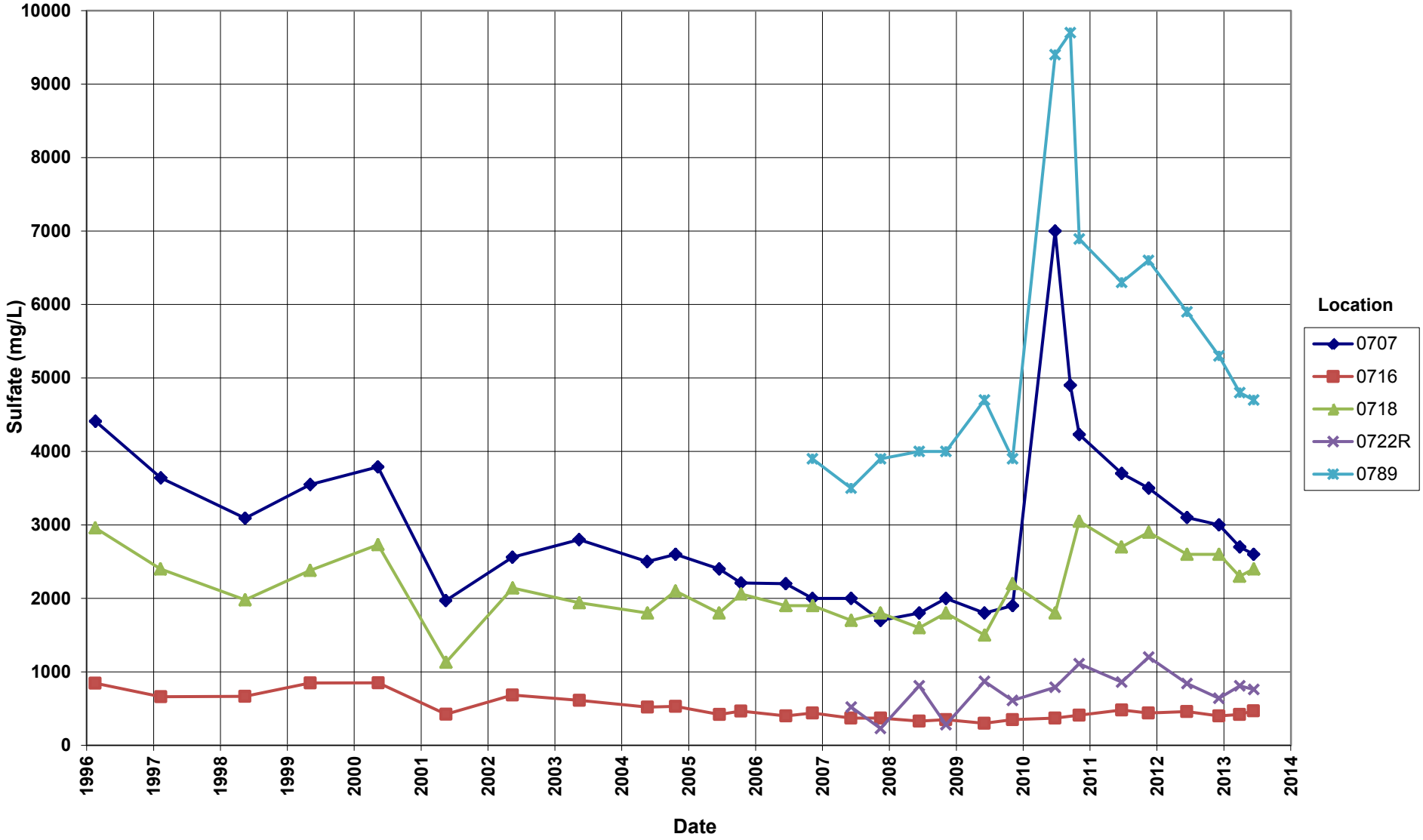
Riverton Processing Site
Sulfate Concentration
Semi-Confined Aquifer Locations

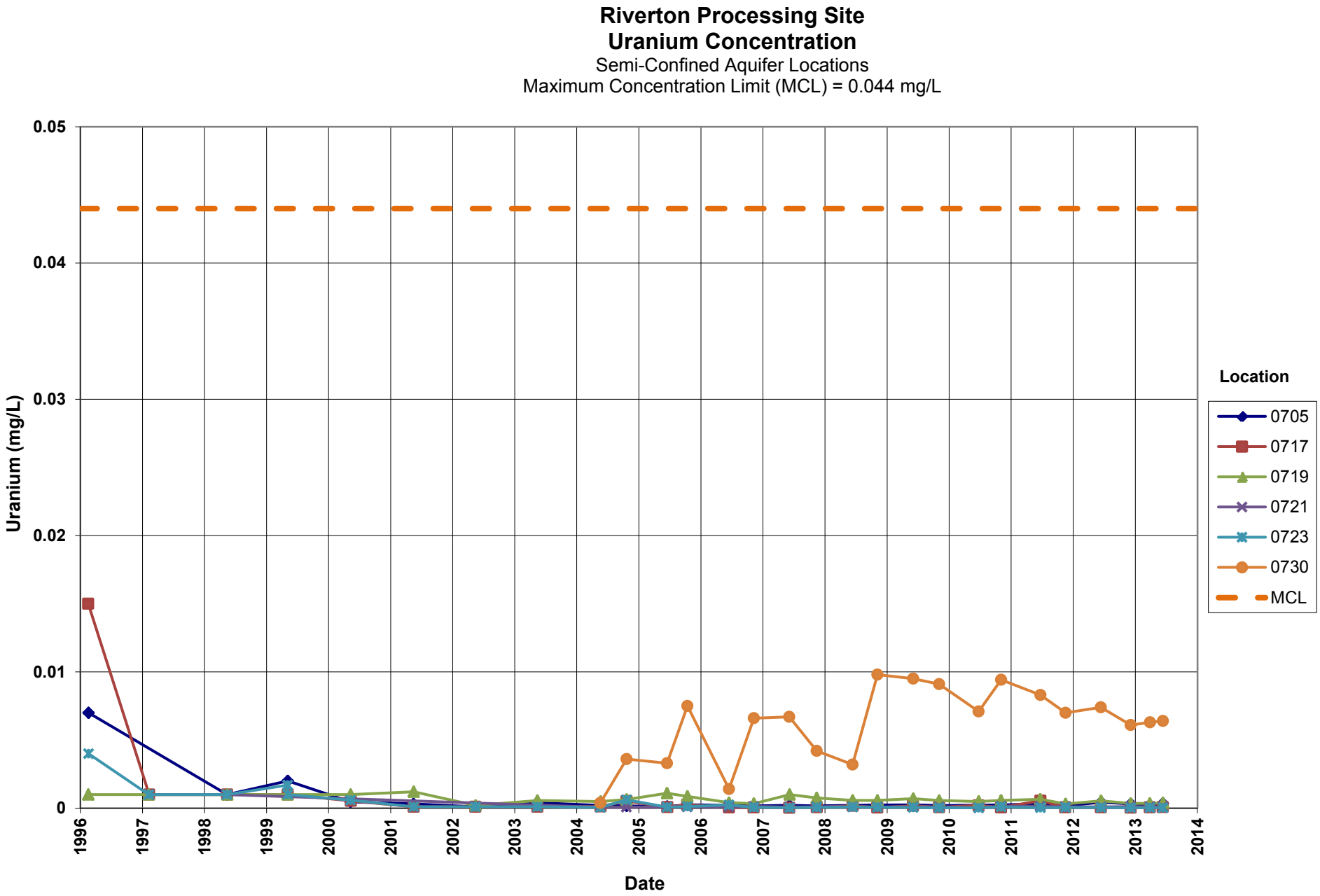


Riverton Processing Site
Sulfate Concentration
Surficial Aquifer Locations

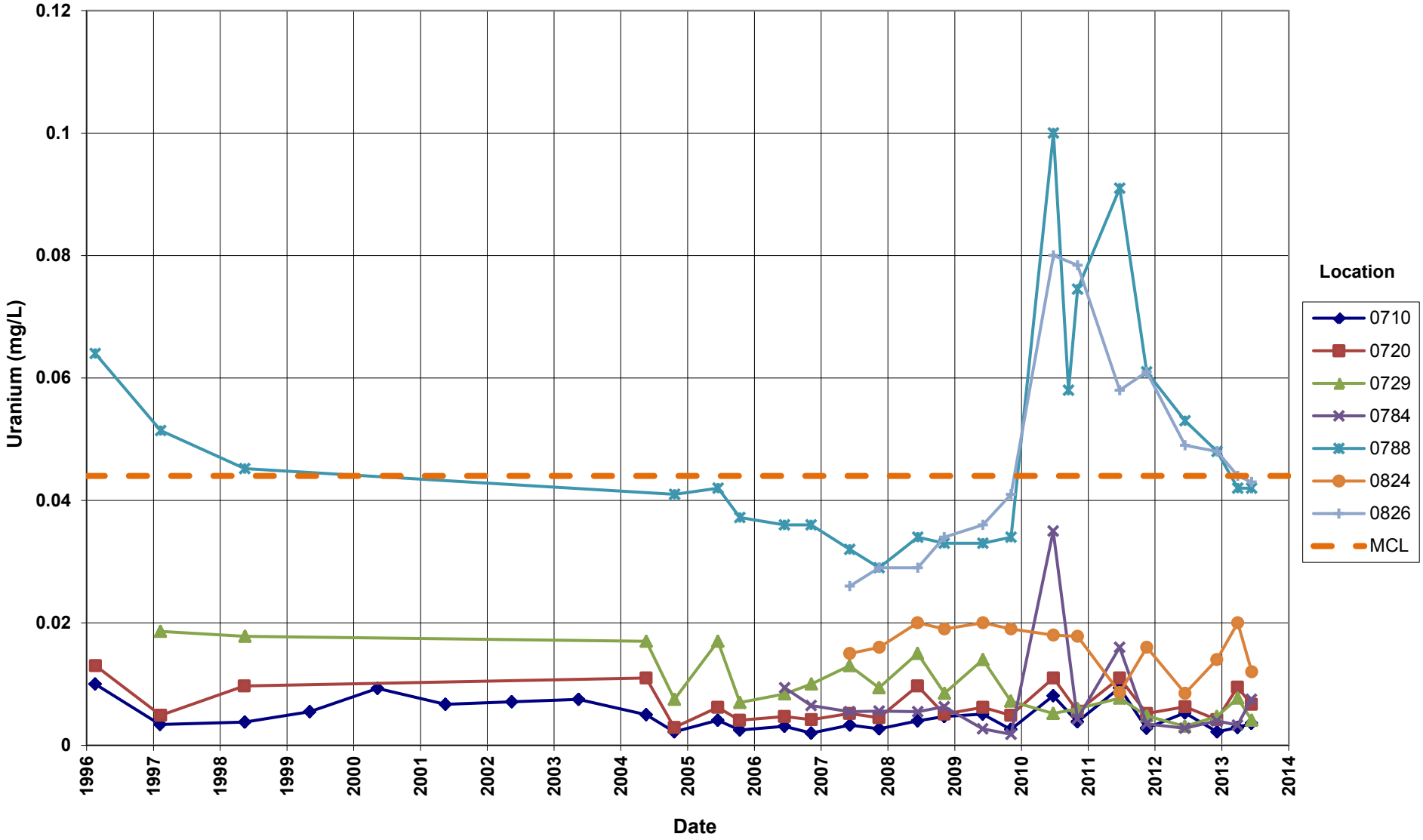


Riverton Processing Site
Sulfate Concentration
Surficial Aquifer Locations

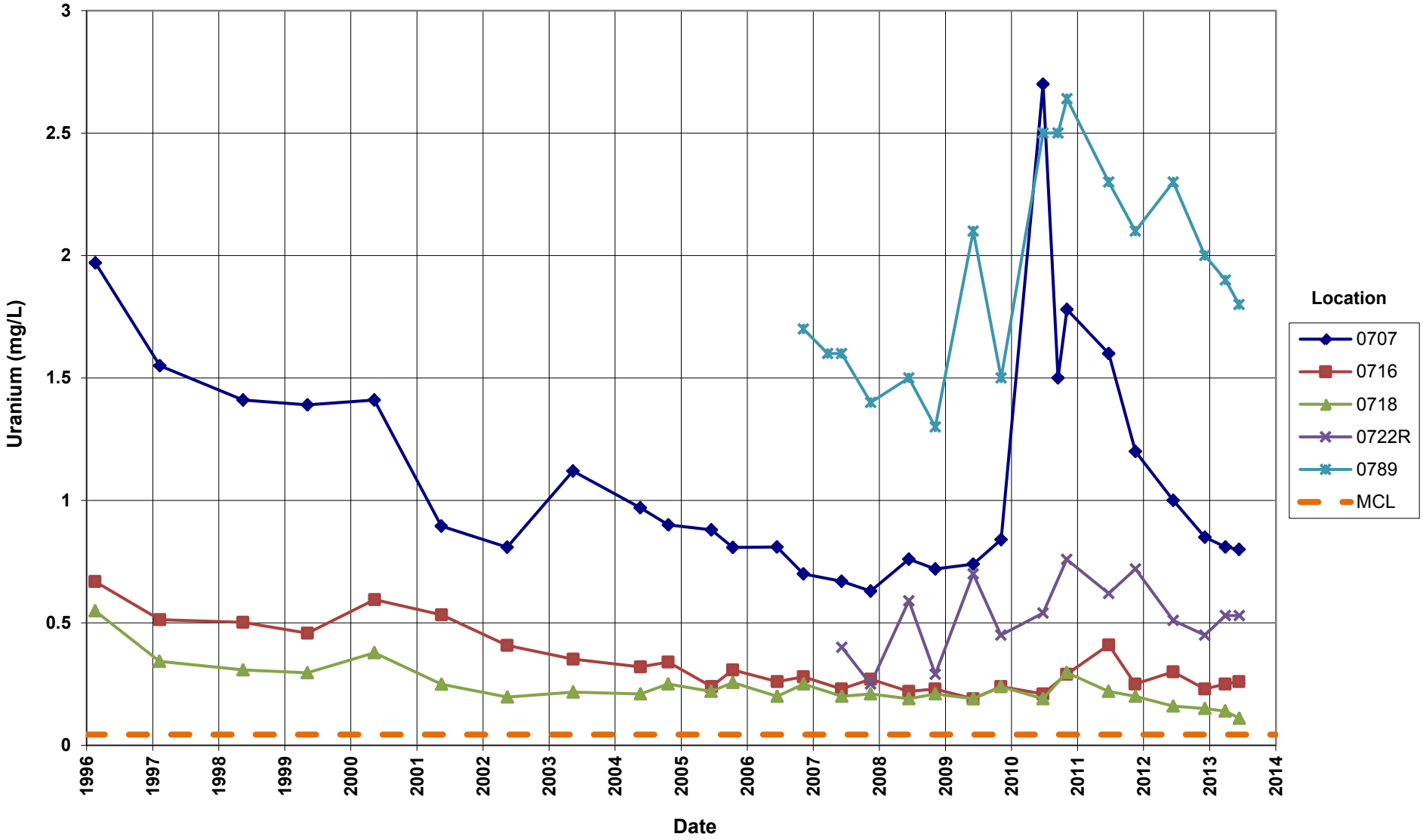



Riverton Processing Site
Uranium Concentration
Semi-Confined Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
0.05
0.04
0.03
0.02
0.01
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Date
Location
0705
0717
0719
0721
0723
0730
MCL

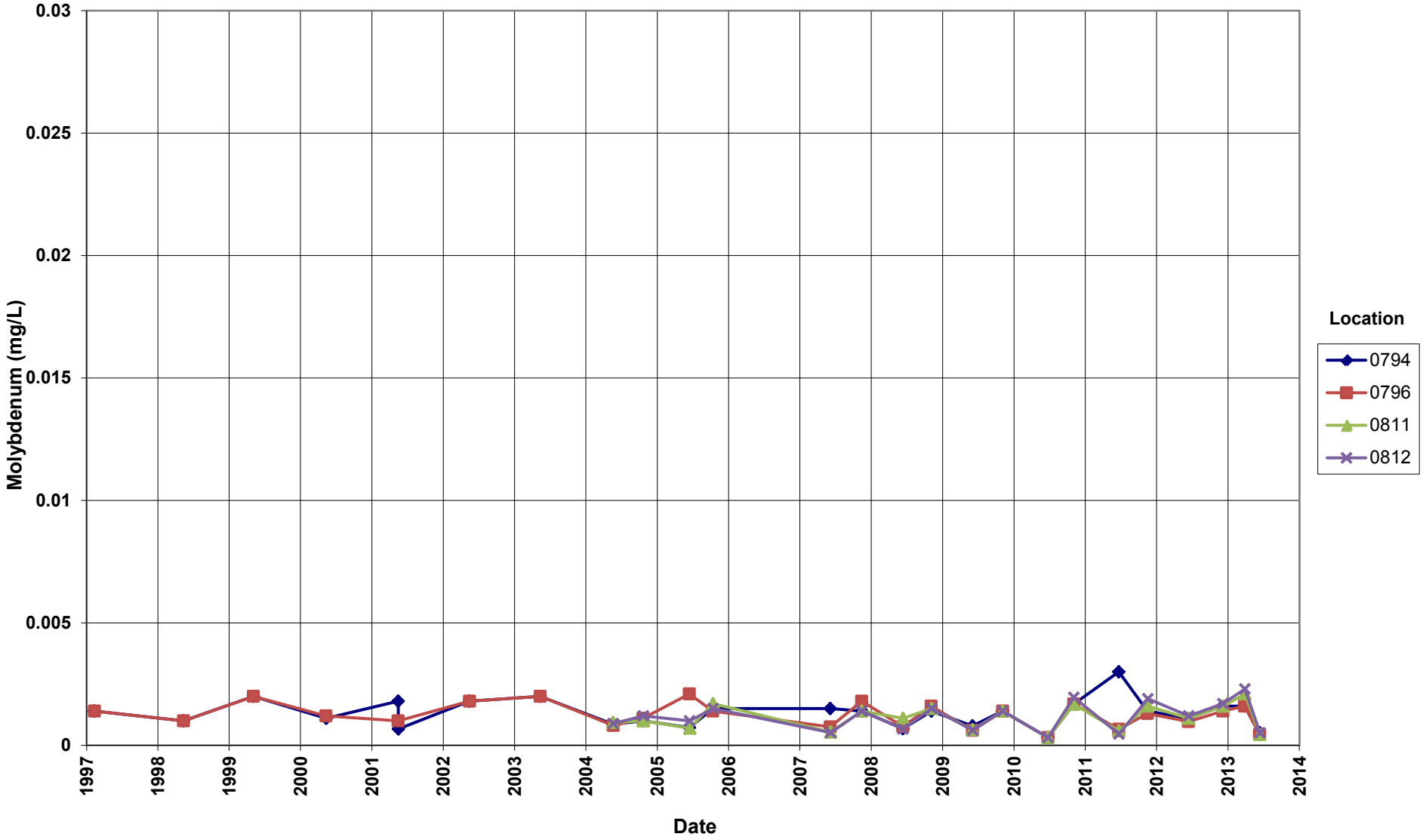
Riverton Processing Site
Uranium Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L



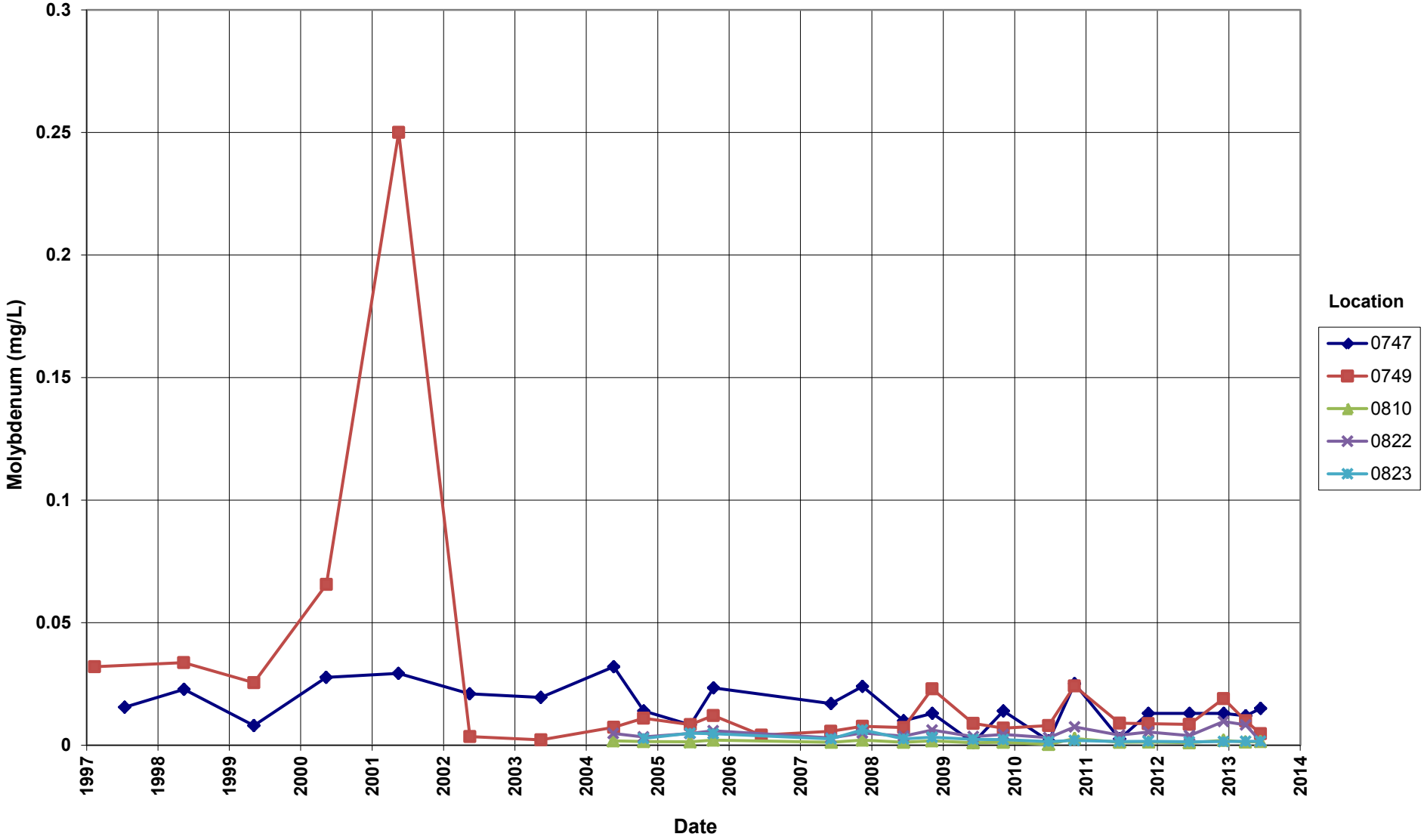
Riverton Processing Site
Uranium Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L



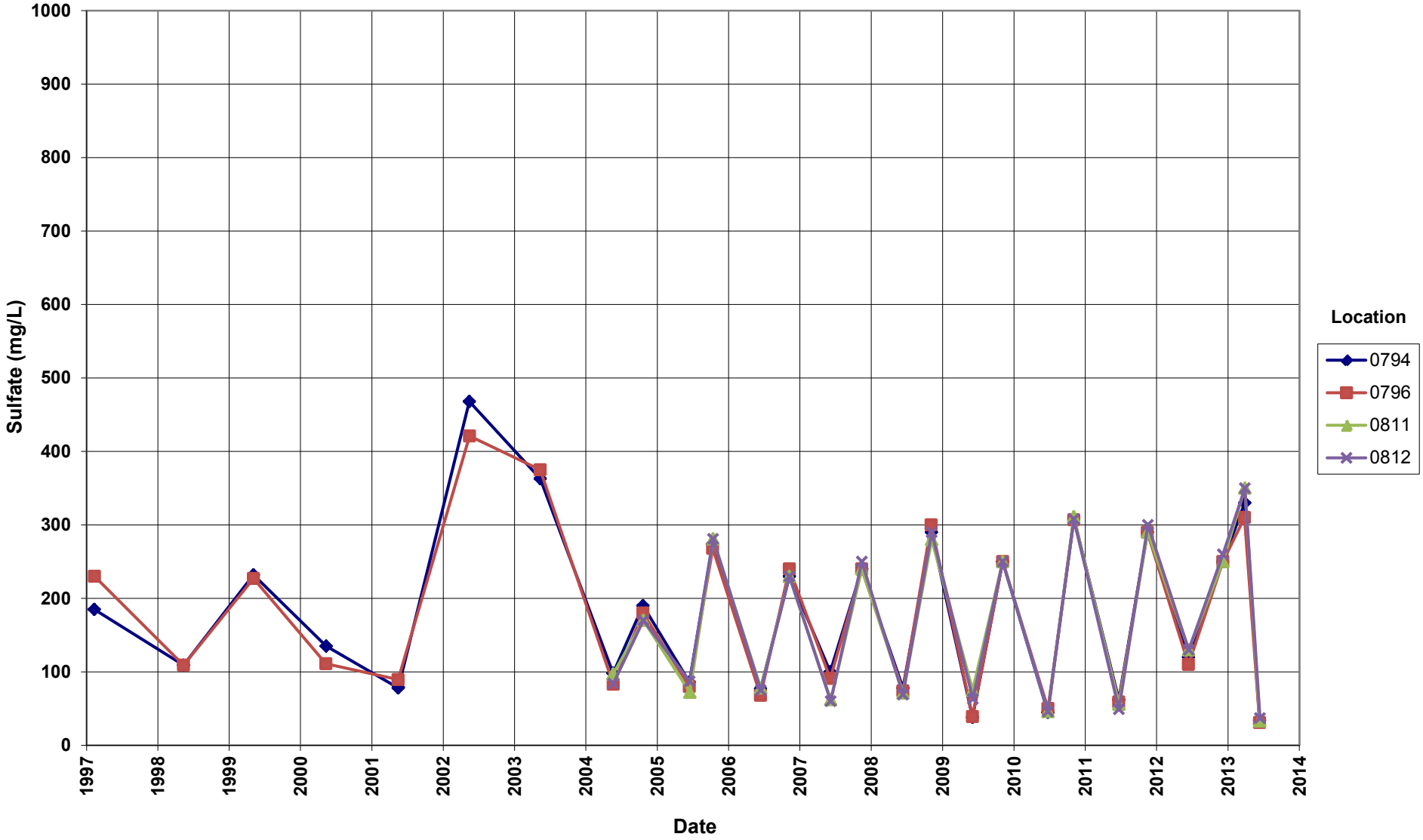
Riverton Processing Site
Molybdenum Concentration
Little Wind River Surface Water Locations



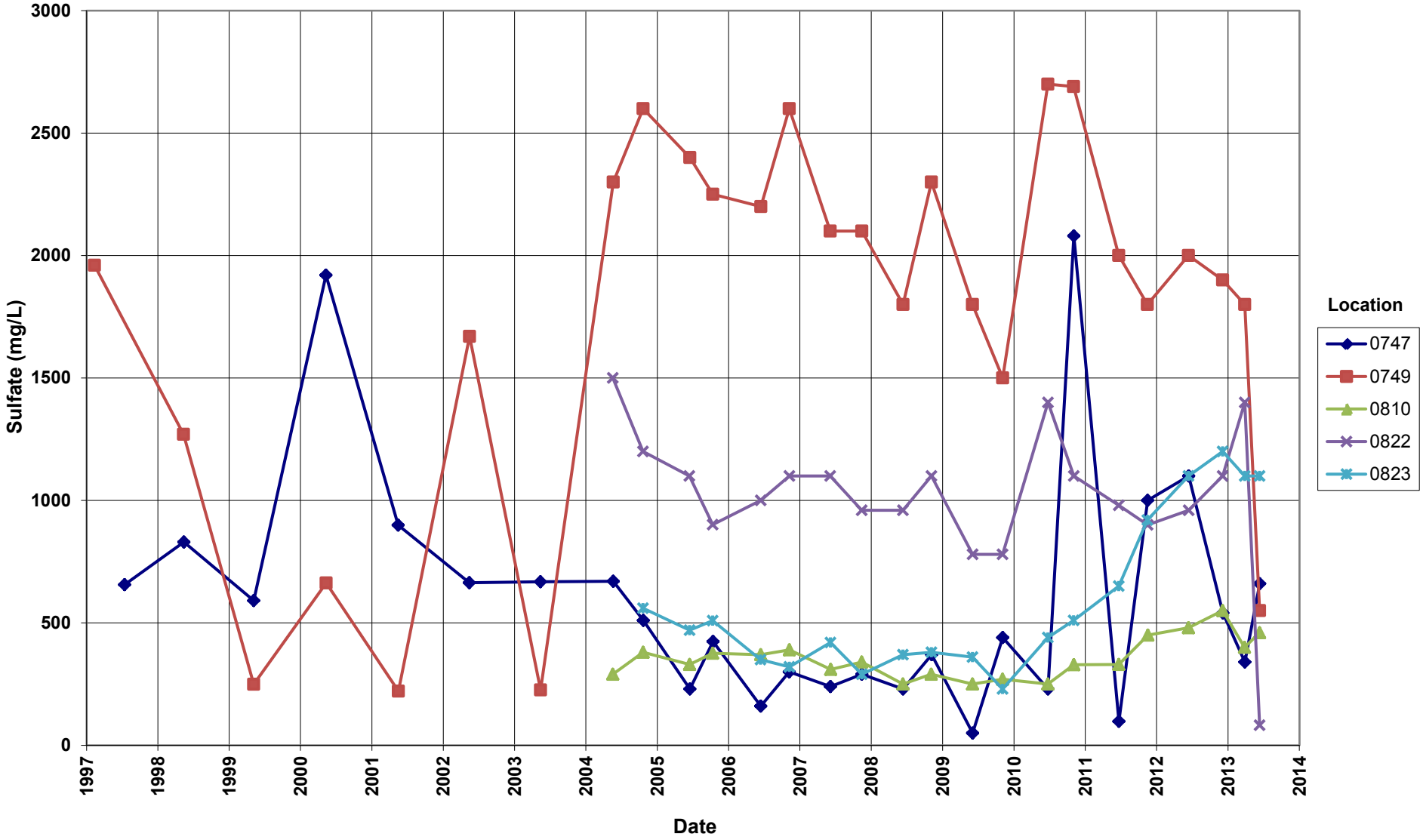
Riverton Processing Site
Molybdenum Concentration
Oxbow Lake, Wetlands, Ditch & Pond Surface Water Locations



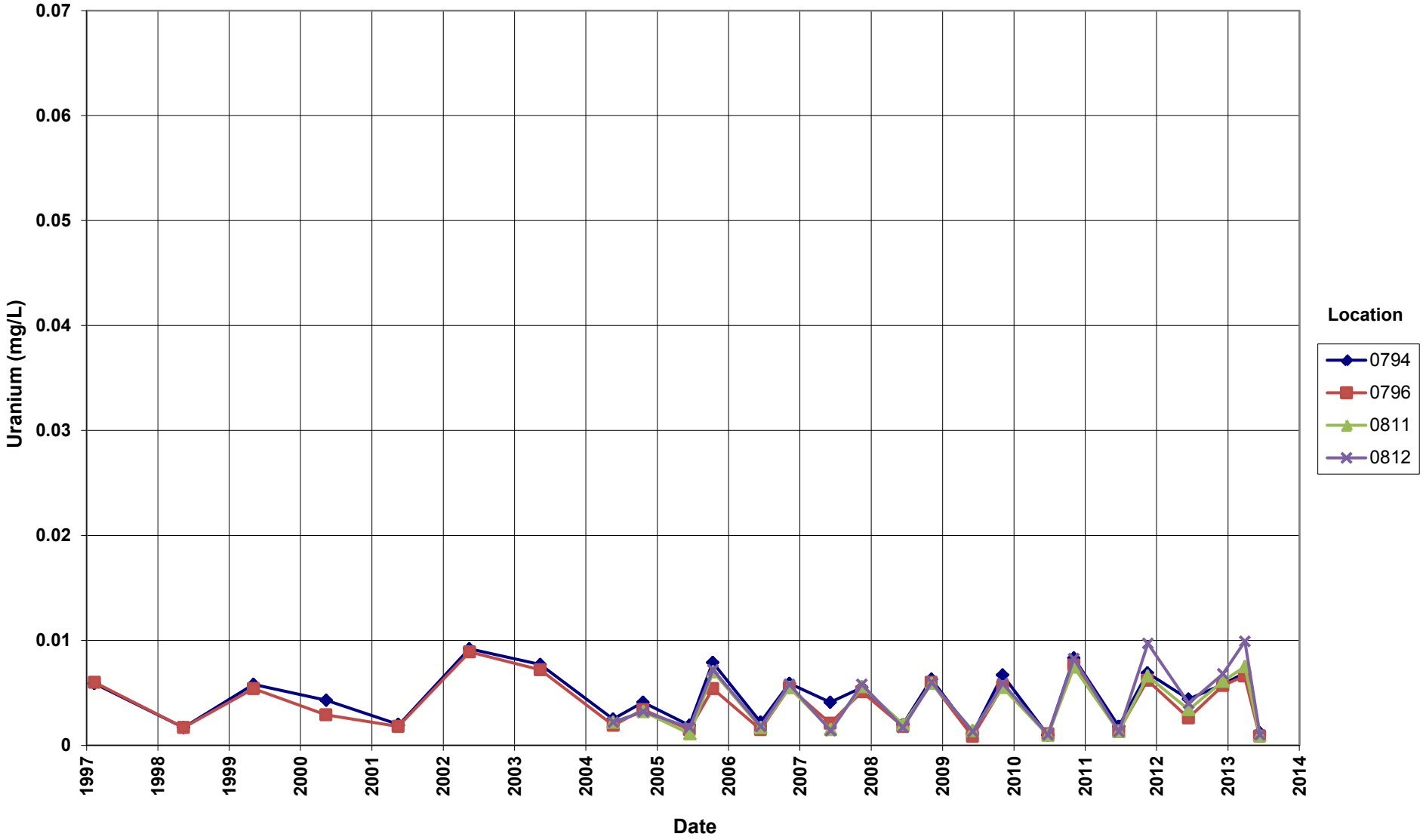
Riverton Processing Site
Sulfate Concentration
Little Wind River Surface Water Locations



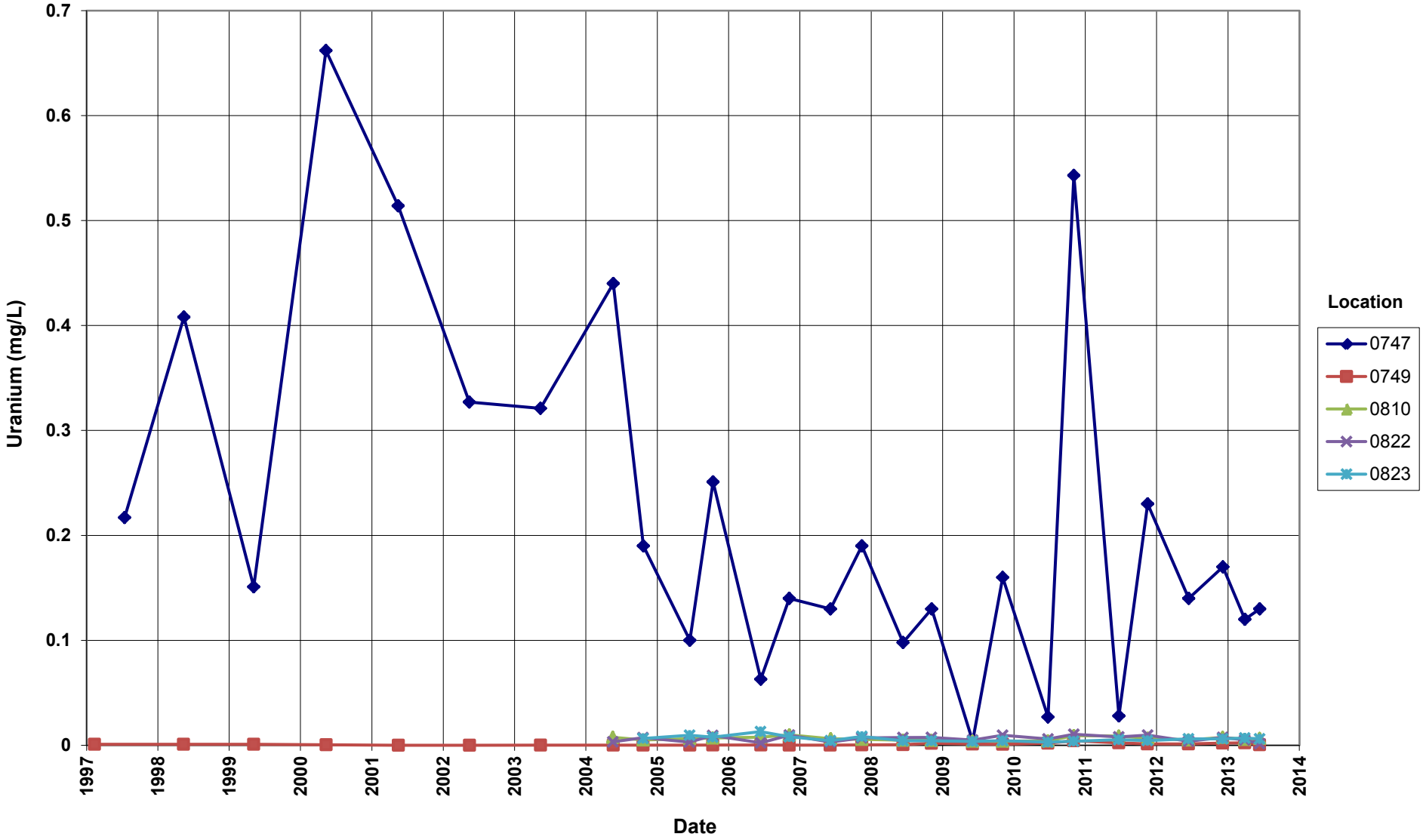
Riverton Processing Site
Sulfate Concentration
Oxbow Lake, Wetlands, Ditch & Pond Surface Water Locations



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

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Task Order LM-501
Control Number 13-0558

May 15, 2013

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-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
June 2013 Environmental Sampling at the Riverton, Wyoming, Processing Site

Reference: Task Order LM-501-02-117-402, 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 maps 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 and will occur as part of the routine environmental sampling currently scheduled to begin the week of June 10, 2013.

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

Monitoring Wells*

705 Se	716 Sf	719 Se	722R Sf	730 Se	784 Sf	824 Sf
707 Sf	717 Se	720 Sf	723 Se	732 Se	788 Sf	826 Sf
710 Sf	718 Sf	721 Se	729 Sf	736 Se	789 Sf	

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

Surface Locations

747	794	810	811	812	822	823
749	796					

Domestic Wells

405	430	436	460	828	841	842
422						

All routine monitoring 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)
Karl Stoeckle, DOE
Sam Campbell, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
EDD Delivery
rc-grand.junction
File: RVT 410.02 (A)

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

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					
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					
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

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
440					X	898 Rendezvous Road; on hold
441					X	898 Rendezvous Road; pending owner's permission
460	X					140 Goes in Lodge Road
828	X					33 St Stephens Road
841	X					22 Whitetail Dr
842	X					14 Whitetail Dr

Note: Quarterly sampling conducted in December, March, June, and August

Constituent Sampling Breakdown

Site	Riverton				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	138	36			
Field Measurements					
Alkalinity	X	X			
Dissolved Oxygen	X	X			
Redox Potential	X	X			
Residual Chlorine					
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Calcium	X		5	SW-846 6010	LMM-01
Chloride	X		0.5	SW-846 9056	MIS-A-045
Chromium					
Dissolved Organic Carbon	X		1	SM5310 B, C, D	WCH-A-024
Iron					
Lead					
Magnesium	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					
Nitrate + Nitrite as N (NO3+NO2)-N					
Potassium	X		5	SW-846 6010	LMM-01
Radium-226		0822 only	1 pCi/L	Gas Proportional Counter	GPC-A-018
Radium-228		0822 only	1 pCi/L	Gas Proportional Counter	GPC-A-020
Selenium					
Sodium	X		5	SW-846 6010	LMM-01
Strontium					
Sulfate	X	X	0.5	SW-846 9056	MIS-A-045
Sulfide					
Total Dissolved Solids					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
Total No. of Analytes	10	6			

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

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Attachment 4
Trip Report

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Stoller
Grand Junction Office
established 1959

Memorandum

Control Number N/A

DATE: June 24, 2013

TO: Distribution

FROM: Sam Campbell

SUBJECT: Trip Report

Site: Riverton, Wyoming, Processing Site.

Dates of Sampling Event: June 10 to June 13, 2013

Team Members: Sam Campbell and David Atkinson

Number of Locations Sampled: 20 monitoring wells, 9 surface water locations, and 8 domestic wells.

Locations Not Sampled/Reason: None.

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 high and river water was flowing into the Oxbow Lake at the time of sampling.

All sample intake (tubing) depths at the Riverton site have been fixed vertically by suspending the tubing from the well cap (for above ground completions) or by marking the tubing adjacent to the inner casing (for flush-mount completions) at the sampling depth. Tubing and well depths below top-of-casing were measured in most wells and are displayed in Table 1.

Field measurements were made at multiple levels within selected wells to determine if vertical stratification exists. Wells were pumped at a low flow-rate (same as the flow-rate used to sample), which resulted in a stabilized water-level. The flow cell was drained between each level to ensure representative water was measured at each level. Results of measurements from the multiple levels are displayed in Table 2.

Field Variance: None.

Table 1. Pump Intake Data[a]

Well Location	Tubing Depth	Well Depth	Distance above bottom of well	Sump Length	Distance above bottom of screen	Screen Length
705	45.65	49.65	4	2	2	10
707	12	15.45	3.45	2	1.45	5
710	15.45	17.57	2.12	2	0.12	5
716	12.75	14.89	2.14	0	2.14	5
717	49.5	51.76	2.26	2	0.26	10
718	13.2	16.95	3.75	0	3.75	5
719	37.48	39.98	2.5	2	0.5	10
720	10.5	12.99	2.49	0	2.49	5
721	47.7	50.78	3.08	2	1.08	10
0722R	13.22	16.22	3	0.5	2.5	5
723	44.93	48.13	3.2	2	1.2	10
729	11.17	13.97[b]	2.8	0	2.8	5
730	37.18	39.98[b]	2.8	2	0.8	10
732	40.8	43.1	2.3	0	2.3	15
736	33.55	35.91	2.36	0.4	1.96	15
784	9.39	11.51	2.12	0.45	1.67	4.45
788	16.2	18.25	2.05	0.4	1.65	12
789	NM[c]	19.1[b]	NM[c]	0.4	-	12
824	12.5	14.8	2.3	0.3	2	5
826	11.82	14.69	2.87	0.3	2.57	5

[a] All units are in feet
[b] Well depth from well log and/or database.
[c] NM = not measured

Access Issues: Met with the new manager of the Chemtrade sulfuric acid plant, Helen Cane, who provided access to the former mill site.

WREQC will obtain land-owner information for surface water location 0810, so the owner can be contacted in the future prior to the sampling event per standard protocol. Current contact information for this location is not valid.

Well Inspection Summary: All monitoring wells were in good condition. Monitoring wells clustered around 0707 were inspected to determine how the top of the well could be raised to reduce impacts from future flooding. The steel surface casing is grouted in place, so the best method to raise the wells will be to weld additional steel casing on the existing casing and extend the PVC inner casing.

Table 2. Multi-Level Monitoring Data[a]

Well ID	Sump Length	Screen Length	Distance from Bottom of well	Temperature	Specific Conductance	Dissolved Oxygen	pH	ORP
0707	2	5	2	11.15	4888	0.95	6.58	79.6
			4	11.63	4752	0.82	6.6	82
			6	11.96	4649	0.81	6.61	86
0789	0.4	12	2	11.06	8288	0.98	6.67	63.3
			4	11.55	8281	1.02	6.74	77.5
			6	12.3	8304	0.88	6.77	83.2
			8	12.71	8345	0.77	6.77	85.6
			10	12.79	8298	0.83	6.77	63.3
0718	0	5	0.5	10.15	4565	0.6	6.63	111
			2.5	10.23	4563	0.68	6.64	112
			4.5	10.11	4556	0.58	6.65	113
723	2	10	2	13.61	3557	0.8	6.69	-14
			4	13.73	3494	0.69	6.75	-17
			6	14.16	3462	0.78	6.77	-21
			10	15.05	3460	0.75	6.8	-22
0722R	0.3	5	0.3	12.23	1855	-	6.46	1
			2.3	12.68	1852	-	6.51	7
			4.3	13.33	1842	-	6.53	17

[a] Units: length = feet; temperature = °C; specific conductance = µmhos/cm; dissolved oxygen = mg/L; pH = standard units; oxidation-reduction potential = millivolts.

Requisition Numbers Assigned: All samples were assigned to requisition index number (RIN) 13065379 and were shipped to the ALS Laboratory Group on June 18, 2013.

Water Level Measurements: Water levels were measured at all sampled monitoring wells and 13 additional monitoring wells. Continuous water-level data was downloaded from pressure transducers installed in five monitoring wells located upgradient, on, and downgradient of the site. A pressure transducer was installed in monitoring well 0826.

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
2175	N/A	Equipment Blank	LHV 730
2353	0747	Duplicate	LHV 734
2433	0789	Duplicate	LHV 735

Stakeholder/Regulatory: Wind River Environmental Quality Commission (WREQC) representatives (Travis Shakespeare, Ricki Trosper, Santee Moss, and Steve Babits) observed sampling activities and collected split samples.

The DOE Site Manager (Bill Dam) and Stoller Public Affairs (Judy Miller) observed sampling activities as several locations.

A sampling demonstration was provided to members of the media, which included KCWY news (Keith Kocinski), WyoFile (Ron Feemster), and The Ranger (Alejandra Silva).

An unofficial Joint Business Council meeting was attended with Bill Dam and Judy Miller to brief council members on the new cooperative agreement.

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: There was no evidence of new gravel pits or well drilling within the institutional control boundary.

Corrective Action Required/Taken: Raise the elevation of monitoring wells 0702, 0705, 0707, and 0709.

Obtain contact information for surface water location 0810.

(SEC/lcg)

cc: (electronic)
Bill Dam, DOE
Sam Campbell, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Judy Miller, Stoller
EDD Delivery