LMS/RVT/S00611

Data Validation Package

WM-00060

June 2011
Groundwater and Surface Water Sampling at the Riverton, Wyoming, Processing Site

September 2011

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Data Validation Package for the
Riverton, Wyoming, Processing Site, June 2011

The U.S. Department of Energy (DOE) has prepared a Data Validation Package containing the groundwater and surface water monitoring data generated from the June 2011 sampling event at the Riverton, Wyoming, Processing Site. This package includes worksheets and reports that document the sampling activities and validation procedures conducted. At your request, you are receiving a hard copy of the report.

The report is also available for your review on the Internet at the DOE Office of Legacy Management (LM) website – www.lm.doe.gov. From the LM website home page, select the United States map icon titled Legacy Management Sites. Then select the Riverton Site from the drop-down list. The report will be available on the Riverton Processing Site page of the LM website under Site Documents and Links.

U.S. DEPARTMENT OF ENERGY | Legacy Management

WM-00060

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Sampling Event Summary

Site: Riverton, Wyoming, Processing Site

Sampling Period: June 21-22, 2011

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 comprised sampling 18 monitoring wells, 9 surface water locations, and 5 domestic wells at the Riverton, Wyoming, Processing Site.

Water levels were measured at all sampled monitoring wells and 14 additional monitoring wells that were not sampled. Sampling and analysis were 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 their respective U.S. Environmental Protection Agency (EPA) (Title 40 *Code of Federal Regulations* [CFR] Part 192) groundwater standard. The EPA groundwater standards for molybdenum and uranium were exceeded in samples collected from surficial aquifer monitoring wells listed in Table 1. Time-concentration graphs are included in the Data Presentation section.

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 2011

Analyte	Standard[a]	Location	Concentration in mg/L
Molybdenum	0.1	0707	1.2
		0716	0.15
		0722R	0.13
		0789	0.56
Uranium	0.044	0707	1.6
		0716	0.41
		0718	0.22
		0722R	0.62
		0788	0.09
		0789	2.3
		0826	0.06

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

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 into 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. Time-concentration 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 2011) to Benchmark

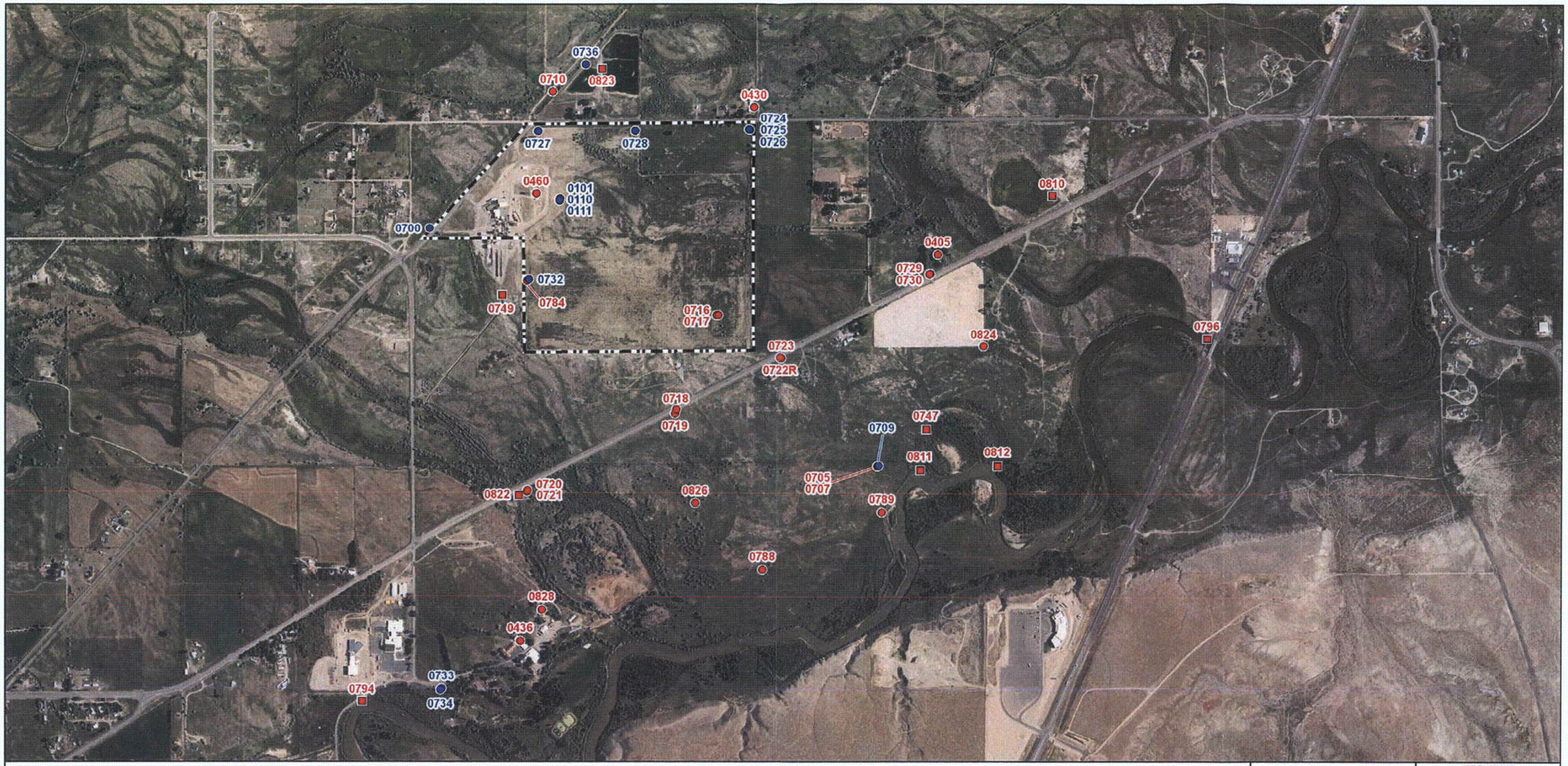
Location	Uranium Concentration (mg/L)
0794 Benchmark	**0.011**
0796 Little Wind River	0.0014
0811 Little Wind River	0.0013
0812 Little Wind River	0.0013
0747 Oxbow Lake	0.028
0810 Constructed Wetlands	0.0088
0822 West Side Irrigation Ditch	0.0080
0823 Gravel Pit Pond	0.0054

The sample collected at the ditch that discharges from the Chemtrade sulfuric acid plant (0749) continues to have elevated concentrations of sulfate (2,000 mg/L). The elevated sulfate concentration in the sulfuric acid plant effluent has affected the sulfate concentration downstream in the west side irrigation ditch (980 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 and radium-228 concentrations were below the respective Decision Level Concentrations indicating no impact to water quality in the ditch.

Sam Campbell
Site Lead, S.M. Stoller Corporation

9-16-11
Date



LEGEND

- WELL SAMPLED - JUNE 2011
- SURFACE LOCATION SAMPLED - JUNE 2011
- WELL - WATER LEVEL ONLY - JUNE 2011
- SITE BOUNDARY

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
Sampled Locations Map Riverton, WY, Processing Site June 2011	
DATE PREPARED: September 27, 2011	FILENAME: S0779900

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Riverton, Wyoming, Processing Site, Sample Locations

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Riverton, Wyoming	**Date(s) of Water Sampling**	June 21-22, 2011
Date(s) of Verification	August 22, 2011	**Name of Verifier**	Steve Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOPs, instructions.		Work Order letter dated May 16, 2011.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibration was performed on June 16, 2011.
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Was the category of the well documented?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicate samples were collected from locations 0707 and 0786.
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):	11063890
Sample Event:	June 21-22, 2011
Site(s):	Riverton, Wyoming
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1106364
Analysis:	Metals, Wet Chemistry, and Radiochemistry
Validator:	Steve Donivan
Review Date:	August 19, 2011

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
1106364-4	0460	Manganese	U	Less than 5 times the calibration blank
1106364-32	0828	Manganese	U	Less than 5 times the calibration blank
1106364-35	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 28, 2011, 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 with the following exception. Radium-226 and radium-228 were listed on the COC form as requested analytes for the equipment blank collected. However these analyses were not required for the equipment blank and aliquots not submitted.

Preservation and Holding Times

The sample shipment was received cool and intact with the temperature inside the iced cooler at 1.0 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All analyses were performed within the required holding times.

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
Calibrations for manganese were performed on July 18, 2011, 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 14 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 11, 2011, using two calibration standards. Initial and continuing calibration verification checks were made at the required frequency resulting in 17 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 seven calibration standards on June 15, 2011. 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 "U" flag (not detected) when the result is greater than the minimum detectable concentration (MDC) but less than the Decision Level Concentration, estimated as 3 times the one-sigma total propagated uncertainty. Results above the Decision Level Concentration and the MDC are qualified with a "J" flag (estimated) when the result is less than Determination Limit (3 times the MDC).

Radium-226
Instrument calibration was performed May 6, 2011. Daily instrument checks met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Radium-228
Instrument calibration was performed June 9, 2011. Daily instrument checks met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Method and Calibration Blanks

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

Metals and Wet Chemistry
All method blank and calibration blank results associated with the samples were below the PQLs for all analytes. 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 decision level concentration.

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. All serial dilution data evaluated met the acceptance criteria.

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 2.6. 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 26, 2011. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 11063890 Lab Code: PAR Validator: Steve Donivan Validation Date: 8/19/2011

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

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 11063890 Lab Code: PAR Date Due: 7/26/2011

Matrix: Water Site Code: RVT Date Completed: 7/26/2011

Analyte	Method Type	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	ICV	CCV	ICB	CCB								
Manganese	ICP/ES	07/18/2011	0.0000	1.0000	OK	OK	OK	OK	OK	99.0	98.0	95.0	3.0	90.0	1.0	101.0
Manganese	ICP/ES	07/18/2011							OK	97.0	88.0	86.0	1.0	88.0	10.0	103.0
Molybdenum	ICP/MS	07/11/2011	0.0000	1.0000	OK	OK	OK	OK	OK	102.0	103.0	100.0	3.0	99.0	1.0	111.0
Molybdenum	ICP/MS	07/11/2011							OK	105.0	111.0	111.0	0.0	98.0		94.0
Uranium	ICP/MS	07/11/2011	0.0000	1.0000	OK	OK	OK	OK	OK	111.0	110.0	113.0	2.0	105.0	8.0	120.0
Uranium	ICP/MS	07/11/2011							OK	113.0	98.0	115.0	2.0			95.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 11063890 **Lab Code:** PAR **Date Due:** 7/26/2011

Matrix: Water **Site Code:** RVT **Date Completed:** 7/26/2011

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	06/29/2011	0.000	1.0000	OK	OK	OK	OK	OK	97.00	103.0	105.0	1.00	
SULFATE	06/29/2011							OK	97.00	99.0	98.0	0	
SULFATE	06/29/2011									112.0			

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 11063890 **Lab Code:** PAR **Date Due:** 7/26/2011

Matrix: Water **Site Code:** RVT **Date Completed:** 7/26/2011

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0822	Radium-226	07/21/2011			87.9			
Blank_Spike	Radium-226	07/21/2011			90.2	107.00		
Blank	Radium-226	07/21/2011	0.0180	U	91.9			
0822	Radium-228	07/07/2011			73.5			
Blank_Spike	Radium-228	07/07/2011			75.1	107.00		
Blank_Spike_Du	Radium-228	07/07/2011			74.6	94.00		0.60
Blank	Radium-228	07/07/2011	0.1000	U	72.2			

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 classified as Category IV and sampled by filling bottles at the discharge point.

Sample results for all monitoring wells met the Category I or II low-flow sampling criteria and were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Wells 0705, 0719 and 0730 were classified as Category II and were further qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.

Equipment Blank Assessment

Equipment blanks are prepared and analyzed to document contamination attributable the sample collection process. One equipment blank was submitted with these samples. Sulfate was detected in this blank. The sulfate concentrations in the associated samples was greater than 10 times the blank concentration, not requiring qualification.

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 0707 and 0784 (field duplicate IDs 2175 and 2644). 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: Equipment/Trip Blanks

RIN: 11063890 Lab Code: PAR Project: Riverton Validation Date: 8/19/2011

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1106364-35	SW9056	SULFATE	0.51		0.5	MG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1106364-18	JHT 069	0747	98	2		
1106364-19	JHT 070	0749	2000	50		
1106364-23	JHT 071	0794	62	1		
1106364-24	JHT 072	0796	59	1		
1106364-25	JHT 073	0810	330	20		
1106364-26	JHT 074	0811	56	1		
1106364-27	JHT 075	0812	49	1		
1106364-28	JHT 076	0822	980	20		
1106364-29	JHT 077	0823	650	20		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 11063890 Lab Code: PAR Project: Riverton Validation Date: 8/19/2011

Duplicate: 2175 Sample: 0707

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Manganese	1300			1	1300			1	0		UG/L
Molybdenum	1400			50	1200			50	15.38		UG/L
SULFATE	3600			100	3700			100	2.74		MG/L
Uranium	1600			50	1500			50	6.45		UG/L

Duplicate: 2644 Sample: 0784

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Manganese	600			1	600			1	0		UG/L
Molybdenum	22			10	24			10	8.70		UG/L
SULFATE	2300			50	2300			50	0		MG/L
Uranium	16			10	16			10	0		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 — Steve Donivan — 9-16-2011 — Date

Data Validation Lead: Steve Donivan — Steve Donivan — 9-16-2011 — Date

Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the 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.

The sulfate result from location 0430 and the uranium result from location 0824 were identified as potentially anomalous. These data are acceptable as reported. The increase in sulfate concentration in well 0430 correlates with the values observed for alkalinity and specific conductance from this well. The uranium concentration in well 0824 has been trending downward since 2009.

Data Validation Outliers Report - No Field Parameters
Comparison: All Historical Data
Laboratory: ALS Laboratory Group
RIN: 11063890
Report Date: 8/22/2011

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current Result	Current Qualifiers Lab	Current Qualifiers Data	Historical Maximum Result	Historical Maximum Qualifiers Lab	Historical Maximum Qualifiers Data	Historical Minimum Result	Historical Minimum Qualifiers Lab	Historical Minimum Qualifiers Data	Number of Data Points N	Number of Data Points N Below Detect	Statistical Outlier
RVT01	0405	N001	06/21/2011	Sulfate	190			390			245			24	0	No
RVT01	0430	N001	06/21/2011	Manganese	0.0018	B		0.014			0.0021	B		24	12	No
RVT01	0430	N001	06/21/2011	Sulfate	390			212			180			23	0	Yes
RVT01	0705	N001	06/22/2011	Manganese	0.063		FQ	0.043		FQ	0.00023	U	FQ	39	17	No
RVT01	0718	N001	06/21/2011	Manganese	0.35		F	3.28			0.36		F	26	0	No
RVT01	0722R	N001	06/22/2011	Molybdenum	0.13		F	0.113		F	0.053		F	8	0	No
RVT01	0723	N001	06/22/2011	Manganese	0.33		F	1.01			0.41		F	26	0	No
RVT01	0730	N001	06/22/2011	Manganese	0.18		FQ	0.12		F	0.04			18	0	No
RVT01	0730	N001	06/22/2011	Sulfate	160		FQ	400			170		F	17	0	No
RVT01	0796	0001	06/21/2011	Manganese	0.0037	B		0.14			0.0052	B		32	0	No
RVT01	0812	0001	06/22/2011	Manganese	0.0067			0.0448			0.0087			12	0	No
RVT01	0822	N001	06/21/2011	Manganese	0.0067			0.15			0.0071			13	0	No
RVT01	0823	N001	06/21/2011	Sulfate	650			560			230			13	0	No
RVT01	0824	N001	06/22/2011	Manganese	0.0083		F	0.007		F	0.00042	B	UF	8	2	No
RVT01	0824	N001	06/22/2011	Molybdenum	0.0064		F	0.00503		F	0.0037		F	8	0	No
RVT01	0824	N001	06/22/2011	Sulfate	65		F	190		F	110		F	8	0	No
RVT01	0824	N001	06/22/2011	Uranium	0.0086		F	0.02		F	0.015		F	8	0	Yes

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.

Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0405 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	-	237			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	-	3.6			#		
Manganese	mg/L	06/21/2011	N001	-	0.0064			#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	-	0.0029			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	-	149			#		
pH	s.u.	06/21/2011	N001	-	8.71			#		
Specific Conductance	umhos /cm	06/21/2011	N001	-	750			#		
Sulfate	mg/L	06/21/2011	N001	-	190			#	2.5	
Temperature	C	06/21/2011	N001	-	13.42			#		
Turbidity	NTU	06/21/2011	N001	-	1.49			#		
Uranium	mg/L	06/21/2011	N001	-	0.000029	U		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0430 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	-	79			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	-	1.17			#		
Manganese	mg/L	06/21/2011	N001	-	0.0018	B		#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	-	0.005			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	-	130.1			#		
pH	s.u.	06/21/2011	N001	-	9.29			#		
Specific Conductance	umhos /cm	06/21/2011	N001	-	993			#		
Sulfate	mg/L	06/21/2011	N001	-	390			#	5	
Temperature	C	06/21/2011	N001	-	12.41			#		
Turbidity	NTU	06/21/2011	N001	-	5.57			#		
Uranium	mg/L	06/21/2011	N001	-	0.000029	U		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0436 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	-	171			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	-	4.89			#		
Manganese	mg/L	06/21/2011	N001	-	0.0018		B	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	-	0.0031			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	-	214.8			#		
pH	s.u.	06/21/2011	N001	-	8.76			#		
Specific Conductance	umhos /cm	06/21/2011	N001	-	776			#		
Sulfate	mg/L	06/21/2011	N001	-	210			#	2.5	
Temperature	C	06/21/2011	N001	-	13.94			#		
Turbidity	NTU	06/21/2011	N001	-	4.97			#		
Uranium	mg/L	06/21/2011	N001	-	0.00007		B	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0460 WELL Koch Sulfuric Acid Plant

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	-	175			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	-	3.31			#		
Manganese	mg/L	06/21/2011	N001	-	0.00094	B	U	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	-	0.0029			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	-	203.6			#		
pH	s.u.	06/21/2011	N001	-	8.77			#		
Specific Conductance	umhos /cm	06/21/2011	N001	-	715			#		
Sulfate	mg/L	06/21/2011	N001	-	170			#	2.5	
Temperature	C	06/21/2011	N001	-	18.19			#		
Turbidity	NTU	06/21/2011	N001	-	4.98			#		
Uranium	mg/L	06/21/2011	N001	-	0.00005	B		#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0705 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	37.3	-	61.8	66		FQ	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	37.3	-	61.8	2.68		FQ	#		
Manganese	mg/L	06/22/2011	N001	37.3	-	61.8	0.063		FQ	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	37.3	-	61.8	0.0029		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	37.3	-	61.8	177.7		FQ	#		
pH	s.u.	06/22/2011	N001	37.3	-	61.8	8.23		FQ	#		
Specific Conductance	umhos /cm	06/22/2011	N001	37.3	-	61.8	1232		FQ	#		
Sulfate	mg/L	06/22/2011	N001	37.3	-	61.8	390		FQ	#	10	
Temperature	C	06/22/2011	N001	37.3	-	61.8	10.05		FQ	#		
Turbidity	NTU	06/22/2011	N001	37.3	-	61.8	4.43		FQ	#		
Uranium	mg/L	06/22/2011	N001	37.3	-	61.8	0.00032		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0707 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	9.1 - 23.3	382		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	9.1 - 23.3	2.12		F	#		
Manganese	mg/L	06/22/2011	N001	9.1 - 23.3	1.3		F	#	0.00011	
Manganese	mg/L	06/22/2011	N002	9.1 - 23.3	1.3		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	9.1 - 23.3	1.4		F	#	0.0016	
Molybdenum	mg/L	06/22/2011	N002	9.1 - 23.3	1.2		F	#	0.0016	
Oxidation Reduction Potential	mV	06/22/2011	N001	9.1 - 23.3	214.5		F	#		
pH	s.u.	06/22/2011	N001	9.1 - 23.3	6.97		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	9.1 - 23.3	6593		F	#		
Sulfate	mg/L	06/22/2011	N001	9.1 - 23.3	3600		F	#	50	
Sulfate	mg/L	06/22/2011	N002	9.1 - 23.3	3700		F	#	50	
Temperature	C	06/22/2011	N001	9.1 - 23.3	8.99		F	#		
Turbidity	NTU	06/22/2011	N001	9.1 - 23.3	3.98		F	#		
Uranium	mg/L	06/22/2011	N001	9.1 - 23.3	1.6		F	#	0.00015	
Uranium	mg/L	06/22/2011	N002	9.1 - 23.3	1.5		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0710 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	9.8	-	26.8	309		F	#		
Dissolved Oxygen	mg/L	06/21/2011	N001	9.8	-	26.8	2.31		F	#		
Manganese	mg/L	06/21/2011	N001	9.8	-	26.8	0.013		F	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	9.8	-	26.8	0.0019		F	#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	9.8	-	26.8	236.3		F	#		
pH	s.u.	06/21/2011	N001	9.8	-	26.8	7.26		F	#		
Specific Conductance	umhos /cm	06/21/2011	N001	9.8	-	26.8	1188		F	#		
Sulfate	mg/L	06/21/2011	N001	9.8	-	26.8	370		F	#	10	
Temperature	C	06/21/2011	N001	9.8	-	26.8	8.92		F	#		
Turbidity	NTU	06/21/2011	N001	9.8	-	26.8	2		F	#		
Uranium	mg/L	06/21/2011	N001	9.8	-	26.8	0.0094		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0716 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	9.78	-	14.78	306		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	9.78	-	14.78	1.64		F	#		
Manganese	mg/L	06/22/2011	N001	9.78	-	14.78	0.23		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	9.78	-	14.78	0.15		F	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	9.78	-	14.78	179.4		F	#		
pH	s.u.	06/22/2011	N001	9.78	-	14.78	7.06		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	9.78	-	14.78	1558		F	#		
Sulfate	mg/L	06/22/2011	N001	9.78	-	14.78	480		F	#	10	
Temperature	C	06/22/2011	N001	9.78	-	14.78	10.73		F	#		
Turbidity	NTU	06/22/2011	N001	9.78	-	14.78	2.1		F	#		
Uranium	mg/L	06/22/2011	N001	9.78	-	14.78	0.41		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0717 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	45.1	-	55.1	210		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	45.1	-	55.1	1.1		F	#		
Manganese	mg/L	06/22/2011	N001	45.1	-	55.1	0.28		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	45.1	-	55.1	0.0087		F	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	45.1	-	55.1	111.9		F	#		
pH	s.u.	06/22/2011	N001	45.1	-	55.1	7.66		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	45.1	-	55.1	1894		F	#		
Sulfate	mg/L	06/22/2011	N001	45.1	-	55.1	710		F	#	10	
Temperature	C	06/22/2011	N001	45.1	-	55.1	11.46		F	#		
Turbidity	NTU	06/22/2011	N001	45.1	-	55.1	4.58		F	#		
Uranium	mg/L	06/22/2011	N001	45.1	-	55.1	0.00055		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0718 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	18.24 - 23.24	393		F	#		
Dissolved Oxygen	mg/L	06/21/2011	N001	18.24 - 23.24	0.9		F	#		
Manganese	mg/L	06/21/2011	N001	18.24 - 23.24	0.35		F	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	18.24 - 23.24	0.079		F	#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	18.24 - 23.24	213.5		F	#		
pH	s.u.	06/21/2011	N001	18.24 - 23.24	7.02		F	#		
Specific Conductance	umhos /cm	06/21/2011	N001	18.24 - 23.24	5155		F	#		
Sulfate	mg/L	06/21/2011	N001	18.24 - 23.24	2700		F	#	25	
Temperature	C	06/21/2011	N001	18.24 - 23.24	11.8		F	#		
Turbidity	NTU	06/21/2011	N001	18.24 - 23.24	3.19		F	#		
Uranium	mg/L	06/21/2011	N001	18.24 - 23.24	0.22		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0719 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	38.47	-	48.47	123		FQ	#		
Dissolved Oxygen	mg/L	06/21/2011	N001	38.47	-	48.47	5.5		FQ	#		
Manganese	mg/L	06/21/2011	N001	38.47	-	48.47	0.16		FQ	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	38.47	-	48.47	0.013		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	38.47	-	48.47	118.9		FQ	#		
pH	s.u.	06/21/2011	N001	38.47	-	48.47	7.61		FQ	#		
Specific Conductance	umhos /cm	06/21/2011	N001	38.47	-	48.47	1210		FQ	#		
Sulfate	mg/L	06/21/2011	N001	38.47	-	48.47	440		FQ	#	10	
Temperature	C	06/21/2011	N001	38.47	-	48.47	13.29		FQ	#		
Turbidity	NTU	06/21/2011	N001	38.47	-	48.47	5.66		FQ	#		
Uranium	mg/L	06/21/2011	N001	38.47	-	48.47	0.00065		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0720 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	7.94 - 12.94	257		F	#		
Dissolved Oxygen	mg/L	06/21/2011	N001	7.94 - 12.94	0.14		F	#		
Manganese	mg/L	06/21/2011	N001	7.94 - 12.94	0.072		F	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	7.94 - 12.94	0.0018		F	#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	7.94 - 12.94	185		F	#		
pH	s.u.	06/21/2011	N001	7.94 - 12.94	7.19		F	#		
Specific Conductance	umhos /cm	06/21/2011	N001	7.94 - 12.94	1096		F	#		
Sulfate	mg/L	06/21/2011	N001	7.94 - 12.94	320		F	#	10	
Temperature	C	06/21/2011	N001	7.94 - 12.94	9.81		F	#		
Turbidity	NTU	06/21/2011	N001	7.94 - 12.94	1.68		F	#		
Uranium	mg/L	06/21/2011	N001	7.94 - 12.94	0.011		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0721 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	44.43 - 54.43	136		F	#		
Dissolved Oxygen	mg/L	06/21/2011	N001	44.43 - 54.43	1.61		F	#		
Manganese	mg/L	06/21/2011	N001	44.43 - 54.43	0.0044	B	F	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	44.43 - 54.43	0.0027		F	#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	44.43 - 54.43	184		F	#		
pH	s.u.	06/21/2011	N001	44.43 - 54.43	8.77		F	#		
Specific Conductance	umhos /cm	06/21/2011	N001	44.43 - 54.43	886		F	#		
Sulfate	mg/L	06/21/2011	N001	44.43 - 54.43	280		F	#	5	
Temperature	C	06/21/2011	N001	44.43 - 54.43	11.91		F	#		
Turbidity	NTU	06/21/2011	N001	44.43 - 54.43	1.28		F	#		
Uranium	mg/L	06/21/2011	N001	44.43 - 54.43	0.00014		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0722R WELL Replacement well for destroyed well 0722.

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	11.1	-	16.1	308		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	11.1	-	16.1	2.1		F	#		
Manganese	mg/L	06/22/2011	N001	11.1	-	16.1	0.002	B	F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	11.1	-	16.1	0.13		F	#	0.0016	
Oxidation Reduction Potential	mV	06/22/2011	N001	11.1	-	16.1	139.4		F	#		
pH	s.u.	06/22/2011	N001	11.1	-	16.1	6.9		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	11.1	-	16.1	2057		F	#		
Sulfate	mg/L	06/22/2011	N001	11.1	-	16.1	860		F	#	10	
Temperature	C	06/22/2011	N001	11.1	-	16.1	11.84		F	#		
Turbidity	NTU	06/22/2011	N001	11.1	-	16.1	0.93		F	#		
Uranium	mg/L	06/22/2011	N001	11.1	-	16.1	0.62		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0723 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	45.99	-	55.99	306		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	45.99	-	55.99	1.37		F	#		
Manganese	mg/L	06/22/2011	N001	45.99	-	55.99	0.33		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	45.99	-	55.99	0.00032	U	F	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	45.99	-	55.99	138.7		F	#		
pH	s.u.	06/22/2011	N001	45.99	-	55.99	7.1		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	45.99	-	55.99	3577		F	#		
Sulfate	mg/L	06/22/2011	N001	45.99	-	55.99	1700		F	#	25	
Temperature	C	06/22/2011	N001	45.99	-	55.99	12.1		F	#		
Turbidity	NTU	06/22/2011	N001	45.99	-	55.99	0.69		F	#		
Uranium	mg/L	06/22/2011	N001	45.99	-	55.99	0.00004	B	F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0729 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	14.71	-	19.71	272		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	14.71	-	19.71	4.45		F	#		
Manganese	mg/L	06/22/2011	N001	14.71	-	19.71	0.067		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	14.71	-	19.71	0.0035		F	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	14.71	-	19.71	198.2		F	#		
pH	s.u.	06/22/2011	N001	14.71	-	19.71	7.17		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	14.71	-	19.71	710		F	#		
Sulfate	mg/L	06/22/2011	N001	14.71	-	19.71	100		F	#	2.5	
Temperature	C	06/22/2011	N001	14.71	-	19.71	10.55		F	#		
Turbidity	NTU	06/22/2011	N001	14.71	-	19.71	9.89		F	#		
Uranium	mg/L	06/22/2011	N001	14.71	-	19.71	0.0077		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0730 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	38.62	-	48.62	345		FQ	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	38.62	-	48.62	1.84		FQ	#		
Manganese	mg/L	06/22/2011	N001	38.62	-	48.62	0.18		FQ	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	38.62	-	48.62	0.0047		FQ	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	38.62	-	48.62	164		FQ	#		
pH	s.u.	06/22/2011	N001	38.62	-	48.62	7.36		FQ	#		
Specific Conductance	umhos /cm	06/22/2011	N001	38.62	-	48.62	957		FQ	#		
Sulfate	mg/L	06/22/2011	N001	38.62	-	48.62	160		FQ	#	5	
Temperature	C	06/22/2011	N001	38.62	-	48.62	11.06		FQ	#		
Turbidity	NTU	06/22/2011	N001	38.62	-	48.62	4.77		FQ	#		
Uranium	mg/L	06/22/2011	N001	38.62	-	48.62	0.0083		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0784 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	1.65 - 6.65	142		F	#		
Dissolved Oxygen	mg/L	06/21/2011	N001	1.65 - 6.65	0.09		F	#		
Manganese	mg/L	06/21/2011	N001	1.65 - 6.65	0.6		F	#	0.00011	
Manganese	mg/L	06/21/2011	N002	1.65 - 6.65	0.6		F	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	1.65 - 6.65	0.022		F	#	0.00032	
Molybdenum	mg/L	06/21/2011	N002	1.65 - 6.65	0.024		F	#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	1.65 - 6.65	168.1		F	#		
pH	s.u.	06/21/2011	N001	1.65 - 6.65	7.45		F	#		
Specific Conductance	umhos /cm	06/21/2011	N001	1.65 - 6.65	4157		F	#		
Sulfate	mg/L	06/21/2011	N001	1.65 - 6.65	2300		F	#	25	
Sulfate	mg/L	06/21/2011	N002	1.65 - 6.65	2300		F	#	25	
Temperature	C	06/21/2011	N001	1.65 - 6.65	13.08		F	#		
Turbidity	NTU	06/21/2011	N001	1.65 - 6.65	0.85		F	#		
Uranium	mg/L	06/21/2011	N001	1.65 - 6.65	0.016		F	#	0.000029	
Uranium	mg/L	06/21/2011	N002	1.65 - 6.65	0.016		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0788 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	1.41	-	13.41	475		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	1.41	-	13.41	2.17		F	#		
Manganese	mg/L	06/22/2011	N001	1.41	-	13.41	0.38		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	1.41	-	13.41	0.025		F	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	1.41	-	13.41	207.3		F	#		
pH	s.u.	06/22/2011	N001	1.41	-	13.41	7.1		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	1.41	-	13.41	4797		F	#		
Sulfate	mg/L	06/22/2011	N001	1.41	-	13.41	2500		F	#	25	
Temperature	C	06/22/2011	N001	1.41	-	13.41	9.98		F	#		
Turbidity	NTU	06/22/2011	N001	1.41	-	13.41	3.38		F	#		
Uranium	mg/L	06/22/2011	N001	1.41	-	13.41	0.091		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0789 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab Qualifiers Data	Lab Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	6.2	-	18.2	519	F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	6.2	-	18.2	3.06	F	#		
Manganese	mg/L	06/22/2011	N001	6.2	-	18.2	0.54	F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	6.2	-	18.2	0.56	F	#	0.0032	
Oxidation Reduction Potential	mV	06/22/2011	N001	6.2	-	18.2	217.3	F	#		
pH	s.u.	06/22/2011	N001	6.2	-	18.2	7.04	F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	6.2	-	18.2	10763	F	#		
Sulfate	mg/L	06/22/2011	N001	6.2	-	18.2	6300	F	#	50	
Temperature	C	06/22/2011	N001	6.2	-	18.2	9.38	F	#		
Turbidity	NTU	06/22/2011	N001	6.2	-	18.2	1.07	F	#		
Uranium	mg/L	06/22/2011	N001	6.2	-	18.2	2.3	F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0824 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	9.5	-	14.5	207		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	9.5	-	14.5	5.57		F	#		
Manganese	mg/L	06/22/2011	N001	9.5	-	14.5	0.0083		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	9.5	-	14.5	0.0064		F	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	9.5	-	14.5	161		F	#		
pH	s.u.	06/22/2011	N001	9.5	-	14.5	7.31		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	9.5	-	14.5	568		F	#		
Sulfate	mg/L	06/22/2011	N001	9.5	-	14.5	65		F	#	2.5	
Temperature	C	06/22/2011	N001	9.5	-	14.5	13.91		F	#		
Turbidity	NTU	06/22/2011	N001	9.5	-	14.5	9.82		F	#		
Uranium	mg/L	06/22/2011	N001	9.5	-	14.5	0.0086		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0826 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	N001	6.6	-	11.6	446		F	#		
Dissolved Oxygen	mg/L	06/22/2011	N001	6.6	-	11.6	0.83		F	#		
Manganese	mg/L	06/22/2011	N001	6.6	-	11.6	2.2		F	#	0.00011	
Molybdenum	mg/L	06/22/2011	N001	6.6	-	11.6	0.031		F	#	0.00032	
Oxidation Reduction Potential	mV	06/22/2011	N001	6.6	-	11.6	194.1		F	#		
pH	s.u.	06/22/2011	N001	6.6	-	11.6	7.09		F	#		
Specific Conductance	umhos /cm	06/22/2011	N001	6.6	-	11.6	3247		F	#		
Sulfate	mg/L	06/22/2011	N001	6.6	-	11.6	1400		F	#	25	
Temperature	C	06/22/2011	N001	6.6	-	11.6	9.97		F	#		
Turbidity	NTU	06/22/2011	N001	6.6	-	11.6	4.98		F	#		
Uranium	mg/L	06/22/2011	N001	6.6	-	11.6	0.058		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0828 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	-	182			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	-	3.63			#		
Manganese	mg/L	06/21/2011	N001	-	0.0013	B	U	#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	-	0.0031			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	-	215.8			#		
pH	s.u.	06/21/2011	N001	-	8.75			#		
Specific Conductance	umhos /cm	06/21/2011	N001	-	795			#		
Sulfate	mg/L	06/21/2011	N001	-	210			#	5	
Temperature	C	06/21/2011	N001	-	14.65			#		
Turbidity	NTU	06/21/2011	N001	-	3.32			#		
Uranium	mg/L	06/21/2011	N001	-	0.00011			#	0.000029	

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

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.

J	Estimated
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X,Y,Z	Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

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

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0747 SURFACE LOCATION 8/26/97 State plane east changed from 594497.14 to an estimation close to river

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	0001	126			#		
Manganese	mg/L	06/22/2011	0001	0.18			#	0.00011	
Molybdenum	mg/L	06/22/2011	0001	0.0026			#	0.00032	
Sulfate	mg/L	06/22/2011	0001	98			#	1	
Uranium	mg/L	06/22/2011	0001	0.028			#	0.000029	
Dissolved Oxygen	mg/L	06/22/2011	N001	4.59			#		
Oxidation Reduction Potential	mV	06/22/2011	N001	167.5			#		
pH	s.u.	06/22/2011	N001	7.6			#		
Specific Conductance	umhos/cm	06/22/2011	N001	430			#		
Temperature	C	06/22/2011	N001	19.38			#		
Turbidity	NTU	06/22/2011	N001	36.1			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0749 SURFACE LOCATION 8/26/97 State plane east changed from 589532.71 to an estimation close to river

Parameter	Units	Sample Date	ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	95			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	3.31			#		
Manganese	mg/L	06/21/2011	N001	0.05			#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	0.009			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	177.2			#		
pH	s.u.	06/21/2011	N001	7.46			#		
Specific Conductance	umhos/cm	06/21/2011	N001	3344			#		
Sulfate	mg/L	06/21/2011	N001	2000			#	25	
Temperature	C	06/21/2011	N001	24.8			#		
Turbidity	NTU	06/21/2011	N001	9.29			#		
Uranium	mg/L	06/21/2011	N001	0.0024			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0794 SURFACE LOCATION 8/26/97 State plane north changed from 844178.27 to an estimation close to river

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	0001	117			#		
Manganese	mg/L	06/21/2011	0001	0.0065			#	0.00011	
Molybdenum	mg/L	06/21/2011	0001	0.003			#	0.00032	
Sulfate	mg/L	06/21/2011	0001	62			#	0.5	
Uranium	mg/L	06/21/2011	0001	0.0018			#	0.000029	
Dissolved Oxygen	mg/L	06/21/2011	N001	9.4			#		
Oxidation Reduction Potential	mV	06/21/2011	N001	222.3			#		
pH	s.u.	06/21/2011	N001	8.17			#		
Specific Conductance	umhos/cm	06/21/2011	N001	281			#		
Temperature	C	06/21/2011	N001	13.16			#		
Turbidity	NTU	06/21/2011	N001	96.1			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0796 SURFACE LOCATION Was possibly historically sampled ~900 ft E from current location

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	0001	98			#		
Manganese	mg/L	06/21/2011	0001	0.0037		B	#	0.00011	
Molybdenum	mg/L	06/21/2011	0001	0.00066		B	#	0.00032	
Sulfate	mg/L	06/21/2011	0001	59			#	0.5	
Uranium	mg/L	06/21/2011	0001	0.0014			#	0.000029	
Dissolved Oxygen	mg/L	06/21/2011	N001	9.93			#		
Oxidation Reduction Potential	mV	06/21/2011	N001	206.7			#		
pH	s.u.	06/21/2011	N001	7.74			#		
Specific Conductance	umhos/cm	06/21/2011	N001	251			#		
Temperature	C	06/21/2011	N001	11.94			#		
Turbidity	NTU	06/21/2011	N001	129			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0810 SURFACE LOCATION Gravel Pit Pond

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	396			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	8.68			#		
Manganese	mg/L	06/21/2011	N001	0.054			#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	0.0012			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	225.8			#		
pH	s.u.	06/21/2011	N001	8.82			#		
Specific Conductance	umhos/cm	06/21/2011	N001	1308			#		
Sulfate	mg/L	06/21/2011	N001	330			#	10	
Temperature	C	06/21/2011	N001	17.81			#		
Turbidity	NTU	06/21/2011	N001	7.13			#		
Uranium	mg/L	06/21/2011	N001	0.0088			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0811 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	0001	63			#		
Manganese	mg/L	06/22/2011	0001	0.0051			#	0.00011	
Molybdenum	mg/L	06/22/2011	0001	0.00059	B		#	0.00032	
Sulfate	mg/L	06/22/2011	0001	56			#	0.5	
Uranium	mg/L	06/22/2011	0001	0.0013			#	0.000029	
Dissolved Oxygen	mg/L	06/22/2011	N001	8.94			#		
Oxidation Reduction Potential	mV	06/22/2011	N001	160.3			#		
pH	s.u.	06/22/2011	N001	7.97			#		
Specific Conductance	umhos/cm	06/22/2011	N001	266			#		
Temperature	C	06/22/2011	N001	14.68			#		
Turbidity	NTU	06/22/2011	N001	78.8			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0812 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/22/2011	0001	65			#		
Manganese	mg/L	06/22/2011	0001	0.0067			#	0.00011	
Molybdenum	mg/L	06/22/2011	0001	0.00046	B		#	0.00032	
Sulfate	mg/L	06/22/2011	0001	49			#	0.5	
Uranium	mg/L	06/22/2011	0001	0.0013			#	0.000029	
Dissolved Oxygen	mg/L	06/22/2011	N001	8.56			#		
Oxidation Reduction Potential	mV	06/22/2011	N001	129.9			#		
pH	s.u.	06/22/2011	N001	7.98			#		
Specific Conductance	umhos/cm	06/22/2011	N001	249			#		
Temperature	C	06/22/2011	N001	17.38			#		
Turbidity	NTU	06/22/2011	N001	76			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0822 SURFACE LOCATION west-side irrigation ditch

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	220			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	5.16			#		
Manganese	mg/L	06/21/2011	N001	0.0067			#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	0.0041			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	185.3			#		
pH	s.u.	06/21/2011	N001	8.44			#		
Radium-226	pCi/L	06/21/2011	N001	0.19	U		#	0.19	0.142
Radium-228	pCi/L	06/21/2011	N001	0.42	U		#	0.42	0.247
Specific Conductance	umhos/cm	06/21/2011	N001	2052			#		
Sulfate	mg/L	06/21/2011	N001	980			#	10	
Temperature	C	06/21/2011	N001	22.6			#		
Turbidity	NTU	06/21/2011	N001	2.42			#		
Uranium	mg/L	06/21/2011	N001	0.008			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011
Location: 0823 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/21/2011	N001	79			#		
Dissolved Oxygen	mg/L	06/21/2011	N001	6.86			#		
Manganese	mg/L	06/21/2011	N001	0.051			#	0.00011	
Molybdenum	mg/L	06/21/2011	N001	0.0015			#	0.00032	
Oxidation Reduction Potential	mV	06/21/2011	N001	231.9			#		
pH	s.u.	06/21/2011	N001	8.62			#		
Specific Conductance	umhos/cm	06/21/2011	N001	1819			#		
Sulfate	mg/L	06/21/2011	N001	650			#	10	
Temperature	C	06/21/2011	N001	19.35			#		
Turbidity	NTU	06/21/2011	N001	1.81			#		
Uranium	mg/L	06/21/2011	N001	0.0054			#	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

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BLANKS REPORT
LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)
RIN: 11063890
Report Date: 8/22/2011

Parameter	Site Code	Location ID	Sample Date	ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Manganese	RVT01	0999	06/22/2011	N001	mg/L	0.0011	B	U	0.00011		E
Molybdenum	RVT01	0999	06/22/2011	N001	mg/L	0.00032	U		0.00032		E
Sulfate	RVT01	0999	06/22/2011	N001	mg/L	0.51			0.5		E
Uranium	RVT01	0999	06/22/2011	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.

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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011

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	06/22/2011	18:47:00	9.25	4937.33
0110	O	4944.35	06/22/2011	18:37:00	8.45	4935.9
0111	O	4946.87	06/22/2011	18:49:00	8.46	4938.41
0700	U	4951.38	06/22/2011	17:13:00	5.46	4945.92
0705	D	4930.8	06/22/2011	11:30:20	4.39	4926.41
0707	D	4931	06/22/2011	10:45:58	3.96	4927.04
0709	D	4930.7	06/22/2011	11:01:00	2.73	4927.97
0710	U	4947.9	06/21/2011	11:20:17	4.94	4942.96
0716	O	4939.12	06/22/2011	17:50:36	7.77	4931.35
0717	O	4938.8	06/22/2011	18:15:30	7.51	4931.29
0718	D	4937.6	06/21/2011	16:10:50	6.62	4930.98
0719	D	4937.55	06/21/2011	17:00:34	6.3	4931.25
0720	C	4940.46	06/21/2011	14:45:50	4.91	4935.55
0721	C	4940.47	06/21/2011	15:30:31	6.63	4933.84
0722R		4937.06	06/22/2011	15:15:17	8.28	4928.78
0723	D	4936.01	06/22/2011	14:55:50	7.04	4928.97
0724	U	4941.36	06/22/2011	17:29:00	5.62	4935.74
0725	U	4941.66	06/22/2011	18:31:00	5.97	4935.69
0726	U	4942	06/22/2011	18:36:00	5.56	4936.44
0727	U	4951.69	06/22/2011	17:15:00	9.06	4942.63
0728	U	4946.01	06/22/2011	17:23:00	6.4	4939.61
0729	D	4932.75	06/22/2011	08:25:27	4.72	4928.03
0730	D	4933.08	06/22/2011	08:40:14	5.26	4927.82
0732	U	4945.07	06/21/2011	13:25:00	7.05	4938.02
0733	U	4946.76	06/21/2011	09:14:00	4.22	4942.54
0734	U	4946.08	06/21/2011	09:10:00	5.92	4940.16
0736	U	4946	06/21/2011	10:59:00	6.56	4939.44
0784	U	4945.45	06/21/2011	13:15:38	6	4939.45

STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 8/22/2011

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0788	C	4935.09	06/22/2011	14:10:44	6.78	4928.31
0789	D	4933.66	06/22/2011	12:00:12	6.47	4927.19
0824		4928.27	06/22/2011	16:55:07	2.83	4925.44
0826		4936.98	06/22/2011	13:20:07	5.91	4931.07

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

Hydrographs

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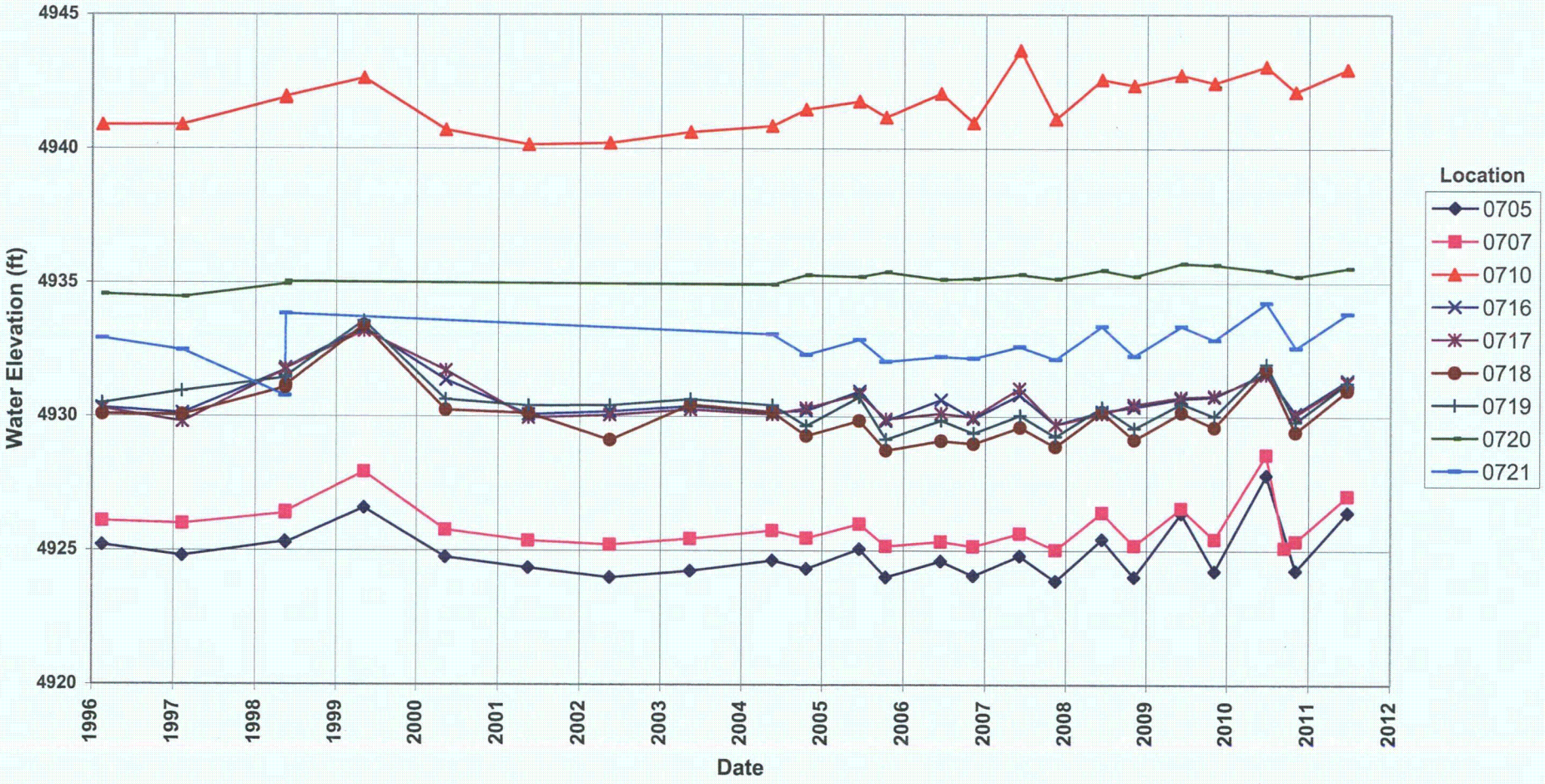
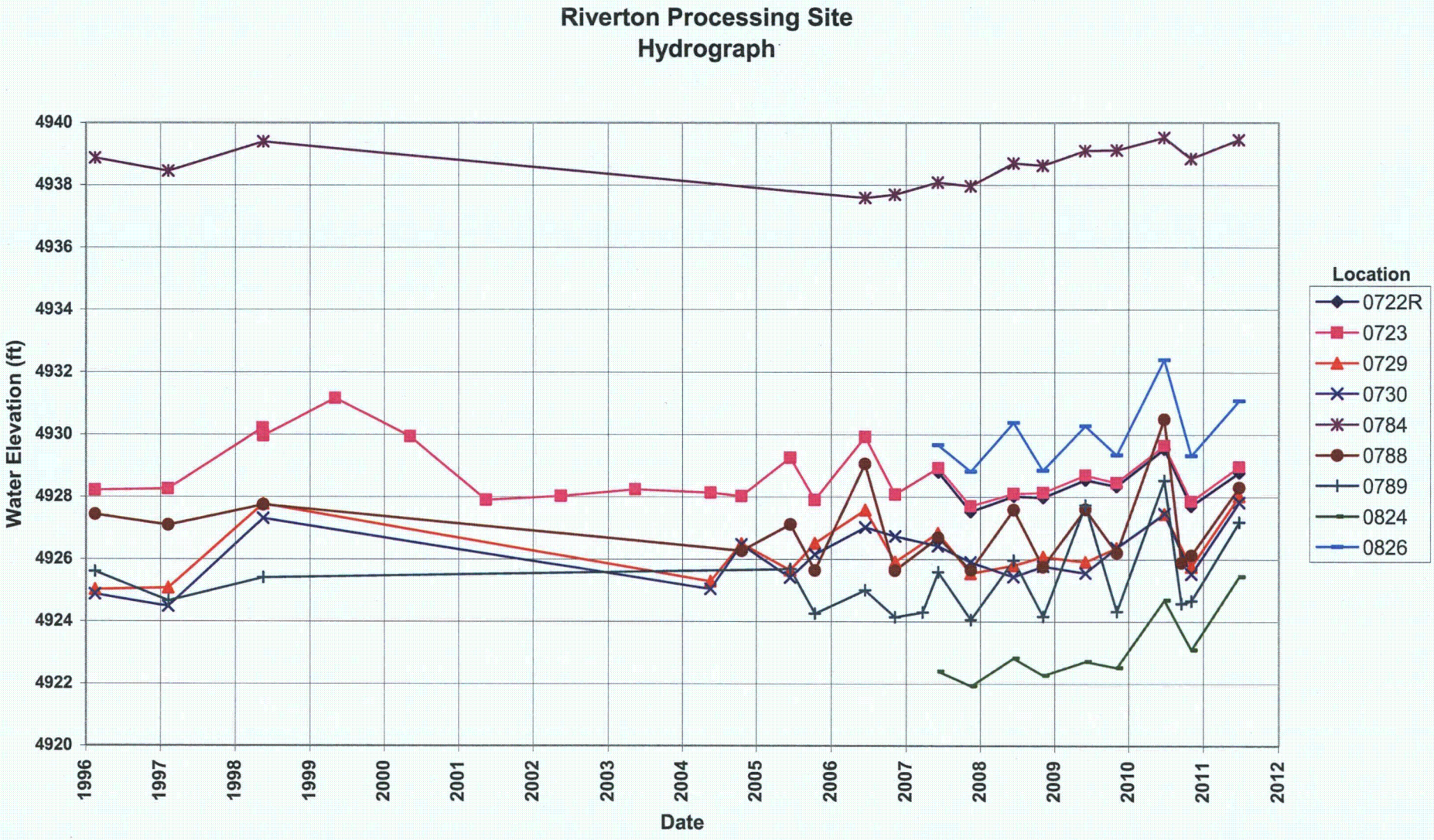
Riverton Processing Site
Hydrograph




Riverton Processing Site
Hydrograph
Water Elevation (ft)
4940
4938
4936
4934
4932
4930
4928
4926
4924
4922
4920
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0722R
0723
0729
0730
0784
0788
0789
0824
0826

Time-Concentration Graphs

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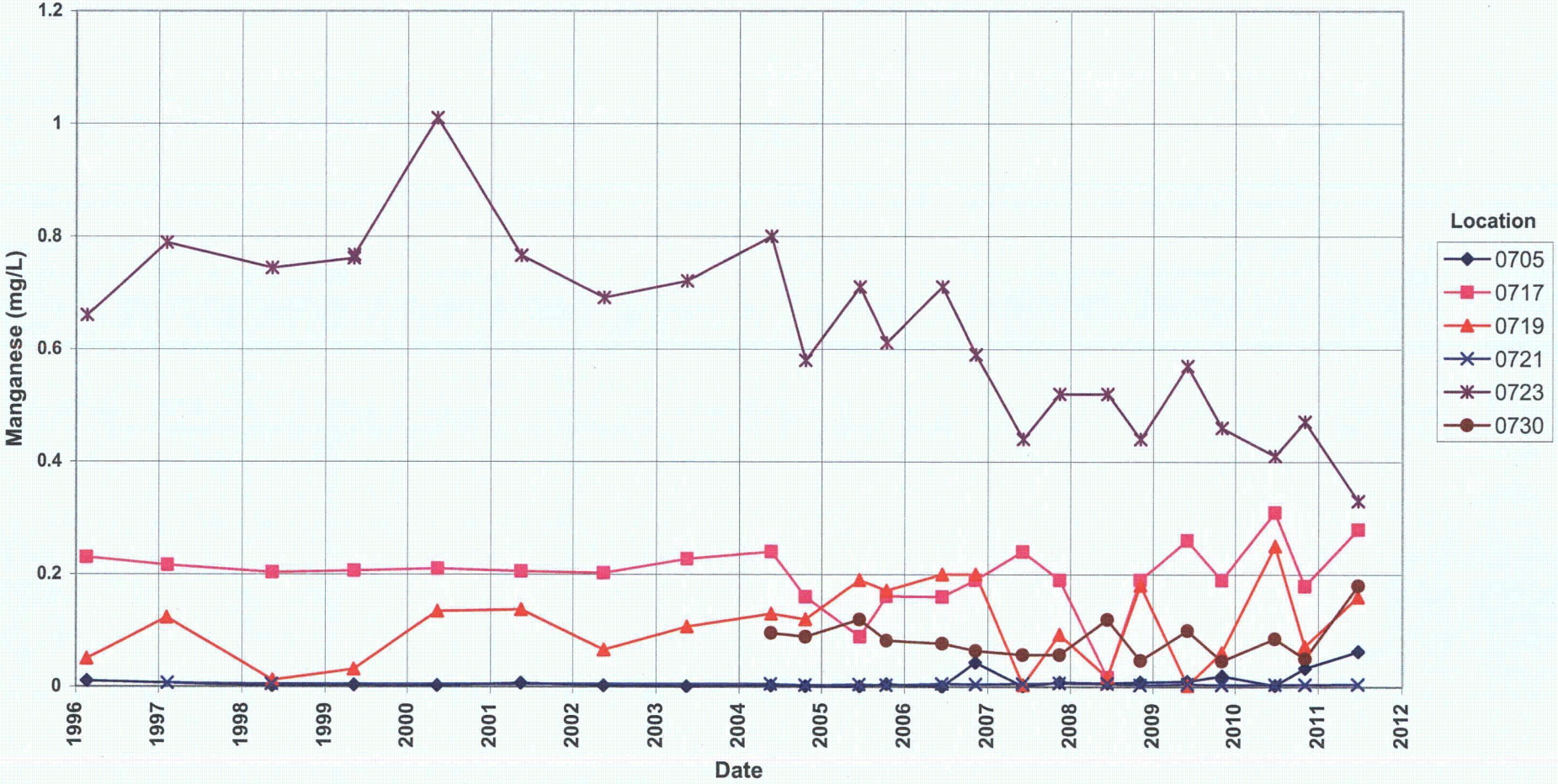
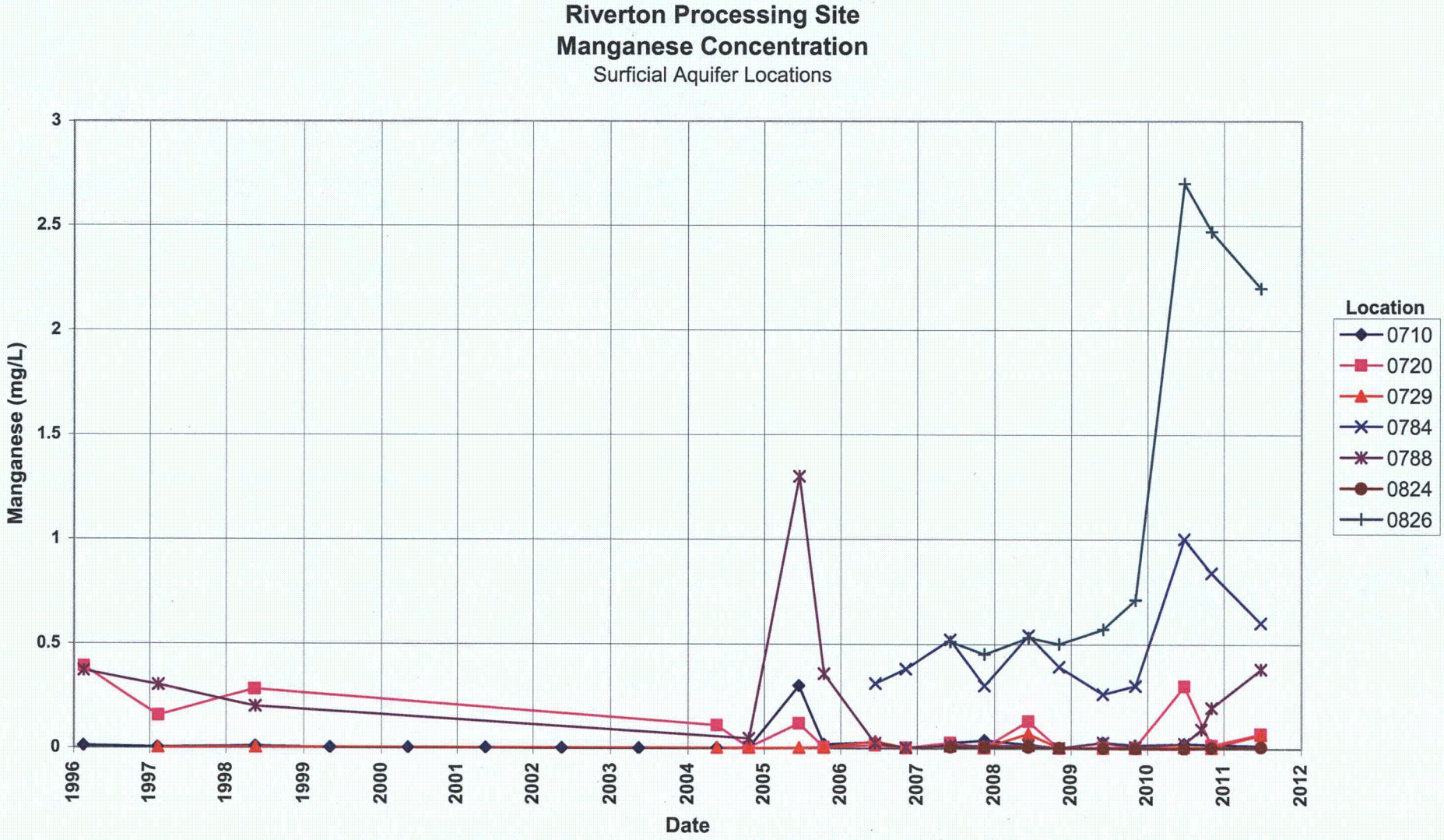
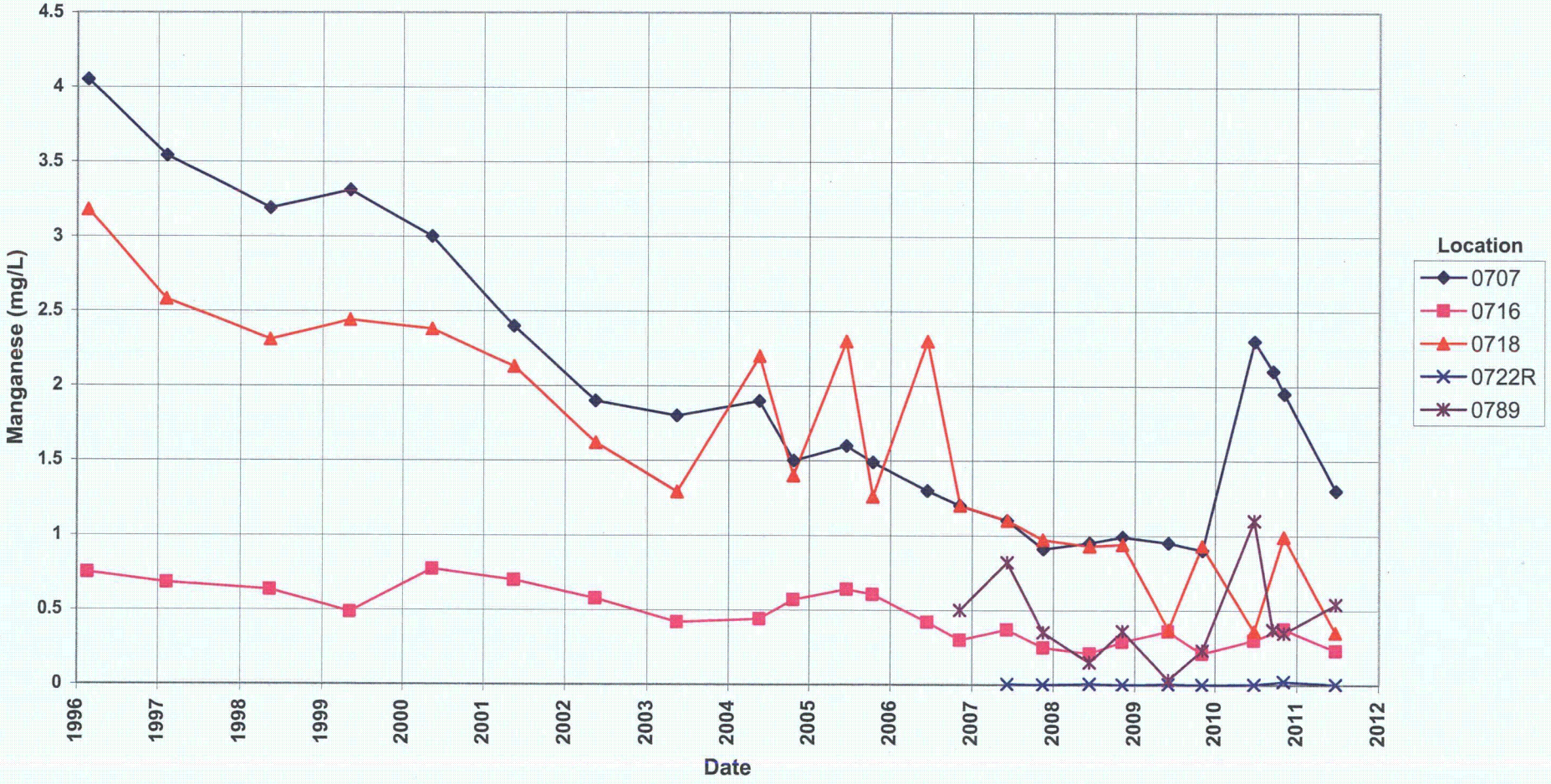
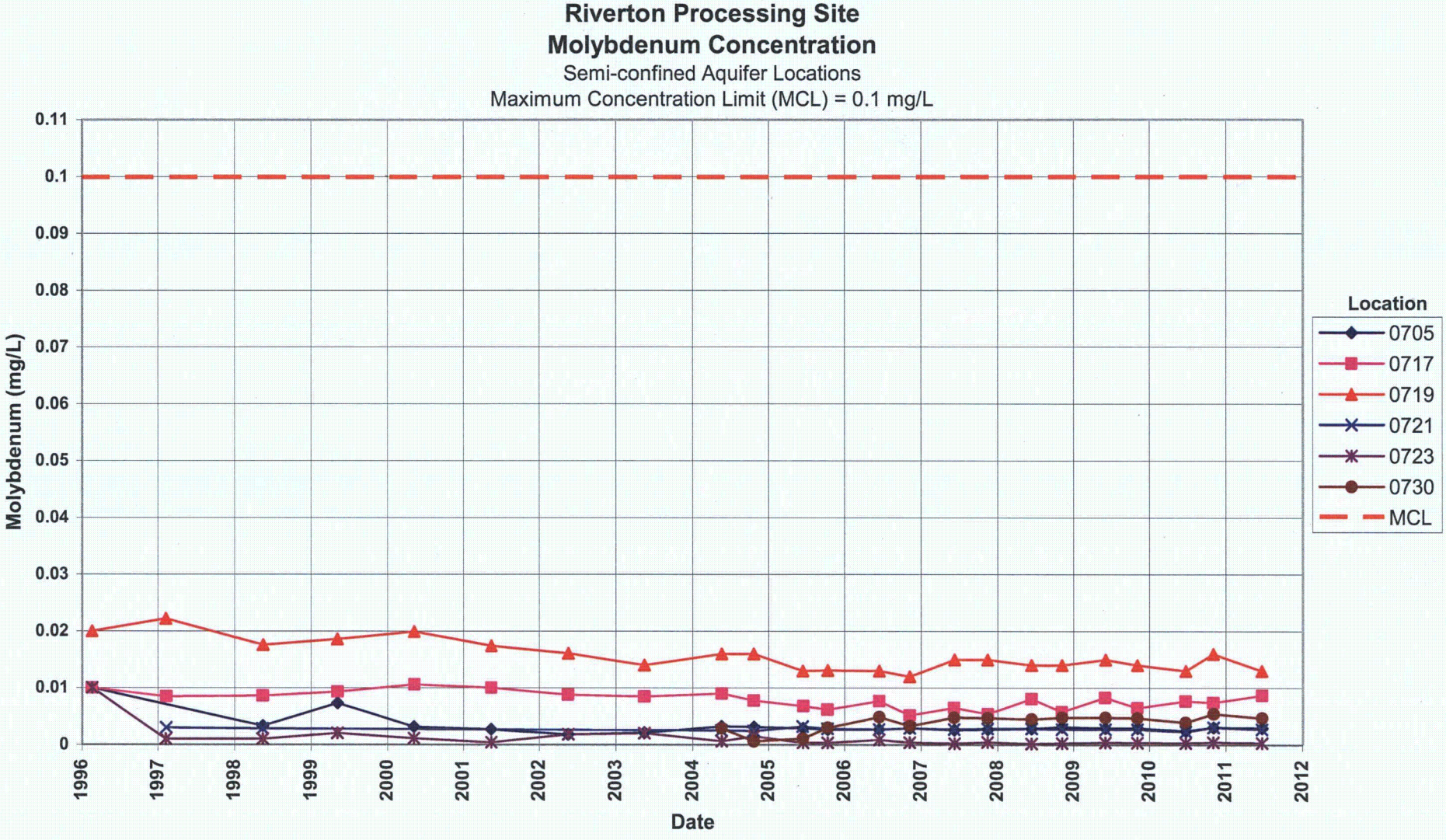
Riverton Processing Site
Manganese Concentration
Semi-Confined Aquifer Locations

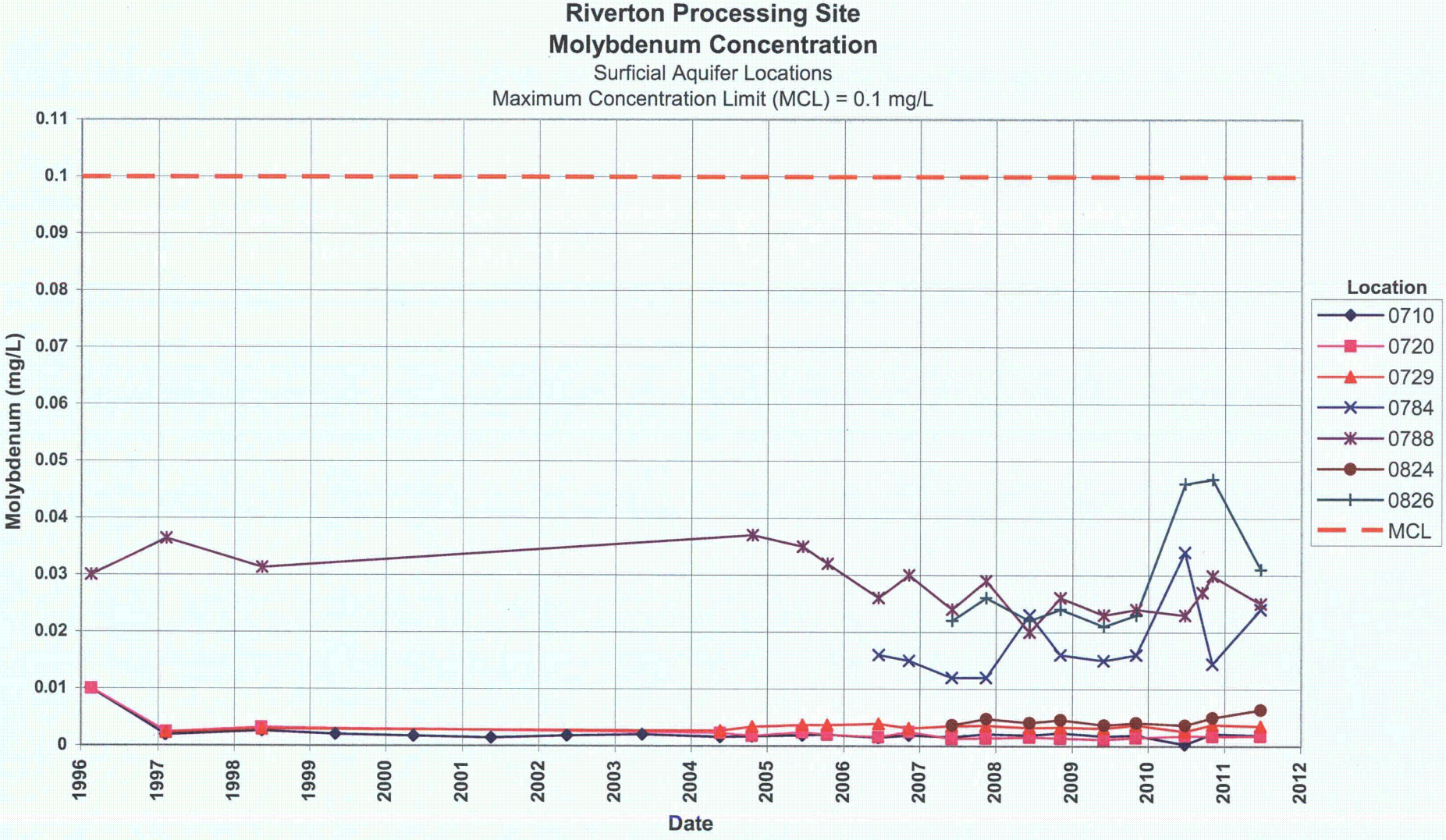



Riverton Processing Site
Manganese Concentration
Surficial Aquifer Locations
Manganese (mg/L)
3
2.5
2
1.5
1
0.5
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0710
0720
0729
0784
0788
0824
0826

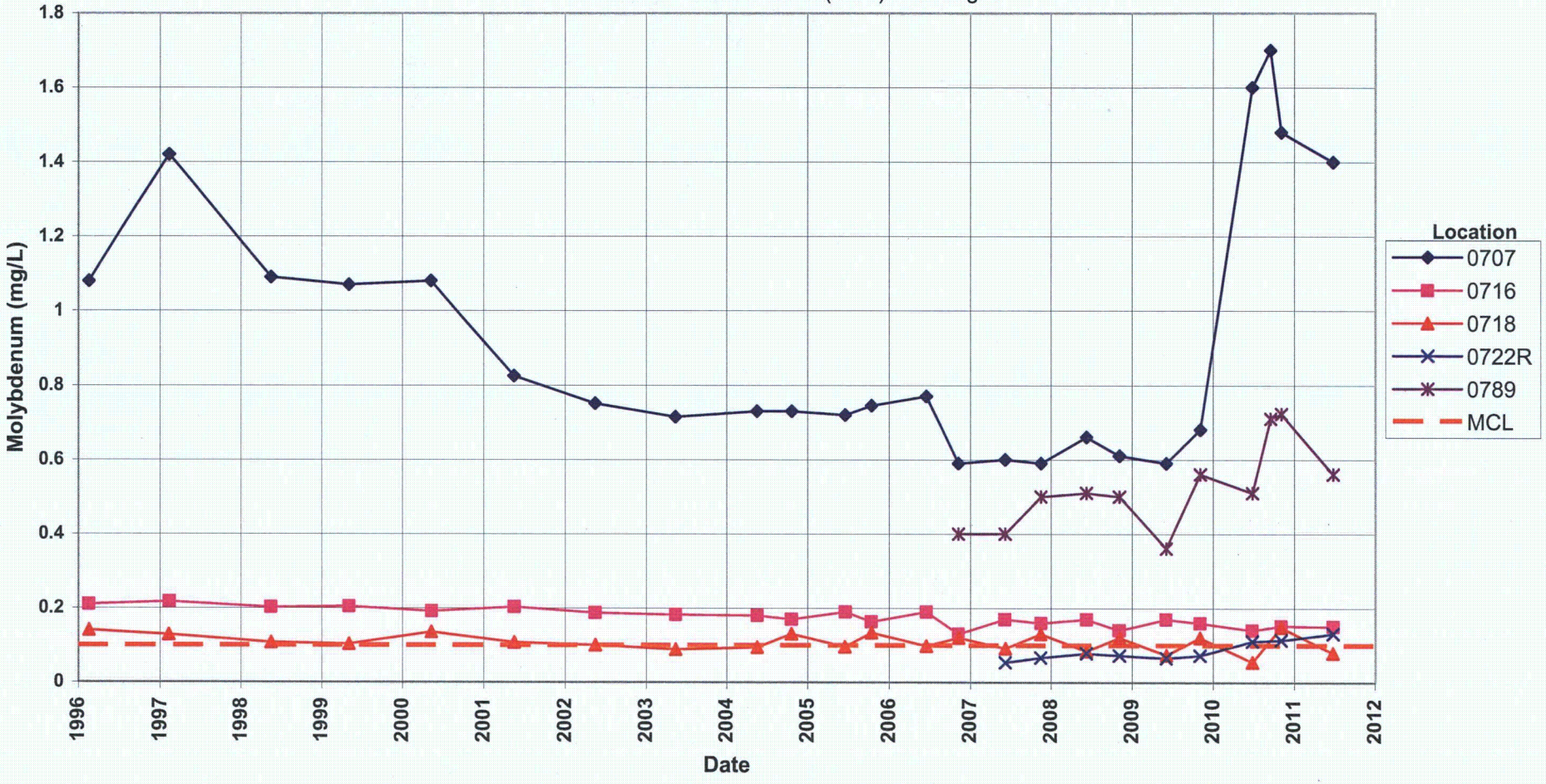
Riverton Processing Site
Manganese Concentration
Surficial Aquifer Locations



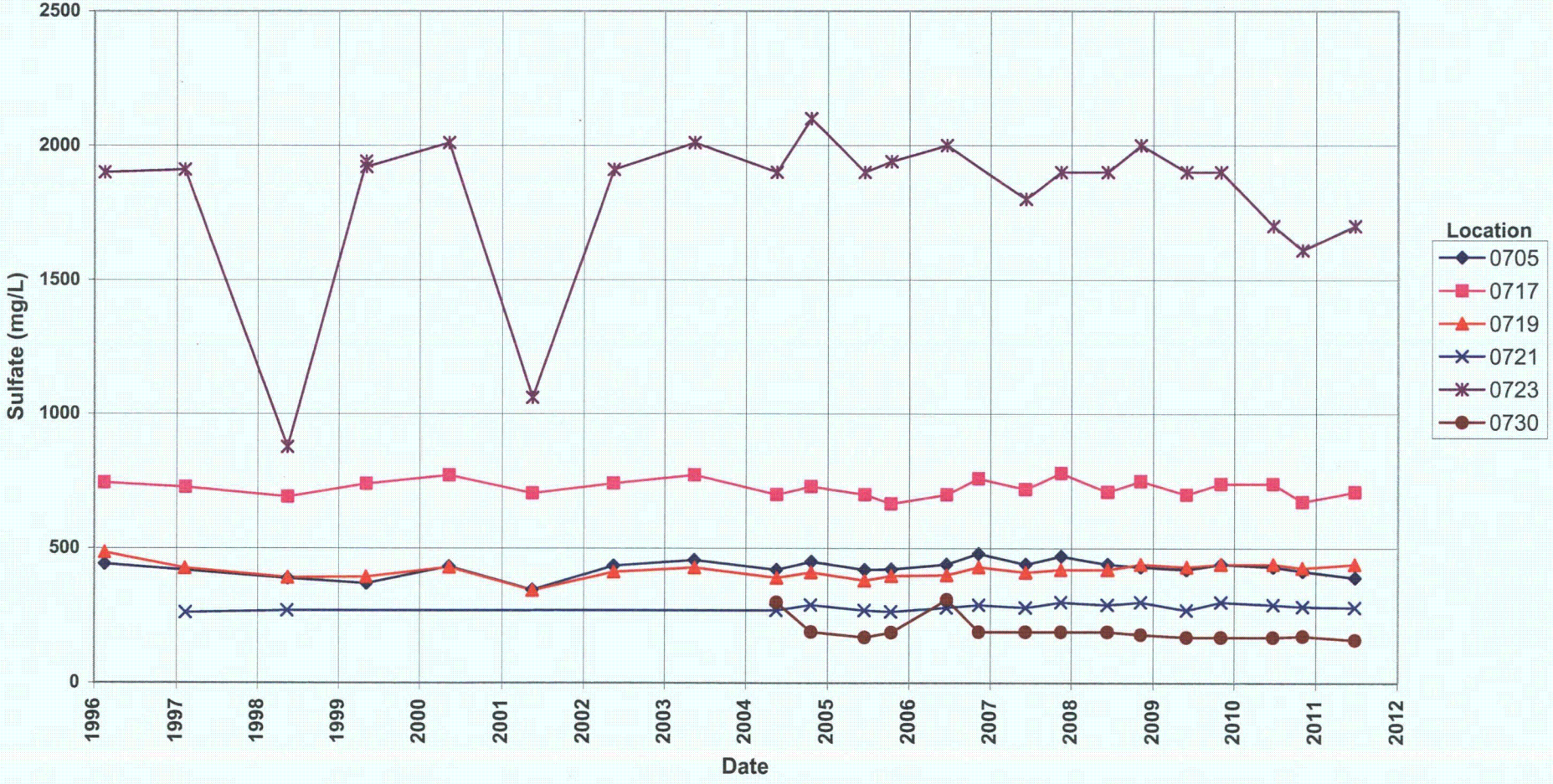

Riverton Processing Site
Molybdenum Concentration
Semi-confined Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L
Molybdenum (mg/L)
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0705
0717
0719
0721
0723
0730
MCL

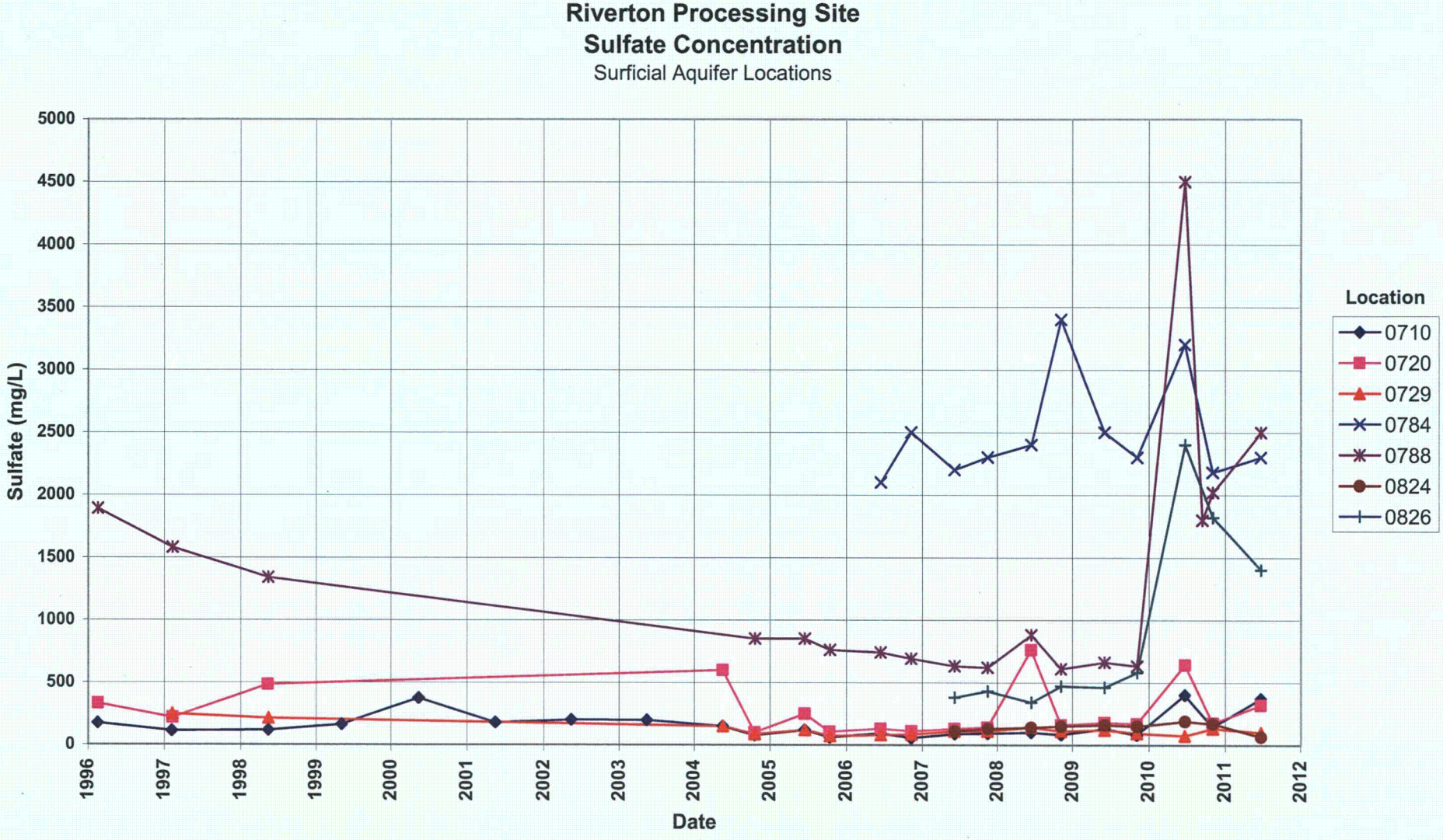

Riverton Processing Site
Molybdenum Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.1 mg/L
Molybdenum (mg/L)
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0710
0720
0729
0784
0788
0824
0826
MCL

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

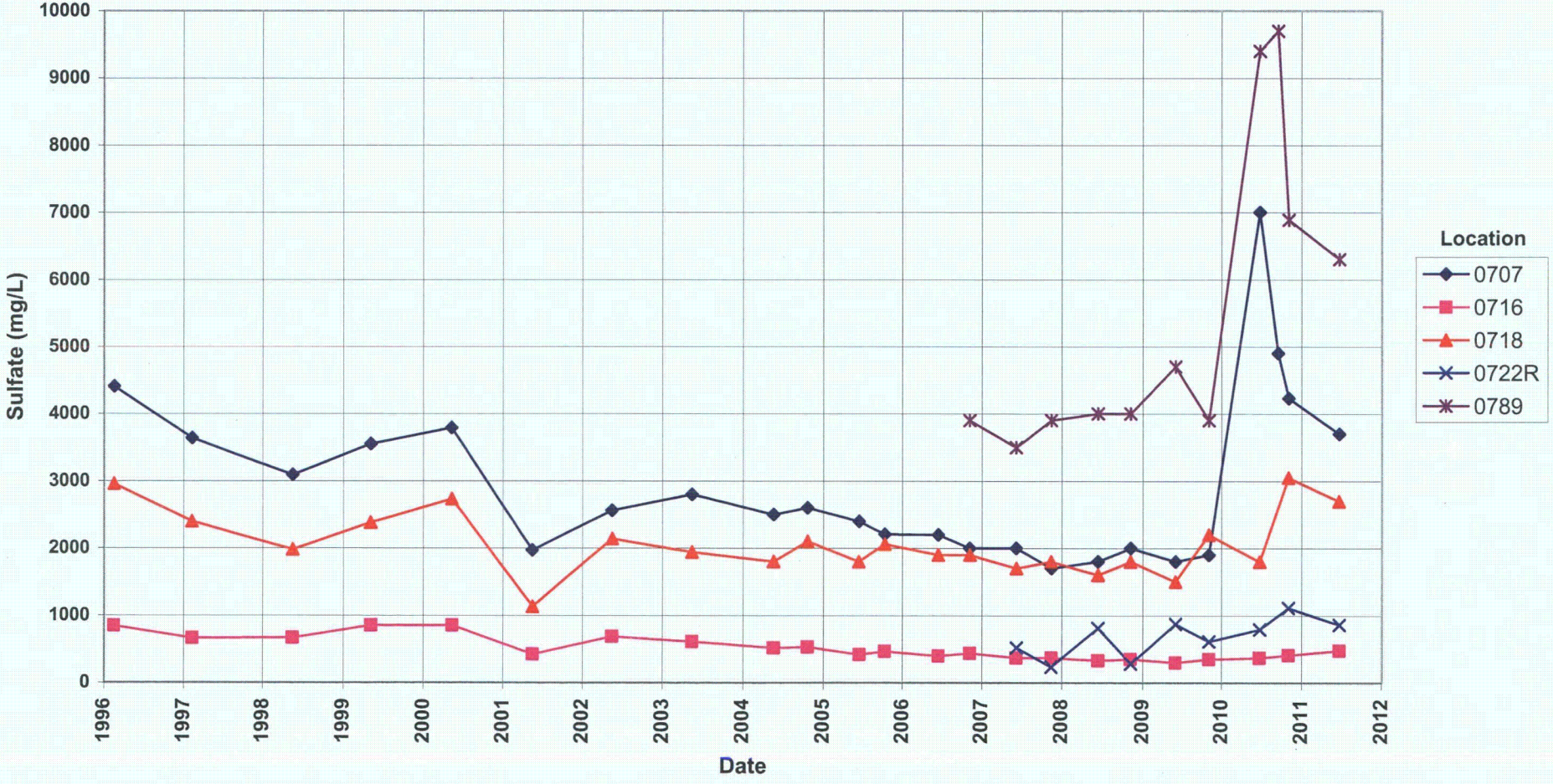


Riverton Processing Site
Sulfate Concentration
Semi-Confined Aquifer Locations

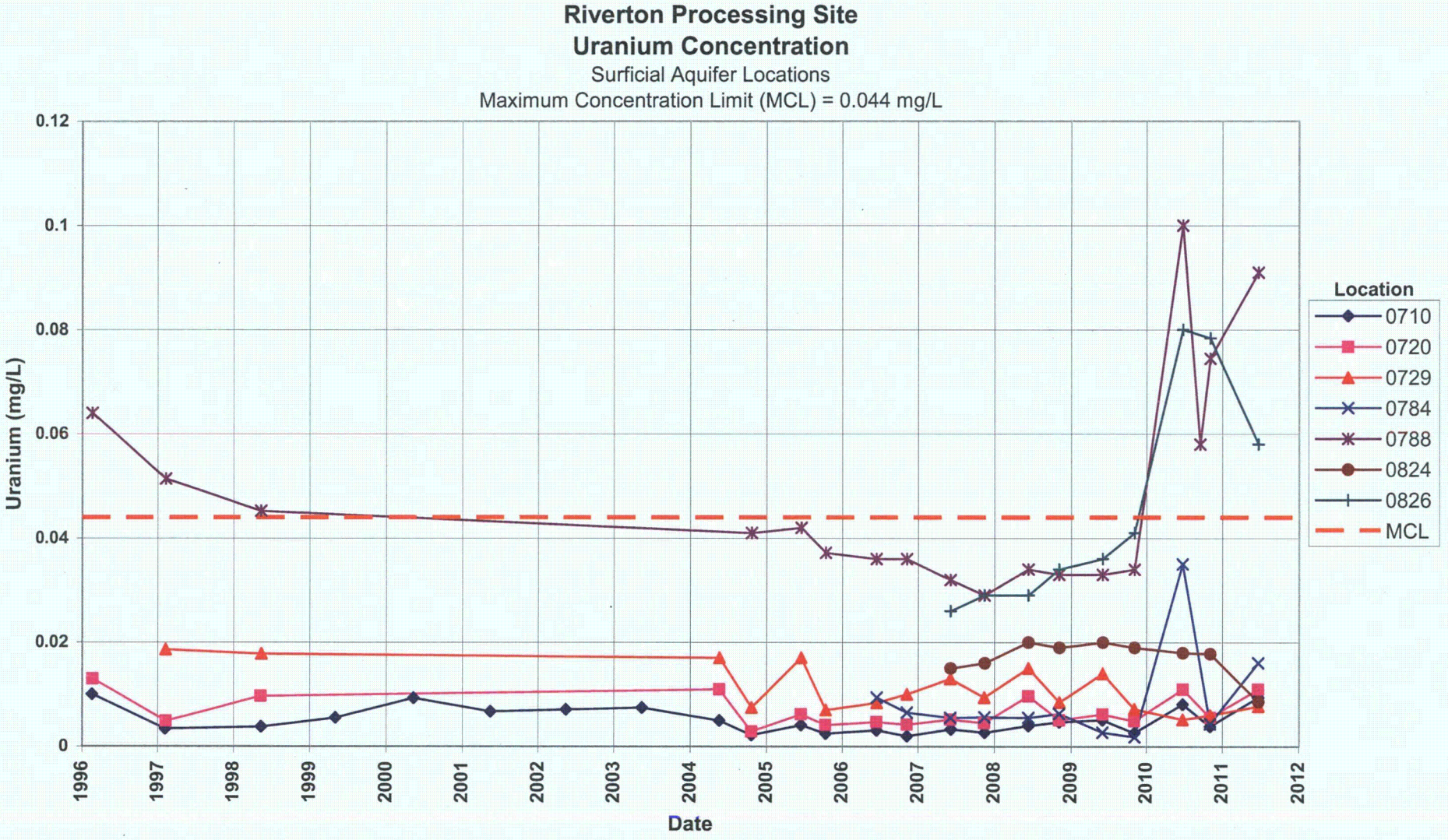


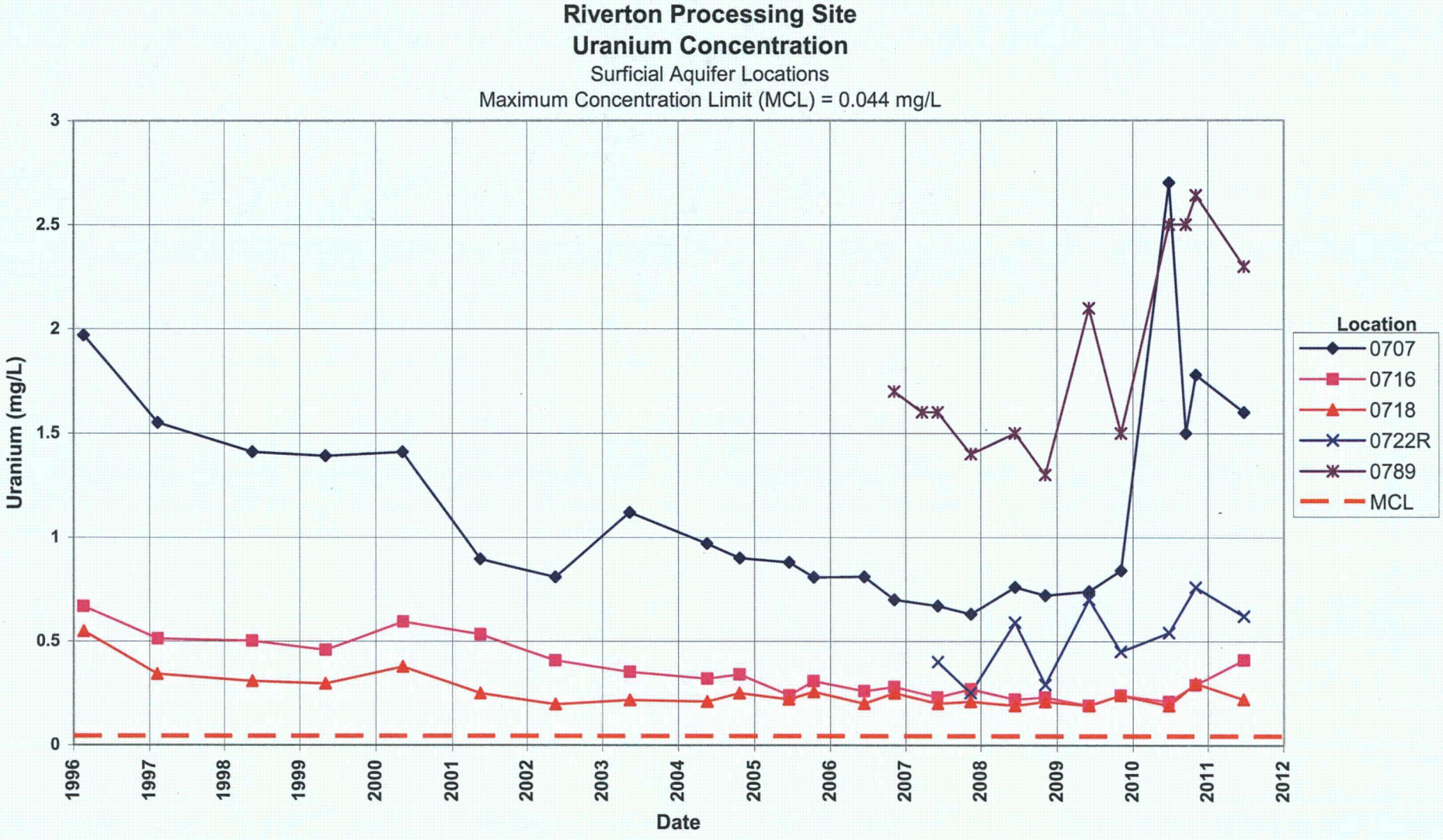

Riverton Processing Site
Sulfate Concentration
Surficial Aquifer Locations
Sulfate (mg/L)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0710
0720
0729
0784
0788
0824
0826

Riverton Processing Site
Sulfate Concentration
Surficial Aquifer Locations

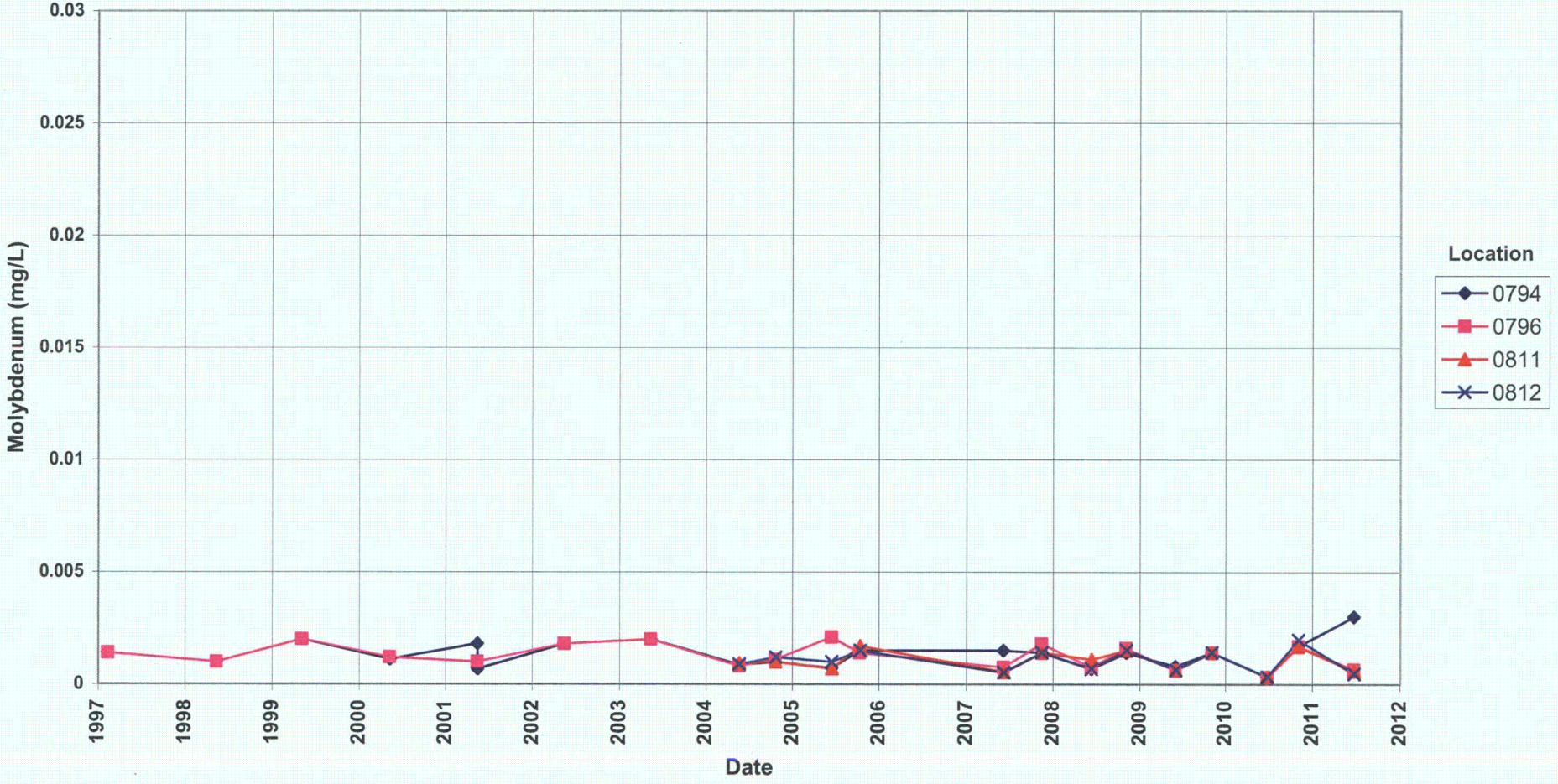



Riverton Processing Site
Uranium Concentration
Semi-Confined Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0705
0717
0719
0721
0723
0730
MCL

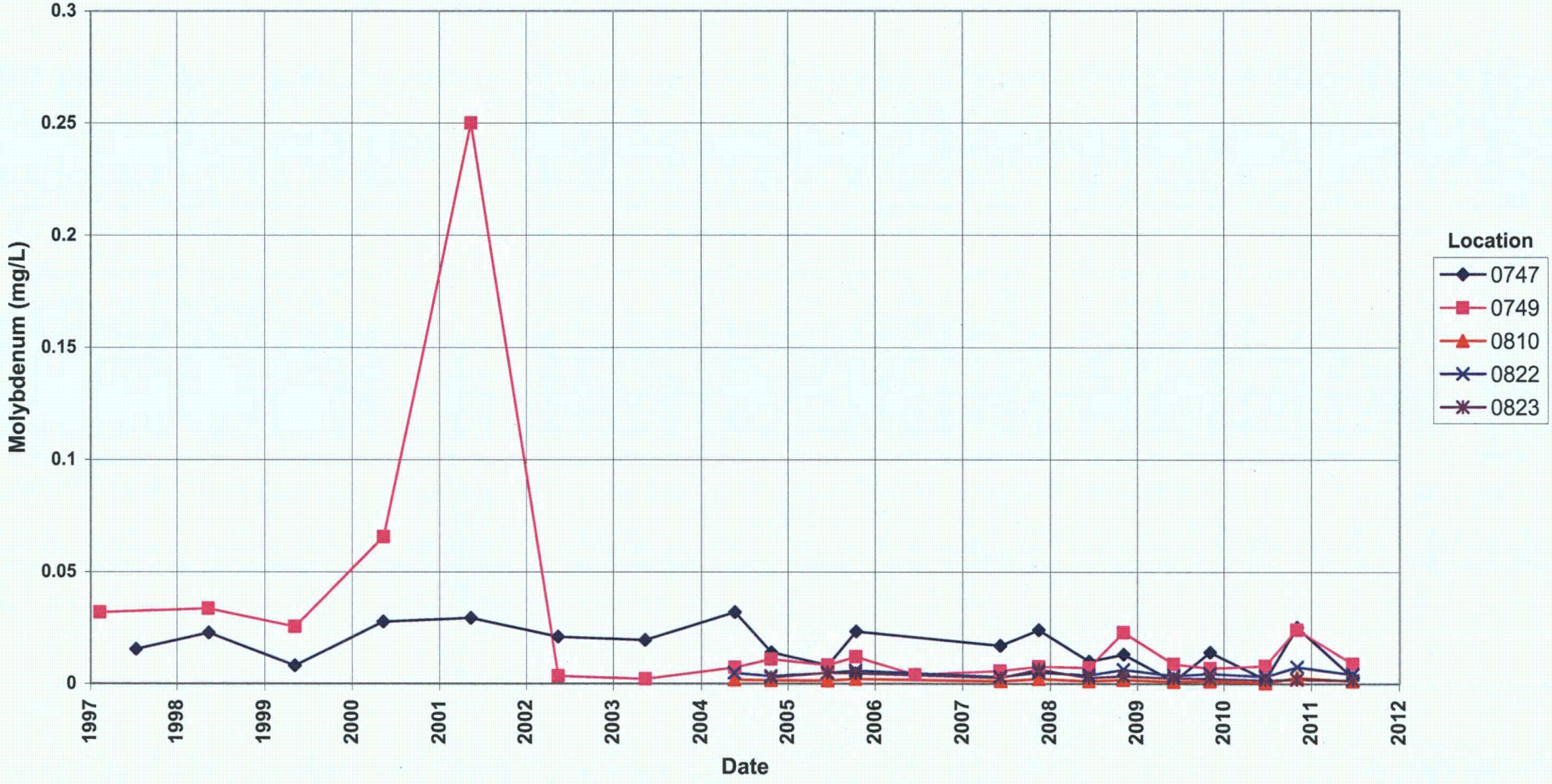

Riverton Processing Site
Uranium Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0710
0720
0729
0784
0788
0824
0826
MCL


Riverton Processing Site
Uranium Concentration
Surficial Aquifer Locations
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
3
2.5
2
1.5
1
0.5
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date
Location
0707
0716
0718
0722R
0789
MCL

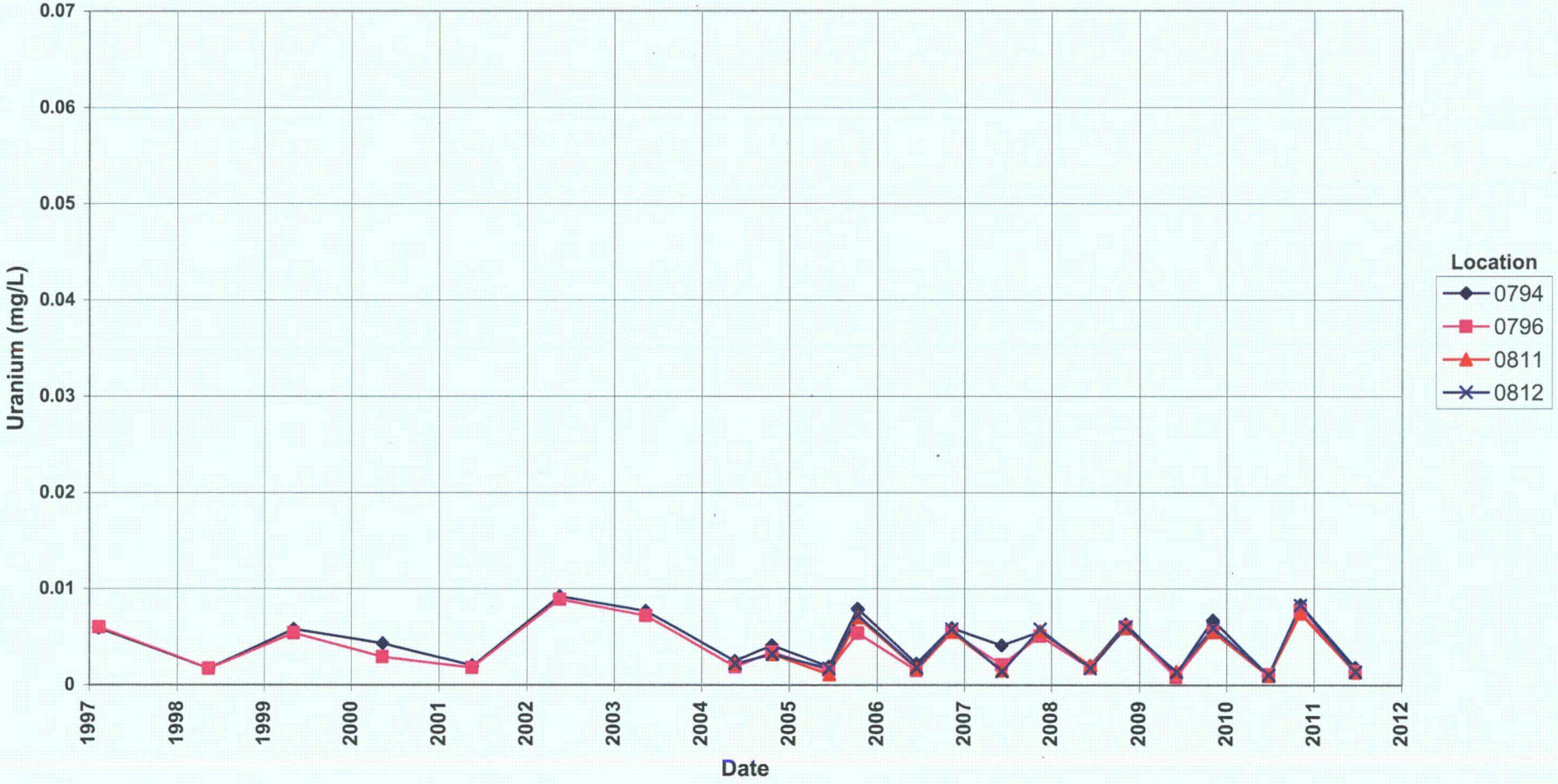
Riverton Processing Site
Molybdenum Concentration
Little Wind River Surface Water Locations



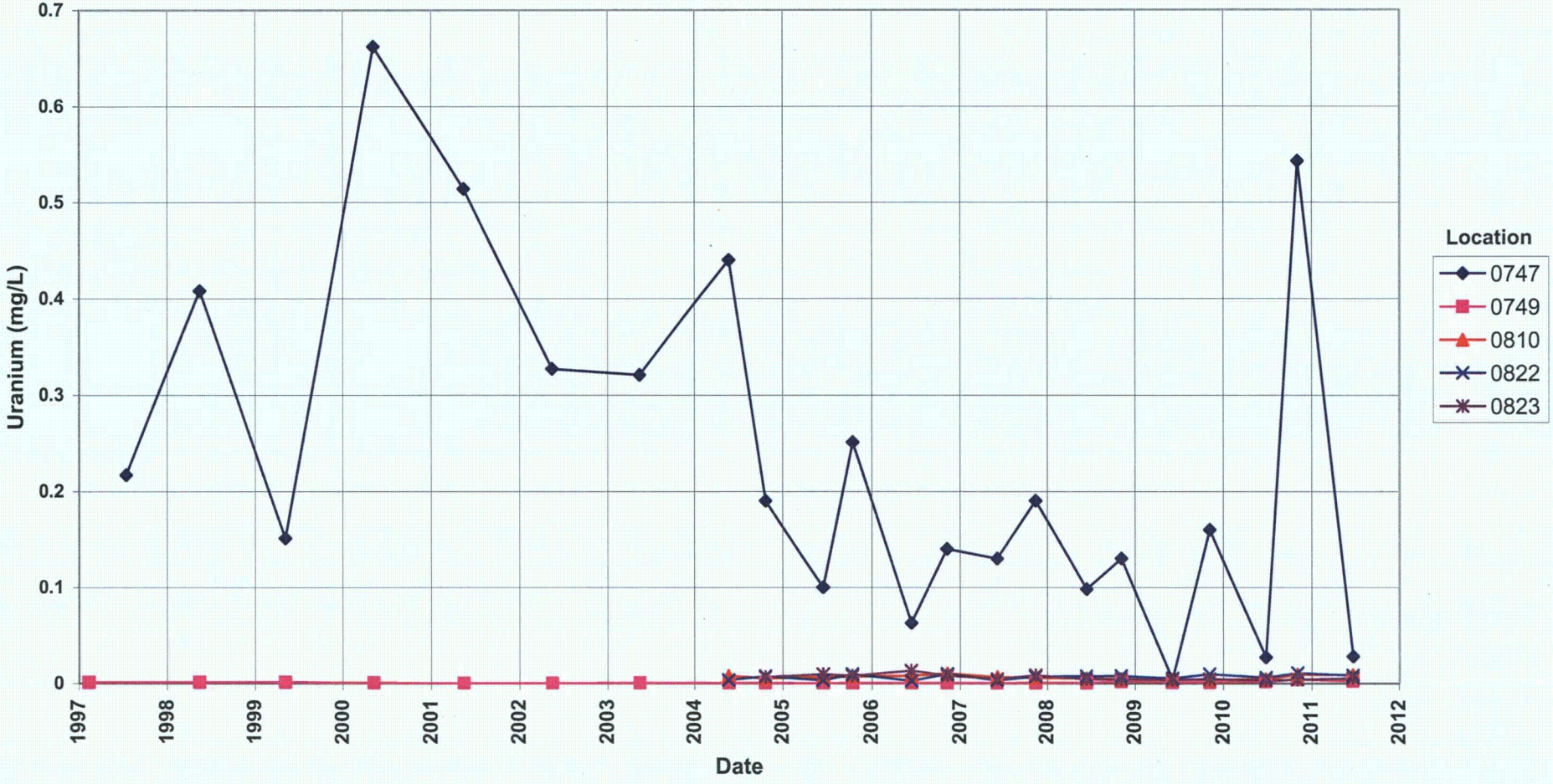
Riverton Processing Site
Molybdenum Concentration
Oxbow Lake, Wetlands, Ditch & Pond Surface Water Locations



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

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Stoller

established 1959

Task Order LM00-501
Control Number 11-0654

May 16, 2011

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
June 2011 Environmental Sampling at Riverton, Wyoming

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

Dear Dr. Gil:

The purpose of this letter is to inform you of the upcoming sampling event at Riverton, WY. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring at the Riverton, WY, Processing Site. Water quality data will be collected from monitoring wells, domestic wells, and surface locations at this site as part of the environmental sampling currently scheduled to begin the week of June 20, 2011.

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

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

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.

Sincerely,

Sam Campbell

Sam Campbell
Site Lead

SC/lcg/lb

Enclosures (3)

cc: (electronic)
Sam Campbell, Stoller
Steve Donivan, 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
Monitoring Wells						
101					X	WL only
110					X	WL only
111					X	WL only
700					X	WL only
702					X	Data logger
705		X				
707		X				Data logger
709					X	WL only; Data logger
710		X				
716		X				
717		X				
718		X				
719		X				
720		X				
721		X				
722R		X				
723		X				
724					X	WL only
725					X	WL only
726					X	WL only
727					X	WL only
728					X	WL only
729		X				
730		X				
732					X	WL only
733					X	WL only
734					X	WL only
736					X	WL only
784		X				
788		X				
789		X				Data logger
824		X				
826		X				
Surface Locations						
747		X				
749		X				
794		X				
796		X				
810		X				Gravel pit
811		X				Little Wind River
812		X				Little Wind River
822		X				
823		X				

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Domestic Wells						
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				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	48	18			
Field Measurements					
Alkalinity	X	X			
Dissolved Oxygen	X	X			
Redox Potential	X	X			
Residual Chlorine					
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride					
Iron					
Lead					
Magnesium					
Manganese	X	X	0.005	SW-846 6010	LMM-01
Molybdenum	X	X	0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (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					
Silica					
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					
Total No. of Analytes	4	6			

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

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Attachment 4
Trip Report

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Stoller

established 1959

Control Number N/A

DATE: June 28, 2011

TO: Distribution

FROM: Sam Campbell

SUBJECT: Trip Report

Site: Riverton, Wyoming, Processing Site.

Dates of Sampling Event: June 20 to June 22, 2011.

Team Members: Sam Campbell and Kent Moe

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

Locations Not Sampled/Reason: None

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

Flow in the Little Wind River was high (but below flood stage) due to run-off from mountain snow-pack. The river was flowing through the Oxbow Lake at the time of sampling.

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	0784	Duplicate	JHT-082
2645	Equipment Blank	Equipment Blank	JHT-083
2175	0707	Duplicated	JHT-528

Requisition Numbers Assigned: All samples were assigned to requisition index number (RIN) 11063890 and were shipped to the ALS Laboratory Group on June 27, 2011.

Water Level Measurements: Water levels were measured at all sampled monitoring wells and 14 additional monitoring wells.

Well Inspection Summary: All monitoring wells were in good shape. Monitoring wells 0724, 0725, and 0726 were recently upgraded with new concrete pads.
Equipment: All equipment functioned properly.

Stakeholder/Regulatory: Wind River Environmental Quality Commission (WREQC) personnel collected split-samples at locations 0707, 0710, 0718, 0720, 0784, 0789, and 0826. Split samples were collected for an extensive list of analytes.

An old well (Photo 1) located on the Chemtrade sulfuric acid plant property was discovered by plant personnel during site clean-up activities. The depth of the well was measured at 12.3 feet below top of casing and depth to water was 7.06 below the top of casing. Original purpose and ownership of the well is unknown.

Met with the Manager of the Chemtrade sulfuric acid plant, David Luzmoor. Access to the former millsite property was streamlined because Mr. Luzmoor suggested access through double gates in security fence inside the Chemtrade facility. Chemtrade personnel will mark one of the low-lying monitoring wells so that it is not damaged by mowing operations. Mr. Luzmoor also pointed out the location of the old well on their property.

Institutional Controls

Fences, Gates, Locks: No issues identified.

Signs: Two of the three warning signs installed around the oxbow lake were intact; one sign was down and damaged by wind.

Trespassing/Site Disturbances: None

Access Issues: Property owner at the location of monitoring well 0710, Steve Hampton, can be reached at (307) 851-7703. Mr. Hampton's son, who we met while sampling, gave us his cell phone number. Mr. Hampton has been difficult to reach over the last few years.

Corrective Action Required/Taken: The damaged oxbow lake warning sign needs to be replaced.

The old well found on the Chemtrade property should be properly abandoned.

Steve Hampton should be contacted regarding access to monitoring well 0710.

(SEC/lb)

cc: (electronic)
April Gil, DOE
Steve Donivan, Stoller
Keith Miller, Stoller
Michelle Morton, Stoller
File: RVT 410.02 (A)

Photo 1. Old well on Chemtrade property.

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