Department of Energy
Office of Legacy Management

MAY 10 2010

Mr. Don Aragon, Executive Director
Wind River Environmental Quality Commission
P.O. Box 217
Ft. Washakie, WY 82514

Subject: Transmittal of the Data Validation Package for the Riverton, Wyoming, Site, November 2009

Dear Mr. Aragon:

Enclosed is your copy of the data validation package presenting results of the validation and evaluation of the data collected during the November 2009 sampling event conducted at the Riverton, Wyoming, processing site.

This sampling event consisted of sampling 19 monitor wells, 4 domestic wells, and 9 surface water locations at the Riverton processing site as specified in the *Long-Term Management Plan for the Riverton, Wyoming, Processing Site*.

All data were checked against laboratory analytical quality control criteria, and data not meeting the criteria were qualified per the *Standard Practice for Validation of Laboratory Data*. All data in this package are considered validated and available for use.

This document will soon be available on the DOE Legacy Management (LM) website at http://lm.doe.gov/riverton/2009_S01109.

Please contact me at (970) 248-6016 or Sam Campbell at (970) 248-6654 with any questions.

Sincerely,

Jalena Dayvault
Site Manager

Enclosure

FSME20

MAY 1 0 2010

cc w/enclosure:
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Sampling Events-DVPs-VMRs/ DVP Riverton November 2009.doc

LMS/RVT/S01109

Data Validation Package

November 2009
Water Sampling at the Riverton, Wyoming, Processing Site

January 2010

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Riverton, Wyoming, Processing Site

Sampling Period: November 3–4, 2009

The draft 2007 *Long-Term Management Plan* (LTMP) *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 19 monitor wells, 9 surface water locations, and 4 domestic wells at the Riverton, Wyoming, Processing Site.

Domestic well 0828 was not sampled because the tap had been shut off and winterized. Water levels were measured at all sampled monitor wells and 15 additional monitor wells that were not sampled. Sampling and analysis was conducted as specified in the LTMP 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 monitor 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 monitor wells listed in Table 1. Groundwater modeling predicts that natural flushing of the surficial aquifer will reduce concentrations below standards within 100 years. Concentration-versus-time graphs are included in the Data Presentation section. Progress of natural flushing will be assessed in the annual Verification Monitoring Report, which will include results from both 2009 sampling events (June and November).

Table 1. Riverton Wells with Samples that Exceeded EPA Groundwater Standards in November 2009

Analyte	Standard[a]	Location	Concentration in milligrams/liter (mg/L)
Molybdenum	0.1	0707	0.68
		0716	0.16
		0718	0.12
		0789	0.51
Uranium	0.044	0707	0.84
		0716	0.24
		0718	0.24
		0722R	0.45
		0789	1.3

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

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.

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 not flowing from the river to 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 (November 2009) to Benchmark

Location	Uranium Concentration (mg/L)
0794 Benchmark	**0.011**
0796 Little Wind River	0.0056
0811 Little Wind River	0.0055
0812 Little Wind River	0.0059
0747 Oxbow Lake	0.16
0810 Constructed Wetlands	0.0040
0822 West Side Irrigation Ditch	0.0096
0823 Gravel Pit Pond	0.0044

The sample collected at the ditch that discharges from the Chemtrade sulfuric acid plant (0749) continues to have elevated concentrations of sulfate (1,500 mg/L). The elevated sulfate concentration in the sulfuric acid plant effluent has affected the sulfate concentration downstream in the west side irrigation ditch (780 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. All radium concentrations were below detection limits or were estimated based on the low concentration and analytical uncertainty, which indicates no impact to water quality in the ditch.

Sam Campbell

Sam Campbell
Site Lead, S.M. Stoller

4-15-2010
Date

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**	November 3-4, 2009
Date(s) of Verification	December 29, 2009	**Name of Verifier**	Gretchen Baer

	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 October 5, 2009.
2. Were the sampling locations specified in the planning documents sampled?	No	Domestic well 0828 was not sampled because the tap had been shut off and winterized.
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibration was performed on 11-02-2009. The millivolt output span of the pH calibration was out of range for values 4-7. All sample locations had pH values >7; no pH data needed to be qualified.
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	For turbidity, a standard value was mis-entered. All turbidity calibration checks were acceptable.
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	The category of well 0705 was misidentified in the Trip Report, but was correct in the field data sheets.
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 at locations 0747 and 0789.
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	Location IDs 2644, 2645, and 2646 were used for QC samples.
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 (COC) records completed and was sample custody maintained?	No	No Stoller representative signed the COC upon relinquishment of the samples.
17. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the "Date Signed" fields (FDCS)?	Yes	Some sheets included an extraneous team member that was not present at this sampling event.
18. Was all other pertinent information documented on the field data sheets?	Yes	At location 0729 the field sheet incorrectly listed a bladder pump as field equipment: a peristaltic pump was used.
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):	09102669
Sample Event:	November 3-4, 2009
Site(s):	Riverton, Wyoming
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	0911106
Analysis:	Metals, Wet Chemistry, and Radiochemistry
Validator:	Gretchen Baer
Review Date:	December 29, 2009

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory Data," GT-9(P). 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	Flag	Reason
0911106-1	0405	Uranium	U	Less than 5 times the calibration blank
0911106-2	0430	Molybdenum	U	Less than 5 times the calibration blank
0911106-2	0430	Uranium	U	Less than 5 times the calibration blank
0911106-3	0436	Manganese	J	Intercept greater than 3 times MDL
0911106-4	0460	Manganese	J	Intercept greater than 3 times MDL
0911106-4	0460	Uranium	U	Less than 5 times the calibration blank
0911106-9	0717	Uranium	U	Less than 5 times the calibration blank
0911106-14	0722R	Manganese	J	Negative calibration blank
0911106-15	0723	Molybdenum	U	Less than 5 times the calibration blank

Table 4 (continued). Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
0911106-15	0723	Uranium	U	Less than 5 times the calibration blank
0911106-16	0729	Manganese	J	Intercept greater than 3 times MDL
0911106-29	0822	Radium-226	J	Less than 3 times the MDC
0911106-29	0822	Radium-228	J	Yield adjusted by laboratory
0911106-31	0824	Manganese	J	Intercept greater than 3 times MDL
0911106-33	Equipment Blank	Manganese	J	Negative calibration blank
0911106-33	Equipment Blank	Uranium	U	Less than 5 times the calibration blank

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 35 water samples on November 10, 2009, 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 exceptions. No Stoller representative signed the COC upon relinquishment of the samples. Sample 0828 was listed on the COC but was not received by the laboratory; the trip report documented that this sample was not collected.

Preservation and Holding Times

The sample shipment was received cool and intact with the temperature inside the iced cooler at 3.4 °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.

Method SW-846 6010, Manganese

Calibration for manganese was performed on December 7, 2009, using three calibration standards. The calibration curve correlation coefficient value was greater than 0.995. The absolute value of the intercept was slightly greater than 3 times the method detection limit (MDL). All associated detects less than 3 times the intercept are qualified with a "J" flag (estimated). Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 11 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 December 1, 2009, using eight calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in six 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 November 12, 2009. 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 calibration and calibration check standards were prepared from independent sources. 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

All radiochemical results reported included the calculated two-sigma total propagated uncertainty (TPU) and minimum detectable concentration (MDC). Radiochemical results are qualified with a "J" flag (estimated) when the result is greater than the MDC, but less than 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 two-sigma TPU.

Radium-226
Samples were screened for radium-226 by gas flow proportional counting. Plateau voltage determinations were performed in May and June 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 September through October 2009.

Radium-228
Plateau voltage determinations were performed in May and June 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 PQL 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. For manganese, some blank results were negative and the absolute values were greater than the MDL but less than the PQL. Associated manganese results that were less than 5 times the MDL are qualified with a "J" flag as estimated values.

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 TPU) 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 using the following equation as specified in *Quality Systems for Analytical Services* revision 2.5.

$$MDC = \frac{4.65 \times \sqrt{\frac{b}{T}}}{K} + \frac{3}{K \times T}$$

Where:
b = background count rate (cpm)
K = Efficiency factor
T = Count time in minutes

The calculation of the MDCs using the equation above was verified. 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

A revised EDD file arrived on December 10, 2009, with corrected ticket numbers. A second revised EDD file arrived on January 6, 2010, with corrected radium-228 laboratory quality control sample results in response to Request for Information #09-2508. 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: 09102669 Lab Code: PAR Validator: Gretchen Baer Validation Date: 12/29/2009

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: 09102669 **Lab Code:** PAR **Date Due:** 12/8/2009

Matrix: Water **Site Code:** RVT **Date Completed:** 12/10/2009

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	12/07/2009	-0.8500	1.0000	OK	OK	OK	OK	OK	104.0	105.0	104.0	1.0	94.0		103.0
MANGANESE	12/07/2009							OK	109.0	105.0	105.0	0.0	100.0		106.0
MOLYBDENUM	12/01/2009	-0.0030	1.0000	OK	OK	OK	OK	OK	99.0	100.0	99.0	1.0	107.0		117.0
MOLYBDENUM	12/01/2009							OK	97.0	96.0	97.0	1.0			
URANIUM	12/01/2009	0.0000	1.0000	OK	OK	OK	OK	OK	100.0	102.0	102.0	0.0	105.0		116.0
URANIUM	12/01/2009							OK	100.0	99.0	99.0	1.0			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 09102669 **Lab Code:** PAR **Date Due:** 12/8/2009

Matrix: Water **Site Code:** RVT **Date Completed:** 12/10/2009

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	11/12/2009	1.405	0.9998	OK		OK							
SULFATE	11/16/2009				OK		OK	OK	98.00	105.0			
SULFATE	11/16/2009							OK	100.00	106.0	105.0	0	
SULFATE	11/16/2009									110.0	110.0	0	
SULFATE	11/17/2009									111.0			

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 09102669 **Lab Code:** PAR **Date Due:** 12/8/2009

Matrix: Water **Site Code:** RVT **Date Completed:** 12/10/2009

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0822	Radium-226	12/02/2009			88.6			
LCS	Radium-226	12/02/2009			92.3	98.4		
LCS_Duplicate	Radium-226	12/02/2009			93.4	98.5		0
Blank	Radium-226	12/02/2009	0.0966	U	90.8			
0822	Radium-228	12/03/2009			62.0			
LCS	Radium-228	12/03/2009			61.3	89.1		
LCS_Duplicate	Radium-228	12/03/2009			62.6	112.0		1.00
Blank	Radium-228	12/03/2009	-0.1330	U	59.7			

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. Monitor wells were sampled using a peristaltic pump and dedicated tubing. Domestic wells (0405, 0430, 0436, and 0460) were sampled by filling bottles at the discharge point.

Domestic wells were classified as Category IV. Sample results for all monitor 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 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 (2644) was collected after decontamination of the non-dedicated tubing reel used to collect some surface water samples. Manganese was detected in this blank. All associated sample results for manganese were greater than 5 times the blank concentration. Uranium was also detected in the blank by the laboratory, but this analyte has been 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 0747 and 0789 (field duplicate IDs 2645 and 2646). 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: 09102669 Lab Code: PAR Project: Riverton Validation Date: 12/29/2009

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	0911106-33	SW6010	MANGANESE	0.28	--B	0.067	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
0911106-18	HLV 936	0747	330	1		
0911106-24	HLV 939	0796	23	1		
0911106-27	HLV 941	0811	24	1		
0911106-28	HLV 942	0812	24	1		
0911106-29	HLV 943	0822	150	1		
0911106-30	HLV 944	0823	7.2	1		
0911106-35	HLV 952	2646	310	1		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 09102669 Lab Code: PAR Project: Riverton Validation Date: 12/29/2009

Duplicate: 2645 Sample: 0789

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
MANGANESE	220			1	230			1	4.44		UG/L
MOLYBDENUM	510			500	560			500	9.35		UG/L
SULFATE	3900			50	3900			50	0		MG/L
URANIUM	1300			500	1500			500	14.29		UG/L

Duplicate: 2646 Sample: 0747

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
MANGANESE	330			1	310			1	6.25		UG/L
MOLYBDENUM	13			10	14			20	7.41		UG/L
SULFATE	440			10	430			10	2.30		MG/L
URANIUM	160			50	160			20	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 — Date: 1-19-2010

Data Validation Lead: Gretchen Baer — Date: 1/19/09

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.

One laboratory result was identified as potentially anomalous. The manganese result for location 0826 had a concentration higher than previously observed. Recent results for manganese, specific conductance, sulfate, and uranium indicate upward trending at this location. The data for this RIN are acceptable as qualified.

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Data Validation Outliers Report - No Field Parameters
Laboratory: PARAGON (Fort Collins, CO)
RIN: 09102669
Comparison: All Historical Data
Report Date: 12/29/2009

Site Code	Location Code	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	Normally Distributed	Statistical Outlier
RVT01	0707	11/04/2009	Manganese	0.9		F	6.4			0.91		F	47	0	No	No
RVT01	0722R	11/03/2009	Manganese	0.00013	B	JF	0.0051		F	0.00014	U	FJ	5	2	Yes	No
RVT01	0784	11/04/2009	Uranium	0.0018		F	0.0094		F	0.0027		F	7	0	Yes	No
RVT01	0789	11/04/2009	Molybdenum	0.56		F	0.51		F	0.34		F	9	0	Yes	No
RVT01	0809	11/04/2009	Uranium	0.0065		F	0.0055		F	0.001		F	11	0	Yes	No
RVT01	0822	11/03/2009	Manganese	0.15			0.1			0.0071			9	0	Yes	No
RVT01	0823	11/03/2009	Molybdenum	0.0023			0.0063	E		0.0024			8	0	Yes	No
RVT01	0823	11/03/2009	Sulfate	230			560			290			10	0	Yes	No
RVT01	0824	11/04/2009	Manganese	0.0015	B	JF	0.007		F	0.0021	B	F	5	1	Yes	No
RVT01	0826	11/04/2009	Manganese	0.71		F	0.57		F	0.45		F	6	0	Yes	Yes
RVT01	0826	11/04/2009	Sulfate	580		F	470		F	340		F	6	0	Yes	No
RVT01	0826	11/04/2009	Uranium	0.041		F	0.036		F	0.026		F	6	0	Yes	No

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.		

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: 12/30/2009
Location: 0405 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	-	0.0036	B		#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	-	0.0044			#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	-	16			#		
pH	s.u.	11/03/2009	N001	-	8.8			#		
Specific Conductance	umhos /cm	11/03/2009	N001	-	987			#		
Sulfate	mg/L	11/03/2009	N001	-	360			#	2.5	
Temperature	C	11/03/2009	N001	-	11.68			#		
Turbidity	NTU	11/03/2009	N001	-	5.54			#		
Uranium	mg/L	11/03/2009	N001	-	0.000028	B	U	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0430 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	-	0.0076	E		#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	-	0.0025		U	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	-	65.9			#		
pH	s.u.	11/03/2009	N001	-	8.78			#		
Specific Conductance	umhos /cm	11/03/2009	N001	-	772			#		
Sulfate	mg/L	11/03/2009	N001	-	190			#	2.5	
Temperature	C	11/03/2009	N001	-	15.78			#		
Turbidity	NTU	11/03/2009	N001	-	5.4			#		
Uranium	mg/L	11/03/2009	N001	-	0.000047	B	U	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0436 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	-	0.0023	B	J	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	-	0.0033			#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	-	51.9			#		
pH	s.u.	11/03/2009	N001	-	8.87			#		
Specific Conductance	umhos /cm	11/03/2009	N001	-	767			#		
Sulfate	mg/L	11/03/2009	N001	-	190			#	2.5	
Temperature	C	11/03/2009	N001	-	14.83			#		
Turbidity	NTU	11/03/2009	N001	-	2.61			#		
Uranium	mg/L	11/03/2009	N001	-	0.000081	B		#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0460 WELL Koch Sulfuric Acid Plant

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	-	0.00088	B	J	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	-	0.0029			#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	-	54.4			#		
pH	s.u.	11/03/2009	N001	-	8.82			#		
Specific Conductance	umhos /cm	11/03/2009	N001	-	743			#		
Sulfate	mg/L	11/03/2009	N001	-	170			#	2.5	
Temperature	C	11/03/2009	N001	-	28.87			#		
Turbidity	NTU	11/03/2009	N001	-	7.18			#		
Uranium	mg/L	11/03/2009	N001	-	0.000061	B	U	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0705 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	37.3	-	61.8	0.019		F	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	37.3	-	61.8	0.0029		F	#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	37.3	-	61.8	-22.9		F	#		
pH	s.u.	11/04/2009	N001	37.3	-	61.8	8.48		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	37.3	-	61.8	1235		F	#		
Sulfate	mg/L	11/04/2009	N001	37.3	-	61.8	440		F	#	5	
Temperature	C	11/04/2009	N001	37.3	-	61.8	9.97		F	#		
Turbidity	NTU	11/04/2009	N001	37.3	-	61.8	1.95		F	#		
Uranium	mg/L	11/04/2009	N001	37.3	-	61.8	0.00019		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0707 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	9.1	-	23.3	0.9		F	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	9.1	-	23.3	0.68		F	#	0.0017	
Oxidation Reduction Potential	mV	11/04/2009	N001	9.1	-	23.3	42.5		F	#		
pH	s.u.	11/04/2009	N001	9.1	-	23.3	7.04		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	9.1	-	23.3	3651		F	#		
Sulfate	mg/L	11/04/2009	N001	9.1	-	23.3	1900		F	#	25	
Temperature	C	11/04/2009	N001	9.1	-	23.3	10.08		F	#		
Turbidity	NTU	11/04/2009	N001	9.1	-	23.3	0.89		F	#		
Uranium	mg/L	11/04/2009	N001	9.1	-	23.3	0.84		F	#	0.000049	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0710 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	9.8	-	26.8	0.014		F	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	9.8	-	26.8	0.0019		F	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	9.8	-	26.8	17.1		F	#		
pH	s.u.	11/03/2009	N001	9.8	-	26.8	7.5		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	9.8	-	26.8	492		F	#		
Sulfate	mg/L	11/03/2009	N001	9.8	-	26.8	79		F	#	0.5	
Temperature	C	11/03/2009	N001	9.8	-	26.8	13.02		F	#		
Turbidity	NTU	11/03/2009	N001	9.8	-	26.8	4.16		F	#		
Uranium	mg/L	11/03/2009	N001	9.8	-	26.8	0.0026		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0716 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	9.78	-	14.78	0.21		F	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	9.78	-	14.78	0.16		F	#	0.00085	
Oxidation Reduction Potential	mV	11/03/2009	N001	9.78	-	14.78	84.5		F	#		
pH	s.u.	11/03/2009	N001	9.78	-	14.78	7.21		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	9.78	-	14.78	1214		F	#		
Sulfate	mg/L	11/03/2009	N001	9.78	-	14.78	350		F	#	5	
Temperature	C	11/03/2009	N001	9.78	-	14.78	11.42		F	#		
Turbidity	NTU	11/03/2009	N001	9.78	-	14.78	4.7		F	#		
Uranium	mg/L	11/03/2009	N001	9.78	-	14.78	0.24		F	#	0.000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0717 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	45.1	-	55.1	0.19		F	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	45.1	-	55.1	0.0065		F	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	45.1	-	55.1	-83.8		F	#		
pH	s.u.	11/03/2009	N001	45.1	-	55.1	7.77		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	45.1	-	55.1	1979		F	#		
Sulfate	mg/L	11/03/2009	N001	45.1	-	55.1	740		F	#	10	
Temperature	C	11/03/2009	N001	45.1	-	55.1	10.23		F	#		
Turbidity	NTU	11/03/2009	N001	45.1	-	55.1	2.67		F	#		
Uranium	mg/L	11/03/2009	N001	45.1	-	55.1	0.000071	B	UF	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0718 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	18.24	-	23.24	0.93		F	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	18.24	-	23.24	0.12		F	#	0.00085	
Oxidation Reduction Potential	mV	11/03/2009	N001	18.24	-	23.24	89.9		F	#		
pH	s.u.	11/03/2009	N001	18.24	-	23.24	7.1		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	18.24	-	23.24	4479		F	#		
Sulfate	mg/L	11/03/2009	N001	18.24	-	23.24	2200		F	#	25	
Temperature	C	11/03/2009	N001	18.24	-	23.24	13.8		F	#		
Turbidity	NTU	11/03/2009	N001	18.24	-	23.24	3.7		F	#		
Uranium	mg/L	11/03/2009	N001	18.24	-	23.24	0.24		F	#	0.000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0719 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	38.47	-	48.47	0.061		FQ	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	38.47	-	48.47	0.014		FQ	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	38.47	-	48.47	1.9		FQ	#		
pH	s.u.	11/03/2009	N001	38.47	-	48.47	7.8		FQ	#		
Specific Conductance	umhos /cm	11/03/2009	N001	38.47	-	48.47	1163		FQ	#		
Sulfate	mg/L	11/03/2009	N001	38.47	-	48.47	440		FQ	#	5	
Temperature	C	11/03/2009	N001	38.47	-	48.47	11		FQ	#		
Turbidity	NTU	11/03/2009	N001	38.47	-	48.47	4.56		FQ	#		
Uranium	mg/L	11/03/2009	N001	38.47	-	48.47	0.00056		FQ	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0720 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	7.94	-	12.94	0.0077		F	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	7.94	-	12.94	0.0015		F	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	7.94	-	12.94	-124.6		F	#		
pH	s.u.	11/03/2009	N001	7.94	-	12.94	7.33		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	7.94	-	12.94	735		F	#		
Sulfate	mg/L	11/03/2009	N001	7.94	-	12.94	170		F	#	2.5	
Temperature	C	11/03/2009	N001	7.94	-	12.94	12.41		F	#		
Turbidity	NTU	11/03/2009	N001	7.94	-	12.94	2.3		F	#		
Uranium	mg/L	11/03/2009	N001	7.94	-	12.94	0.0049		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0721 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	44.43	-	54.43	0.0034	B	F	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	44.43	-	54.43	0.0027		F	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	44.43	-	54.43	-37.6		F	#		
pH	s.u.	11/03/2009	N001	44.43	-	54.43	8.82		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	44.43	-	54.43	907		F	#		
Sulfate	mg/L	11/03/2009	N001	44.43	-	54.43	300		F	#	2.5	
Temperature	C	11/03/2009	N001	44.43	-	54.43	11.67		F	#		
Turbidity	NTU	11/03/2009	N001	44.43	-	54.43	2.3		F	#		
Uranium	mg/L	11/03/2009	N001	44.43	-	54.43	0.000097	B	F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0722R WELL Replacement well for destroyed well 0722.

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	11.1	-	16.1	0.00013	B	JF	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	11.1	-	16.1	0.072		F	#	0.0017	
Oxidation Reduction Potential	mV	11/03/2009	N001	11.1	-	16.1	29.6		F	#		
pH	s.u.	11/03/2009	N001	11.1	-	16.1	7		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	11.1	-	16.1	1511		F	#		
Sulfate	mg/L	11/03/2009	N001	11.1	-	16.1	610		F	#	5	
Temperature	C	11/03/2009	N001	11.1	-	16.1	14.3		F	#		
Turbidity	NTU	11/03/2009	N001	11.1	-	16.1	2		F	#		
Uranium	mg/L	11/03/2009	N001	11.1	-	16.1	0.45		F	#	0.000049	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0723 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	45.99	-	55.99	0.46		F	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	45.99	-	55.99	0.00035	B	UF	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	45.99	-	55.99	-35.9		F	#		
pH	s.u.	11/03/2009	N001	45.99	-	55.99	7.13		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	45.99	-	55.99	3892		F	#		
Sulfate	mg/L	11/03/2009	N001	45.99	-	55.99	1900		F	#	25	
Temperature	C	11/03/2009	N001	45.99	-	55.99	12.62		F	#		
Turbidity	NTU	11/03/2009	N001	45.99	-	55.99	2.2		F	#		
Uranium	mg/L	11/03/2009	N001	45.99	-	55.99	0.000026	B	UF	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0729 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	14.71	-	19.71	0.0011	B	JF	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	14.71	-	19.71	0.0037		F	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	14.71	-	19.71	175.3		F	#		
pH	s.u.	11/03/2009	N001	14.71	-	19.71	7.2		F	#		
Specific Conductance	umhos /cm	11/03/2009	N001	14.71	-	19.71	719		F	#		
Sulfate	mg/L	11/03/2009	N001	14.71	-	19.71	94		F	#	2.5	
Temperature	C	11/03/2009	N001	14.71	-	19.71	11.83		F	#		
Turbidity	NTU	11/03/2009	N001	14.71	-	19.71	2.9		F	#		
Uranium	mg/L	11/03/2009	N001	14.71	-	19.71	0.0072		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0730 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	38.62	-	48.62	0.046		FQ	#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	38.62	-	48.62	0.0047		FQ	#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	38.62	-	48.62	97		FQ	#		
pH	s.u.	11/03/2009	N001	38.62	-	48.62	7.4		FQ	#		
Specific Conductance	umhos /cm	11/03/2009	N001	38.62	-	48.62	970		FQ	#		
Sulfate	mg/L	11/03/2009	N001	38.62	-	48.62	170		FQ	#	2.5	
Temperature	C	11/03/2009	N001	38.62	-	48.62	10.72		FQ	#		
Turbidity	NTU	11/03/2009	N001	38.62	-	48.62	6.2		FQ	#		
Uranium	mg/L	11/03/2009	N001	38.62	-	48.62	0.0091		FQ	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0784 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab Qualifiers	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	1.65	-	6.65	0.3		F	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	1.65	-	6.65	0.016		F	#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	1.65	-	6.65	-29.2		F	#		
pH	s.u.	11/04/2009	N001	1.65	-	6.65	8.08		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	1.65	-	6.65	4588		F	#		
Sulfate	mg/L	11/04/2009	N001	1.65	-	6.65	2300		F	#	25	
Temperature	C	11/04/2009	N001	1.65	-	6.65	13.11		F	#		
Turbidity	NTU	11/04/2009	N001	1.65	-	6.65	4.68		F	#		
Uranium	mg/L	11/04/2009	N001	1.65	-	6.65	0.0018		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0788 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	1.41	-	13.41	0.0077		F	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	1.41	-	13.41	0.024		F	#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	1.41	-	13.41	36.2		F	#		
pH	s.u.	11/04/2009	N001	1.41	-	13.41	7.42		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	1.41	-	13.41	1913		F	#		
Sulfate	mg/L	11/04/2009	N001	1.41	-	13.41	630		F	#	10	
Temperature	C	11/04/2009	N001	1.41	-	13.41	11.49		F	#		
Turbidity	NTU	11/04/2009	N001	1.41	-	13.41	7.2		F	#		
Uranium	mg/L	11/04/2009	N001	1.41	-	13.41	0.034		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0789 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	6.2	-	18.2	0.22		F	#	0.000067	
Manganese	mg/L	11/04/2009	N002	6.2	-	18.2	0.23		F	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	6.2	-	18.2	0.51		F	#	0.0043	
Molybdenum	mg/L	11/04/2009	N002	6.2	-	18.2	0.56		F	#	0.0043	
Oxidation Reduction Potential	mV	11/04/2009	N001	6.2	-	18.2	-2.4		F	#		
pH	s.u.	11/04/2009	N001	6.2	-	18.2	7.11		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	6.2	-	18.2	6574		F	#		
Sulfate	mg/L	11/04/2009	N001	6.2	-	18.2	3900		F	#	25	
Sulfate	mg/L	11/04/2009	N002	6.2	-	18.2	3900		F	#	25	
Temperature	C	11/04/2009	N001	6.2	-	18.2	11.14		F	#		
Turbidity	NTU	11/04/2009	N001	6.2	-	18.2	1.19		F	#		
Uranium	mg/L	11/04/2009	N001	6.2	-	18.2	1.3		F	#	0.00012	
Uranium	mg/L	11/04/2009	N002	6.2	-	18.2	1.5		F	#	0.00012	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0809 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	10.5	-	19.4	0.73		F	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	10.5	-	19.4	0.0017		F	#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	10.5	-	19.4	-23		F	#		
pH	s.u.	11/04/2009	N001	10.5	-	19.4	7.65		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	10.5	-	19.4	885		F	#		
Sulfate	mg/L	11/04/2009	N001	10.5	-	19.4	290		F	#	2.5	
Temperature	C	11/04/2009	N001	10.5	-	19.4	11.8		F	#		
Turbidity	NTU	11/04/2009	N001	10.5	-	19.4	1.43		F	#		
Uranium	mg/L	11/04/2009	N001	10.5	-	19.4	0.0065		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0824 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	9.5	-	14.5	0.0015	B	JF	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	9.5	-	14.5	0.0041		F	#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	9.5	-	14.5	69.7		F	#		
pH	s.u.	11/04/2009	N001	9.5	-	14.5	7.27		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	9.5	-	14.5	938		F	#		
Sulfate	mg/L	11/04/2009	N001	9.5	-	14.5	150		F	#	2.5	
Temperature	C	11/04/2009	N001	9.5	-	14.5	11.36		F	#		
Turbidity	NTU	11/04/2009	N001	9.5	-	14.5	1.59		F	#		
Uranium	mg/L	11/04/2009	N001	9.5	-	14.5	0.019		F	#	0.0000024	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0826 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	6.6	-	11.6	0.71		F	#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	6.6	-	11.6	0.023		F	#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	6.6	-	11.6	-4.1		F	#		
pH	s.u.	11/04/2009	N001	6.6	-	11.6	7.3		F	#		
Specific Conductance	umhos /cm	11/04/2009	N001	6.6	-	11.6	1814		F	#		
Sulfate	mg/L	11/04/2009	N001	6.6	-	11.6	580		F	#	10	
Temperature	C	11/04/2009	N001	6.6	-	11.6	11.09		F	#		
Turbidity	NTU	11/04/2009	N001	6.6	-	11.6	1.81		F	#		
Uranium	mg/L	11/04/2009	N001	6.6	-	11.6	0.041		F	#	0.0000024	

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

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

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

QA QUALIFIER:
- # Validated according to quality assurance guidelines.

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Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
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
Manganese	mg/L	11/04/2009	0001	0.33			#	0.000067	
Manganese	mg/L	11/04/2009	0002	0.31			#	0.000067	
Molybdenum	mg/L	11/04/2009	0001	0.013			#	0.000085	
Molybdenum	mg/L	11/04/2009	0002	0.014			#	0.00017	
Oxidation Reduction Potential	mV	11/04/2009	N001	44.5			#		
pH	s.u.	11/04/2009	N001	7.78			#		
Specific Conductance	umhos/cm	11/04/2009	N001	1353			#		
Sulfate	mg/L	11/04/2009	0001	440			#	5	
Sulfate	mg/L	11/04/2009	0002	430			#	5	
Temperature	C	11/04/2009	N001	9.73			#		
Turbidity	NTU	11/04/2009	N001	43.4			#		
Uranium	mg/L	11/04/2009	0001	0.16			#	0.000012	
Uranium	mg/L	11/04/2009	0002	0.16			#	0.0000049	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0749 SURFACE LOCATION 8/26/97 State plane east changed from 589532.71 to an estimation close to river

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	N001	0.045			#	0.000067	
Molybdenum	mg/L	11/04/2009	N001	0.007			#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	86.6			#		
pH	s.u.	11/04/2009	N001	7.43			#		
Specific Conductance	umhos/cm	11/04/2009	N001	2703			#		
Sulfate	mg/L	11/04/2009	N001	1500			#	10	
Temperature	C	11/04/2009	N001	21.27			#		
Turbidity	NTU	11/04/2009	N001	7.96			#		
Uranium	mg/L	11/04/2009	N001	0.001			#	0.0000024	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
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
Manganese	mg/L	11/03/2009	0001	0.025			#	0.000067	
Molybdenum	mg/L	11/03/2009	0001	0.0014			#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	20.5			#		
pH	s.u.	11/03/2009	N001	8.43			#		
Specific Conductance	umhos/cm	11/03/2009	N001	810			#		
Sulfate	mg/L	11/03/2009	0001	250			#	2.5	
Temperature	C	11/03/2009	N001	7.9			#		
Turbidity	NTU	11/03/2009	N001	62			#		
Uranium	mg/L	11/03/2009	0001	0.0067			#	0.0000024	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
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
Manganese	mg/L	11/04/2009	0001	0.023			#	0.000067	
Molybdenum	mg/L	11/04/2009	0001	0.0014			#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	17.2			#		
pH	s.u.	11/04/2009	N001	8.57			#		
Specific Conductance	umhos/cm	11/04/2009	N001	827			#		
Sulfate	mg/L	11/04/2009	0001	250			#	2.5	
Temperature	C	11/04/2009	N001	7.37			#		
Turbidity	NTU	11/04/2009	N001	32.8			#		
Uranium	mg/L	11/04/2009	0001	0.0056			#	0.0000024	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0810 SURFACE LOCATION Gravel Pit Pond

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	0.047			#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	0.0012			#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	213.6			#		
pH	s.u.	11/03/2009	N001	9.15			#		
Specific Conductance	umhos/cm	11/03/2009	N001	1249			#		
Sulfate	mg/L	11/03/2009	N001	270			#	5	
Temperature	C	11/03/2009	N001	5.11			#		
Turbidity	NTU	11/03/2009	N001	5.9			#		
Uranium	mg/L	11/03/2009	N001	0.004			#	0.0000024	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0811 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	0001	0.024			#	0.000067	
Molybdenum	mg/L	11/04/2009	0001	0.0014			#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	170.6			#		
pH	s.u.	11/04/2009	N001	8.01			#		
Specific Conductance	umhos/cm	11/04/2009	N001	801			#		
Sulfate	mg/L	11/04/2009	0001	250			#	2.5	
Temperature	C	11/04/2009	N001	4.07			#		
Turbidity	NTU	11/04/2009	N001	82.1			#		
Uranium	mg/L	11/04/2009	0001	0.0055			#	0.0000024	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0812 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2009	0001	0.024			#	0.000067	
Molybdenum	mg/L	11/04/2009	0001	0.0014			#	0.000085	
Oxidation Reduction Potential	mV	11/04/2009	N001	38.6			#		
pH	s.u.	11/04/2009	N001	8.55			#		
Specific Conductance	umhos/cm	11/04/2009	N001	800			#		
Sulfate	mg/L	11/04/2009	0001	250			#	2.5	
Temperature	C	11/04/2009	N001	6.65			#		
Turbidity	NTU	11/04/2009	N001	34.6			#		
Uranium	mg/L	11/04/2009	0001	0.0059			#	0.0000024	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0822 SURFACE LOCATION west-side irrigation ditch

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	0001	0.15			#	0.000067	
Molybdenum	mg/L	11/03/2009	0001	0.0044			#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	-12.8			#		
pH	s.u.	11/03/2009	N001	7.55			#		
Radium-226	pCi/L	11/03/2009	0001	0.303		J	#	0.17	0.187
Radium-228	pCi/L	11/03/2009	0001	0.6	U	J	#	0.6	0.355
Specific Conductance	umhos/cm	11/03/2009	N001	1871			#		
Sulfate	mg/L	11/03/2009	0001	780			#	10	
Temperature	C	11/03/2009	N001	9.03			#		
Turbidity	NTU	11/03/2009	N001	162			#		
Uranium	mg/L	11/03/2009	0001	0.0096			#	0.0000024	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009
Location: 0823 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2009	N001	0.0072			#	0.000067	
Molybdenum	mg/L	11/03/2009	N001	0.0023			#	0.000085	
Oxidation Reduction Potential	mV	11/03/2009	N001	55.1			#		
pH	s.u.	11/03/2009	N001	9.43			#		
Specific Conductance	umhos/cm	11/03/2009	N001	777			#		
Sulfate	mg/L	11/03/2009	N001	230			#	2.5	
Temperature	C	11/03/2009	N001	7.77			#		
Turbidity	NTU	11/03/2009	N001	7.01			#		
Uranium	mg/L	11/03/2009	N001	0.0044			#	0.0000024	

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

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

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

QA QUALIFIER:
- # Validated according to quality assurance guidelines.

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Equipment Blank Data

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BLANKS REPORT
LAB: PARAGON (Fort Collins, CO)
RIN: 09102669
Report Date: 12/30/2009

Parameter	Site Code	Location ID	Sample Date	ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Manganese	RVT01	0999	11/03/2009	N001	mg/L	0.00028	B	J	0.000067		E
Molybdenum	RVT01	0999	11/03/2009	N001	mg/L	0.000085	U		0.000085		E
Sulfate	RVT01	0999	11/03/2009	N001	mg/L	0.5	U		0.5		E
Uranium	RVT01	0999	11/03/2009	N001	mg/L	0.000026	B	U	0.0000024		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: 12/30/2009

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0101	O	4946.58	11/04/2009	15:58:00	9.63	4936.95	
0110	O	4944.35	11/04/2009	16:07:00	9.26	4935.09	
0111	O	4946.87	11/04/2009	16:08:00	9.29	4937.58	
0700	U	4951.38	11/03/2009	14:00:00	5.31	4946.07	
0702	D	4931	11/04/2009	10:35:00	6.44	4924.56	
0705	D	4930.8	11/04/2009	11:20:12	6.57	4924.23	
0707	D	4931	11/04/2009	10:55:17	5.57	4925.43	
0709	D	4930.7	11/04/2009	10:34:00	8.99	4921.71	
0710	U	4947.9	11/03/2009	14:50:09	5.45	4942.45	
0716	O	4939.12	11/03/2009	16:15:46	8.38	4930.74	
0717	O	4938.8	11/03/2009	16:35:01	8.02	4930.78	
0718	D	4937.6	11/03/2009	09:50:31	8	4929.6	
0719	D	4937.55	11/03/2009	09:30:19	7.54	4930.01	
0720	C	4940.46	11/03/2009	11:30:01	4.79	4935.67	
0721	C	4940.47	11/03/2009	11:07:25	7.61	4932.86	
0722R		4937.06	11/03/2009	10:45:01	8.72	4928.34	
0723	D	4936.01	11/03/2009	10:25:21	7.55	4928.46	
0724	U	4941.36	11/03/2009	15:25:00	6.88	4934.48	
0725	U	4941.66	11/03/2009	16:56:00	7.18	4934.48	
0726	U	4942	11/03/2009	16:57:00	6.14	4935.86	
0727	U	4951.69	11/04/2009	16:08:00	9.93	4941.76	
0728	U	4946.01	11/04/2009	16:11:00	8.11	4937.9	
0729	D	4932.75	11/03/2009	09:00:23	6.39	4926.36	
0730	D	4933.08	11/03/2009	09:05:43	6.72	4926.36	
0732	U	4945.07	11/04/2009	10:36:00	7.39	4937.68	
0733	U	4946.76	11/03/2009	13:57:00	6.99	4939.77	
0734	U	4946.08	11/03/2009	14:00:00	8.06	4938.02	

STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 12/30/2009

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0736	U	4946	11/03/2009	14:37:00	6.49	4939.51	
0784	U	4945.45	11/04/2009	15:55:42	6.34	4939.11	
0788	C	4935.09	11/04/2009	12:40:04	8.88	4926.21	
0789	D	4933.66	11/04/2009	10:10:25	9.35	4924.31	
0809		4932.09	11/04/2009	14:10:01	7.82	4924.27	
0824		4928.27	11/04/2009	15:10:51	5.76	4922.51	
0826		4936.98	11/04/2009	13:00:42	7.64	4929.34	

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

WATER LEVEL FLAGS: D Dry F FLOWING

Time-Concentration Graphs

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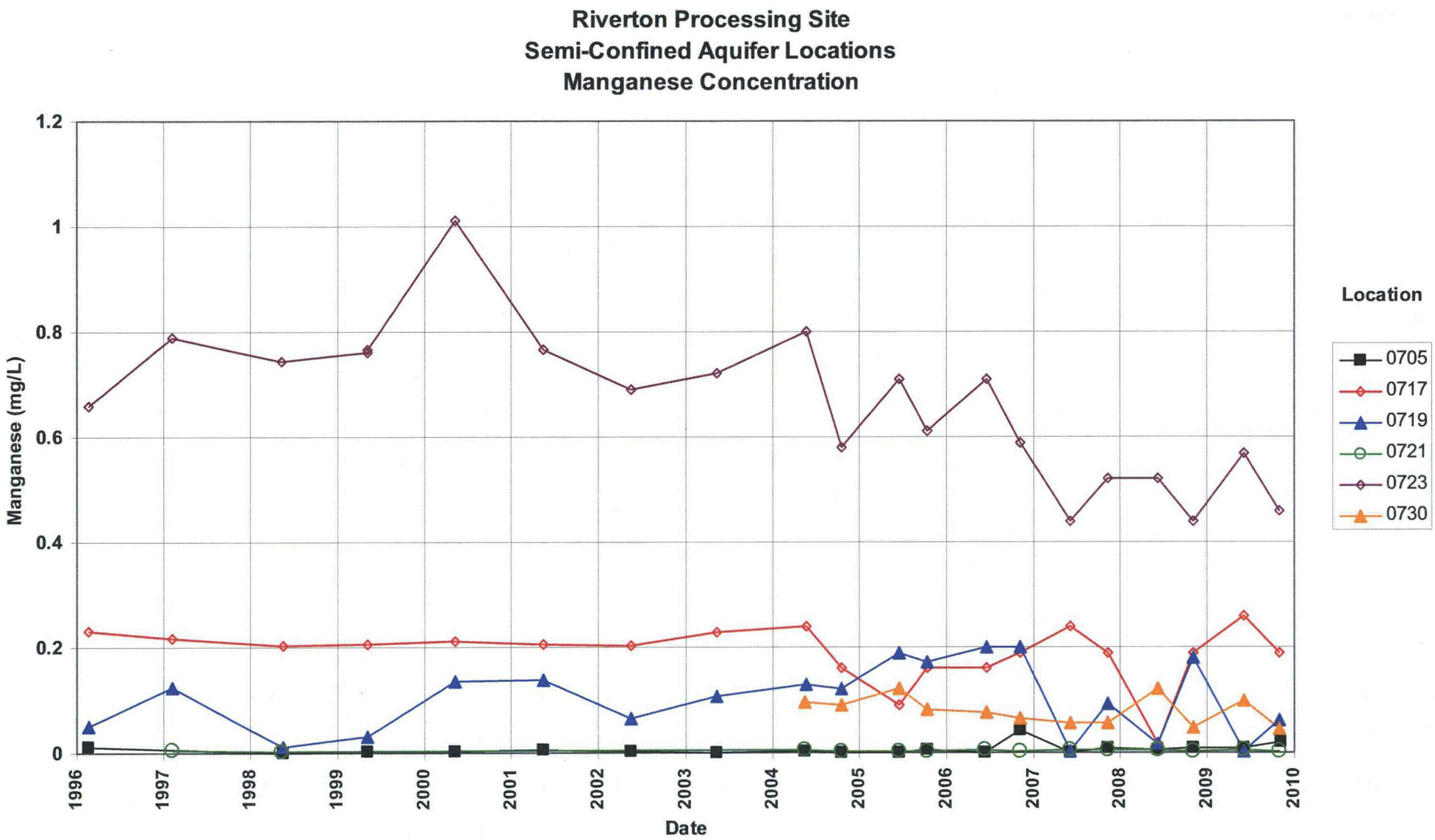
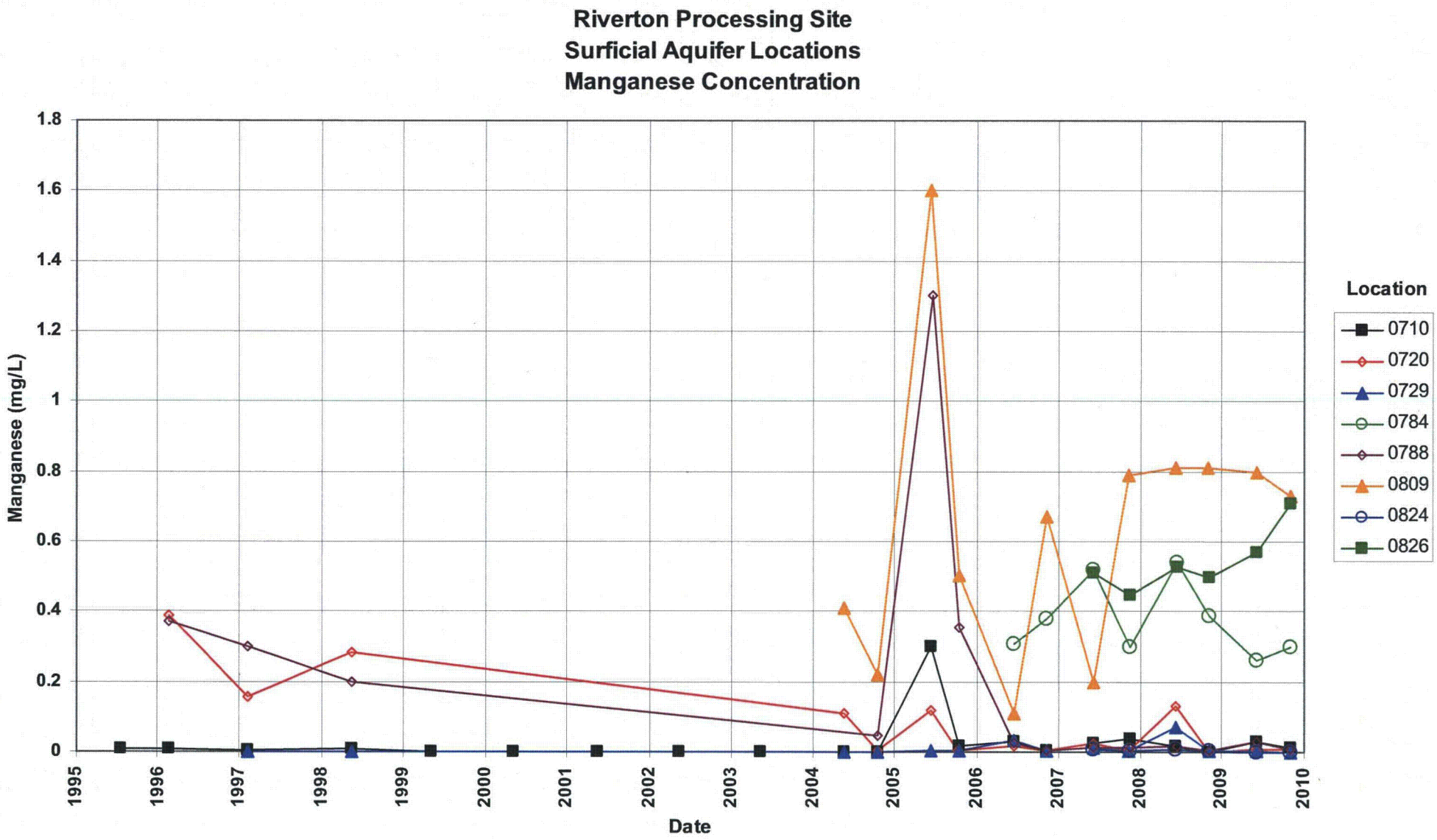
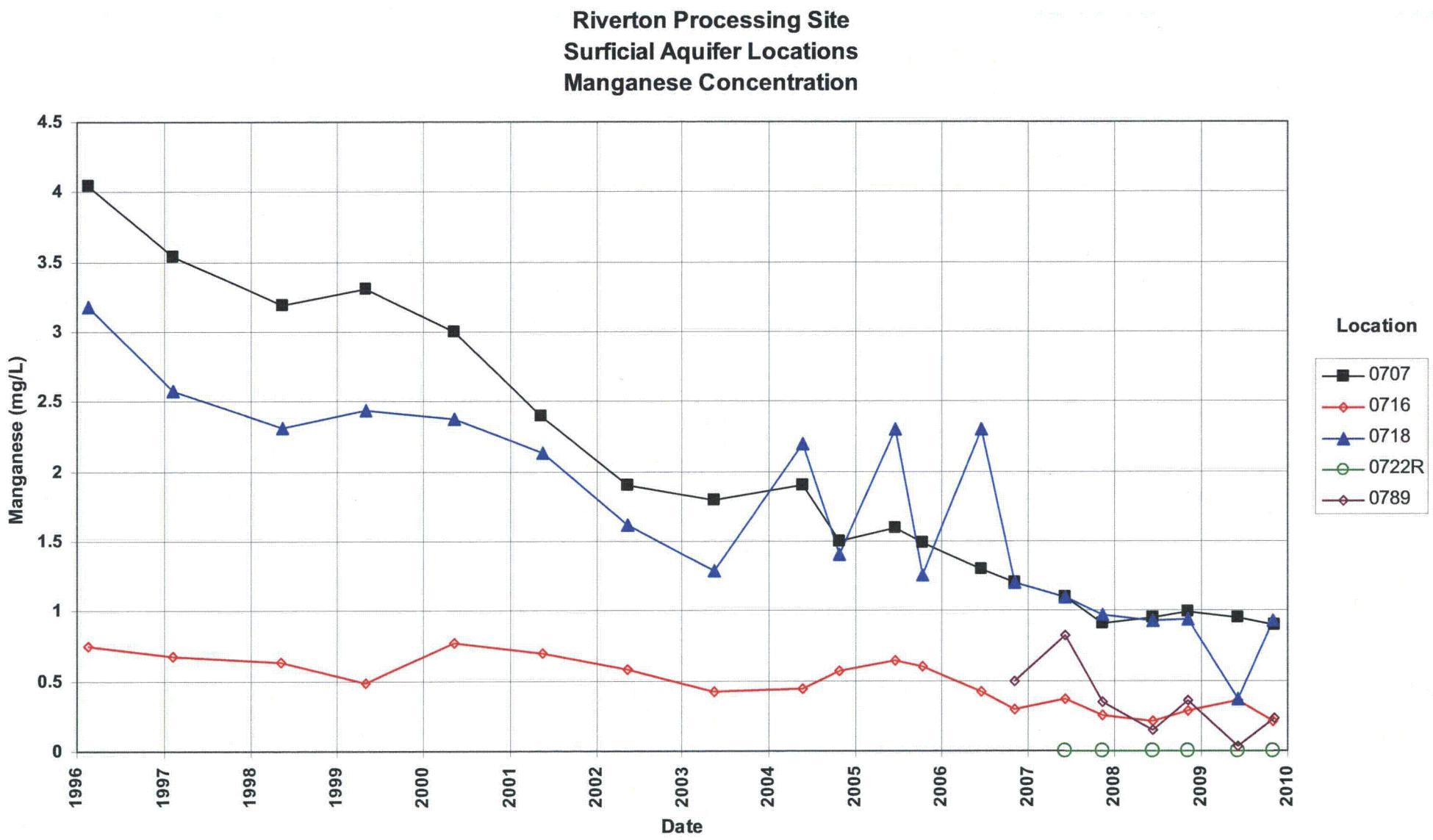
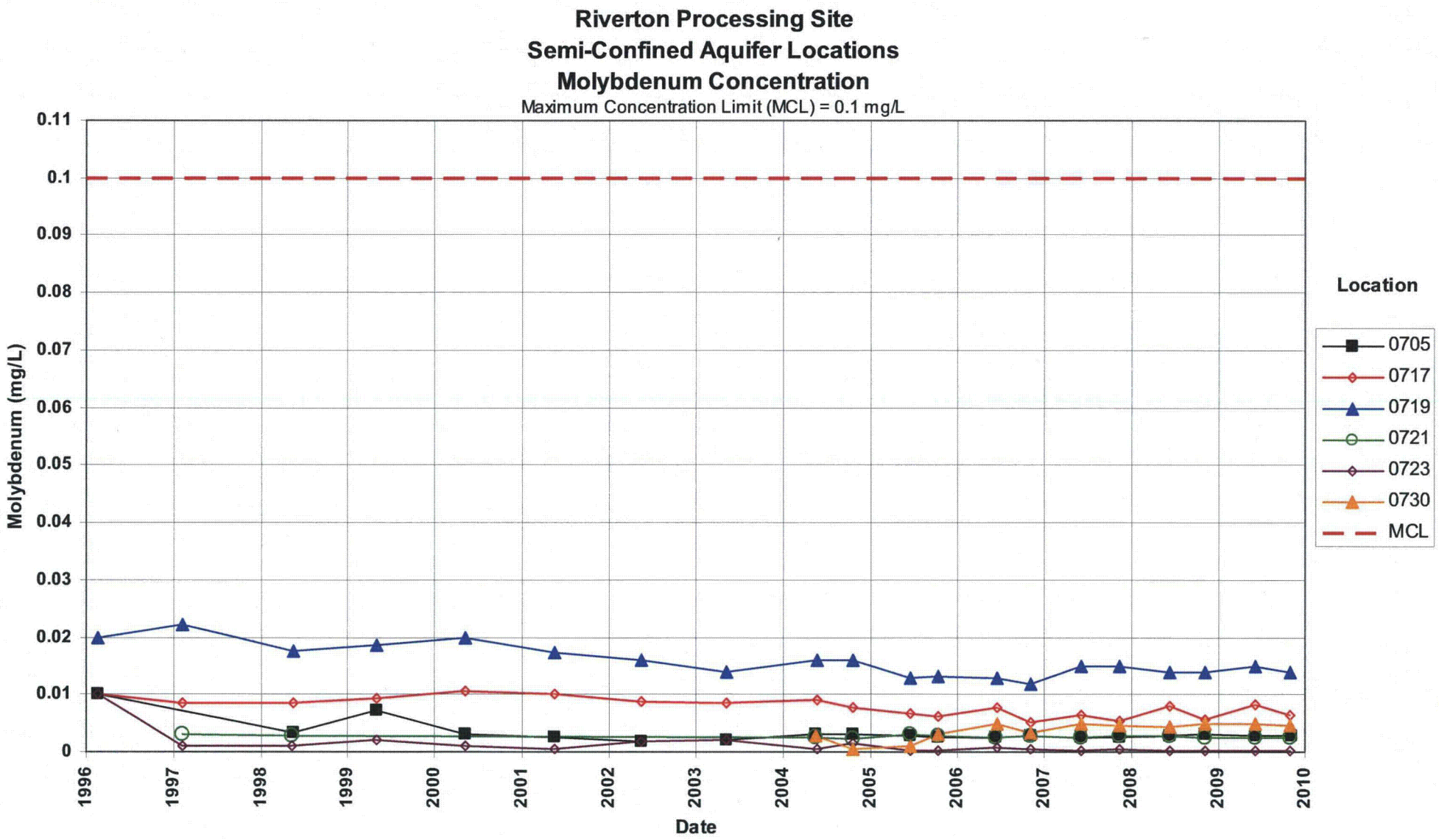
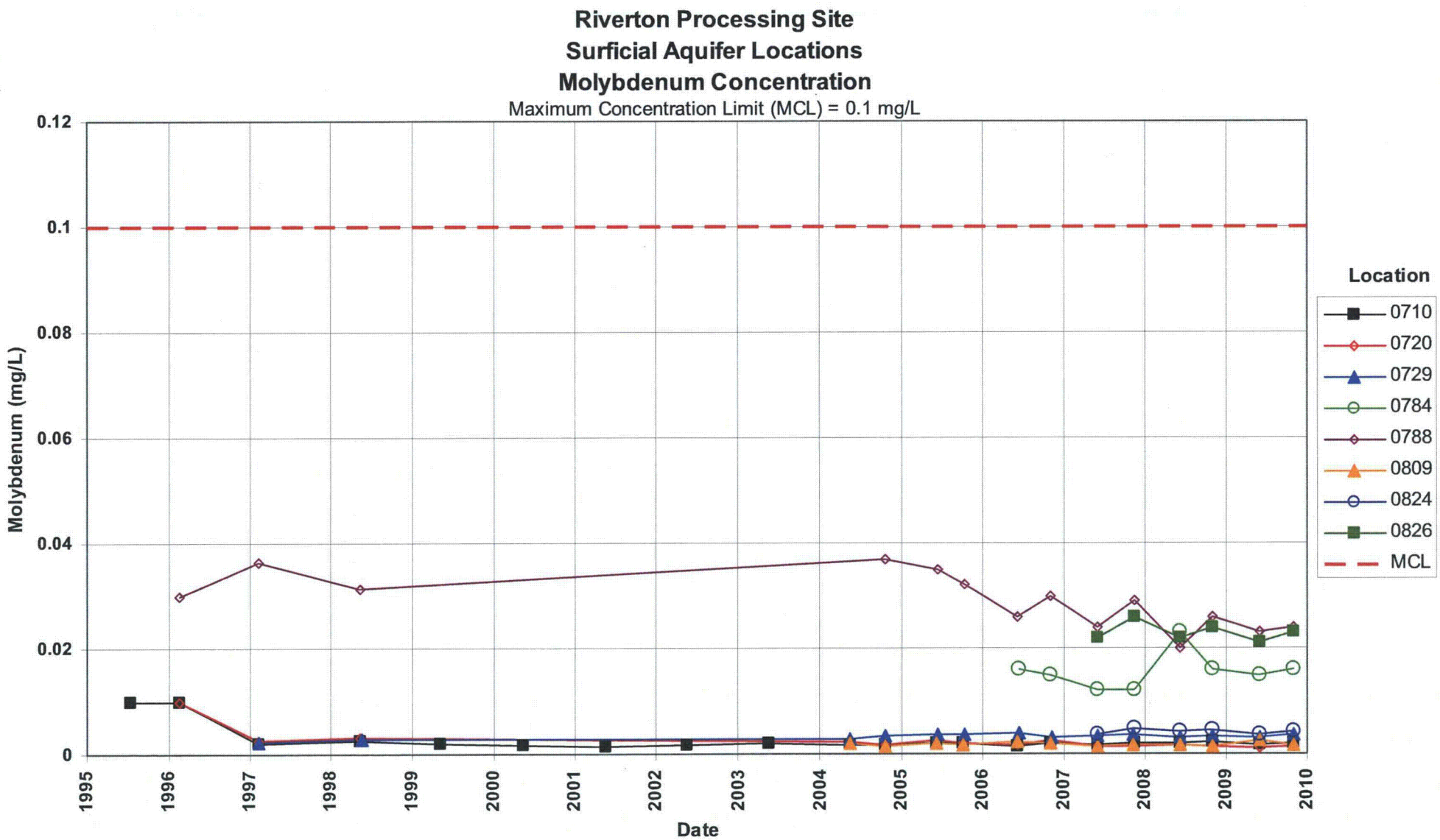
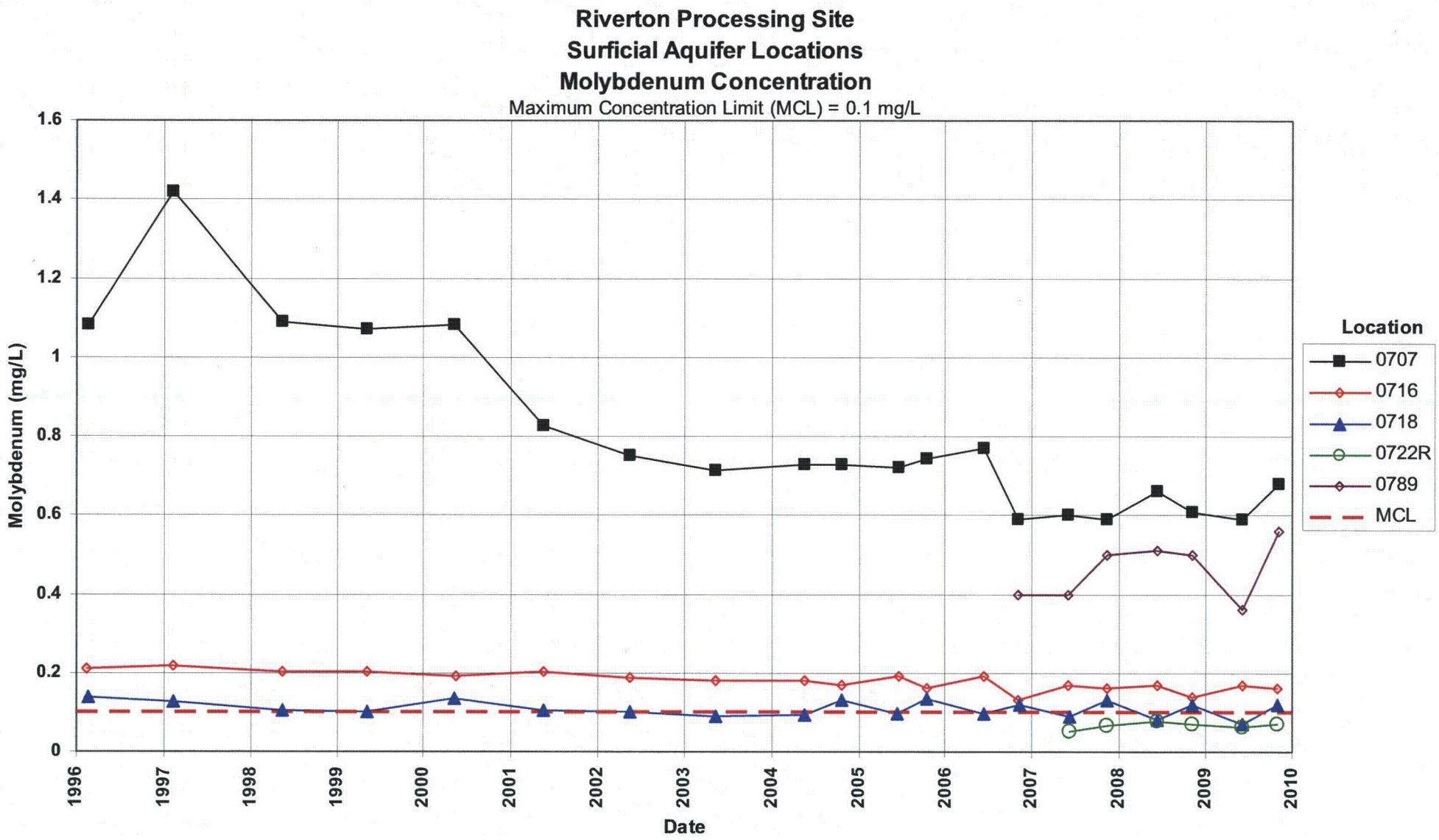

Riverton Processing Site
Semi-Confined Aquifer Locations
Manganese Concentration
Manganese (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0705
0717
0719
0721
0723
0730

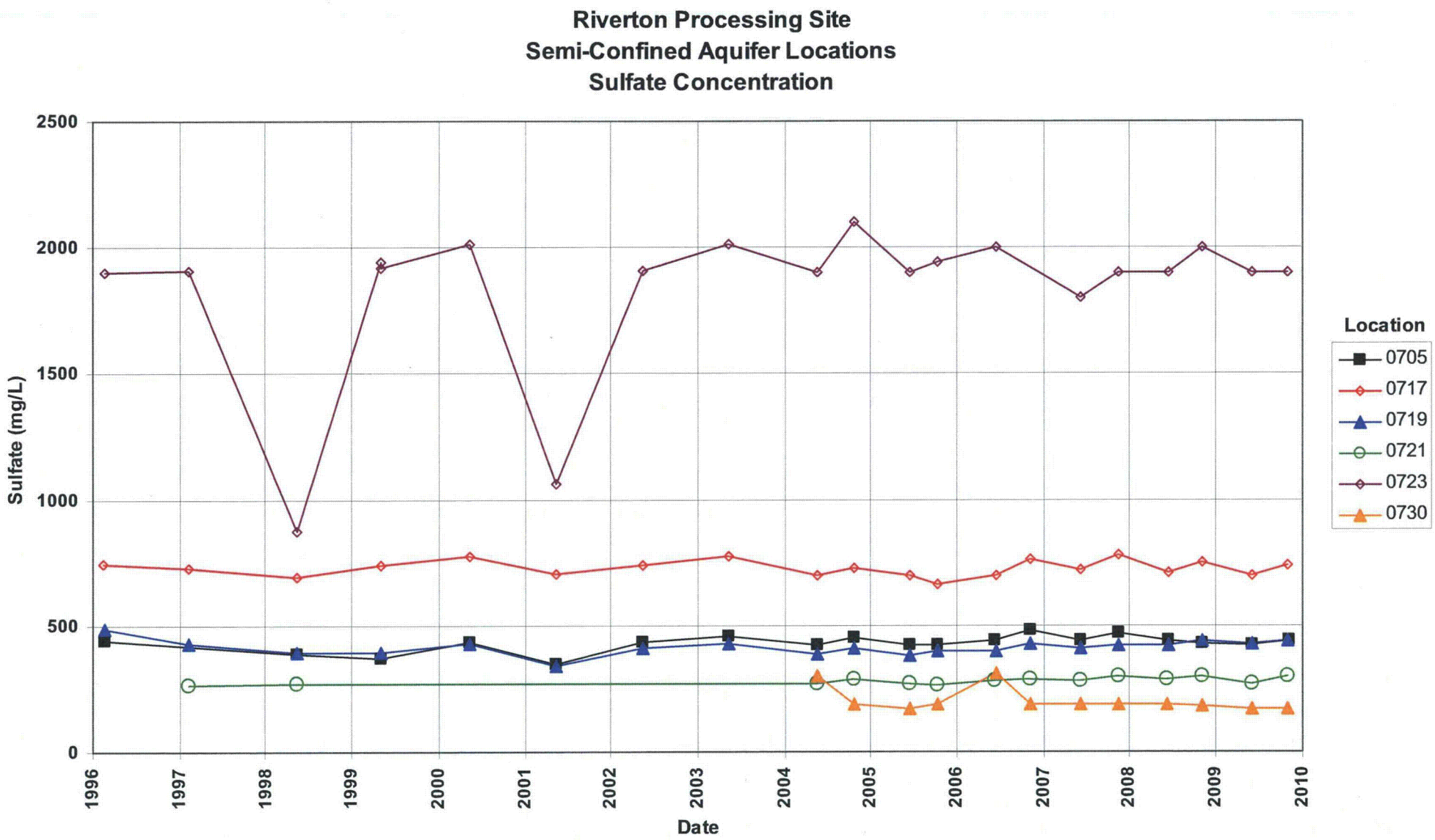

Riverton Processing Site
Surficial Aquifer Locations
Manganese Concentration
Manganese (mg/L)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0710
0720
0729
0784
0788
0809
0824
0826

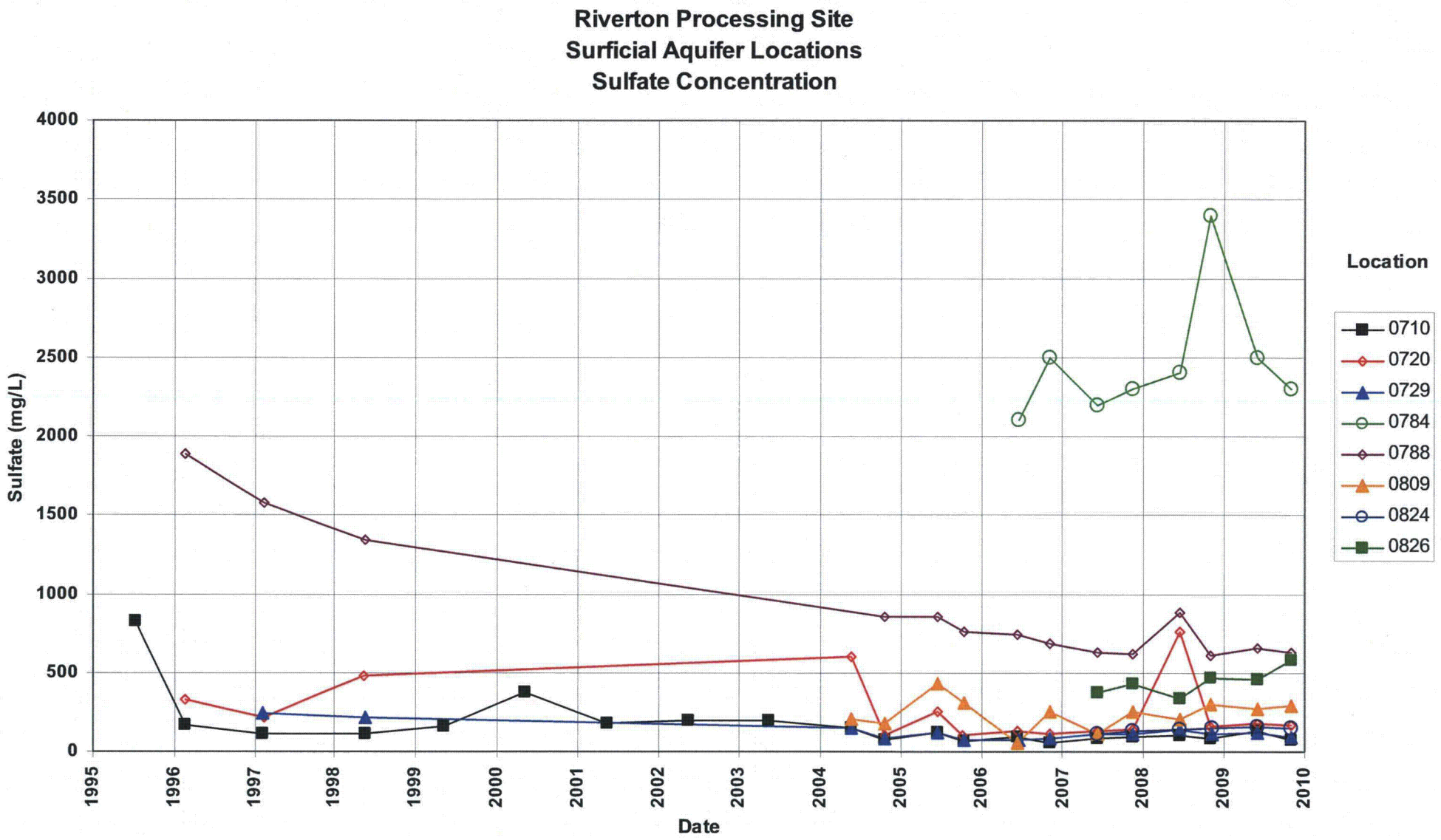

Riverton Processing Site
Surficial Aquifer Locations
Manganese Concentration
Manganese (mg/L)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0707
0716
0718
0722R
0789

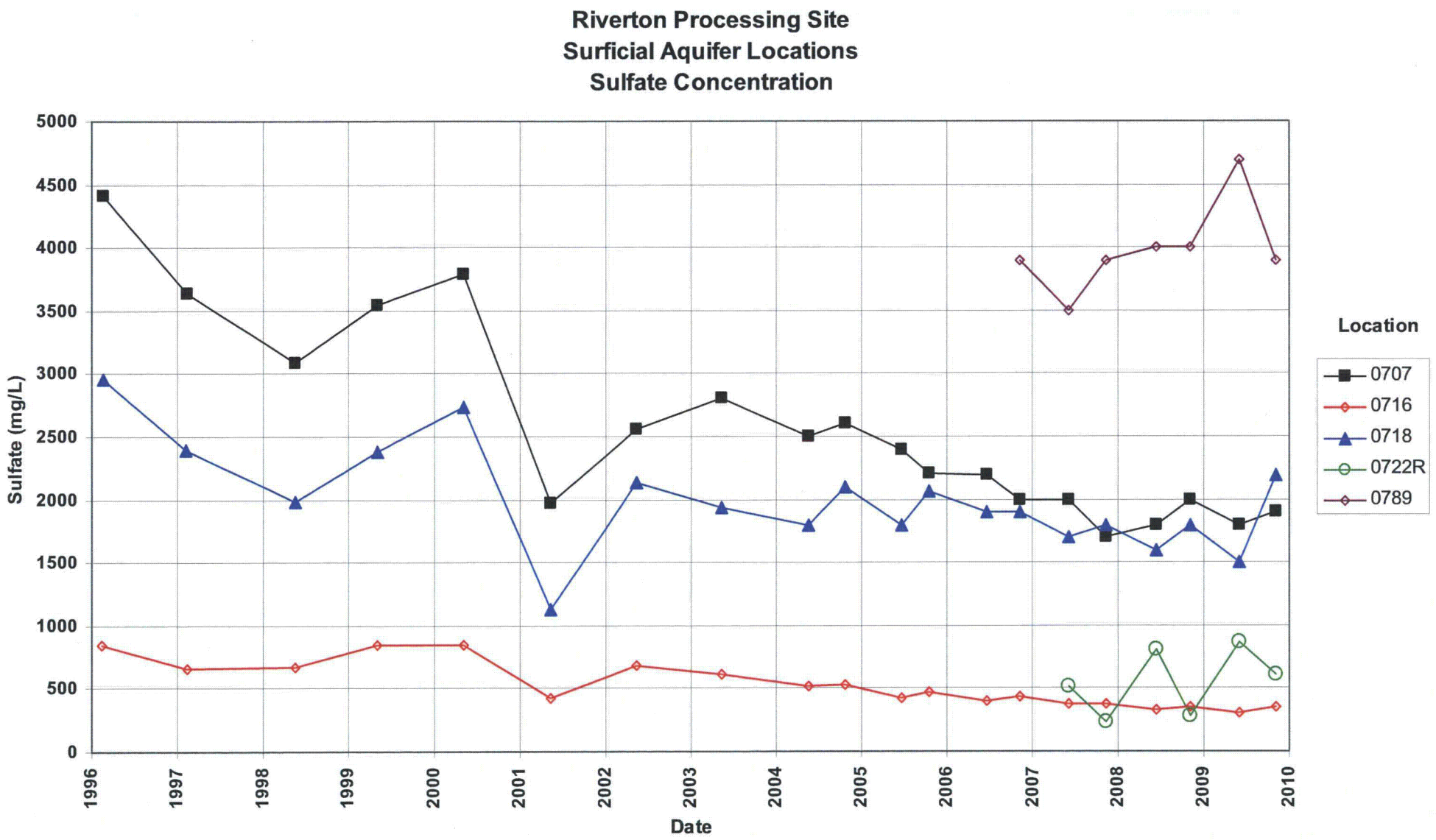

Riverton Processing Site
Semi-Confined Aquifer Locations
Molybdenum Concentration
Maximum Concentration Limit (MCL) = 0.1 mg/L
Molybdenum (mg/L)
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0705
0717
0719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

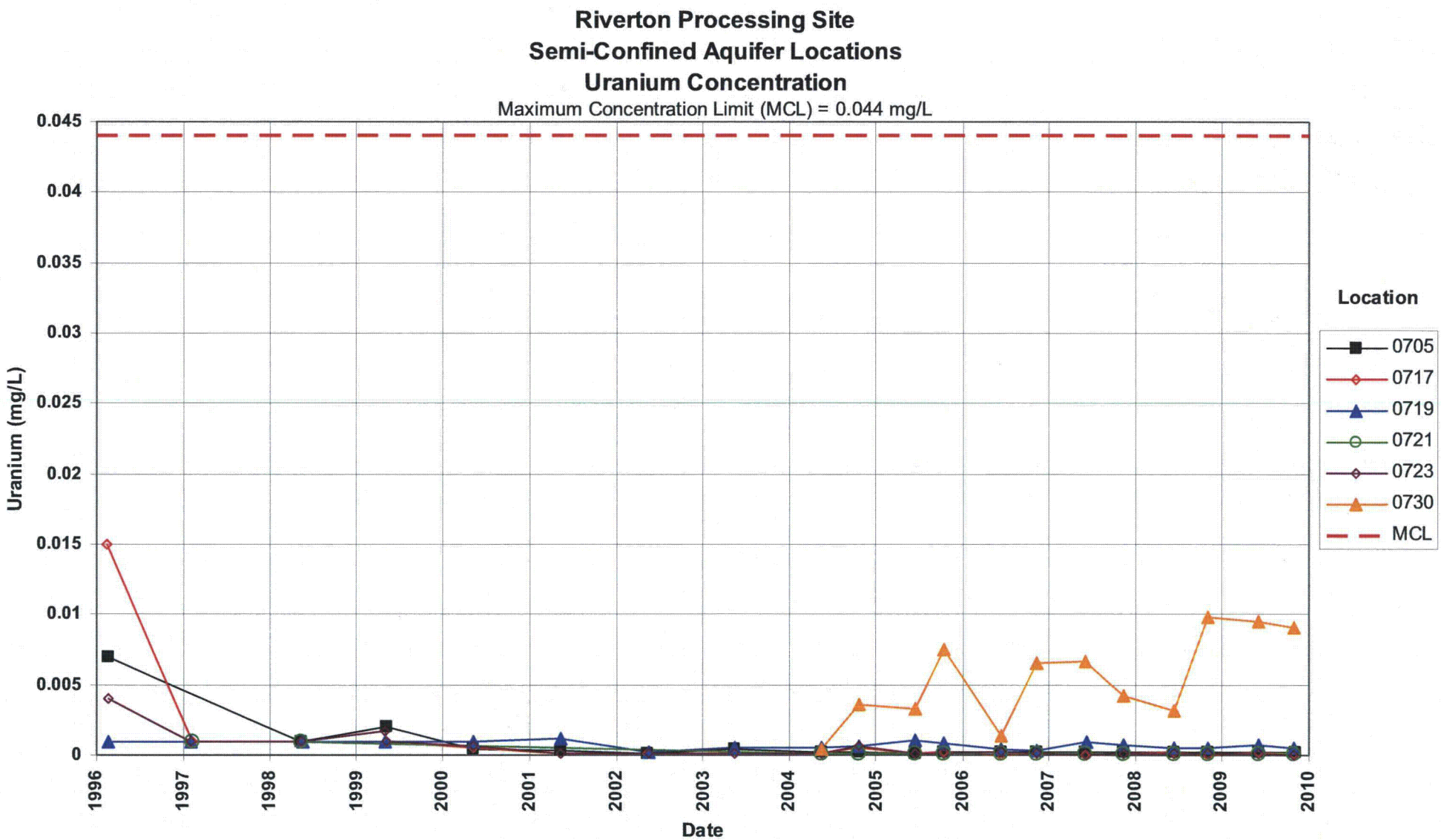

Riverton Processing Site
Surficial Aquifer Locations
Molybdenum Concentration
Maximum Concentration Limit (MCL) = 0.1 mg/L
Molybdenum (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0710
0720
0729
0784
0788
0809
0824
0826
MCL

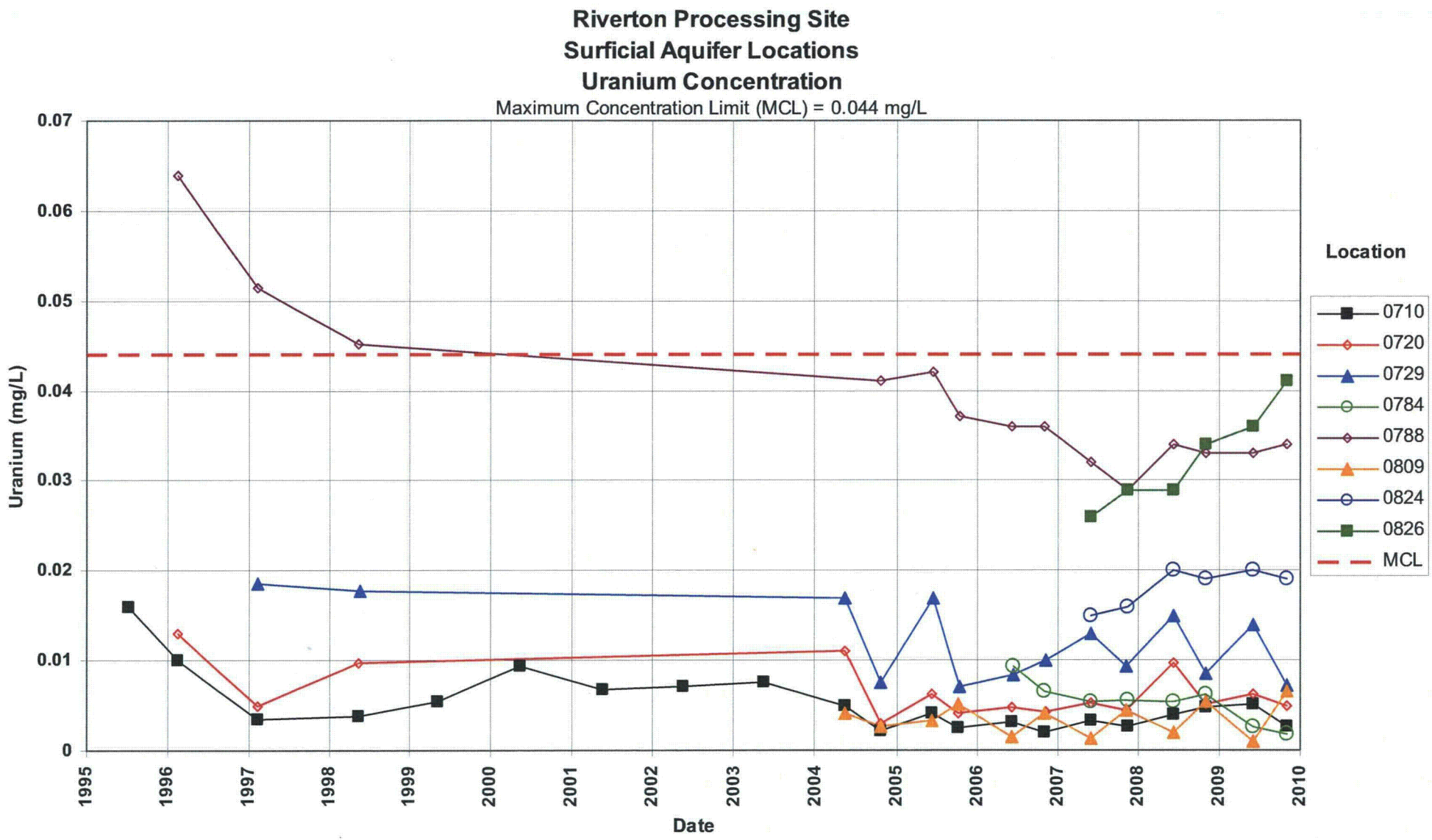

Riverton Processing Site
Surficial Aquifer Locations
Molybdenum Concentration
Maximum Concentration Limit (MCL) = 0.1 mg/L
Molybdenum (mg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0707
0716
0718
0722R
0789
MCL

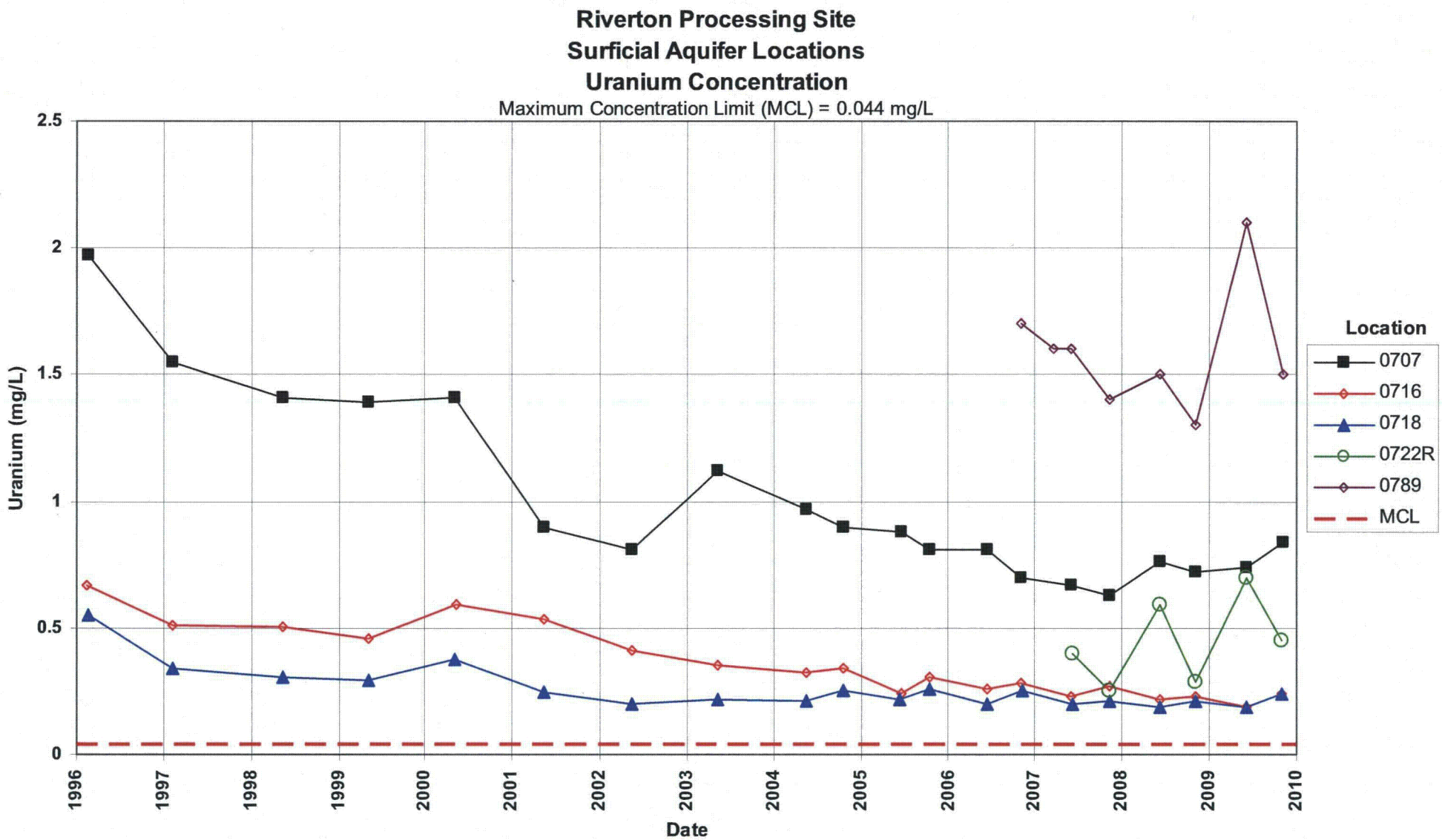

Riverton Processing Site
Semi-Confined Aquifer Locations
Sulfate Concentration
Sulfate (mg/L)
2500
2000
1500
1000
500
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0705
0717
0719
0721
0723
0730

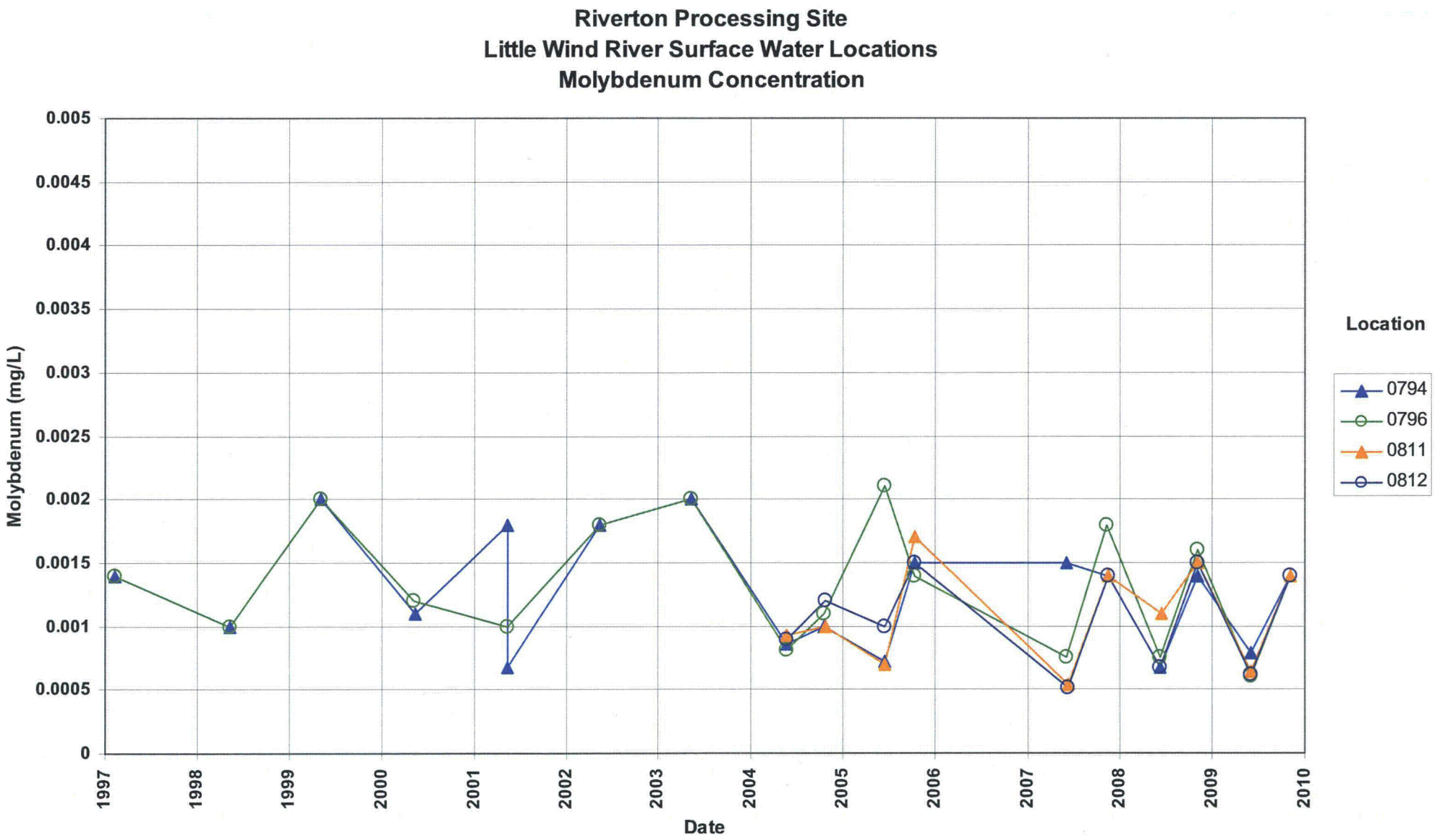

Riverton Processing Site
Surficial Aquifer Locations
Sulfate Concentration
Sulfate (mg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0710
0720
0729
0784
0788
0809
0824
0826

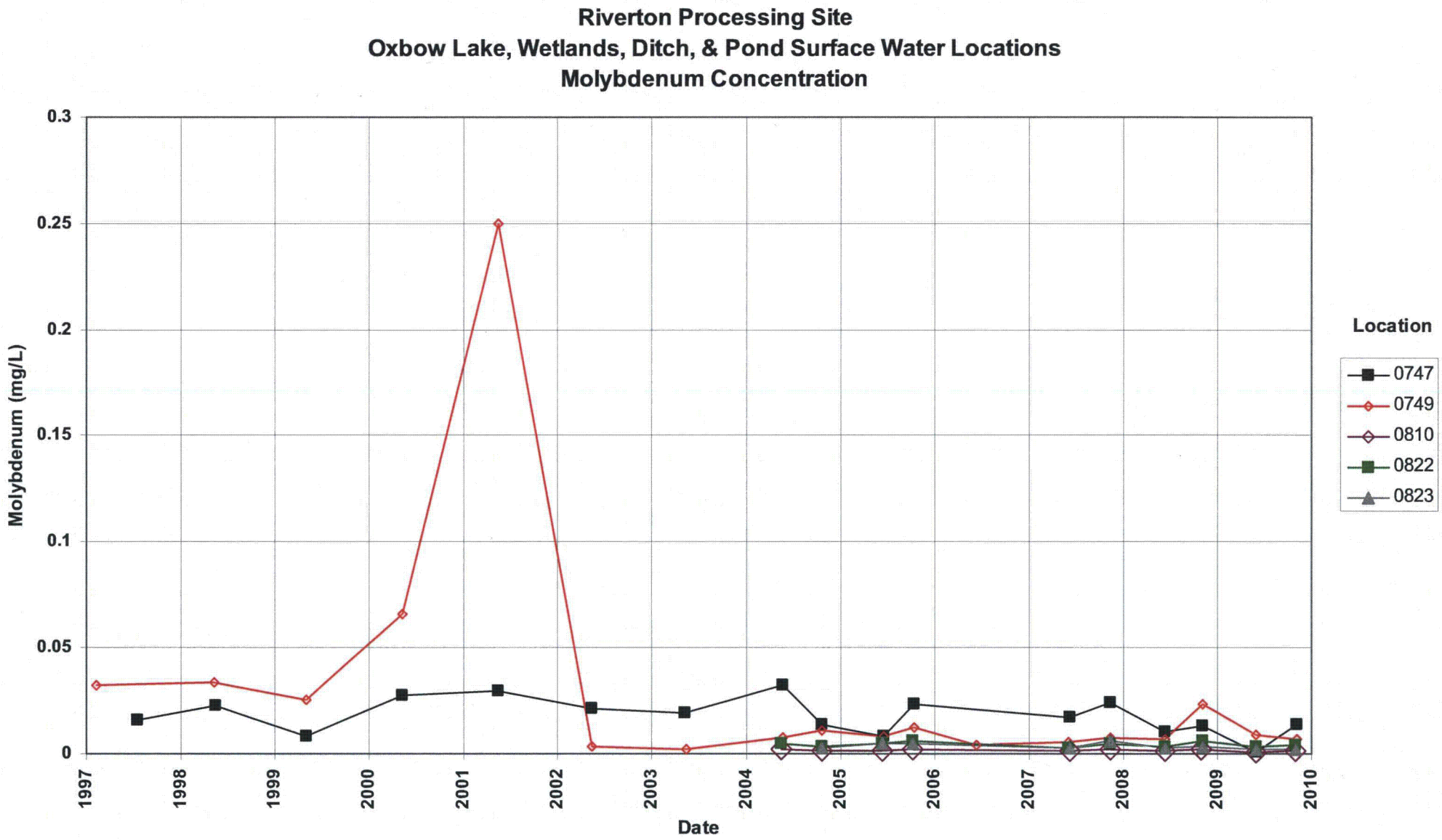

Riverton Processing Site
Surficial Aquifer Locations
Sulfate Concentration
Sulfate (mg/L)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0707
0716
0718
0722R
0789

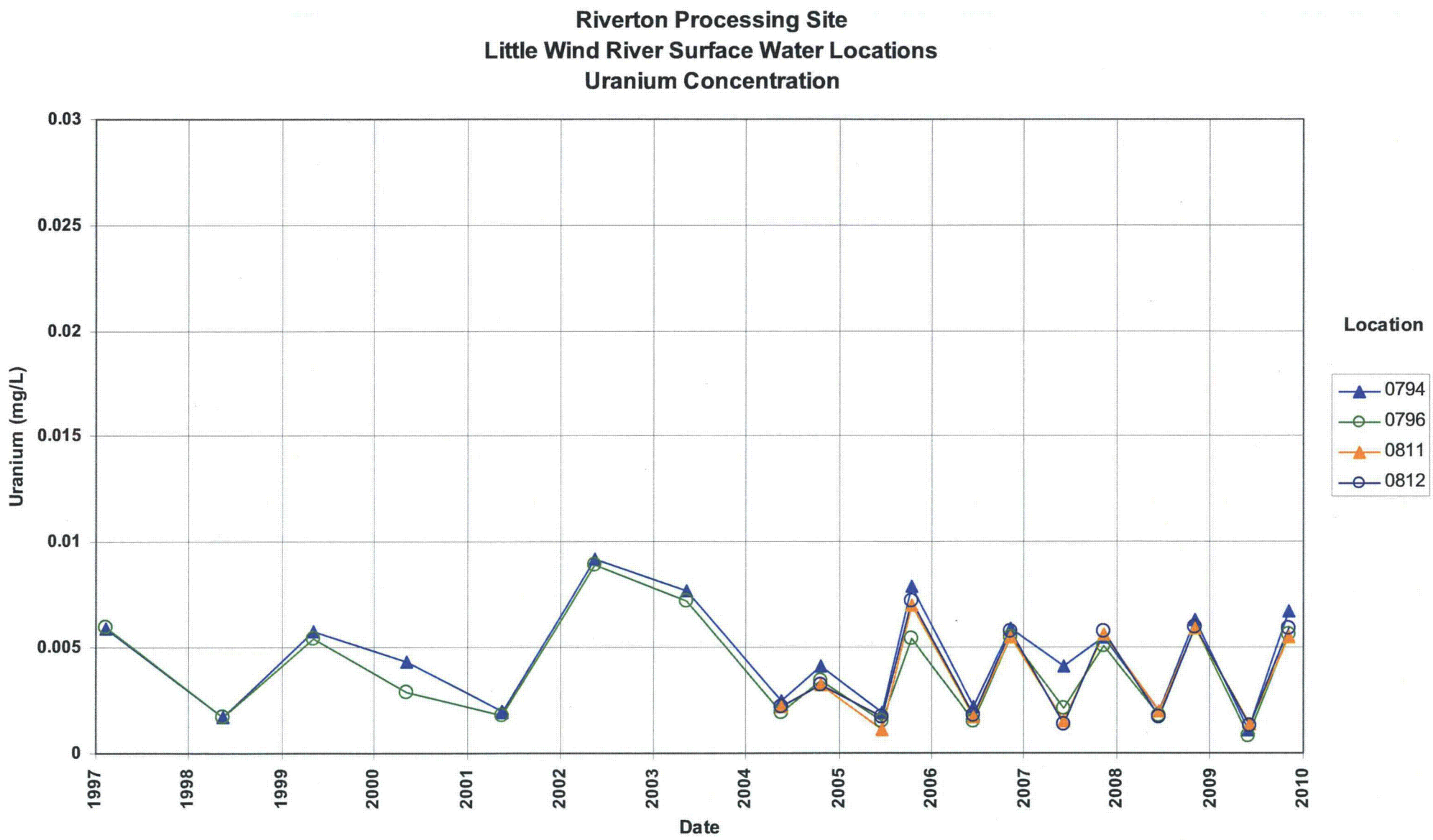

Riverton Processing Site
Semi-Confined Aquifer Locations
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0705
0717
0719
0721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

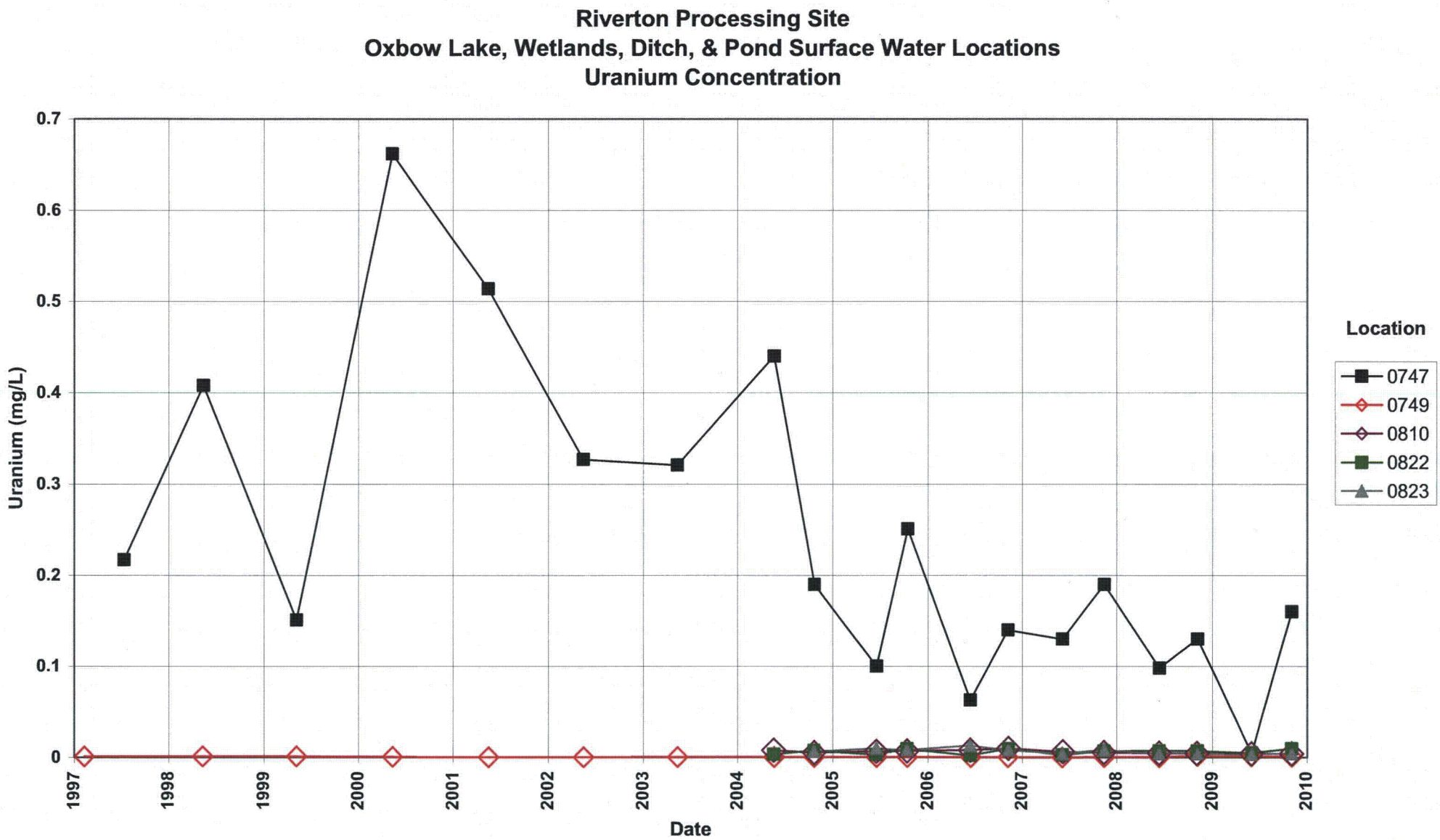

Riverton Processing Site
Surficial Aquifer Locations
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0710
0720
0729
0784
0788
0809
0824
0826
MCL


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


Riverton Processing Site
Little Wind River Surface Water Locations
Molybdenum Concentration
Molybdenum (mg/L)
0.005
0.0045
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0794
0796
0811
0812


Riverton Processing Site
Oxbow Lake, Wetlands, Ditch, & Pond Surface Water Locations
Molybdenum Concentration
Molybdenum (mg/L)
0.3
0.25
0.2
0.15
0.1
0.05
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0747
0749
0810
0822
0823


Riverton Processing Site
Little Wind River Surface Water Locations
Uranium Concentration
Uranium (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0794
0796
0811
0812


Riverton Processing Site
Oxbow Lake, Wetlands, Ditch, & Pond Surface Water Locations
Uranium Concentration
Uranium (mg/L)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
0747
0749
0810
0822
0823

Attachment 3
Sampling and Analysis Work Order

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Stoller

established 1959

Task Order LM00-501
Control Number 10-0005

October 5, 2009

U.S. Department of Energy
Office of Legacy Management
ATTN: Jalena Dayvault
Site Manager
2597 B ¾ Road
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
November 2009 Environmental Sampling at Riverton, Wyoming

REFERENCE: Task Order LM-501-02-117-402, Riverton, WY, Disposal 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 disposal site. Water quality data will be collected from monitor wells, domestic wells, and surface locations at this site as part of the routine environmental sampling currently scheduled to begin the week of November 2, 2009.

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

Monitor 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

The S.M. Stoller Corporation 2597 B ¾ Road 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
Site Lead

SC/lcg/lb

Enclosures (3)

cc: (electronic)
Cheri Bahrke, Stoller
Sam Campbell, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
EDD Delivery
rc-grand.junction

The S.M. Stoller Corporation 2597 B ¾ Road Grand Junction, CO 81503 (970) 248-6000 Fax: (970) 248-6040

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					
Dissolved Oxygen					
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					
Chromium					
Iron					
Lead					
Magnesium					
Manganese	X	X	0.005	SW-846 6010	LMM-01
Molybdenum	X	X	0.003	SW-846 6020	LMM-02
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					
Total No. of Analytes	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.

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Attachment 4
Trip Report

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Stoller
Grand Junction Office
established 1959

Memorandum

Control Number N/A

DATE: November 18, 2009

TO: Sam Campbell

FROM: Dan Sellers

SUBJECT: Trip Report

Site: Riverton, Wyoming, Processing Site.

Dates of Sampling Event: November 2 to November 5, 2009.

Team Members: Dan Sellers and Joe Treviño.

Number of Locations Sampled: 19 monitor wells, 9 surface water locations, and 4 domestic wells.

Locations Not Sampled/Reason: Domestic well 0828 was not sampled because the tap has been shut off and winterized.

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

At the time of sampling, the Little Wind River was not at flood stage and water was not flowing through the Oxbow Lake.

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	Equipment Blank	Equipment Blank	HLV 950
2645	0789	Duplicate	HLV 951
2646	0747	Duplicate	HLV 952

Requisition Numbers Assigned: All samples were assigned to requistion identification number (RIN) 09102669 and were shipped to the ALS Laboratory Group on November 10, 2009.

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

Well Inspection Summary: Concrete pads at monitor wells 0725 and 0726 have deteriorated; monitor well 0735 has been impacted by erosion from the Little Wind River and will likely be destroyed during the spring runoff. All other wells were in good shape.

Equipment: All equipment functioned properly. Successful testing of upgrades to the Field Data Collection System, which included direct electronic transfer of the field data from field instrumentation, was completed during this event

Stakeholder/Regulatory: The Wind River Environmental Quality Commission (WREQC) observed sampling activities and split samples at monitor wells 0707 and 0789.

Institutional Controls

Fences, Gates, Locks: No issues identified.
Signs: Warning signs installed around the oxbow lake were intact.
Trespassing/Site Disturbances: None
Safety Issues: None.

Access Issues: New phone numbers were obtained to contact owners of domestic well 0430: Lawrence Raymond (307) 851-3965 or Brent Raymond (307) 840-6243.

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

(DLS/lcg)

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