

# Data Validation Package

---

**June 2010**  
**Groundwater and Surface Water**  
**Sampling at the Riverton, Wyoming,**  
**Processing Site**

**October 2010**



**U.S. DEPARTMENT OF**  
**ENERGY**

Legacy  
Management

---

This page intentionally left blank

# Contents

Sampling Event Summary .....	1
Riverton, Wyoming, Processing Site, Sample Locations .....	5
Data Assessment Summary.....	7
Water Sampling Field Activities Verification Checklist.....	9
Laboratory Performance Assessment .....	11
Sampling Quality Control Assessment .....	27
Certification .....	30

## **Attachment 1—Assessment of Anomalous Data**

Potential Outliers Report

## **Attachment 2—Data Presentation**

Groundwater Quality Data  
Surface Water Quality Data  
Equipment Blank Data  
Static Water Level Data  
Hydrographs  
Time-Concentration Graphs

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

## **Attachment 4—Trip Report**

This page intentionally left blank

# Sampling Event Summary

**Site:** Riverton, Wyoming, Processing Site

**Sampling Period:** June 23–24, 2010  
September 15, 2010

The 2009 *Long-Term Management Plan for the Riverton, Wyoming, Processing Site* requires semiannual monitoring to evaluate groundwater conditions and assess the progress of natural flushing of the uppermost aquifer. This event involved sampling 18 monitoring wells, 9 surface water locations, and 5 domestic wells at the Riverton, Wyoming, Processing Site. Monitoring well 0809 was destroyed by high flows in the Little Wind River and not sampled.

Water levels were measured at all sampled monitoring wells and 15 additional monitoring wells that were not sampled. Sampling and analysis was conducted as specified in the Long-Term Management Plan and the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated).

Concentrations of molybdenum and uranium in samples collected from semi-confined aquifer monitoring wells were below the 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. Concentration-versus-time graphs are included in the Data Presentation section. Contaminant concentrations exceeded historical maximum values at many groundwater locations. Because of the high concentrations and the unusually high water levels due to flooding, U.S. Department of Energy directed resampling locations 0707, 0788, and 0789 on September 15, 2010. The analysis of these samples confirmed the anomalous concentrations observed, and the results are included in this report. The high concentrations observed are attributed to the flooding conditions encountered along the Little Wind River.

Results from domestic wells (locations 0405, 0430, 0436, and 0460) did not indicate any impacts from the Riverton site. Concentrations of molybdenum and uranium in samples collected from domestic wells were below EPA groundwater and drinking water standards, respectively.

Table 1. Riverton Wells with Samples that Exceeded EPA Groundwater Standards in June 2010 and in September<sup>a</sup> 2010

Analyte	Standard <sup>b</sup>	Location	Concentration in milligrams per liter (mg/L)
Molybdenum	0.1	0707 (June)	1.6
		0707 (Sept)	1.7
		0716	0.14
		0722R	0.11
		0789 (June)	0.51
		0789 (Sept)	0.71
Uranium	0.044	0707 (June)	2.7
		0707 (Sept)	1.5
		0716	0.21
		0718	0.19
		0722R	0.54
		0788 (June)	0.1
		0788 (Sept)	0.058
		0789 (June)	2.5
		0789 (Sept)	2.5
0826	0.08		

<sup>a</sup> Wells 0707, 0788, and 0789 were resampled in September.

<sup>b</sup> Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.


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 2, 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 through the lake. The other 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. Concentration-versus-time graphs of molybdenum and uranium results at all surface water locations are included in the Data Presentation section.

Table 2. Comparison of Surface Water Concentrations (June 2010) to Benchmark

Location	Uranium Concentration (mg/L)
0794 Benchmark	0.011
0796 Little Wind River	0.0011
0811 Little Wind River	0.00096
0812 Little Wind River	0.0010
0747 Oxbow Lake	0.0270
0810 Constructed Wetlands	0.0042
0822 West Side Irrigation Ditch	0.0060
0823 Gravel Pit Pond	0.0031

The sample collected at the ditch that discharges from the Chemtrade sulfuric acid plant (0749) continues to have elevated concentrations of sulfate (2,700 mg/L). The elevated sulfate concentration in the sulfuric acid plant effluent has affected the sulfate concentration downstream in the west side irrigation ditch (1,400 mg/L at location 0822).

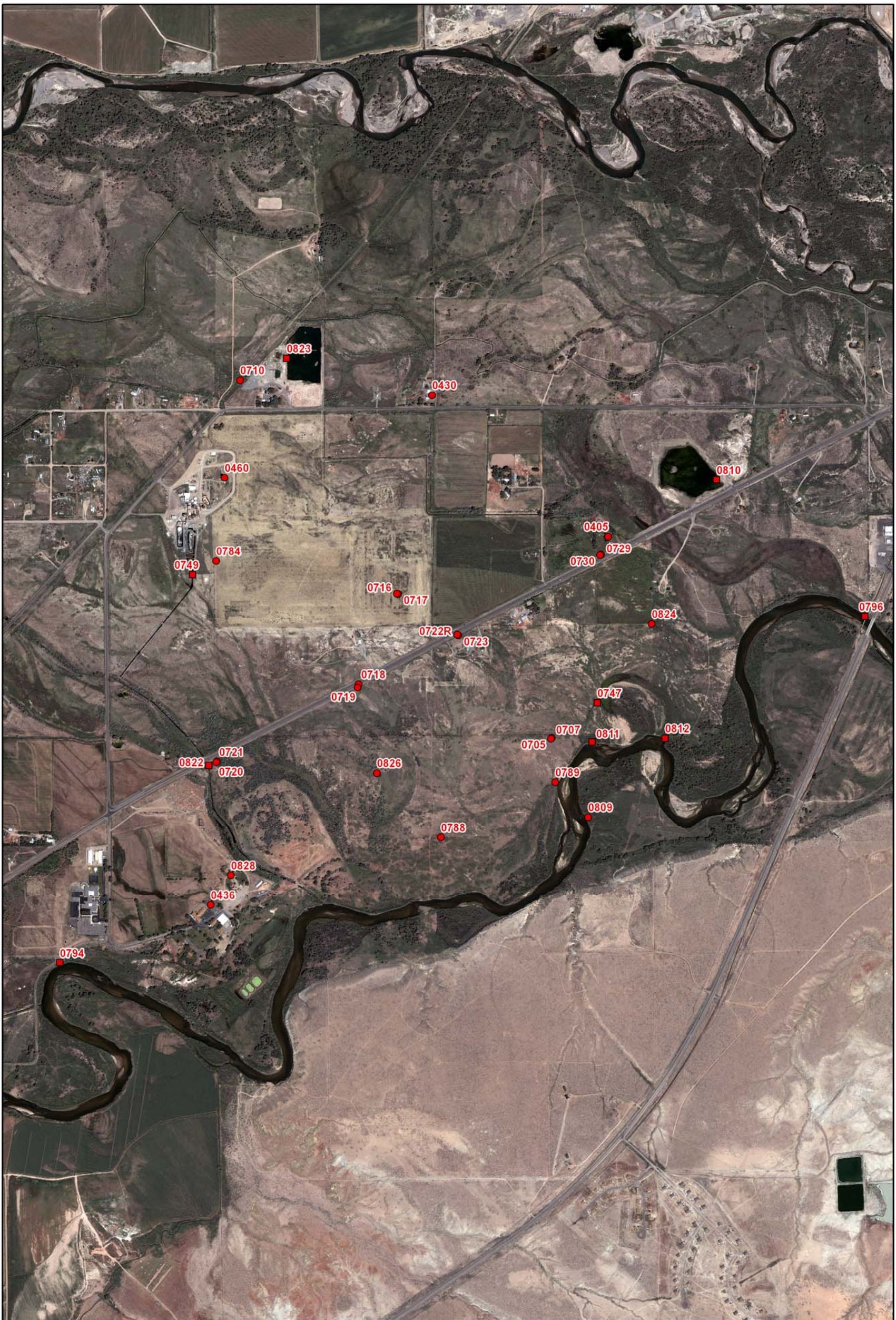
Water samples from 0822 (west side irrigation ditch) were analyzed for radium-226 and radium-228 in response to potentially elevated concentrations of these constituents in the sediments within the ditch. The radium-226 concentration was slightly above, and the radium-228 concentration below, the respective Decision Level Concentration indicating no impact to water quality in the ditch.

  
 \_\_\_\_\_  
 Sam Campbell  
 Site Lead, S.M. Stoller Corporation

10-25-2010  
 Date

This page intentionally left blank





**LEGEND**

- Monitor Wells or Tap Locations
- Surface Water Locations

N



SCALE IN FEET

1,200 600 0 1,200

U.S. DEPARTMENT OF ENERGY  
GRAND JUNCTION, COLORADO

Work Performed by  
**S.M. Stoller Corporation**  
Under DOE Contract  
No. DE-AC01-07LM00060

**Riverton, WY, Processing Site  
Sample Locations**

DATE PREPARED:  
January 22, 2010

FILENAME:  
S0621400

M:\LTS\11110042\04\000\S06214\S0621400.mxd smithw 1/22/2010 2:08:40 PM

*Riverton, Wyoming, Processing Site, Sample Locations*



This page intentionally left blank

# Data Assessment Summary

This page intentionally left blank

### Water Sampling Field Activities Verification Checklist

<b>Project</b>	<u>Riverton, Wyoming</u>	<b>Date(s) of Water Sampling</b>	<u>June 23-24, 2010, September 15, 2010</u>
<b>Date(s) of Verification</b>	<u>October 8, 2010</u>	<b>Name of Verifier</b>	<u>Steve Donovan</u>

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order Letter dated May 5, 2010.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>No</u>	<u>Monitoring well 0809 was destroyed by high flows in the Little Wind River.</u>
3. Was a pre-trip calibration conducted as specified in the above-named documents?	<u>Yes</u>	<u>Pre-trip calibrations were performed on 06/21/2010 and 09/14/2010.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u> <u>Yes</u>	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>Yes</u>	
6. Was the category of the well documented?	<u>Yes</u>	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	<u>Yes</u>	
Did the water level stabilize prior to sampling?	<u>Yes</u>	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	<u>Yes</u>	
Was the flow rate less than 500 mL/min?	<u>Yes</u>	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<u>NA</u>	

### 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 for locations 0460 (06/23/2010), 0789 (06/24/2010), and 0788 (09/15/2010).
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	One equipment blank was collected.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number?	Yes	
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	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. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the "Date Signed" fields (FDCS)?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

## Laboratory Performance Assessment

### General Information

Report Number (RIN): 10063125  
Sample Event: June 23-24, 2010  
Site(s): Riverton, Wyoming  
Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
Work Order No.: 1006303  
Analysis: Metals, Wet Chemistry, and Radiochemistry  
Validator: Steve Donivan  
Review Date: September 2, 2010

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) “Standard Practice for Validation of Laboratory 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 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Manganese	LMM-01	SW-846 3005A	SW-846 6010B
Molybdenum, Uranium	LMM-02	SW-846 3005A	SW-846 6020A
Radium-226	GPC-A-018	PA SOP712R14	PA SOP724R10
Radium-228	GPC-A-020	PA SOP746R8	PA SOP724R10
Sulfate	MIS-A-044	MCAWW 300.0	MCAWW 300.0

### Data Qualifier Summary

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

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1006303-28	0822	Radium-226	J	Less than 3 times the determination limit
1006303-30	0824	Manganese	U	Less than 5 times the calibration blank
1006303-33	0460 Duplicate	Manganese	U	Less than 5 times the calibration blank
1006303-35	Equipment Blank	Manganese	U	Less than 5 times the calibration blank

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 35 water samples on June 29, 2010, 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 0.6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses.

### Laboratory Instrument Calibration

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

#### *Method SW-846 6010, Manganese*

Calibration for manganese was performed on July 28, 2010, using a single point calibration. Initial and continuing calibration verification checks were made at the required frequency resulting in 18 verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit (PQL) and all results were within the acceptance range.

#### *Method SW-846 6020, Molybdenum and Uranium*

Calibrations for molybdenum and uranium were performed on July 28, 2010, 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 method detection limit (MDL). Initial and continuing calibration verification checks were made at the required frequency resulting in 12 verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

#### *Method SW-846 9056, Sulfate*

The calibration for sulfate was performed using six calibration standards on July 13, 2010. 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 resulting in seven verification checks. The calibration checks met the acceptance criteria.



## Radiochemical Analysis

Radiochemical results are qualified with a “J” flag (estimated) when the result is greater than the minimum detectable concentration (MDC), but less than Determination Limit (3 times the MDC). Radiochemical results are qualified with a “U” flag (not detected) when the result is greater than the MDC, but less than the Decision Level Concentration estimated as the two sigma total propagated uncertainty.

### *Radium-226*

Samples were screened for radium-226 by gas flow proportional counting. Plateau voltage determinations were performed in November 2009. Daily instrument checks met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples. Efficiency calibrations were performed March 2010.

### *Radium-228*

Plateau voltage determinations were performed in November 2009. Daily instrument checks met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples. The chemical recovery for the field sample was adjusted by the laboratory to minimize possible low bias. The result is qualified with a “J” flag (estimated). Efficiency calibrations were performed in July 2009.

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

### *Radiochemistry*

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

## Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB 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. Spike samples were analyzed for manganese, molybdenum, sulfate, and uranium. The MS/MSD analyses resulted in acceptable recovery and precision for all analytes.

### 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 100 times the PQL for ICP-MS or greater than 50 times the PQL for ICP. No serial dilution data required evaluation. The laboratory flagged a manganese result for serial dilution failure, but the sample concentration was less than 50 times the PQL, so no further qualification is necessary.

### Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis of molybdenum and uranium to reduce interferences. The required detection limits were met for all metals and wet chemistry analytes.

All radiochemical MDCs were calculated as specified in *Quality Systems for Analytical Services* revision 2.5. All reported MDCs were less than the required MDCs.

### 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, including manual integrations, were satisfactory.

## Electronic Data Deliverable (EDD) File

The EDD file arrived on July 31, 2010. 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 EDDs 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: 10063125 Lab Code: PAR Validator: Steve Donovan Validation Date: 9/2/2010  
Project: Riverton Analysis Type:  Metals  General Chem  Rad  Organics  
# of Samples: 35 Matrix: WATER Requested Analysis Completed: Yes

### Chain of Custody

Present: OK Signed: OK Dated: OK

### Sample

Integrity: OK Preservation: OK Temperature: OK

### Select Quality Parameters

- Holding Times
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

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

There was 1 trip/equipment blank evaluated.

There were 2 duplicates evaluated.

**SAMPLE MANAGEMENT SYSTEM**  
**Metals Data Validation Worksheet**

RIN: 10063125      Lab Code: PAR      Date Due: 7/27/2010  
 Matrix: Water      Site Code: RVT      Date Completed: 8/3/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
Manganese	07/28/2010			OK	OK	OK	OK	OK	101.0	99.0	100.0	1.0	96.0		101.0
Manganese	07/28/2010								99.0	98.0	99.0	1.0	93.0		98.0
Molybdenum	07/28/2010	0.0000	1.0000	OK	OK	OK	OK	OK	85.0	90.0	89.5	0.0	100.0		107.0
Molybdenum	07/28/2010								84.0	88.0	91.0	3.0			106.0
Uranium	07/28/2010	0.0000	1.0000	OK	OK	OK	OK	OK	92.0	89.0	92.0	3.0	105.0		120.0
Uranium	07/28/2010								90.0	88.0	90.0	2.0			100.0

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

**RIN:** 10063125      **Lab Code:** PAR      **Date Due:** 7/27/2010  
**Matrix:** Water      **Site Code:** RVT      **Date Completed:** 8/3/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
SULFATE	07/13/2010	0.000	1.0000	OK	OK	OK	OK		98.0	91.0	2.00		
SULFATE	07/14/2010						OK	98.00	107.0				
SULFATE	07/14/2010							100.00					

**SAMPLE MANAGEMENT SYSTEM**  
**Radiochemistry Data Validation Worksheet**

**RIN:** 10063125                      **Lab Code:** PAR                      **Date Due:** 7/27/2010  
**Matrix:** Water                      **Site Code:** RVT                      **Date Completed:** 8/3/2010

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0822	Radium-226	07/20/2010			86.9			
Blank_Spike	Radium-226	07/20/2010			88.5	104.00		
Blank_Spike_Du	Radium-226	07/20/2010			98.5	94.10		0.60
Blank	Radium-226	07/20/2010	0.0900	U	88.5			
0822	Radium-228	07/15/2010			68.2			
Blank_Spike	Radium-228	07/15/2010			67.4	85.90		
Blank_Spike_Du	Radium-228	07/15/2010			70.3	77.20		0.50
Blank	Radium-228	07/15/2010	0.0300	U	75.8			

## General Information

Report Number (RIN): 10093341  
Sample Event: September 15, 2010  
Site(s): Riverton, Wyoming  
Laboratory: TestAmerica, Denver, Colorado  
Work Order No.: 280-7527-1  
Analysis: Metals and Wet Chemistry  
Validator: Steve Donovan  
Review Date: October 7, 2010

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory 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 5.

*Table 5. Analytes and Methods*

<b>Analyte</b>	<b>Line Item Code</b>	<b>Prep Method</b>	<b>Analytical Method</b>
Manganese	LMM-01	SW-846 3005A	SW-846 6010B
Molybdenum, Uranium	LMM-02	SW-846 3005A	SW-846 6020A
Sulfate	MIS-A-044	MCAWW 300.0	MCAWW 300.0

## Data Qualifier Summary

None of the analytical results required qualification.

## Sample Shipping/Receiving

TestAmerica in Denver, Colorado, received four water samples on September 17, 2010, accompanied by a 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 2.4 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses.

## Laboratory Instrument Calibration

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



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

#### *Method SW-846 6010, Manganese*

Calibration for manganese was performed on October 1, 2010, using a single point calibration. Initial and continuing calibration verification checks were made at the required frequency resulting in three verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit and all results were within the acceptance range.

#### *Method SW-846 6020, Molybdenum and Uranium*

Calibrations for molybdenum and uranium were performed on October 4, 2010, using a single point calibration. Initial and continuing calibration verification checks were made at the required frequency resulting in four verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit 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, Sulfate*

The calibration for sulfate was performed using six calibration standards on September 15, 2010. 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 resulting in three verification checks. The calibration checks met the acceptance criteria.

#### Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the practical quantitation limits for all analytes.

#### Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB 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

MS/MSD samples are used to measure method performance in the sample matrix. Spike samples were analyzed for manganese, molybdenum, sulfate, and uranium. The manganese, molybdenum, and uranium MD/MSD data were not evaluated because the concentration of the unspiked sample was greater than four times the spike concentration. The sulfate MS/MSD analyses resulted in acceptable recovery and precision.

### Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the sample replicates and matrix spike replicates were less than 20 percent for results that are greater than 5 times the practical quantitation limit, 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 100 times the PQL for ICP-MS or greater than 50 times the PQL for ICP. The serial dilution performance was acceptable for all analytes.

### Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

### Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the method detection limit and practical quantitation limit 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, including manual integrations, were satisfactory.

## Electronic Data Deliverable (EDD) File

The EDD file arrived on October 7, 2010. 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 EDDs 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: 10093341 Lab Code: STD Validator: Steve Donovan Validation Date: 10/7/2010  
Project: Riverton Analysis Type:  Metals  General Chem  Rad  Organics  
# of Samples: 4 Matrix: WATER Requested Analysis Completed: Yes

### Chain of Custody

Present: OK Signed: OK Dated: OK

### Sample

Integrity: OK Preservation: OK Temperature: OK

### Select Quality Parameters

- Holding Times
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

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

There was 1 duplicate evaluated.

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

**RIN:** 10093341      **Lab Code:** STD      **Date Due:** 10/1/2010  
**Matrix:** Water      **Site Code:** RVT      **Date Completed:** 10/7/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Sulfate	09/29/2010	0.000	1.0000	OK	OK	OK	OK	OK	93.00	82.0	82.0	0	
Sulfate	09/29/2010								93.00			0	
Sulfate	09/29/2010											5.00	

**SAMPLE MANAGEMENT SYSTEM**

**Metals Data Validation Worksheet**

RIN: 10093341      Lab Code: STD      Date Due: 10/1/2010  
 Matrix: Water      Site Code: RVT      Date Completed: 10/7/2010

Analyte	Date Analyzed	CALIBRATION						Method	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
Manganese	10/01/2010			OK	OK	OK	OK	OK	98.0	74.0	93.0	4.0	99.0	4.0	109.0
Molybdenum	10/05/2010			OK	OK	OK	OK	OK	104.0	250.0	135.0	3.0	107.0	7.0	99.0
Uranium	10/05/2010			OK	OK	OK	OK	OK	102.0	82.0	10.0	2.0	104.0	4.0	102.0

## Sampling Quality Control Assessment

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

### Sampling Protocol

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

Domestic wells were classified as Category IV. 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. The sample results for these wells were qualified with a “Q” flag, indicating the data are qualitative because of the sampling technique.

### Equipment Blank Assessment

An equipment blank (field ID 2646) was collected after decontamination of the non-dedicated tubing reel used to collect some surface water samples. Manganese was detected in this blank, but was qualified during data validation with a “U” flag as not detected. 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 0460 and 0789 during the June 2010 sampling event, and from location 0788 during the September 2010 confirmatory sampling event. The duplicate results were acceptable, meeting the EPA recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than 5 times the PQL.

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

RIN: 10063125    Lab Code: PAR    Project: Riverton    Validation Date: 9/2/2010

Duplicate: 2644

Sample: 0460

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Manganese	0.73	B		1	0.94	B		1	25.15		UG/L
Molybdenum	2.7			10	2.5			10	7.69		UG/L
SULFATE	160			5	160			5	0		MG/L
Uranium	0.029	U		10	0.029	U		10			UG/L

Duplicate: 2645

Sample: 0789

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Manganese	1100			5	1100			5	0		UG/L
Molybdenum	450			200	510			200	12.50		UG/L
SULFATE	9400			100	9200			100	2.15		MG/L
Uranium	2300			200	2500			200	8.33		UG/L



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

RIN: 10093341    Lab Code: STD    Project: Riverton    Validation Date: 10/7/2010

Duplicate: 2045

Sample: 0788

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Manganese	92			1	84			1	9.09		ug/L
Molybdenum	27			1	26			1	3.77		ug/L
Sulfate	1800			50	1800			50	0		mg/L
Uranium	58			1	57			1	1.74		ug/L

### Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Steve Donivan 10-25-2010  
Steve Donivan Date

Data Validation Lead: Steve Donivan 10-25-2010  
Steve Donivan Date

**Attachment 1**  
**Assessment of Anomalous Data**

This page intentionally left blank

# Potential Outliers Report

This page intentionally left blank

## 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 SEEPro database. The application compares the new data set 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.

Twelve results were identified as potentially anomalous. The anomalous data are attributed to the high water in the Little Wind River and flooding conditions encountered. Additional samples were collected on September 15, 2010, from locations 0707, 0788, and 0789. Analysis of these samples confirmed the high concentrations of contaminants present.

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

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 10063125

Report Date: 10/7/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers Lab	Data	Result	Qualifiers Lab	Data	Result	Qualifiers Lab	Data	N	N Below Detect	
RVT01	0707	N001	06/24/2010	Molybdenum	1.6		F	1.42			0.52			48	0	Yes
RVT01	0707	N001	06/24/2010	Sulfate	7000		F	4430			1700		F	47	0	No
RVT01	0707	N001	06/24/2010	Uranium	2.7		F	1.97			0.63		F	48	0	No
RVT01	0710	N001	06/23/2010	Molybdenum	0.00032	U	F	0.01	U		0.0014	B		29	17	No
RVT01	0717	N001	06/23/2010	Manganese	0.31		F	0.26		F	0.017		F	23	0	No
RVT01	0718	N001	06/24/2010	Manganese	0.36		F	3.28			0.37		F	24	0	No
RVT01	0718	N001	06/24/2010	Molybdenum	0.055		F	0.15			0.073		F	24	0	No
RVT01	0719	N001	06/24/2010	Manganese	0.25		FQ	0.24		F	0.0022	B	UFQ	23	1	No
RVT01	0721	N001	06/24/2010	Molybdenum	0.0023		F	0.01	U		0.0024		F	20	3	No
RVT01	0722R	N001	06/24/2010	Molybdenum	0.11		F	0.078		F	0.053		F	6	0	Yes
RVT01	0723	N001	06/24/2010	Manganese	0.41		F	1.01			0.44		F	24	0	No
RVT01	0729	N001	06/23/2010	Uranium	0.0052		F	0.0186			0.007		F	18	0	No
RVT01	0749	N001	06/23/2010	Uranium	0.002			0.0019			0.0001	U		24	14	No
RVT01	0784	N001	06/23/2010	Manganese	1		F	0.54		F	0.26		F	8	0	Yes
RVT01	0784	N001	06/23/2010	Molybdenum	0.034		F	0.023		F	0.012		F	8	0	No
RVT01	0784	N001	06/23/2010	Uranium	0.035		F	0.0094		F	0.0018		F	8	0	Yes
RVT01	0788	N001	06/24/2010	Sulfate	4500		F	1890	I		610		F	15	0	No
RVT01	0788	N001	06/24/2010	Uranium	0.1		F	0.064			0.029		F	15	0	Yes



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

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 10063125

Report Date: 10/7/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers		Result	Qualifiers		Result	Qualifiers		N	N Below Detect	
						Lab	Data		Lab	Data		Lab	Data			
RVT01	0789	N002	06/24/2010	Manganese	1.1		F	0.82		F	0.031		F	11	0	Yes
RVT01	0789	N001	06/24/2010	Manganese	1.1		F	0.82		F	0.031		F	11	0	Yes
RVT01	0789	N001	06/24/2010	Sulfate	9400		F	4700		F	3500		F	11	0	Yes
RVT01	0789	N002	06/24/2010	Sulfate	9200		F	4700		F	3500		F	11	0	Yes
RVT01	0789	N001	06/24/2010	Uranium	2.3		F	2.1		F	1.3		F	12	0	Yes
RVT01	0789	N002	06/24/2010	Uranium	2.5		F	2.1		F	1.3		F	12	0	Yes
RVT01	0794	0001	06/23/2010	Molybdenum	0.00032	U		0.01	U		0.00067	B		28	17	No
RVT01	0794	0001	06/23/2010	Uranium	0.00097			0.011			0.0011			30	1	No
RVT01	0811	0001	06/24/2010	Sulfate	46			281			62			12	0	No
RVT01	0811	0001	06/24/2010	Uranium	0.00096			0.007			0.0011			12	0	No
RVT01	0812	0001	06/24/2010	Manganese	0.0087			0.0403			0.0093			10	0	No
RVT01	0812	0001	06/24/2010	Sulfate	46			290			60			12	0	No
RVT01	0812	0001	06/24/2010	Uranium	0.001			0.0072			0.0013			12	0	No
RVT01	0823	N001	06/23/2010	Molybdenum	0.0015			0.0063	E		0.0023			9	0	No
RVT01	0823	N001	06/23/2010	Uranium	0.0031			0.013			0.0037			11	0	No
RVT01	0824	N001	06/24/2010	Manganese	0.00042	B	UF	0.007		F	0.0015	B	JF	6	1	No
RVT01	0824	N001	06/24/2010	Sulfate	190		F	160		F	110		F	6	0	No
RVT01	0826	N001	06/24/2010	Manganese	2.7		F	0.71		F	0.45		F	7	0	Yes

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

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 10063125

Report Date: 10/7/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers Lab Data		Result	Qualifiers Lab Data		Result	Qualifiers Lab Data		N	N Below Detect	
RVT01	0826	N001	06/24/2010	Molybdenum	0.046		F	0.026		F	0.021		F	7	0	Yes
RVT01	0826	N001	06/24/2010	Sulfate	2400		F	580		F	340		F	7	0	Yes
RVT01	0826	N001	06/24/2010	Uranium	0.08		F	0.041		F	0.026		F	7	0	Yes

**Data Validation Outliers Report - Field Parameters Only**

**Comparison: All Historical Data**

Laboratory: Field Measurements

RIN: 10063125

Report Date: 10/7/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers Lab Data		Result	Qualifiers Lab Data		Result	Qualifiers Lab Data		N	N Below Detect	
RVT01	0430	N001	06/23/2010	Oxidation Reduction Potential	-11.6			271			48		G	13	0	Yes
RVT01	0460	N001	06/23/2010	pH	7.32			8.97			8.07			13	0	No
RVT01	0460	N001	06/23/2010	Specific Conductance	815			743			476			13	0	No
RVT01	0707	N001	06/24/2010	Specific Conductance	11640		F	8340			2350			42	0	Yes
RVT01	0710	N001	06/23/2010	Specific Conductance	1304		F	1059			307			27	0	Yes
RVT01	0722R	N001	06/24/2010	Specific Conductance	2031		F	1874		F	992		F	6	0	No
RVT01	0747	N001	06/24/2010	Turbidity	20			305			23			17	0	No
RVT01	0784	N001	06/23/2010	pH	7.61		F	8.09		F	7.83		F	8	0	No
RVT01	0788	N001	06/24/2010	pH	7.02		F	7.5		F	7.07		F	14	0	No

**Data Validation Outliers Report - Field Parameters Only**

**Comparison: All Historical Data**

Laboratory: Field Measurements

RIN: 10063125

Report Date: 10/7/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	N	N Below Detect			
RVT01	0788	N001	06/24/2010	Specific Conductance	8527	F	3700			1783	F	14	0	No	
RVT01	0789	N001	06/24/2010	Specific Conductance	15505	F	7981	F		6210	F	8	0	No	
RVT01	0810	N001	06/23/2010	Oxidation Reduction Potential	12.5		213.6			27.7		12	0	No	
RVT01	0810	N001	06/23/2010	Specific Conductance	11.36		1539			1005		12	0	Yes	
RVT01	0810	N001	06/23/2010	Temperature	24.31		20.99			5.11		12	0	No	
RVT01	0811	N001	06/24/2010	Specific Conductance	226		907			280		12	0	No	
RVT01	0812	N001	06/24/2010	Temperature	18.38		17.87			4.24		12	0	No	
RVT01	0823	N001	06/23/2010	Oxidation Reduction Potential	22.2		228			35		11	0	No	
RVT01	0824	N001	06/24/2010	pH	7.07	F	7.35	F		7.2	F	6	0	No	
RVT01	0824	N001	06/24/2010	Specific Conductance	981	F	938	F		758	F	6	0	No	
RVT01	0826	N001	06/24/2010	pH	7	F	7.48	F		7.3	F	6	0	Yes	
RVT01	0826	N001	06/24/2010	Specific Conductance	4653	F	1814	F		1298	F	6	0	Yes	
RVT01	0826	N001	06/24/2010	Temperature	11.69	F	11.09	F		8.97	F	6	0	No	

**STATISTICAL TESTS:**

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

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

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

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

This page intentionally left blank

# **Attachment 2**

## **Data Presentation**

This page intentionally left blank

## **Groundwater Quality Data**

This page intentionally left blank



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

REPORT DATE: 10/8/2010

Location: 0405 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	-	0.0037	BE		#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	-	0.0028			#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	-	122			#		
pH	s.u.	06/23/2010	N001	-	8.75			#		
Specific Conductance	umhos/cm	06/23/2010	N001	-	1001			#		
Sulfate	mg/L	06/23/2010	N001	-	300			#	2.5	
Temperature	C	06/23/2010	N001	-	12.9			#		
Turbidity	NTU	06/23/2010	N001	-	3.7			#		
Uranium	mg/L	06/23/2010	N001	-	0.000029	U		#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0430 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	-	0.0038	B		#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	-	0.0021			#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	-	-11.6			#		
pH	s.u.	06/23/2010	N001	-	8.77			#		
Specific Conductance	umhos/cm	06/23/2010	N001	-	825			#		
Sulfate	mg/L	06/23/2010	N001	-	180			#	2.5	
Temperature	C	06/23/2010	N001	-	12.79			#		
Turbidity	NTU	06/23/2010	N001	-	2.47			#		
Uranium	mg/L	06/23/2010	N001	-	0.000029	U		#	0.000029	

---

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

REPORT DATE: 10/8/2010

Location: 0436 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	-	0.0016	B		#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	-	0.0027			#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	-	180			#		
pH	s.u.	06/23/2010	N001	-	8.83			#		
Specific Conductance	umhos/cm	06/23/2010	N001	-	825			#		
Sulfate	mg/L	06/23/2010	N001	-	190			#	2.5	
Temperature	C	06/23/2010	N001	-	17.2			#		
Turbidity	NTU	06/23/2010	N001	-	1.94			#		
Uranium	mg/L	06/23/2010	N001	-	0.000029	U		#	0.000029	

---

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

REPORT DATE: 10/8/2010

Location: 0460 WELL Koch Sulfuric Acid Plant

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	-	0.00073	B		#	0.000054	
Manganese	mg/L	06/23/2010	N002	-	0.00094	B	U	#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	-	0.0027			#	0.00032	
Molybdenum	mg/L	06/23/2010	N002	-	0.0025			#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	-	175			#		
pH	s.u.	06/23/2010	N001	-	7.32			#		
Specific Conductance	umhos/cm	06/23/2010	N001	-	815			#		
Sulfate	mg/L	06/23/2010	N001	-	160			#	2.5	
Sulfate	mg/L	06/23/2010	N002	-	160			#	2.5	
Temperature	C	06/23/2010	N001	-	13.8			#		
Turbidity	NTU	06/23/2010	N001	-	1.17			#		
Uranium	mg/L	06/23/2010	N001	-	0.000029	U		#	0.000029	
Uranium	mg/L	06/23/2010	N002	-	0.000029	U		#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0705 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	37.3	- 61.8	0.0024	B	FQ	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	37.3	- 61.8	0.0024		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	37.3	- 61.8	59.9		FQ	#		
pH	s.u.	06/24/2010	N001	37.3	- 61.8	7.69		FQ	#		
Specific Conductance	umhos /cm	06/24/2010	N001	37.3	- 61.8	1260		FQ	#		
Sulfate	mg/L	06/24/2010	N001	37.3	- 61.8	430		FQ	#	2.5	
Temperature	C	06/24/2010	N001	37.3	- 61.8	10.53		FQ	#		
Turbidity	NTU	06/24/2010	N001	37.3	- 61.8	2.92		FQ	#		
Uranium	mg/L	06/24/2010	N001	37.3	- 61.8	0.00022		FQ	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0707 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Manganese	mg/L	06/24/2010	N001	9.1 - 23.3	2.3		F	#	0.00027	
Manganese	mg/L	09/15/2010	N001	9.1 - 23.3	2.1		F	#	0.00025	
Molybdenum	mg/L	06/24/2010	N001	9.1 - 23.3	1.6		F	#	0.0064	
Molybdenum	mg/L	09/15/2010	N001	9.1 - 23.3	1.7		F	#	0.00014	
Oxidation Reduction Potential	mV	06/24/2010	N001	9.1 - 23.3	86.7		F	#		
Oxidation Reduction Potential	mV	09/15/2010	N001	9.1 - 23.3	47.0		F	#		
pH	s.u.	06/24/2010	N001	9.1 - 23.3	6.73		F	#		
pH	s.u.	09/15/2010	N001	9.1 - 23.3	6.96		F	#		
Specific Conductance	umhos/cm	06/24/2010	N001	9.1 - 23.3	11640		F	#		
Specific Conductance	umhos/cm	09/15/2010	N001	9.1 - 23.3	8630		F	#		
Sulfate	mg/L	06/24/2010	N001	9.1 - 23.3	7000		F	#	50	
Sulfate	mg/L	09/15/2010	N001	9.1 - 23.3	4900		F	#	46	
Temperature	C	06/24/2010	N001	9.1 - 23.3	9.96		F	#		
Temperature	C	09/15/2010	N001	9.1 - 23.3	10.7		F	#		
Turbidity	NTU	06/24/2010	N001	9.1 - 23.3	1.59		F	#		
Turbidity	NTU	09/15/2010	N001	9.1 - 23.3	1.65		F	#		
Uranium	mg/L	06/24/2010	N001	9.1 - 23.3	2.7		F	#	0.00058	
Uranium	mg/L	09/15/2010	N001	9.1 - 23.3	1.5		F	#	0.00002	

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

REPORT DATE: 10/8/2010

Location: 0710 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	9.8	- 26.8	0.023		F	#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	9.8	- 26.8	0.00032	U	F	#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	9.8	- 26.8	45.2		F	#		
pH	s.u.	06/23/2010	N001	9.8	- 26.8	7.37		F	#		
Specific Conductance	umhos /cm	06/23/2010	N001	9.8	- 26.8	1304		F	#		
Sulfate	mg/L	06/23/2010	N001	9.8	- 26.8	400		F	#	2.5	
Temperature	C	06/23/2010	N001	9.8	- 26.8	9.87		F	#		
Turbidity	NTU	06/23/2010	N001	9.8	- 26.8	1.64		F	#		
Uranium	mg/L	06/23/2010	N001	9.8	- 26.8	0.0081		F	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0716 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	9.78 - 14.78	0.3		F	#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	9.78 - 14.78	0.14		F	#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	9.78 - 14.78	135		F	#		
pH	s.u.	06/23/2010	N001	9.78 - 14.78	7		F	#		
Specific Conductance	umhos /cm	06/23/2010	N001	9.78 - 14.78	1320		F	#		
Sulfate	mg/L	06/23/2010	N001	9.78 - 14.78	370		F	#	2.5	
Temperature	C	06/23/2010	N001	9.78 - 14.78	9.8		F	#		
Turbidity	NTU	06/23/2010	N001	9.78 - 14.78	0.61		F	#		
Uranium	mg/L	06/23/2010	N001	9.78 - 14.78	0.21		F	#	0.000029	



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

REPORT DATE: 10/8/2010

Location: 0717 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	45.1	- 55.1	0.31		F	#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	45.1	- 55.1	0.0077		F	#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	45.1	- 55.1	-22.1		F	#		
pH	s.u.	06/23/2010	N001	45.1	- 55.1	7.61		F	#		
Specific Conductance	umhos /cm	06/23/2010	N001	45.1	- 55.1	2035		F	#		
Sulfate	mg/L	06/23/2010	N001	45.1	- 55.1	740		F	#	10	
Temperature	C	06/23/2010	N001	45.1	- 55.1	10.82		F	#		
Turbidity	NTU	06/23/2010	N001	45.1	- 55.1	3.79		F	#		
Uranium	mg/L	06/23/2010	N001	45.1	- 55.1	0.0002		F	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0718 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	18.24 - 23.24	0.36		F	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	18.24 - 23.24	0.055		F	#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	18.24 - 23.24	38		F	#		
pH	s.u.	06/24/2010	N001	18.24 - 23.24	7.09		F	#		
Specific Conductance	umhos /cm	06/24/2010	N001	18.24 - 23.24	4122		F	#		
Sulfate	mg/L	06/24/2010	N001	18.24 - 23.24	1800		F	#	25	
Temperature	C	06/24/2010	N001	18.24 - 23.24	10.59		F	#		
Turbidity	NTU	06/24/2010	N001	18.24 - 23.24	4.3		F	#		
Uranium	mg/L	06/24/2010	N001	18.24 - 23.24	0.19		F	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0719 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	38.47	- 48.47	0.25		FQ	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	38.47	- 48.47	0.013		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	38.47	- 48.47	-20		FQ	#		
pH	s.u.	06/24/2010	N001	38.47	- 48.47	7.83		FQ	#		
Specific Conductance	umhos /cm	06/24/2010	N001	38.47	- 48.47	1271		FQ	#		
Sulfate	mg/L	06/24/2010	N001	38.47	- 48.47	440		FQ	#	5	
Temperature	C	06/24/2010	N001	38.47	- 48.47	12.02		FQ	#		
Turbidity	NTU	06/24/2010	N001	38.47	- 48.47	6.94		FQ	#		
Uranium	mg/L	06/24/2010	N001	38.47	- 48.47	0.00049		FQ	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0720 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	7.94	- 12.94	0.3		F	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	7.94	- 12.94	0.0018		F	#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	7.94	- 12.94	58.1		F	#		
pH	s.u.	06/24/2010	N001	7.94	- 12.94	7.29		F	#		
Specific Conductance	umhos /cm	06/24/2010	N001	7.94	- 12.94	1685		F	#		
Sulfate	mg/L	06/24/2010	N001	7.94	- 12.94	640		F	#	10	
Temperature	C	06/24/2010	N001	7.94	- 12.94	9.59		F	#		
Turbidity	NTU	06/24/2010	N001	7.94	- 12.94	3.43		F	#		
Uranium	mg/L	06/24/2010	N001	7.94	- 12.94	0.011		F	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0721 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	44.43	- 54.43	0.0036	B	F	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	44.43	- 54.43	0.0023		F	#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	44.43	- 54.43	41.7		F	#		
pH	s.u.	06/24/2010	N001	44.43	- 54.43	8.86		F	#		
Specific Conductance	umhos /cm	06/24/2010	N001	44.43	- 54.43	929		F	#		
Sulfate	mg/L	06/24/2010	N001	44.43	- 54.43	290		F	#	2.5	
Temperature	C	06/24/2010	N001	44.43	- 54.43	9.89		F	#		
Turbidity	NTU	06/24/2010	N001	44.43	- 54.43	2.68		F	#		
Uranium	mg/L	06/24/2010	N001	44.43	- 54.43	0.000029	U	F	#	0.000029	

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

REPORT DATE: 10/8/2010

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

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	11.1	- 16.1	0.0017	B	F	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	11.1	- 16.1	0.11		F	#	0.0032	
Oxidation Reduction Potential	mV	06/24/2010	N001	11.1	- 16.1	9.9		F	#		
pH	s.u.	06/24/2010	N001	11.1	- 16.1	7		F	#		
Specific Conductance	umhos/cm	06/24/2010	N001	11.1	- 16.1	2031		F	#		
Sulfate	mg/L	06/24/2010	N001	11.1	- 16.1	790		F	#	10	
Temperature	C	06/24/2010	N001	11.1	- 16.1	11.78		F	#		
Turbidity	NTU	06/24/2010	N001	11.1	- 16.1	1.06		F	#		
Uranium	mg/L	06/24/2010	N001	11.1	- 16.1	0.54		F	#	0.00029	

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

REPORT DATE: 10/8/2010

Location: 0723 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Manganese	mg/L	06/24/2010	N001	45.99 - 55.99	0.41		F	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	45.99 - 55.99	0.00032	U	F	#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	45.99 - 55.99	-30.2		F	#		
pH	s.u.	06/24/2010	N001	45.99 - 55.99	7.15		F	#		
Specific Conductance	umhos /cm	06/24/2010	N001	45.99 - 55.99	3882		F	#		
Sulfate	mg/L	06/24/2010	N001	45.99 - 55.99	1700		F	#	25	
Temperature	C	06/24/2010	N001	45.99 - 55.99	12.18		F	#		
Turbidity	NTU	06/24/2010	N001	45.99 - 55.99	1.52		F	#		
Uranium	mg/L	06/24/2010	N001	45.99 - 55.99	0.000029	U	F	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0729 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	14.71 - 19.71	0.0082		F	#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	14.71 - 19.71	0.0026		F	#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	14.71 - 19.71	32		F	#		
pH	s.u.	06/23/2010	N001	14.71 - 19.71	7.18		F	#		
Specific Conductance	umhos /cm	06/23/2010	N001	14.71 - 19.71	727		F	#		
Sulfate	mg/L	06/23/2010	N001	14.71 - 19.71	73		F	#	2.5	
Temperature	C	06/23/2010	N001	14.71 - 19.71	13.23		F	#		
Turbidity	NTU	06/23/2010	N001	14.71 - 19.71	5.64		F	#		
Uranium	mg/L	06/23/2010	N001	14.71 - 19.71	0.0052		F	#	0.000029	



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

REPORT DATE: 10/8/2010

Location: 0730 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	38.62	- 48.62	0.086		FQ	#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	38.62	- 48.62	0.0039		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	38.62	- 48.62	1.9		FQ	#		
pH	s.u.	06/23/2010	N001	38.62	- 48.62	7.36		FQ	#		
Specific Conductance	umhos /cm	06/23/2010	N001	38.62	- 48.62	1034		FQ	#		
Sulfate	mg/L	06/23/2010	N001	38.62	- 48.62	170		FQ	#	2.5	
Temperature	C	06/23/2010	N001	38.62	- 48.62	13.25		FQ	#		
Turbidity	NTU	06/23/2010	N001	38.62	- 48.62	6.62		FQ	#		
Uranium	mg/L	06/23/2010	N001	38.62	- 48.62	0.0071		FQ	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0784 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	1.65	- 6.65	1		F	#	0.00011	
Molybdenum	mg/L	06/23/2010	N001	1.65	- 6.65	0.034		F	#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	1.65	- 6.65	-37.4		F	#		
pH	s.u.	06/23/2010	N001	1.65	- 6.65	7.61		F	#		
Specific Conductance	umhos /cm	06/23/2010	N001	1.65	- 6.65	5978		F	#		
Sulfate	mg/L	06/23/2010	N001	1.65	- 6.65	3200		F	#	25	
Temperature	C	06/23/2010	N001	1.65	- 6.65	12.6		F	#		
Turbidity	NTU	06/23/2010	N001	1.65	- 6.65	2.98		F	#		
Uranium	mg/L	06/23/2010	N001	1.65	- 6.65	0.035		F	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0788 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	1.41	- 13.41	0.024	B	F	#	0.00027	
Manganese	mg/L	09/15/2010	N001	1.41	- 13.41	0.092		F	#	0.00025	
Manganese	mg/L	09/15/2010	N002	1.41	- 13.41	0.084		F	#	0.00025	
Molybdenum	mg/L	06/24/2010	N001	1.41	- 13.41	0.023		F	#	0.0032	
Molybdenum	mg/L	09/15/2010	N001	1.41	- 13.41	0.027		F	#	0.00014	
Molybdenum	mg/L	09/15/2010	N002	1.41	- 13.41	0.026		F	#	0.00014	
Oxidation Reduction Potential	mV	06/24/2010	N001	1.41	- 13.41	78.9		F	#		
Oxidation Reduction Potential	mV	09/15/2010	N001	1.41	- 13.41	45.0		F	#		
pH	s.u.	06/24/2010	N001	1.41	- 13.41	7.02		F	#		
pH	s.u.	09/15/2010	N001	1.41	- 13.41	7.13		F	#		
Specific Conductance	umhos/cm	06/24/2010	N001	1.41	- 13.41	8527		F	#		
Specific Conductance	umhos/cm	09/15/2010	N001	1.41	- 13.41	4265		F	#		
Sulfate	mg/L	06/24/2010	N001	1.41	- 13.41	4500		F	#	25	
Sulfate	mg/L	09/15/2010	N001	1.41	- 13.41	1800		F	#	12	
Sulfate	mg/L	09/15/2010	N002	1.41	- 13.41	1800		F	#	12	
Temperature	C	06/24/2010	N001	1.41	- 13.41	11.77		F	#		
Temperature	C	09/15/2010	N001	1.41	- 13.41	11.20		F	#		

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

REPORT DATE: 10/8/2010

Location: 0788 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Turbidity	NTU	06/24/2010	N001	1.41	- 13.41	3.87		F	#		
Turbidity	NTU	09/15/2010	N001	1.41	- 13.41	2.25		F	#		
Uranium	mg/L	06/24/2010	N001	1.41	- 13.41	0.1		F	#	0.00029	
Uranium	mg/L	09/15/2010	N001	1.41	- 13.41	0.058		F	#	0.00002	
Uranium	mg/L	09/15/2010	N002	1.41	- 13.41	0.057		F	#	0.00002	

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

REPORT DATE: 10/8/2010

Location: 0789 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	6.2	- 18.2	1.1		F	#	0.00027	
Manganese	mg/L	06/24/2010	N002	6.2	- 18.2	1.1		F	#	0.00027	
Manganese	mg/L	09/15/2010	N001	6.2	- 18.2	0.37		F	#	0.00025	
Molybdenum	mg/L	06/24/2010	N001	6.2	- 18.2	0.45		F	#	0.0064	
Molybdenum	mg/L	06/24/2010	N002	6.2	- 18.2	0.51		F	#	0.0064	
Molybdenum	mg/L	09/15/2010	N001	6.2	- 18.2	0.71		F	#	0.00014	
Oxidation Reduction Potential	mV	06/24/2010	N001	6.2	- 18.2	69.5		F	#		
Oxidation Reduction Potential	mV	09/15/2010	N001	6.2	- 18.2	52.0		F	#		
pH	s.u.	06/24/2010	N001	6.2	- 18.2	7.06		F	#		
pH	s.u.	09/15/2010	N001	6.2	- 18.2	7.07		F	#		
Specific Conductance	umhos/cm	06/24/2010	N001	6.2	- 18.2	15505		F	#		
Specific Conductance	umhos/cm	09/15/2010	N001	6.2	- 18.2	16600		F	#		
Sulfate	mg/L	06/24/2010	N001	6.2	- 18.2	9400		F	#	50	
Sulfate	mg/L	06/24/2010	N002	6.2	- 18.2	9200		F	#	50	
Sulfate	mg/L	09/15/2010	N001	6.2	- 18.2	9700		F	#	46	
Temperature	C	06/24/2010	N001	6.2	- 18.2	12.29		F	#		
Temperature	C	09/15/2010	N001	6.2	- 18.2	12.20		F	#		

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

REPORT DATE: 10/8/2010

Location: 0789 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Turbidity	NTU	06/24/2010	N001	6.2 - 18.2	3.44		F	#		
Turbidity	NTU	09/15/2010	N001	6.2 - 18.2	1.72		F	#		
Uranium	mg/L	06/24/2010	N001	6.2 - 18.2	2.3		F	#	0.00058	
Uranium	mg/L	06/24/2010	N002	6.2 - 18.2	2.5		F	#	0.00058	
Uranium	mg/L	09/15/2010	N001	6.2 - 18.2	2.5		F	#	0.00014	

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

REPORT DATE: 10/8/2010

Location: 0824 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	9.5	- 14.5	0.00042	B	UF	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	9.5	- 14.5	0.0037		F	#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	9.5	- 14.5	77.1		F	#		
pH	s.u.	06/24/2010	N001	9.5	- 14.5	7.07		F	#		
Specific Conductance	umhos /cm	06/24/2010	N001	9.5	- 14.5	981		F	#		
Sulfate	mg/L	06/24/2010	N001	9.5	- 14.5	190		F	#	2.5	
Temperature	C	06/24/2010	N001	9.5	- 14.5	8.96		F	#		
Turbidity	NTU	06/24/2010	N001	9.5	- 14.5	1.03		F	#		
Uranium	mg/L	06/24/2010	N001	9.5	- 14.5	0.018		F	#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0826 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/24/2010	N001	6.6	- 11.6	2.7		F	#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	6.6	- 11.6	0.046		F	#	0.0032	
Oxidation Reduction Potential	mV	06/24/2010	N001	6.6	- 11.6	16.8		F	#		
pH	s.u.	06/24/2010	N001	6.6	- 11.6	7		F	#		
Specific Conductance	umhos /cm	06/24/2010	N001	6.6	- 11.6	4653		F	#		
Sulfate	mg/L	06/24/2010	N001	6.6	- 11.6	2400		F	#	25	
Temperature	C	06/24/2010	N001	6.6	- 11.6	11.69		F	#		
Turbidity	NTU	06/24/2010	N001	6.6	- 11.6	2.28		F	#		
Uranium	mg/L	06/24/2010	N001	6.6	- 11.6	0.08		F	#	0.00029	



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

REPORT DATE: 10/8/2010

Location: 0828 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	06/23/2010	N001	-	0.0019	B		#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	-	0.0028			#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	-	150			#		
pH	s.u.	06/23/2010	N001	-	8.83			#		
Specific Conductance	umhos /cm	06/23/2010	N001	-	815			#		
Sulfate	mg/L	06/23/2010	N001	-	200			#	2.5	
Temperature	C	06/23/2010	N001	-	15.2			#		
Turbidity	NTU	06/23/2010	N001	-	1.15			#		
Uranium	mg/L	06/23/2010	N001	-	0.000029	U		#	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**

This page intentionally left blank

---

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

REPORT DATE: 10/8/2010

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

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Manganese	mg/L	06/24/2010	N001	0.21			#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	0.0018			#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	55.9			#		
pH	s.u.	06/24/2010	N001	7.41			#		
Specific Conductance	umhos/cm	06/24/2010	N001	761			#		
Sulfate	mg/L	06/24/2010	N001	230			#	2.5	
Temperature	C	06/24/2010	N001	24.61			#		
Turbidity	NTU	06/24/2010	N001	20			#		
Uranium	mg/L	06/24/2010	N001	0.027			#	0.000029	

---

---

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

REPORT DATE: 10/8/2010

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

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Manganese	mg/L	06/23/2010	N001	0.12			#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	0.008			#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	90			#		
pH	s.u.	06/23/2010	N001	8.22			#		
Specific Conductance	umhos/cm	06/23/2010	N001	4445			#		
Sulfate	mg/L	06/23/2010	N001	2700			#	25	
Temperature	C	06/23/2010	N001	26.8			#		
Turbidity	NTU	06/23/2010	N001	8.88			#		
Uranium	mg/L	06/23/2010	N001	0.002			#	0.000029	

---

---

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

REPORT DATE: 10/8/2010

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

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Manganese	mg/L	06/23/2010	0001	0.01	E	#	0.000054	
Molybdenum	mg/L	06/23/2010	0001	0.00032	U	#	0.00032	
Sulfate	mg/L	06/23/2010	0001	45		#	0.5	
Uranium	mg/L	06/23/2010	0001	0.00097		#	0.000029	
Oxidation Reduction Potential	mV	06/23/2010	N001	125		#		
pH	s.u.	06/23/2010	N001	8.03		#		
Specific Conductance	umhos/cm	06/23/2010	N001	249		#		
Temperature	C	06/23/2010	N001	16.55		#		
Turbidity	NTU	06/23/2010	N001	66.7		#		

---

---

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

REPORT DATE: 10/8/2010

Location: 0796 SURFACE LOCATION Was possibly historically sampled ~900 ft E from current location

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Manganese	mg/L	06/24/2010	0001	0.0084		#	0.000054	
Molybdenum	mg/L	06/24/2010	0001	0.00032	U	#	0.00032	
Sulfate	mg/L	06/24/2010	0001	50		#	0.5	
Uranium	mg/L	06/24/2010	0001	0.0011		#	0.000029	
Oxidation Reduction Potential	mV	06/24/2010	N001	152.7		#		
pH	s.u.	06/24/2010	N001	7.51		#		
Specific Conductance	umhos/cm	06/24/2010	N001	243		#		
Temperature	C	06/24/2010	N001	13.55		#		
Turbidity	NTU	06/24/2010	N001	62.5		#		

---



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

REPORT DATE: 10/8/2010

Location: 0810 SURFACE LOCATION Gravel Pit Pond

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data		
Manganese	mg/L	06/23/2010	N001	0.036			#	0.000054
Molybdenum	mg/L	06/23/2010	N001	0.00032	U		#	0.00032
Oxidation Reduction Potential	mV	06/23/2010	N001	12.5			#	
pH	s.u.	06/23/2010	N001	9.4			#	
Specific Conductance	umhos/cm	06/23/2010	N001	11.36			#	
Sulfate	mg/L	06/23/2010	N001	250			#	2.5
Temperature	C	06/23/2010	N001	24.31			#	
Turbidity	NTU	06/23/2010	N001	2.3			#	
Uranium	mg/L	06/23/2010	N001	0.0042			#	0.000029

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

REPORT DATE: 10/8/2010

Location: 0811 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data		
Manganese	mg/L	06/24/2010	0001	0.0083			#	0.000054
Molybdenum	mg/L	06/24/2010	0001	0.00032	U		#	0.00032
Sulfate	mg/L	06/24/2010	0001	46			#	0.5
Uranium	mg/L	06/24/2010	0001	0.00096			#	0.000029
Oxidation Reduction Potential	mV	06/24/2010	N001	42.2			#	
pH	s.u.	06/24/2010	N001	8.01			#	
Specific Conductance	umhos/cm	06/24/2010	N001	226			#	
Temperature	C	06/24/2010	N001	16.32			#	
Turbidity	NTU	06/24/2010	N001	61.6			#	

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

REPORT DATE: 10/8/2010

Location: 0812 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data		
Manganese	mg/L	06/24/2010	0001	0.0087		#	0.000054	
Molybdenum	mg/L	06/24/2010	0001	0.00032	U	#	0.00032	
Sulfate	mg/L	06/24/2010	0001	46		#	0.5	
Uranium	mg/L	06/24/2010	0001	0.001		#	0.000029	
Oxidation Reduction Potential	mV	06/24/2010	N001	76.4		#		
pH	s.u.	06/24/2010	N001	7.72		#		
Specific Conductance	umhos/cm	06/24/2010	N001	282		#		
Temperature	C	06/24/2010	N001	18.38		#		
Turbidity	NTU	06/24/2010	N001	56.8		#		

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

REPORT DATE: 10/8/2010

Location: 0822 SURFACE LOCATION west-side irrigation ditch

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers		Detection Limit	Uncertainty
					Lab	Data QA		
Manganese	mg/L	06/24/2010	N001	0.089		#	0.000054	
Molybdenum	mg/L	06/24/2010	N001	0.0031		#	0.00032	
Oxidation Reduction Potential	mV	06/24/2010	N001	79		#		
pH	s.u.	06/24/2010	N001	7.82		#		
Radium-226	pCi/L	06/24/2010	N001	0.221		J #	0.15	0.152
Radium-228	pCi/L	06/24/2010	N001	0.48	U	#	0.48	0.278
Specific Conductance	umhos/cm	06/24/2010	N001	2740		#		
Sulfate	mg/L	06/24/2010	N001	1400		#	10	
Temperature	C	06/24/2010	N001	15.95		#		
Turbidity	NTU	06/24/2010	N001	5.93		#		
Uranium	mg/L	06/24/2010	N001	0.006		#	0.000029	

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

REPORT DATE: 10/8/2010

Location: 0823 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Manganese	mg/L	06/23/2010	N001	0.018		#	0.000054	
Molybdenum	mg/L	06/23/2010	N001	0.0015		#	0.00032	
Oxidation Reduction Potential	mV	06/23/2010	N001	22.2		#		
pH	s.u.	06/23/2010	N001	9.11		#		
Specific Conductance	umhos/cm	06/23/2010	N001	1357		#		
Sulfate	mg/L	06/23/2010	N001	440		#	5	
Temperature	C	06/23/2010	N001	22.48		#		
Turbidity	NTU	06/23/2010	N001	3.86		#		
Uranium	mg/L	06/23/2010	N001	0.0031		#	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.

## **Equipment Blank Data**

This page intentionally left blank



---

**BLANKS REPORT**

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

RIN: 10063125

Report Date: 10/8/2010

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Data	Detection Limit	Uncertainty	Sample Type
Manganese	RVT01	0999	06/24/2010	N001	mg/L	0.00021	B	U	0.000054		E
Molybdenum	RVT01	0999	06/24/2010	N001	mg/L	0.00032	U		0.00032		E
Sulfate	RVT01	0999	06/24/2010	N001	mg/L	0.5	U		0.5		E
Uranium	RVT01	0999	06/24/2010	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.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

## SAMPLE TYPES:

- E Equipment Blank.

This page intentionally left blank

## **Static Water Level Data**

This page intentionally left blank

**STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site**  
**REPORT DATE: 10/8/2010**

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	06/23/2010	10:16:00	8.97	4937.61
0110	O	4944.35	06/23/2010	10:17:00	8.49	4935.86
0111	O	4946.87	06/23/2010	09:51:00	8.5	4938.37
0700	U	4951.38	06/23/2010	11:24:00	5.36	4946.02
0702	D	4931	06/24/2010	18:02:00	2.92	4928.08
0705	D	4930.8	06/24/2010	17:40:14	2.99	4927.81
0707	D	4931	06/24/2010	18:00:41	2.41	4928.59
0707	D	4931	09/15/2010	18:00:41	5.89	4925.11
0709	D	4930.7	06/24/2010	18:01:00	.61	4930.09
0710	U	4947.9	06/23/2010	12:00:40	4.83	4943.07
0716	O	4939.12	06/23/2010	09:10:26	7.48	4931.64
0717	O	4938.8	06/23/2010	09:35:27	7.22	4931.58
0718	D	4937.6	06/24/2010	09:50:07	5.85	4931.75
0719	D	4937.55	06/24/2010	09:35:15	5.59	4931.96
0720	C	4940.46	06/24/2010	08:55:48	5	4935.46
0721	C	4940.47	06/24/2010	08:25:55	6.22	4934.25
0722R		4937.06	06/24/2010	11:10:20	7.52	4929.54
0723	D	4936.01	06/24/2010	10:45:38	6.36	4929.65
0724	U	4941.36	06/23/2010	10:44:00	6.38	4934.98
0725	U	4941.66	06/23/2010	10:43:00	6.69	4934.97
0726	U	4942	06/23/2010	10:26:00	5.23	4936.77
0727	U	4951.69	06/23/2010	10:18:00	8.82	4942.87
0728	U	4946.01	06/23/2010	10:22:00	6.8	4939.21
0729	D	4932.75	06/23/2010	14:30:31	5.3	4927.45
0730	D	4933.08	06/23/2010	14:15:37	5.62	4927.46
0732	U	4945.07	06/23/2010	09:48:00	6.9	4938.17
0733	U	4946.76	06/23/2010	18:06:00	6.65	4940.11
0734	U	4946.08	06/23/2010	18:27:00	6.92	4939.16
0736	U	4946	06/23/2010	11:24:00	6.08	4939.92

**STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site**  
**REPORT DATE: 10/8/2010**

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	06/23/2010	10:05:10	5.93	4939.52
0788	C	4935.09	06/24/2010	16:05:53	4.6	4930.49
0788	C	4935.09	09/15/2010	16:05:53	9.2	4925.89
0789	D	4933.66	06/24/2010	17:15:02	5.14	4928.52
0789	D	4933.66	09/15/2010	17:15:02	9.09	4924.57
0824		4928.27	06/24/2010	19:15:09	3.59	4924.68
0826		4936.98	06/24/2010	15:20:47	4.6	4932.38

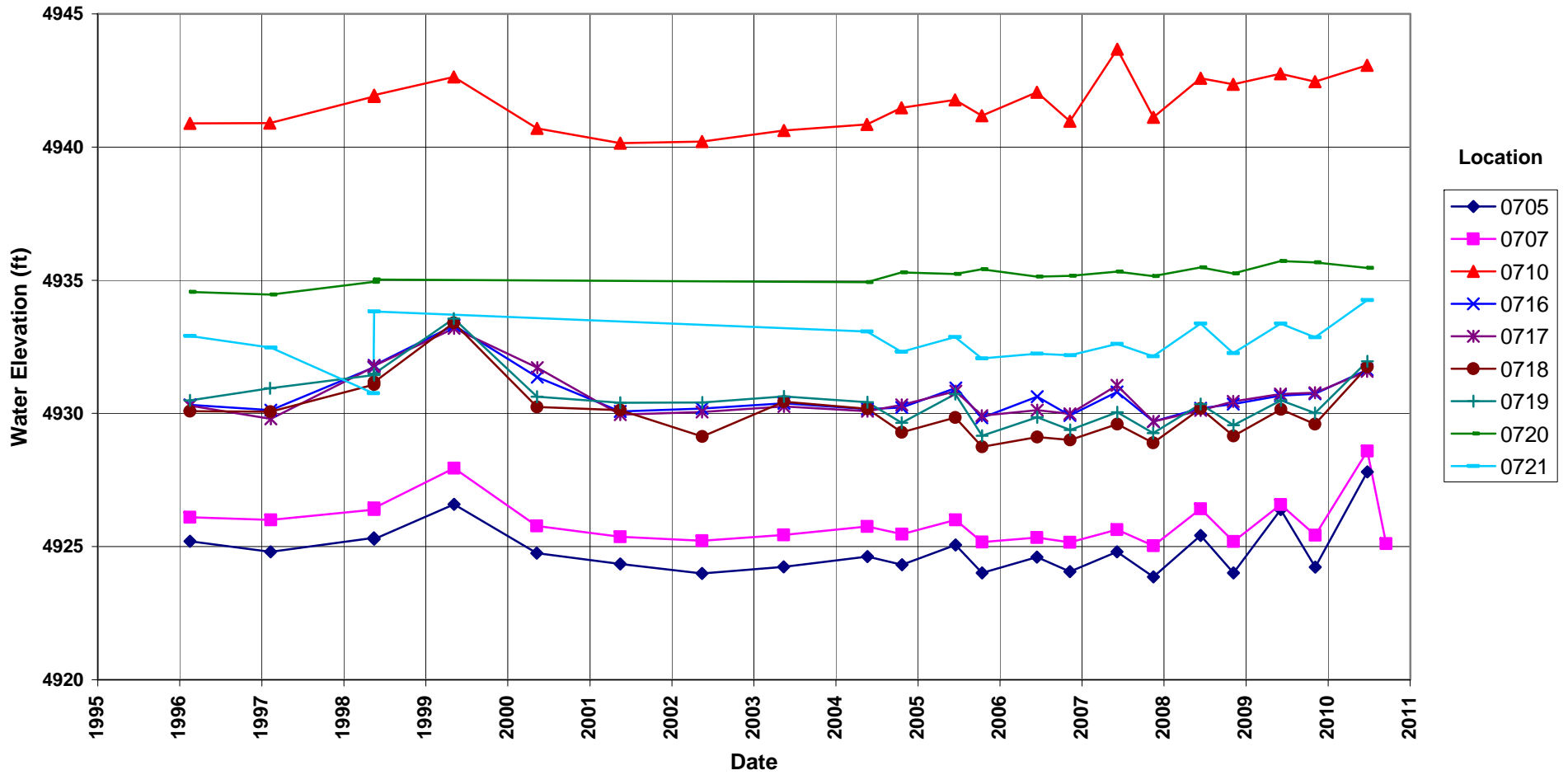
FLOW CODES: B BACKGROUND      C CROSS GRADIENT      D DOWN GRADIENT      F OFF SITE  
                   N UNKNOWN            O ON SITE                U UPGRADIENT

# Hydrographs

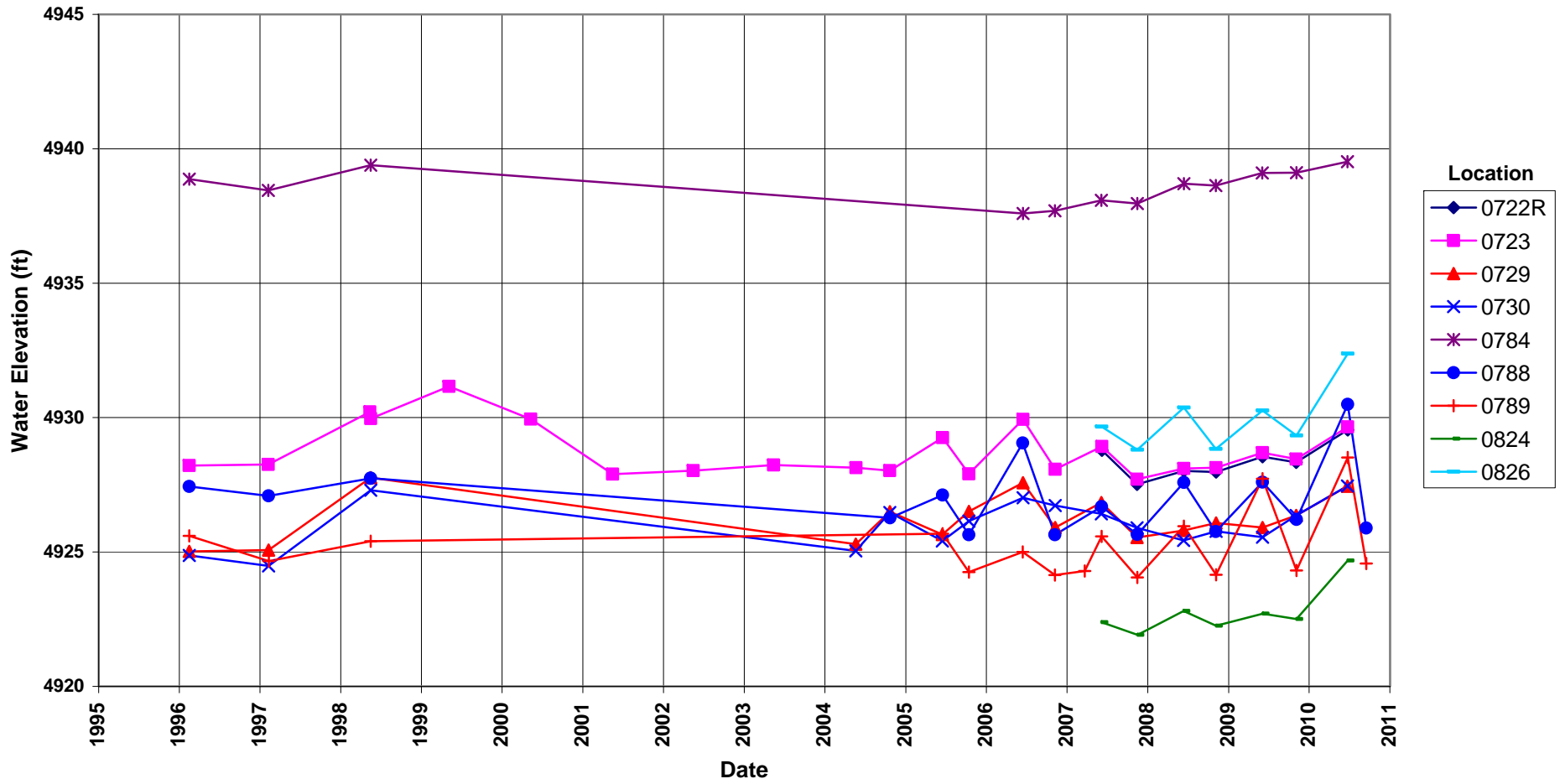
This page intentionally left blank



## Riverton Processing Site Hydrograph



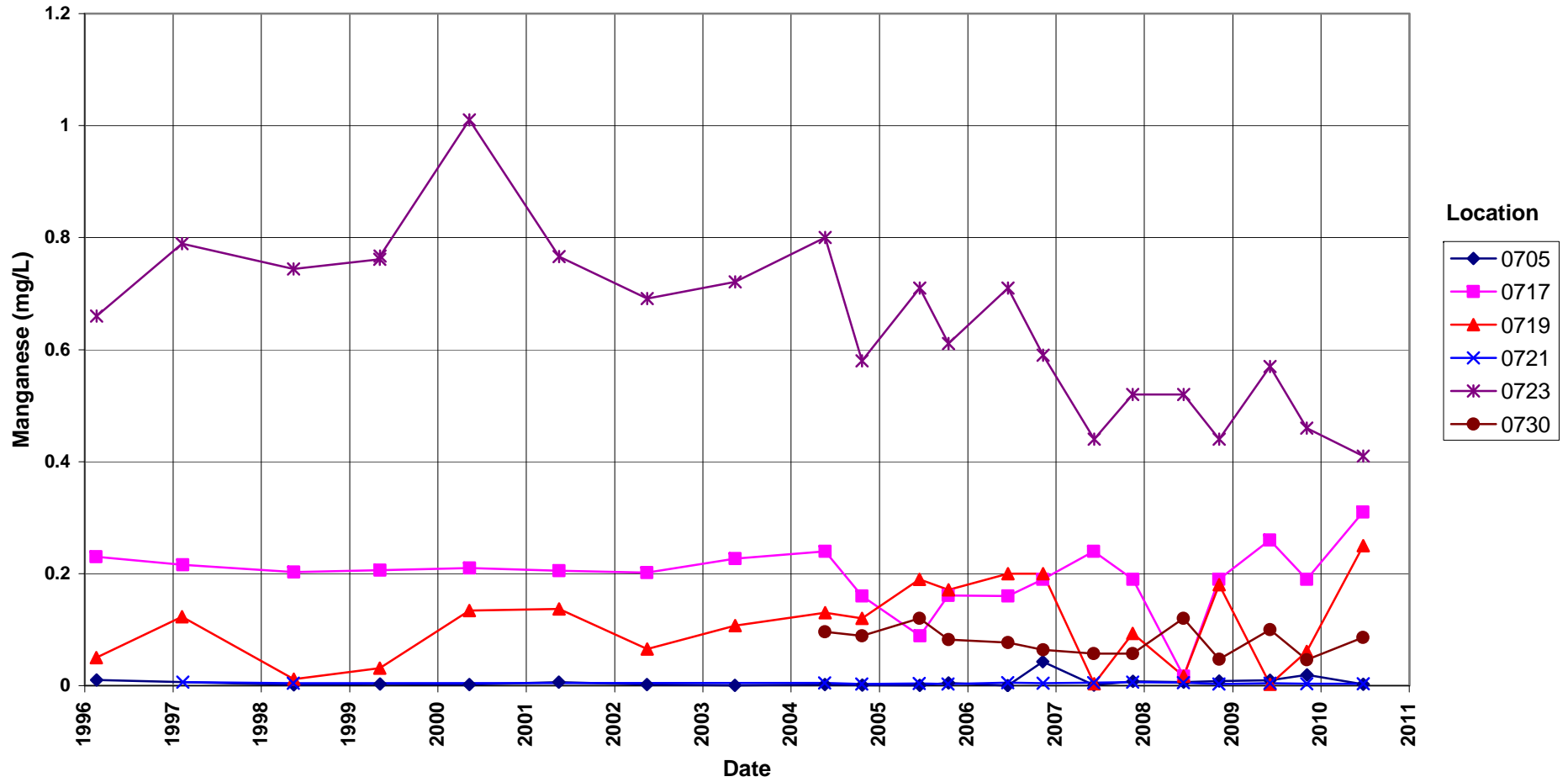
# Riverton Processing Site Hydrograph



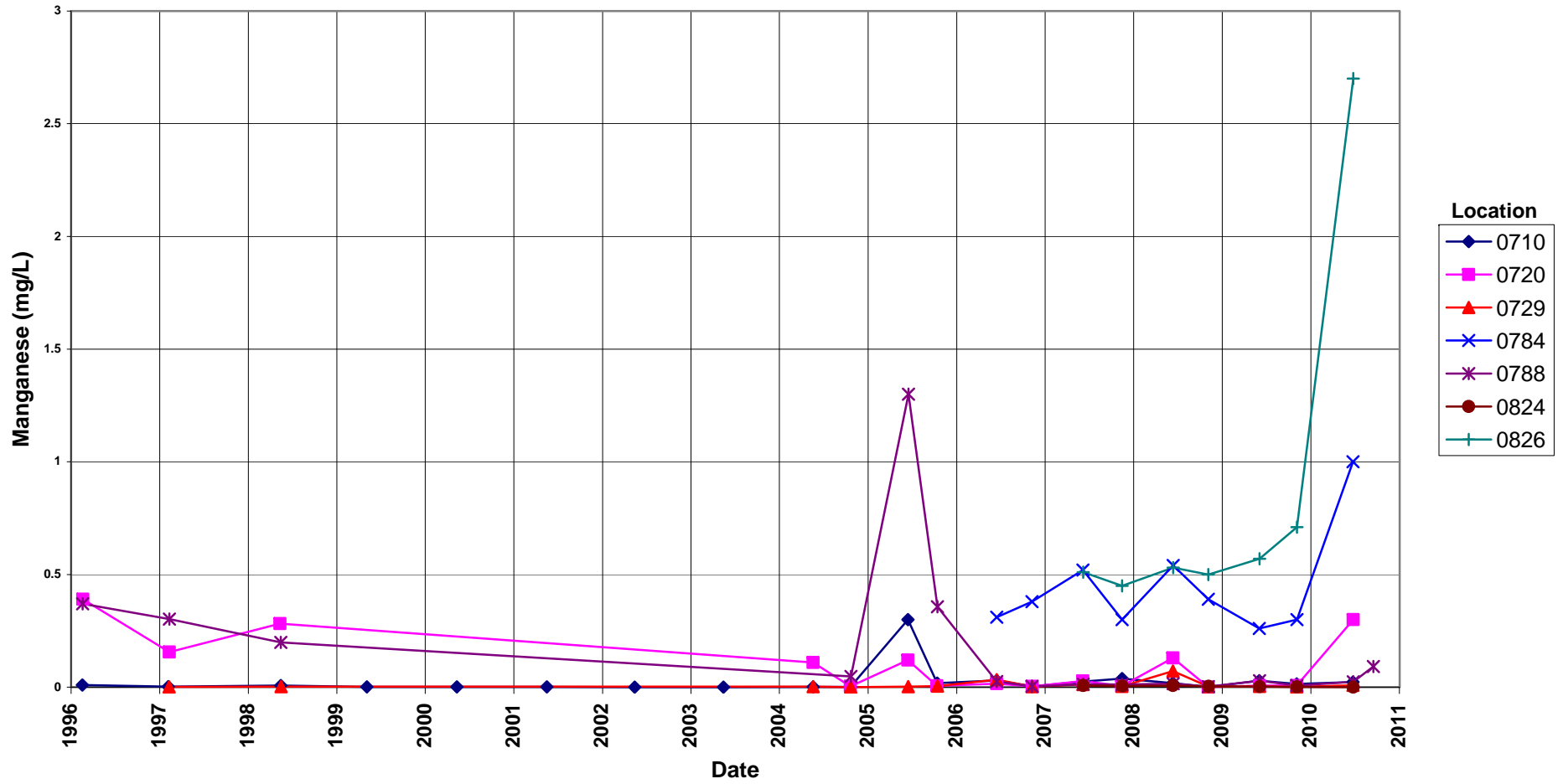
## **Time-Concentration Graphs**

This page intentionally left blank

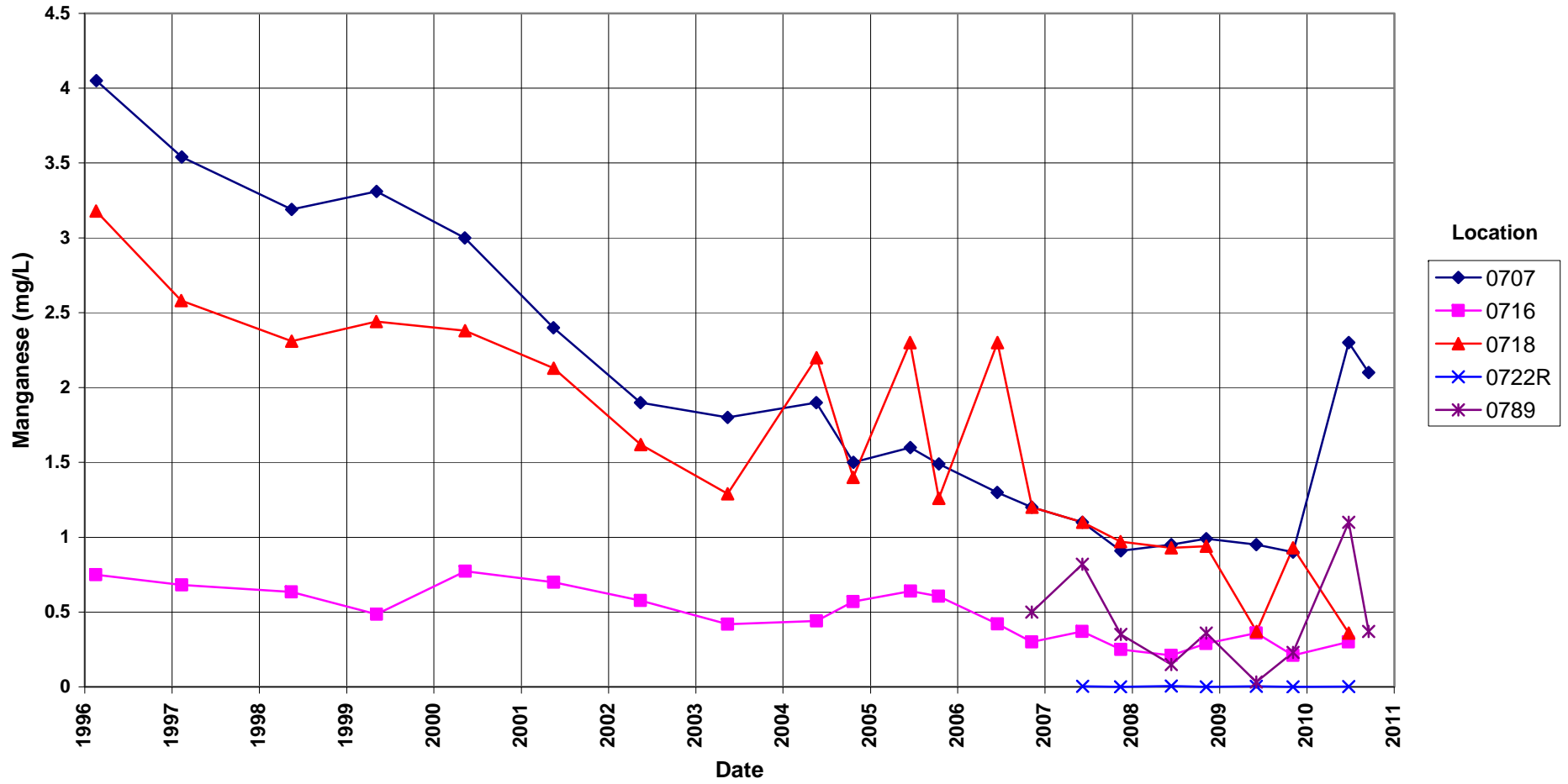
Riverton Processing Site  
Manganese Concentration  
Semi-Confined Aquifer Locations



# Riverton Processing Site Manganese Concentration Surficial Aquifer Locations

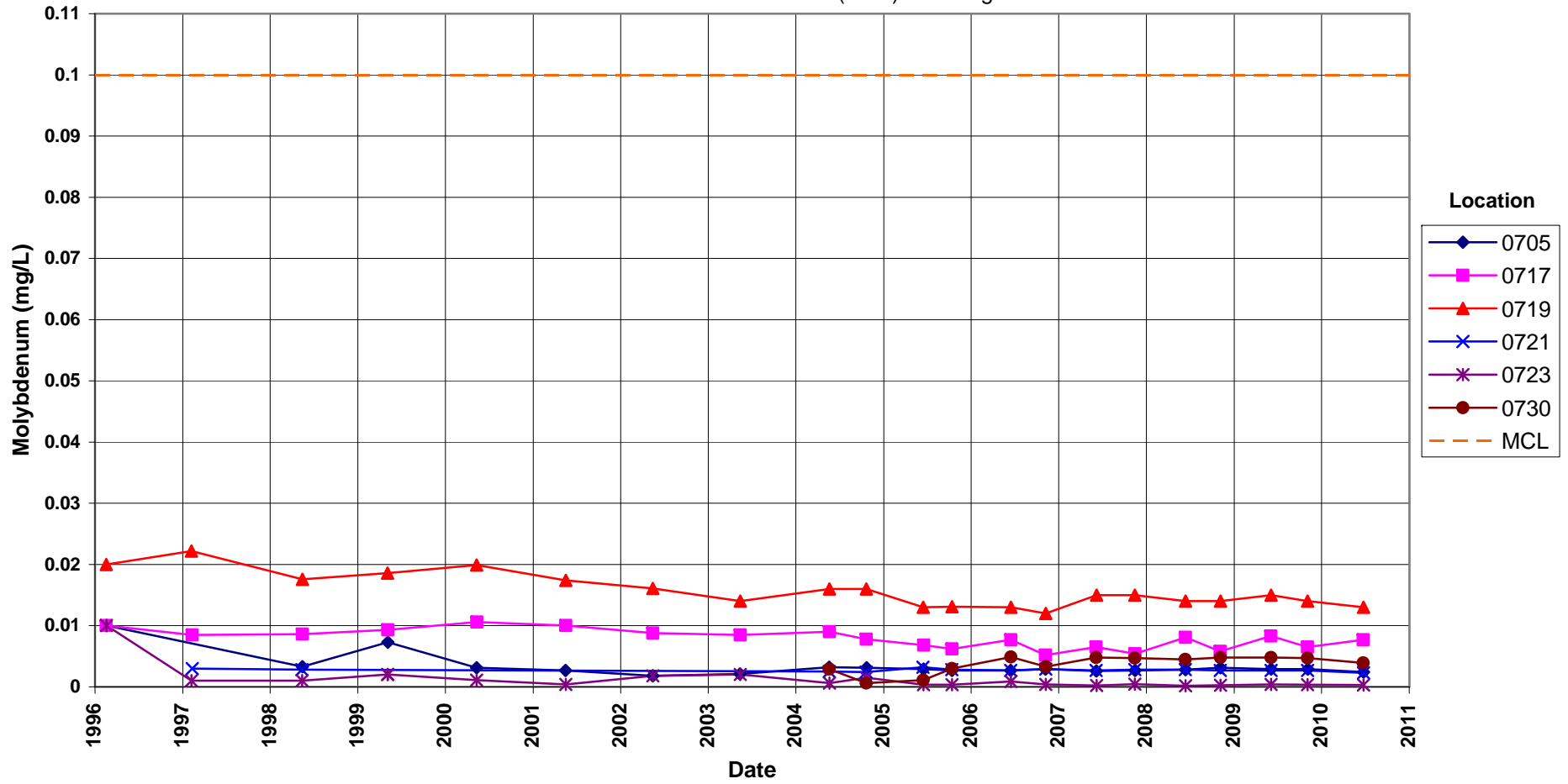


Riverton Processing Site  
Manganese Concentration  
Surficial Aquifer Locations



# Riverton Processing Site Molybdenum Concentration

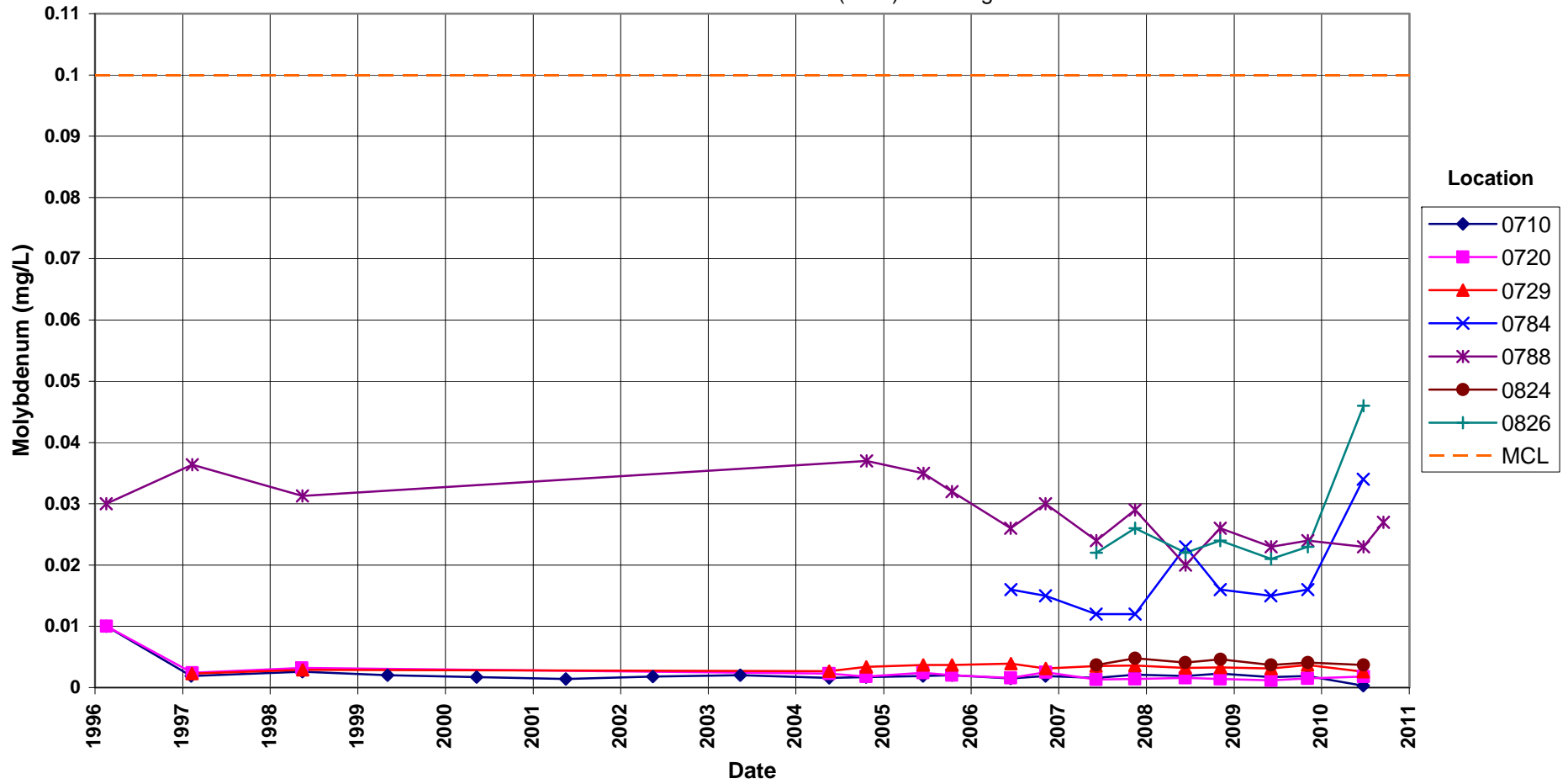
Semi-Confined Aquifer Locations  
Maximum Concentration Limit (MCL) = 0.1 mg/L





# Riverton Processing Site Molybdenum Concentration

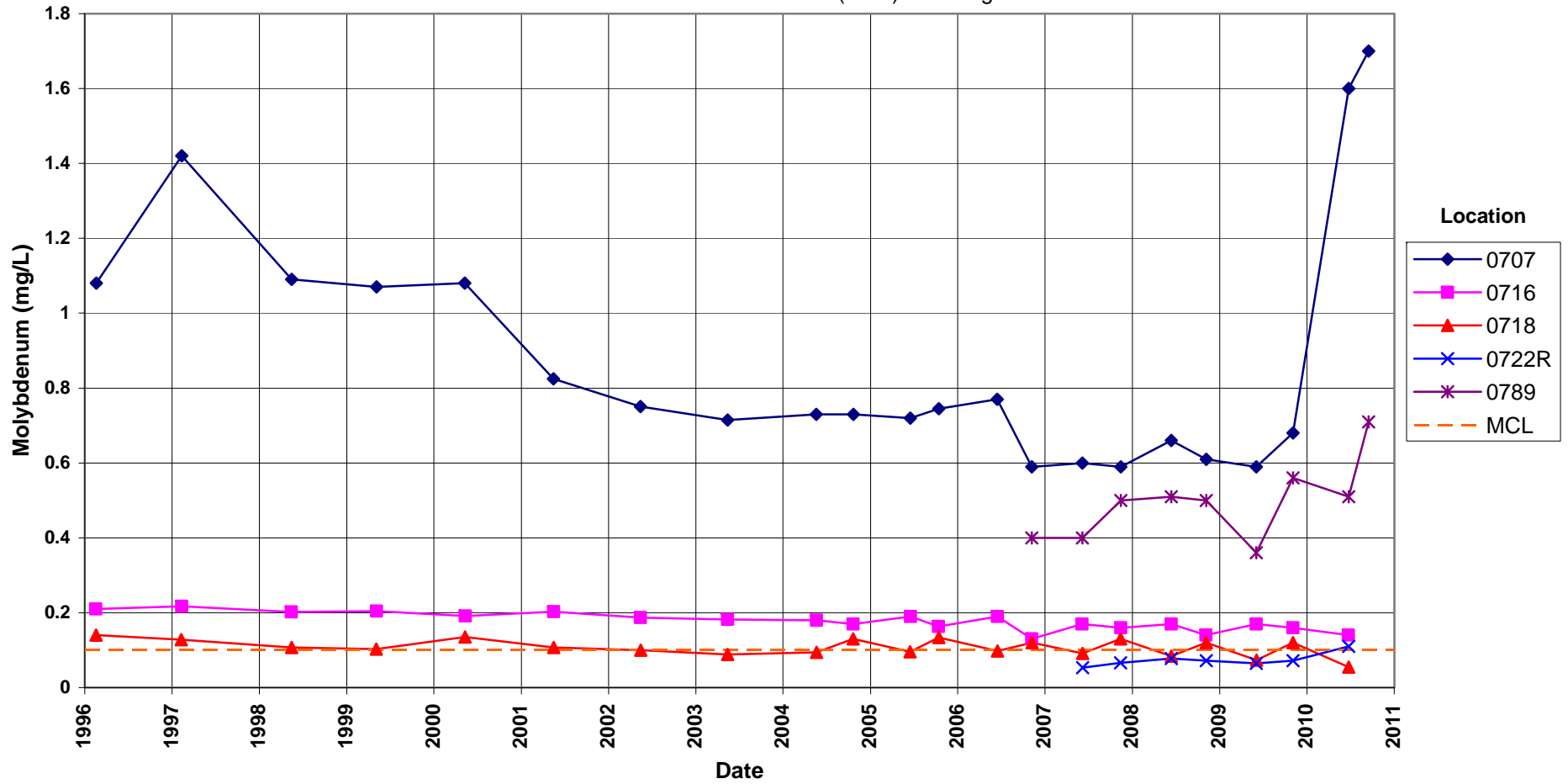
Surficial Aquifer Locations  
Maximum Concentration Limit (MCL) = 0.1 mg/L



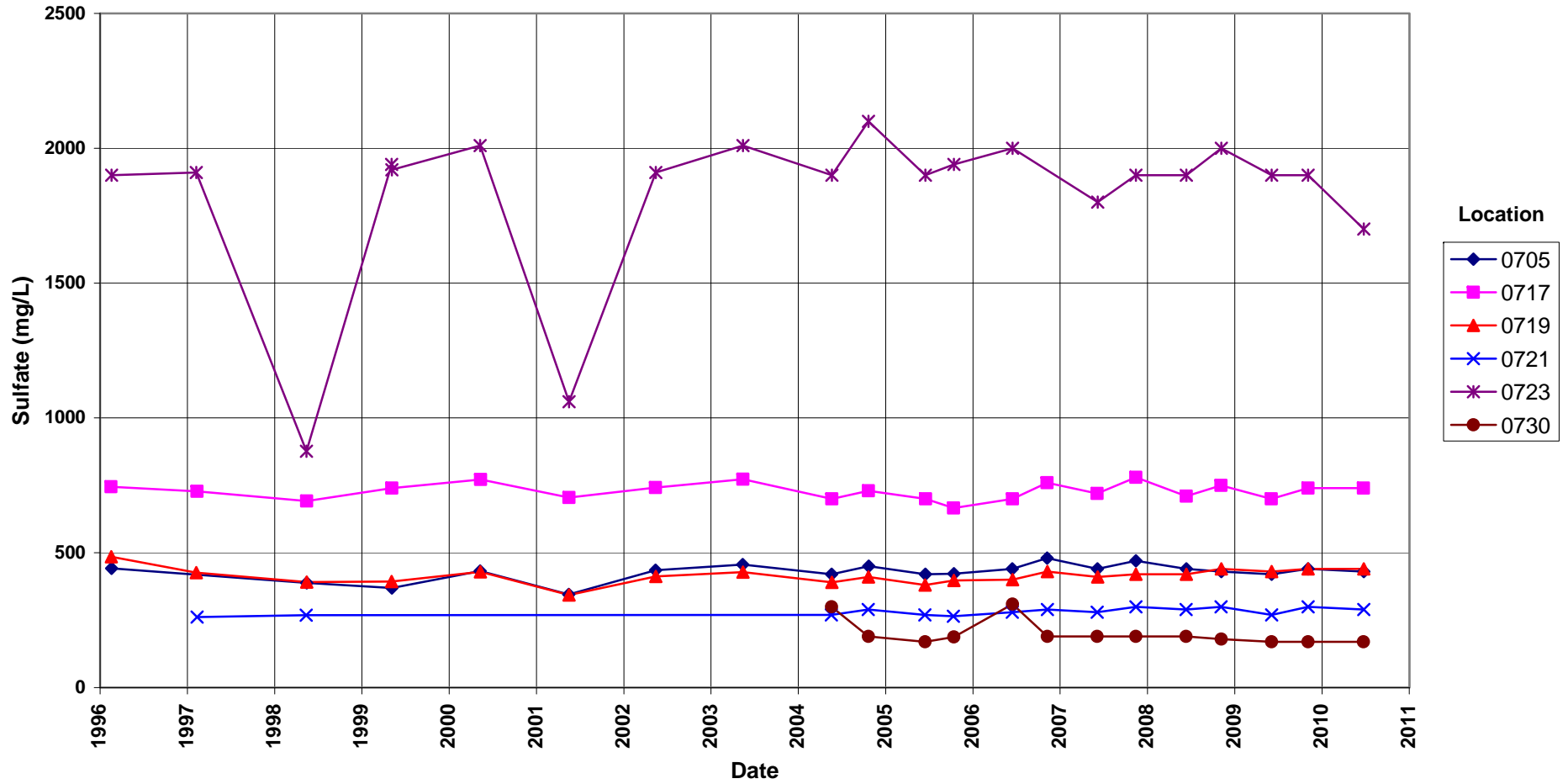
# Riverton Processing Site Molybdenum Concentration

Surficial Aquifer Locations

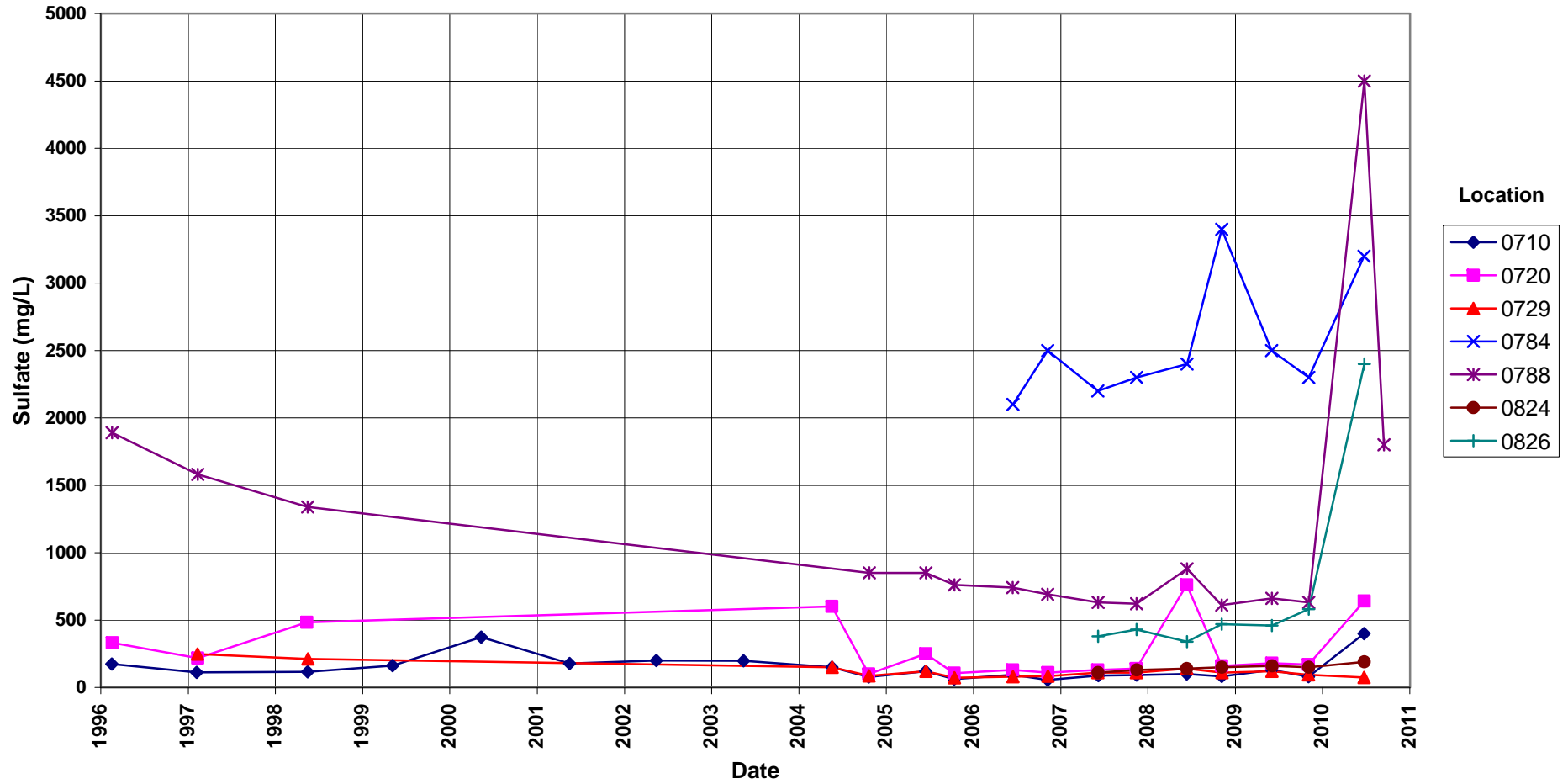
Maximum Concentration Limit (MCL) = 0.1 mg/L



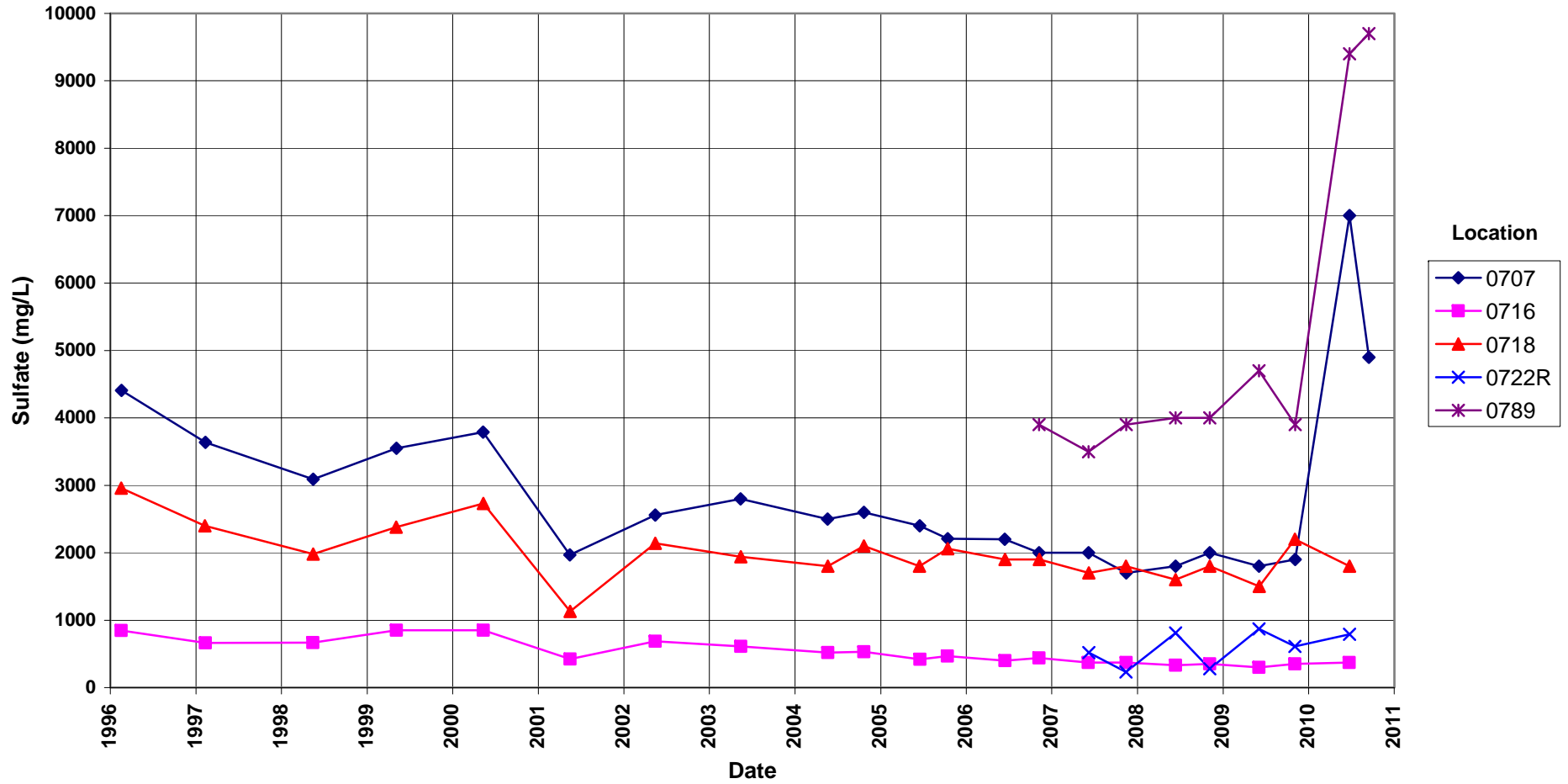
**Riverton Processing Site**  
**Sulfate Concentration**  
Semi-Confined Aquifer Locations



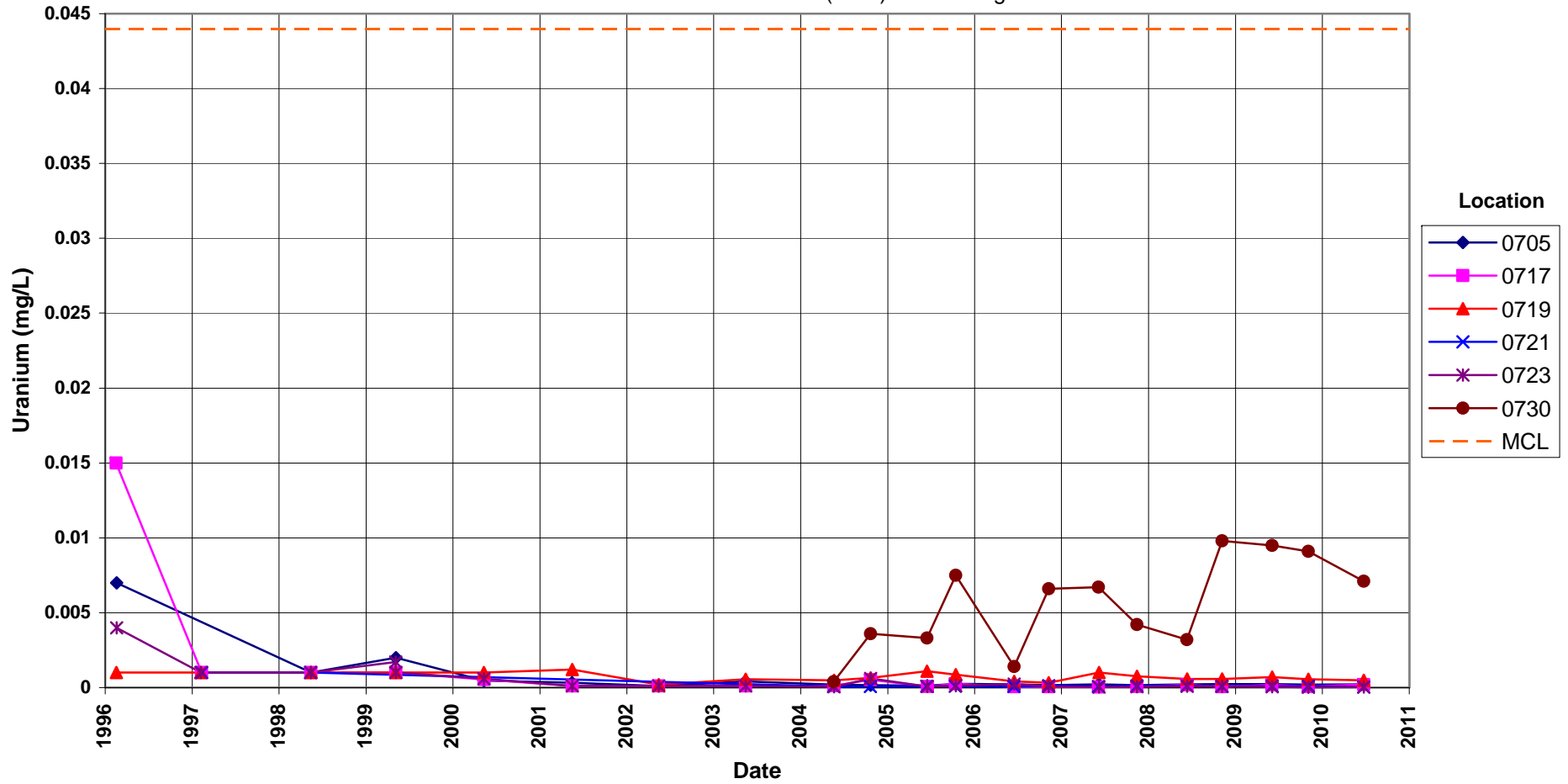
Riverton Processing Site  
Sulfate Concentration  
Surficial Aquifer Locations



Riverton Processing Site  
Sulfate Concentration  
Surficial Aquifer Locations



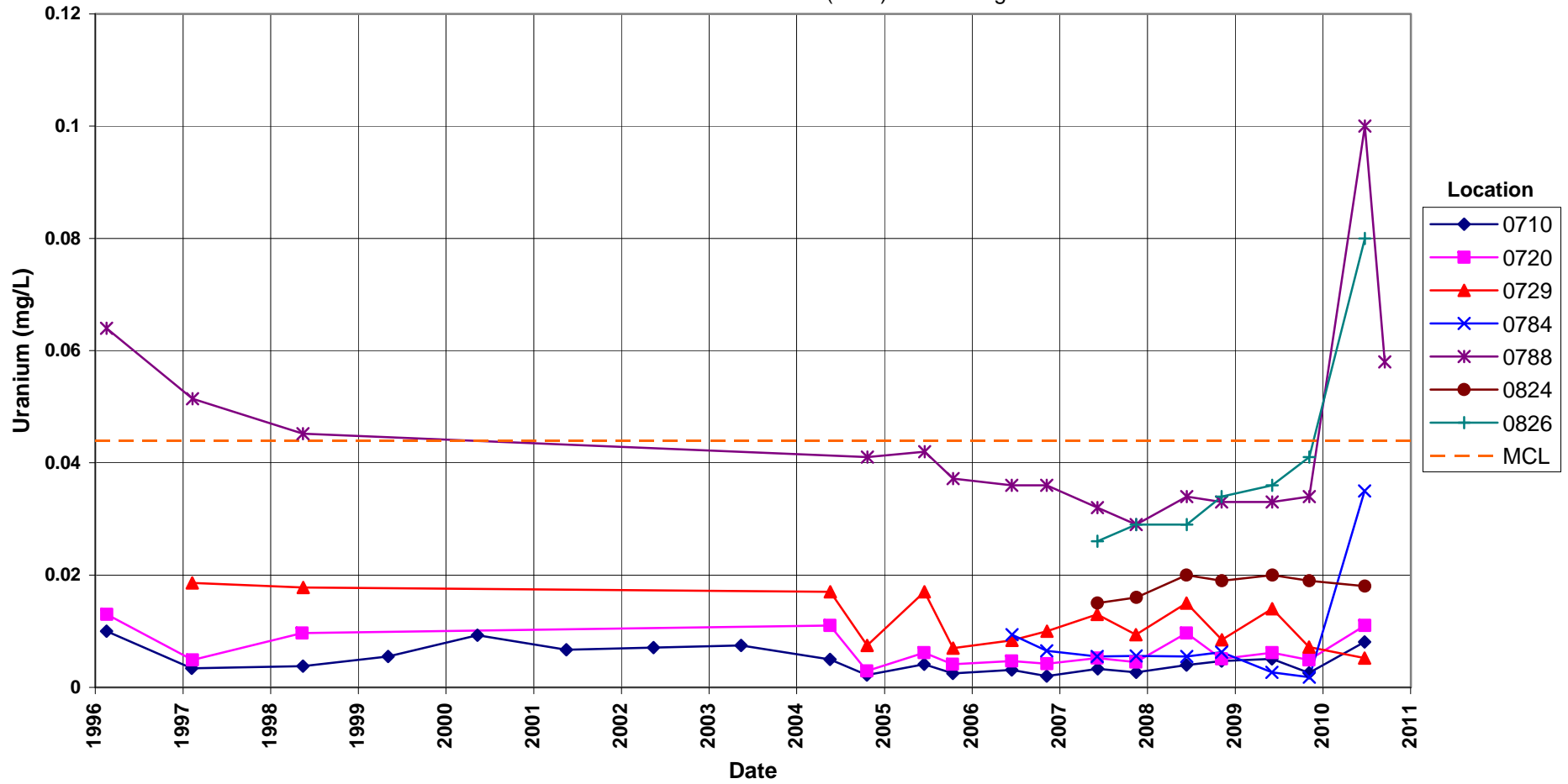
**Riverton Processing Site**  
**Uranium Concentration**  
Semi-Confined Aquifer Locations  
Maximum Concentration Limit (MCL) = 0.044 mg/L



# Riverton Processing Site Uranium Concentration

Surficial Aquifer Locations

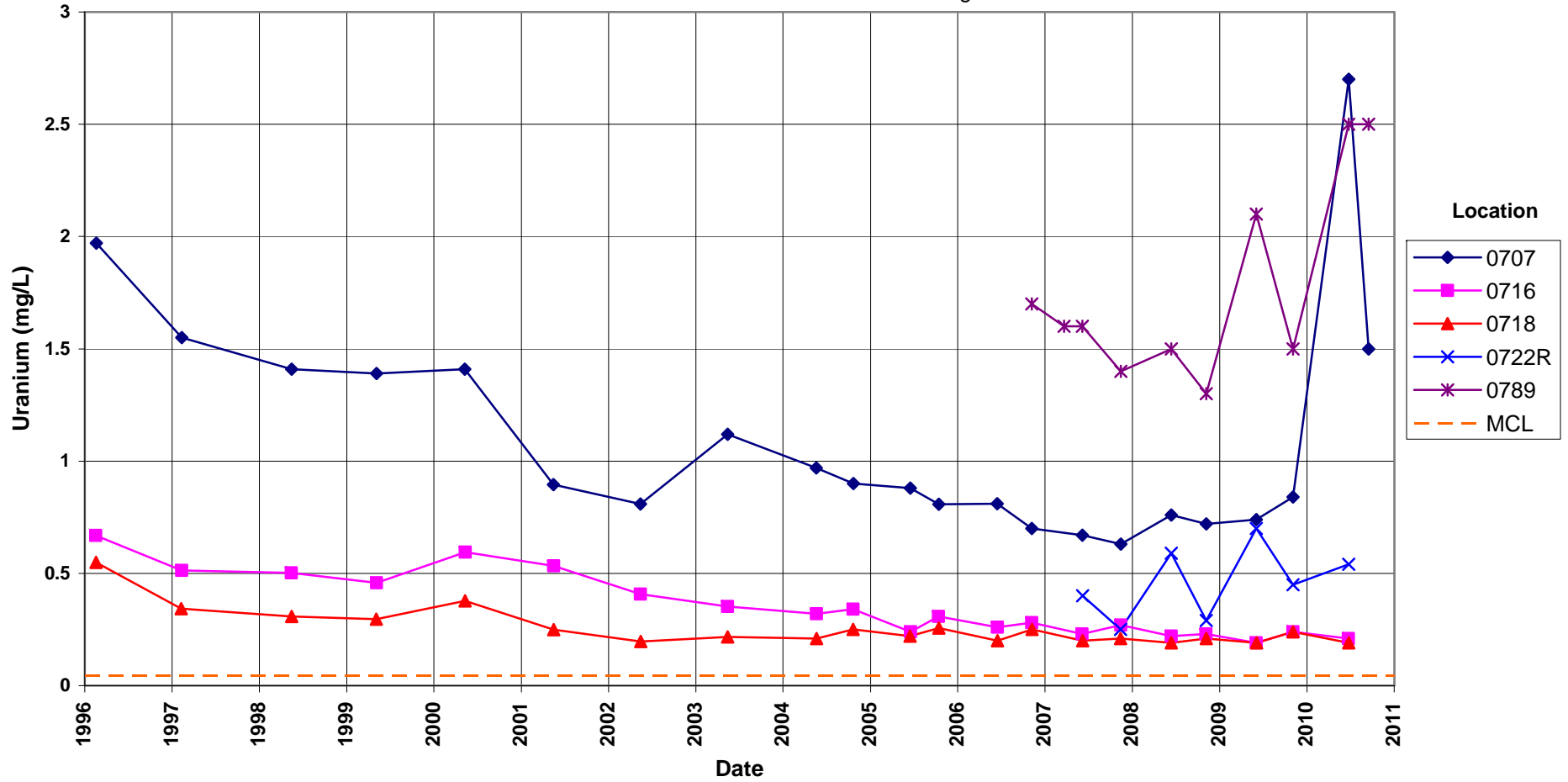
Maximum Concentration Limit (MCL) = 0.044 mg/L



# Riverton Processing Site Uranium Concentration

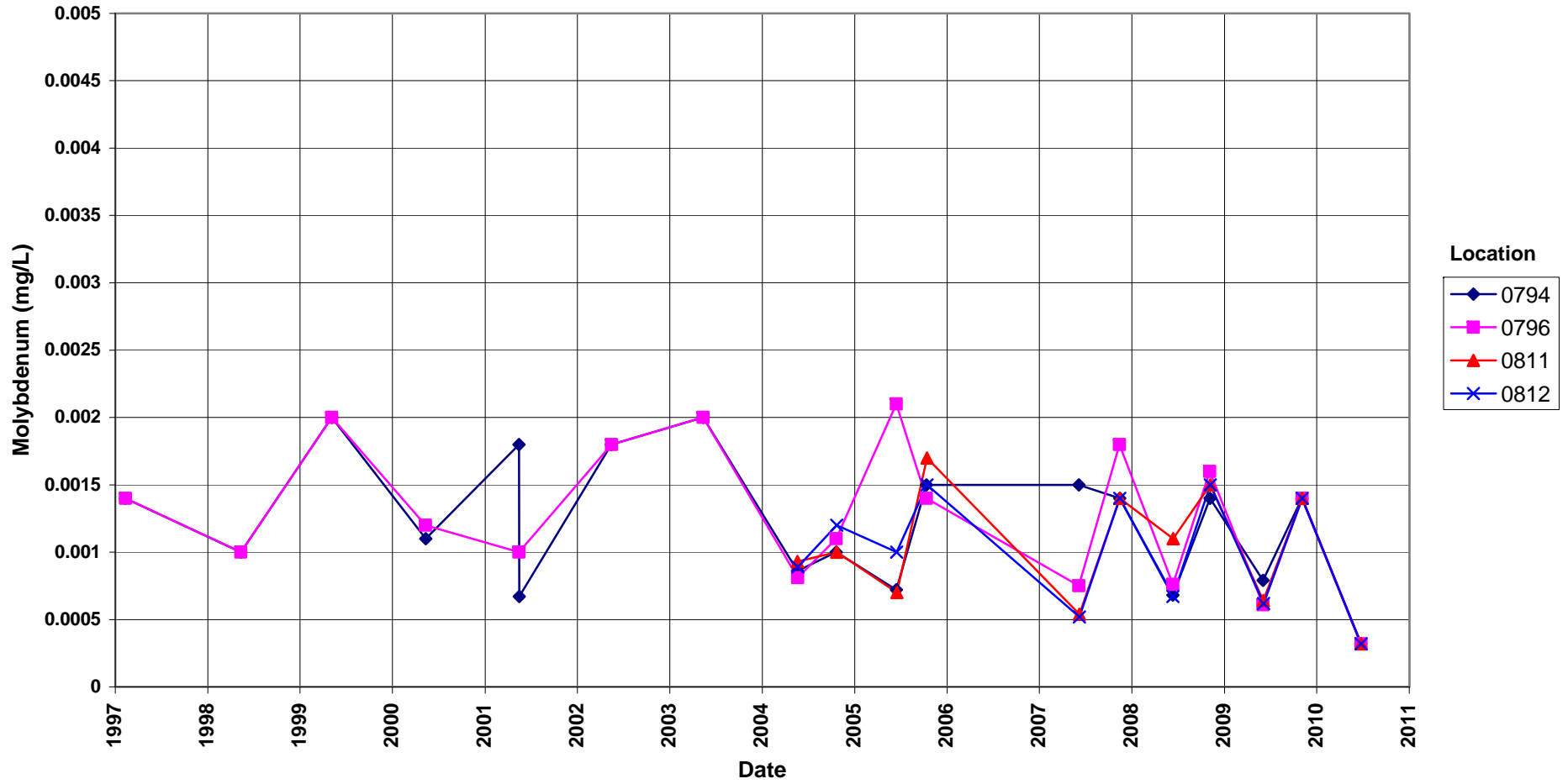
Surficial Aquifer Locations

Maximum Concentration Limit = 0.044 mg/L



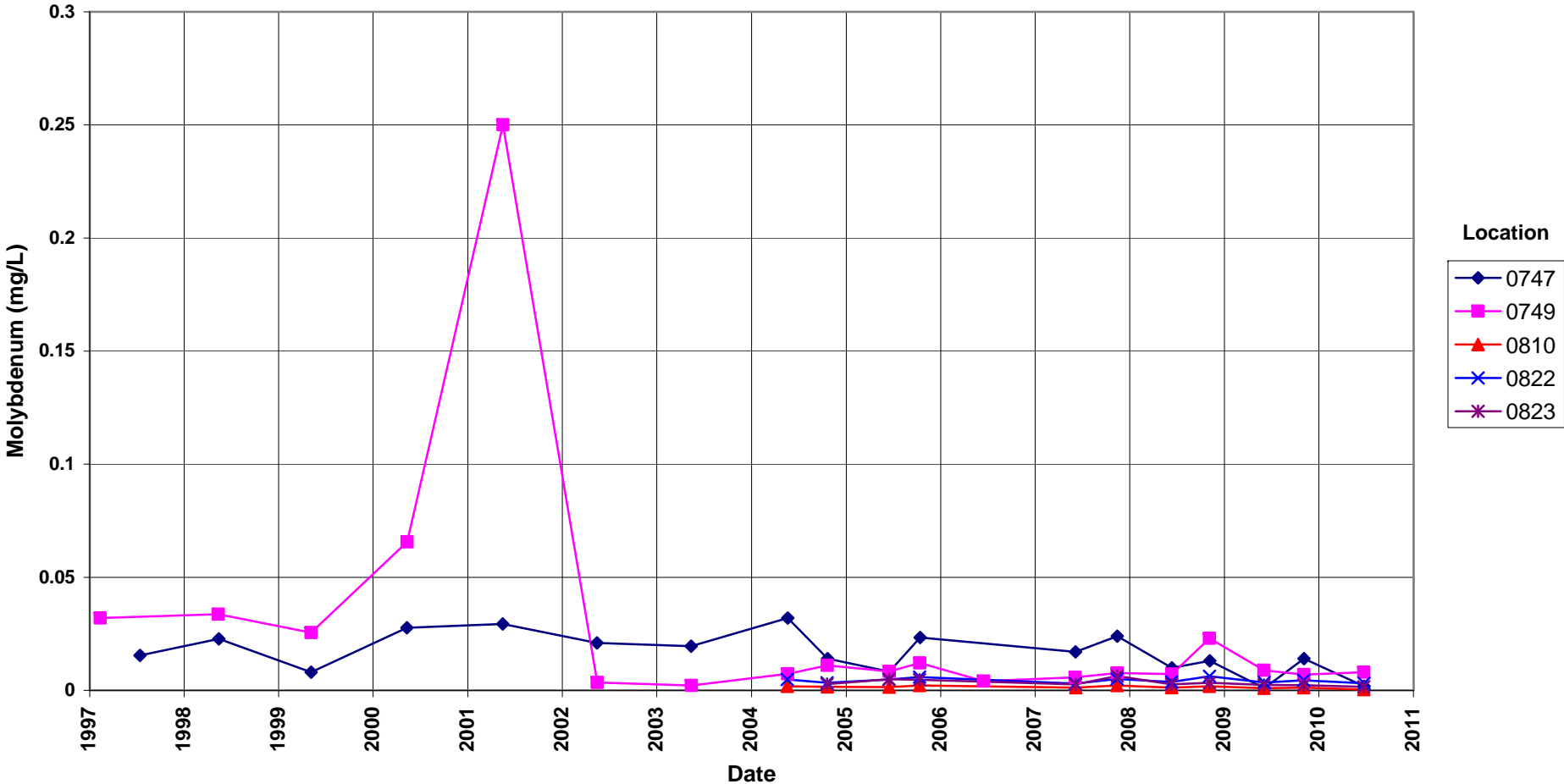


**Riverton Processing Site**  
**Molybdenum Concentration**  
Little Wind River Surface Water Locations

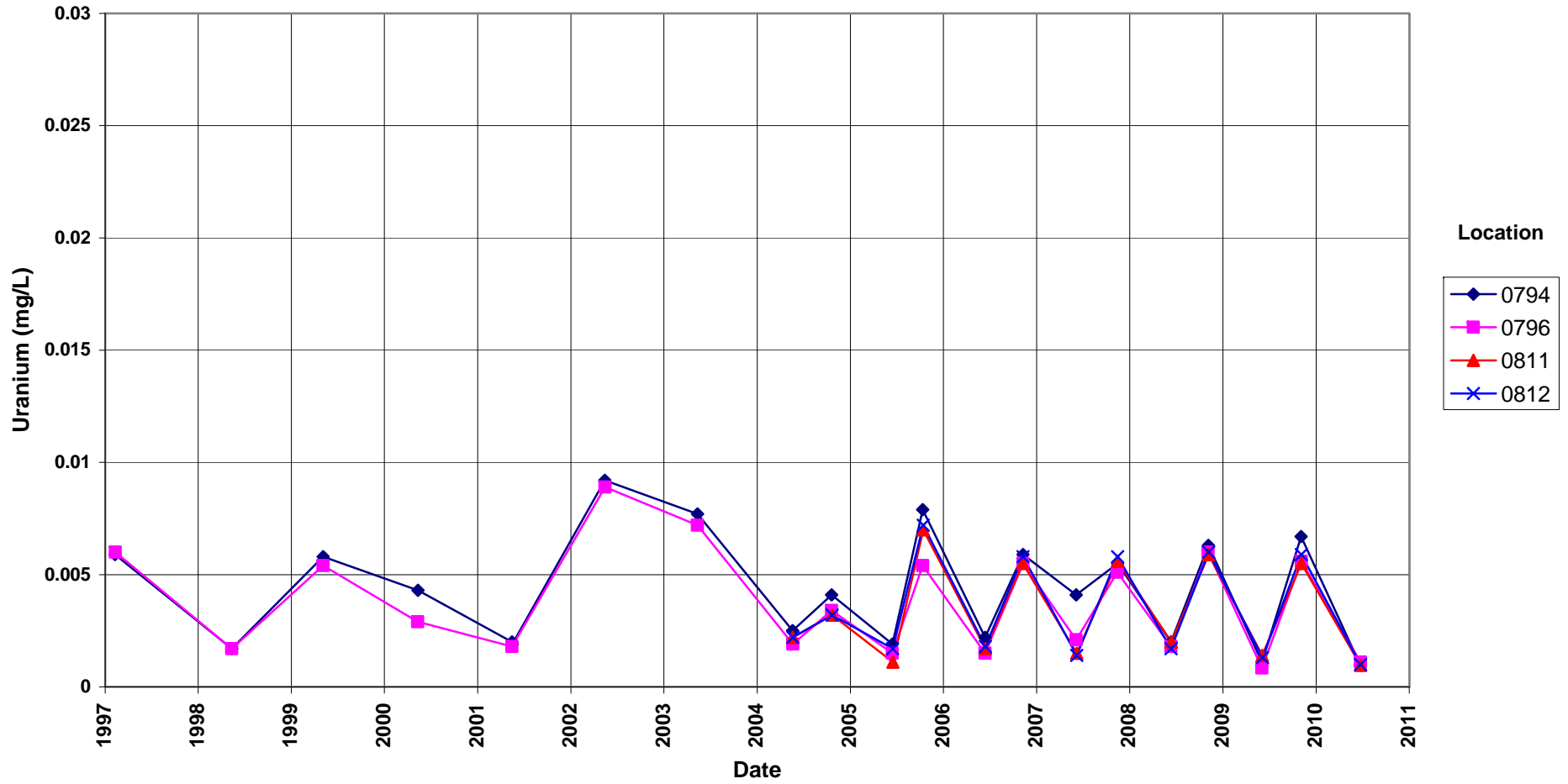


# Riverton Processing Site Molybdenum Concentration

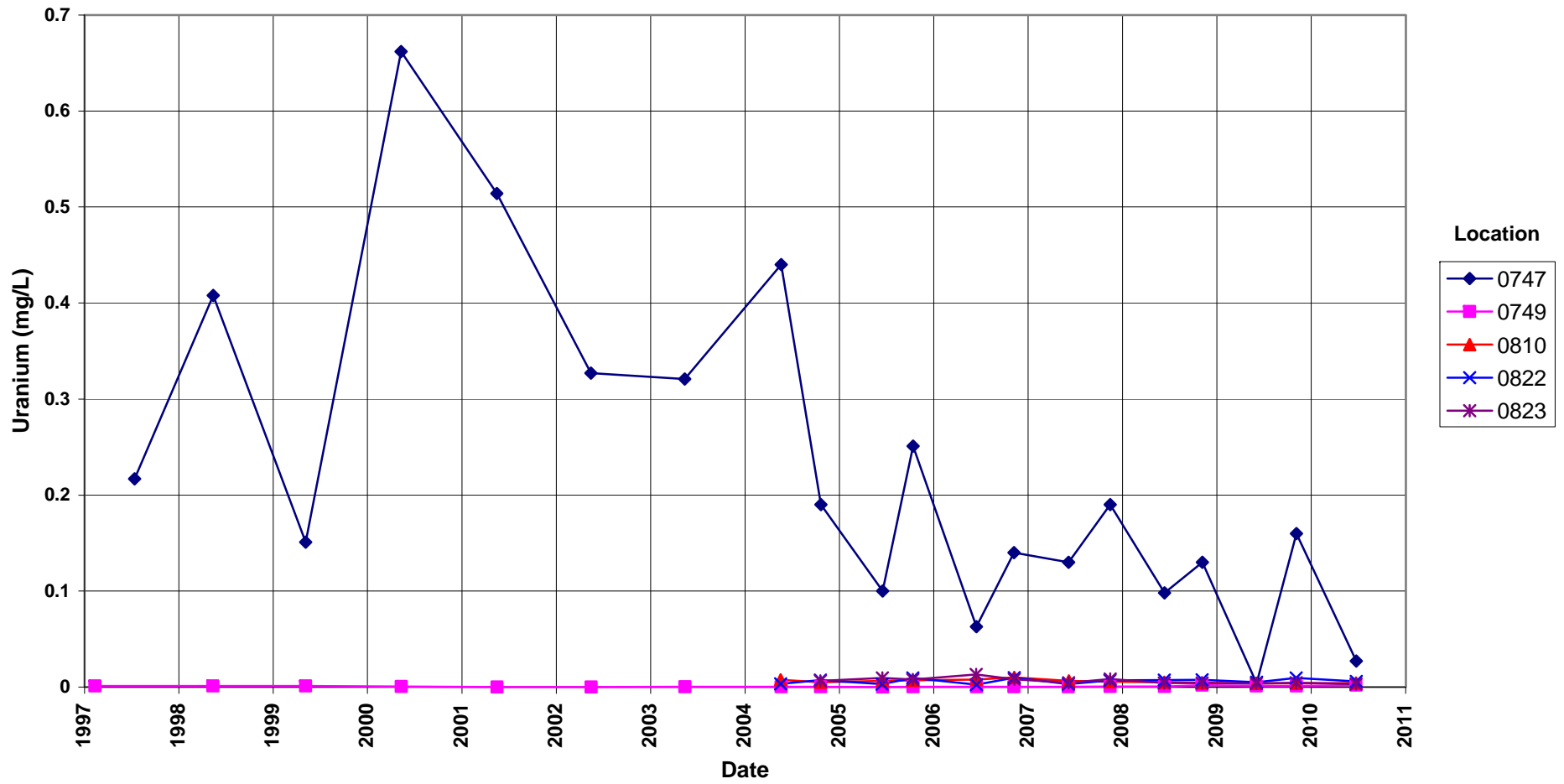
Oxbow Lake, Wetlands, Ditch, & Pond Surface Water Locations



**Riverton Processing Site**  
**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**

This page intentionally left blank



established 1959

Task Order LM00-501  
Control Number 10-0579

May 5, 2010

U.S. Department of Energy  
Office of Legacy Management  
ATTN: Jalena Dayvault  
Site Manager  
2597 B ¼ Road  
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller  
June 2010 Environmental Sampling at Riverton, Wyoming

REFERENCE: Task Order LM-501-02-117-402, Riverton, WY, Processing Site

Dear Ms. Dayvault:

The purpose of this letter is to inform you of the upcoming sampling event at Riverton, Wyoming. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Riverton processing site. Water quality data will be collected from monitoring wells, domestic wells, and surface locations at this site as part of the routine environmental sampling currently scheduled to begin the week of June 14, 2010.

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	789 Sf	824 Sf
707 Sf	717 Se	720 Sf	723 Se	784 Sf	809 Sf	826 Sf
710 Sf	718 Sf	721 Se	729 Sf	788 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
-----	-----	-----	-----	-----

Jalena Dayvault  
Control Number 10-0579  
Page 2

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

Please contact me at (970) 248-6654 if you have any questions or concerns.

Sincerely,



Sam Campbell  
Site Lead

SC/lcg/lb

Enclosures (3)

cc: (electronic)

Cheri Bahrke, Stoller  
Sam Campbell, Stoller  
Steve Donovan, Stoller  
Bev Gallagher, Stoller  
Lauren Goodknight, Stoller  
EDD Delivery  
rc-grand.junction



**Sampling Frequencies for Locations  
at Riverton, Wyoming**

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
<b>Monitoring Wells</b>						
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	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				Added by S. Campbell 6/26/06
788		X				
789		X				Data logger
809		X				Data logger
824		X				
826		X				
<b>Surface Locations</b>						
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				
<b>Domestic Wells</b>						
405		X				921 Rendezvous Road
430		X				204 Goes in Lodge Road
436		X				33 St Stephens Road
460		X				140 Goes in Lodge Road
828		X				33 St Stephens Road

Sampling conducted in November and June

## Constituent Sampling Breakdown

Site	Riverton		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water			
<b>Approx. No. Samples/yr</b>	48	18			
<i>Field Measurements</i>					
Alkalinity					
Dissolved Oxygen					
Redox Potential	X	X			
Residual Chlorine					
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
<i>Laboratory Measurements</i>					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride					
Chromium					
Iron					
Lead					
Magnesium					
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					
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					
Strontium					
Sulfate	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids					
Total Organic Carbon					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
<b>Total No. of Analytes</b>	4	6			

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

# **Attachment 4**

## **Trip Report**

This page intentionally left blank

*Memorandum*

Control Number N/A

DATE: June 30, 2010  
TO: Distribution  
FROM: Sam Campbell  
SUBJECT: Trip Report  
**Site:** Riverton, Wyoming, Processing Site.

**Dates of Sampling Event:** June 22 to June 25, 2010.

**Team Members:** Sam Campbell and Jeff Price

**Number of Locations Sampled:** 18 monitoring wells, 9 surface water locations, and 5 domestic wells.

**Locations Not Sampled/Reason:** Monitoring well 0809 was destroyed by high flows in the Little Wind River.

**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.

The highest flow ever recorded in the Little Wind River occurred on June 9, 2010, which resulted in the following:

- The sampling event was delayed two weeks.
- Flood waters were higher than the tops of some monitoring wells near the river including well 0707, which was redeveloped prior to sampling.
- Some data loggers may have been damaged from the high water. Caps were removed to allow drying.
- The river flowed through the Oxbow Lake, which continued at the time of sampling (Photo 1).

**Field Variance:** None.

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

False ID	True ID	Sample Type	Ticket Number
2644	0460	Duplicate	IHV-319
2645	0789	Duplicate	IHV-320
2646	Equipment Blank	Equipment Blank	IHV-321

**Requisition Number Assigned:** All samples were assigned to requisition index number (RIN) 10063125 and were shipped to the ALS Laboratory Group on June 28, 2010.

**Water Level Measurements:** Water levels were measured at all sampled monitoring wells and 15 additional monitoring wells.

**Well Inspection Summary:** Concrete pads at monitoring wells 0725 and 0726 have deteriorated. Monitoring well 0809 was destroyed without a trace by the Little Wind River, and monitoring well 0735 is now in the middle of the Little Wind River (Photo 2). All other wells were in good shape.

**Equipment:** All equipment functioned properly. Specific conductance readings were high at some locations compared to historical values. A second op-check was conducted on June 24, 2010, which was acceptable.

**Stakeholder/Regulatory:** The Wind River Environmental Quality Commission (WREQC) was contacted but did not have time to split samples during this event.

An old mill well located south of the Chemtrade sulfuric acid plant was abandoned on June 25, 2010. The well was filled with bentonite pellets from total depth to ground surface. A concrete plug was placed in the above-ground portion of the well (Photo 3).

### **Institutional Controls**

**Fences, Gates, Locks:** No issues identified.

**Signs:** Warning signs installed around the oxbow lake were intact.

**Trespassing/Site Disturbances:** None

**Access Issues:** None

**Safety Issues:** None.

**Corrective Action Required/Taken:** New concrete pads are needed around monitoring wells 0725 and 0726. Discussions are needed regarding the replacement of monitoring wells 0809 and 0735.

(SEC/lcg)

cc: (electronic)  
 Jalena Dayvault, DOE  
 Cheri Bahrke, Stoller  
 Steve Donivan, Stoller  
 EDD Delivery



RVT 6/2010. Photo 1. Oxbow Lake.



RVT 6/2010. Photo 2. Well 0735.





RVT 6/2010. Photo 3. Abandoned old mill well.



*Memorandum*

Control Number N/A

DATE: October 6, 2010

TO: Sam Campbell

FROM: Jeff Price

SUBJECT: Trip Report

**Site:** Riverton WY, Processing Site.

**Dates of Sampling Event:** September 15, 2010.

**Team Member:** Joe Trevino and Jeff Price.

**Number of Locations Sampled:** Wells 0707, 0788, and 0789.

**Locations Not Sampled/Reason:** None.

**Location Specific Information:** N/A.

**Field Variance:** None.

**Quality Control Sample Cross Reference:**

False Id	True Id	Sample Type	Associated Matrix	Ticket Number
2045	0788	Duplicate	Groundwater	IKZ 740

**Requisition Numbers Assigned:** Samples were assigned to requisition identification number (RIN) 10093341. Samples were shipped on September 16, 2010, to Test America and will be analyzed for uranium, molybdenum, and sulfate.

**Water Level Measurements:** Only on sampled wells.

**Well Inspection Summary:** N/A.

**Equipment:** All equipment functioned properly.

**Regulatory:** None.

**Institutional Controls:**

**Fences, Gates, Locks:** No issues.

**Signs:** No issues.

**Trespassing/Site Disturbances:** No issues.

**Site Issues:**

**Disposal Cell/Drainage Structure Integrity:** No issues.

**Vegetation/Noxious Weed Concerns:** No issues.

**Maintenance Requirements:** No issues.

**Access Issues:** None.

**Corrective Action Required/Taken:** None.

(SEC/lcg)

cc: (electronic)  
April Gil, DOE  
Cheri Bahrke, Stoller  
Steve Donovan, Stoller  
EDD Delivery