Department of Energy
Office of Legacy Management

FEB 19 2009

Mr. Don Aragon, Executive Director
Wind River Environmental Quality Commission
Building 10, Washakie Street
Fort Washakie, Wyoming 82514

Subject: Transmittal of the Data Validation Package for the Riverton, Wyoming, Site, November 2008

Dear Mr. Aragon:

Enclosed is your copy of the data validation package presenting results of the validation and evaluation of the data collected during November 2008 sampling event conducted at the Riverton, Wyoming, processing site.

This sampling event consisted of sampling 20 monitor wells, 5 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.*

Although concentrations of molybdenum and uranium in samples collected from surficial aquifer wells continue to exceed their respective U. S. Environmental Protection Agency (EPA) ground water standard, concentrations continue to trend downward, indicating natural flushing is progressing. Concentration of molybdenum and uranium in samples collected from semi-confined aquifer monitor wells and confined aquifer domestic wells were below their respective EPA standard.

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.

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

Sincerely,

Jalena Dayvault
Site Manager

Enclosure

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REPLY TO: Grand Junction Office		

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Dayvault/riverton/DVP riverton 11-08.doc

Data Validation Package

November 2008 Groundwater and Surface Water Sampling at the Riverton, Wyoming, Processing Site

February 2009

U.S. DEPARTMENT OF ENERGY | Office of Legacy Management

Contents

Sampling Event Summary 1
Riverton, Wyoming, Processing Site, Sample Locations 3
Data Assessment Summary 5
Water Sampling Field Activities Verification Checklist 7
Laboratory Performance Assessment 9
Sampling Quality Control Assessment 18
Certification 21

Attachment 1—Assessment of Anomalous Data

Potential Outliers Report

Attachment 2—Data Presentation

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

Attachment 3—Sampling and Analysis Work Order

Attachment 4—Trip Report

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Sampling Event Summary

Site: Riverton, Wyoming, Processing Site

Sampling Period: November 3-5, 2008

The draft *Long-Term Management Plan* (LTMP) *for the Riverton, Wyoming, Processing Site* (2007) requires semiannual monitoring to evaluate groundwater conditions and assess the progress of natural flushing of the upper most aquifer. This event involved sampling 20 monitor wells, nine surface water locations, and five domestic wells at the Riverton, Wyoming, Processing Site. Water levels were measured at all sampled monitor wells and 12 additional monitor wells that were not sampled. Sampling and analysis was conducted as specified in LTMP and the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites.*

Results from this sampling event do not indicate any unexpected movement of contaminated groundwater. 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. Although concentrations of molybdenum and uranium in the surficial aquifer currently exceed their respective EPA groundwater standard, concentrations continue to trend downward as shown in the time-concentration graphs, which are included in the Data Presentation section. Groundwater modeling predicts that natural flushing of the surficial aquifer will reduce concentrations below standards within 100 years. Progress of natural flushing will be assessed in the annual Verification Monitoring Report, which will include results from both 2008 sampling events (June and November). The EPA groundwater standards for molybdenum and uranium were exceeded in samples collected from surficial aquifer monitor wells listed in Table 1.

Table 1. Riverton Wells with Samples that Exceeded EPA Groundwater Standards in November 2008

Analyte	Standard[a]	Location	Concentration
Molybdenum	0.1	0707	0.58
		0716	0.14
		0718	0.12
		0789	0.50
Uranium	0.044	0707	0.69
		0716	0.23
		0718	0.21
		0722R	0.29
		0747	0.13
		0789	1.30

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

Results from domestic wells (locations 0405, 0430, 0436, 0460, and 0828) 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 results were compared to the benchmark value for uranium (0.011 mg/L) derived from historical data at surface water location 0794, which is on the Little Wind River upstream of the site and represents background conditions (see sample location map). Uranium concentrations from Little Wind River locations 0796, 0811, and 0812 were below the benchmark value, which indicates minimal site-related impact on the water quality of the Little Wind River. In addition, the uranium concentration from surface water locations 0810 (constructed wetlands), 0822 (west side irrigation ditch), and 0823 (gravel pit pond) were below the benchmark value, which indicates minimal site-related impact to these surface water features. The uranium concentration (0.130 mg/L) in Oxbow Lake at location 0747 exceeded the benchmark value. Oxbow Lake receives discharge of contaminated groundwater and elevated concentrations are expected.

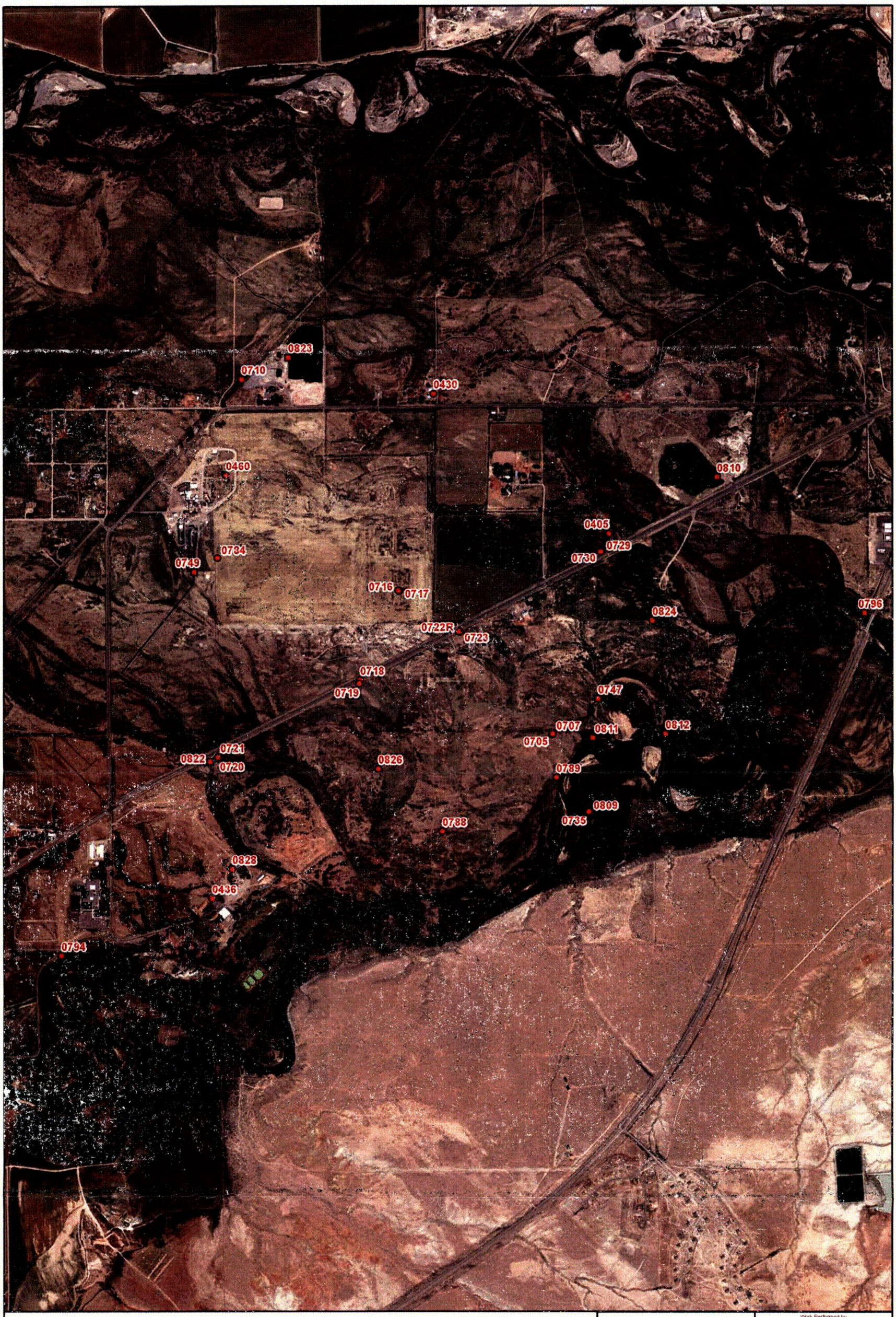
The sample collected at the ditch that discharges from the Chemtrade sulfuric acid plant (0749) continues to have elevated concentrations of sulfate (2,300 mg/L). The elevated sulfate concentration in the sulfuric acid plant effluent has affected the sulfate concentration downstream in the west side irrigation ditch (1,100 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, which indicates no impact to water quality in the ditch.

Sam Campbell — 2-2-09

Sam Campbell
Site Lead, S.M. Stoller

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 3-5, 2008
Date(s) of Verification	December 24, 2008	**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 October 1, 2008.
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 October 31, 2008.
4. Was an operational check of the field equipment conducted daily?	Yes	Calibration checks were performed November 3-5, 2008.
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	Duplicates were collected from locations 0707 and 0716.
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 Completed" 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):	08101898
Sample Event:	November 3-5, 2008
Site(s):	Riverton, Wyoming
Laboratory:	Paragon Analytics, Fort Collins, Colorado
Work Order No.:	0811076
Analysis:	Metals, Wet Chemistry, and Radiochemistry
Validator:	Steve Donivan
Review Date:	December 24, 2008

This validation was performed according to the *Environmental Procedures Catalog*, "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 2.

Table 2. 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 3. Refer to the sections below for an explanation of the data qualifiers applied.

Table 3. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
0811076-5	0717	Uranium	U	Less than 5 times the calibration blank
0811076-9	0721	Uranium	U	Less than 5 times the method blank
0811076-10	0722R	Manganese	J	Negative method blank
0811076-11	0723	Molybdenum	U	Less than 5 times the calibration blank
0811076-11	0723	Uranium	U	Less than 5 times the calibration blank
0811076-28	0822	Radium-226	U	Less than 3 times the TPU
0811076-30	0405	Uranium	U	Less than 5 times the calibration blank
0811076-31	0430	Uranium	U	Less than 5 times the calibration blank
0811076-32	0436	Uranium	U	Less than 5 times the calibration blank
0811076-33	0460	Manganese	J	Negative method blank
0811076-33	0460	Uranium	U	Less than 5 times the calibration blank
0811076-34	0828	Uranium	U	Less than 5 times the calibration blank
0811076-37	Equipment Blank	Molybdenum	U	Less than 5 times the calibration blank
0811076-37	Equipment Blank	Uranium	U	Less than 5 times the calibration blank

Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 37 water samples on November 8, 2008, 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.

Incorrect location IDs were entered for samples GLW 324, GLW 325, GLW 326, GLW 327, and GLW 328 during sample login. Revised deliverables were requested on December 8, 2008. Revisions were received on December 9, 2008.

Preservation and Holding Times

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

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 November 17, 2008, using one calibration standard. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in nine 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 November 18, 2008, using seven 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). Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in seven 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 five calibration standards on November 4, 2008. 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 analyzed for radium-226 by gas flow proportional counting. Plateau voltage determinations and detector efficiency calibrations were performed in July 2008. Daily instrument checks met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Radium-228
Plateau voltage determinations and detector efficiency calibrations were performed in July 2008. 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 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, all 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 with the following exception. The radium-228 laboratory control sample results was greater than the upper acceptance limit indicating a potential high bias. The radium-228 result in the associated sample was not qualified because it was below the MDC.

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 evaluated serial dilution data were acceptable.

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 2.4.

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

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.

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. There were no manual integrations performed and all peak integrations were satisfactory.

Electronic Data Deliverable (EDD) File

The EDD file arrived on December 9, 2008. 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: 08101898 **Lab Code:** PAR **Validator:** _____ **Validation Date:** 12/24/2008

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

# of Samples: 37 **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: 08101898 **Lab Code:** PAR **Date Due:** 12/6/2008

Matrix: Water **Site Code:** RVT **Date Completed:** 12/8/2008

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	11/17/2008			OK	OK	OK	OK	OK	102.0	99.0	99.0	0.0	96.0		102.0
MANGANESE	11/17/2008							OK	98.0	95.0	96.0	0.0	93.0		101.0
MANGANESE	11/17/2008												98.0		104.0
MOLYBDENUM	11/18/2008	0.0000	1.0000	OK	OK	OK	OK	OK	99.0	105.0	102.0	3.0			126.0
MOLYBDENUM	11/18/2008							OK	99.0	103.0	102.0	1.0			116.0
URANIUM	11/18/2008	0.0000	1.0000	OK	OK	OK	OK	OK	102.0	108.0	106.0	2.0		1.0	108.0
URANIUM	11/18/2008							OK	100.0	106.0	103.0	2.0		6.0	106.0

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 08101898 **Lab Code:** PAR **Date Due:** 12/6/2008

Matrix: Water **Site Code:** RVT **Date Completed:** 12/8/2008

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0822	Radium-226	12/03/2008			98.4			
Blank_Spike	Radium-226	12/03/2008			101.0	108.0		
Blank_Spike_Du	Radium-226	12/03/2008			103.0	87.4		1.19
Blank	Radium-226	12/03/2008	-0.0141	U	102.0			
0822	Radium-228	11/25/2008			61.0			
Blank_Spike	Radium-228	11/25/2008			54.3	129.0		
Blank_Spike_Du	Radium-228	11/25/2008			52.1	115.0		0.51
Blank	Radium-228	11/25/2008	0.2010	U	46.2			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 08101898 **Lab Code:** PAR **Date Due:** 12/6/2008

Matrix: Water **Site Code:** RVT **Date Completed:** 12/8/2008

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	11/11/2008	0.000	1.0000	OK	OK	OK	OK	OK	101.00	113.0	109.0	2.00	
SULFATE	11/11/2008							OK	101.00	109.0	107.0	0	
SULFATE	11/11/2008									107.0			
SULFATE	11/12/2008				OK		OK			112.0			

Sampling Quality Control Assessment

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

Sampling Protocol

Surface water locations were sampled using a peristaltic pump and tubing reel or by container immersion. Monitor wells were sampled using a peristaltic pump and dedicated tubing. Domestic wells were sampled by filling bottles at the discharge point.

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 0705 and 0719 were classified as Category II. The sample results for these three wells were qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.

Equipment Blank Assessment

An equipment blank (field ID 2646) was collected after decontamination of the non-dedicated tubing reel used to collect some surface water samples. Manganese and uranium were detected in the blank by the laboratory, but these analytes were 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 0707 and 0716 (field duplicate IDs 2645 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: 08101898 Lab Code: PAR Project: Riverton Validation Date: 12/24/2008

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	0811076-37	SW6020	MOLYBDENUM	0.15	B	0.045	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
0811076-21	GLW 312	0747	13	20		
0811076-22	GLW 313	0749	23	10		
0811076-23	GLW 314	0794	1.4	10		
0811076-24	GLW 315	0796	1.6	10		
0811076-25	GLW 316	0810	1.8	10		
0811076-26	GLW 317	0811	1.5	10		
0811076-27	GLW 318	0812	1.5	10		
0811076-28	GLW 319	0822	6.2	10		
0811076-29	GLW 320	0823	3.3	10		

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	0811076-37	SW6020	URANIUM	0.039	B	0.0036	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
0811076-21	GLW 312	0747	130	20		
0811076-22	GLW 313	0749	1.9	10		
0811076-23	GLW 314	0794	6.3	10		
0811076-24	GLW 315	0796	6	10		
0811076-25	GLW 316	0810	4.6	10		
0811076-26	GLW 317	0811	5.9	10		
0811076-27	GLW 318	0812	6	10		
0811076-28	GLW 319	0822	7.5	10		
0811076-29	GLW 320	0823	4.3	10		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 08101898 Lab Code: PAR Project: Riverton Validation Date: 12/24/2008

Duplicate: 2644 Sample: 0716

Analyte	Sample Result	Sample Flag	Sample Error	Duplicate Result	Duplicate Flag	Duplicate Error	RPD	RER	Units
MANGANESE	280			290			3.51		UG/L
MOLYBDENUM	140			140			0		UG/L
SULFATE	340			350			2.90		MG/L
URANIUM	230			230			0		UG/L

Duplicate: 2645 Sample: 0707

Analyte	Sample Result	Sample Flag	Sample Error	Duplicate Result	Duplicate Flag	Duplicate Error	RPD	RER	Units
MANGANESE	970			990			2.04		UG/L
MOLYBDENUM	580			610			5.04		UG/L
SULFATE	1900			2000			5.13		MG/L
URANIUM	690			720			4.26		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: 1-30-2009

Data Validation Lead: Steve Donivan — Date: 1-30-2009

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Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers 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.

Five results were identified as potentially anomalous. Manganese results for locations 0720 and 0788 had concentrations lower than previously observed. Historical results for manganese at these locations indicate downward trending concentrations. The manganese result for location 0828, sulfate result for location 0787, and uranium results for location 0730 were identified as anomalously high. The data associated with this result were further reviewed. There were no errors noted and the data for this RIN are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters
Laboratory: PARAGON (Fort Collins, CO)
RIN: 08101898
Comparison: All Historical Data
Report Date: 1/12/2009

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	0436	11/04/2008	Manganese	0.00047	B		0.012			0.002	B		13	6	Yes	No
RVT01	0720	11/04/2008	Manganese	0.00029	B	F	1.15			0.0039	B	F	15	0	Yes (log)	Yes
RVT01	0730	11/05/2008	Uranium	0.0098		F	0.0075		FQ	0.00039		F	13	2	Yes (log)	Yes
RVT01	0749	11/04/2008	Uranium	0.0019			0.001	U		0.0001	U		21	14	No	Yes
RVT01	0784	11/04/2008	Sulfate	3400		F	2500		F	2100		F	5	0	Yes	Yes
RVT01	0788	11/04/2008	Manganese	0.0022	B	F	1.3	N	F	0.0033	B	F	12	0	Yes (log)	Yes
RVT01	0788	11/04/2008	Sulfate	610		F	1890	I		620		F	12	0	Yes (log)	No
RVT01	0789	11/05/2008	Uranium	1.3		F	1.7		F	1.4		F	7	0	Yes	No
RVT01	0809	11/03/2008	Uranium	0.0055		F	0.0051		F	0.0013		F	9	0	Yes	No
RVT01	0810	11/03/2008	Uranium	0.0046			0.01			0.0049			10	0	Yes	No
RVT01	0812	11/05/2008	Sulfate	290			281			60			9	0	Yes	No
RVT01	0822	11/04/2008	Manganese	0.1			0.064			0.0071			7	0	Yes	No
RVT01	0822	11/04/2008	Molybdenum	0.0062			0.0059			0.003			7	0	Yes	No
RVT01	0828	11/04/2008	Manganese	0.016			0.0088		U	0.0011	B	U	9	2	Yes	Yes

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.

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Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0405 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/05/2008	N001	-	0.0021	B		#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	-	0.0048			#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	-	168			#		
pH	s.u.	11/05/2008	N001	-	8.61			#		
Specific Conductance	umhos /cm	11/05/2008	N001	-	979			#		
Sulfate	mg/L	11/05/2008	N001	-	390			#	5	
Temperature	C	11/05/2008	N001	-	11.03			#		
Turbidity	NTU	11/05/2008	N001	-	3.73			#		
Uranium	mg/L	11/05/2008	N001	-	0.000028	B	U	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/04/2008	N001	-	0.0047	B		#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	-	0.0023			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	-	271			#		
pH	s.u.	11/04/2008	N001	-	8.78			#		
Specific Conductance	umhos /cm	11/04/2008	N001	-	763			#		
Sulfate	mg/L	11/04/2008	N001	-	210			#	2.5	
Temperature	C	11/04/2008	N001	-	11.72			#		
Turbidity	NTU	11/04/2008	N001	-	2.92			#		
Uranium	mg/L	11/04/2008	N001	-	0.000039	B	U	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/04/2008	N001	-	0.00047	B		#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	-	0.003			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	-	239			#		
pH	s.u.	11/04/2008	N001	-	8.53			#		
Specific Conductance	umhos /cm	11/04/2008	N001	-	766			#		
Sulfate	mg/L	11/04/2008	N001	-	200			#	2.5	
Temperature	C	11/04/2008	N001	-	14.27			#		
Turbidity	NTU	11/04/2008	N001	-	6.5			#		
Uranium	mg/L	11/04/2008	N001	-	0.000055	B	U	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/04/2008	N001	-	0.00014	U	J	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	-	0.0028			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	-	143			#		
pH	s.u.	11/04/2008	N001	-	8.7			#		
Specific Conductance	umhos /cm	11/04/2008	N001	-	727			#		
Sulfate	mg/L	11/04/2008	N001	-	170			#	2.5	
Temperature	C	11/04/2008	N001	-	21.4			#		
Turbidity	NTU	11/04/2008	N001	-	1.85			#		
Uranium	mg/L	11/04/2008	N001	-	0.00005	B	U	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0705 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/05/2008	N001	37.3	-	61.8	0.0083		FQ	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	37.3	-	61.8	0.0031		FQ	#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	37.3	-	61.8	201		FQ	#		
pH	s.u.	11/05/2008	N001	37.3	-	61.8	7.07		FQ	#		
Specific Conductance	umhos /cm	11/05/2008	N001	37.3	-	61.8	1338		FQ	#		
Sulfate	mg/L	11/05/2008	N001	37.3	-	61.8	430		FQ	#	10	
Temperature	C	11/05/2008	N001	37.3	-	61.8	9.49		FQ	#		
Turbidity	NTU	11/05/2008	N001	37.3	-	61.8	3.2		FQ	#		
Uranium	mg/L	11/05/2008	N001	37.3	-	61.8	0.00023		FQ	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/05/2008	N001	9.1	-	23.3	0.97		F	#	0.00014	
Manganese	mg/L	11/05/2008	N002	9.1	-	23.3	0.99		F	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	9.1	-	23.3	0.58		F	#	0.0009	
Molybdenum	mg/L	11/05/2008	N002	9.1	-	23.3	0.61		F	#	0.0009	
Oxidation Reduction Potential	mV	11/05/2008	N001	9.1	-	23.3	191		F	#		
pH	s.u.	11/05/2008	N001	9.1	-	23.3	6.89		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	9.1	-	23.3	3502		F	#		
Sulfate	mg/L	11/05/2008	N001	9.1	-	23.3	1900		F	#	25	
Sulfate	mg/L	11/05/2008	N002	9.1	-	23.3	2000		F	#	25	
Temperature	C	11/05/2008	N001	9.1	-	23.3	10.63		F	#		
Turbidity	NTU	11/05/2008	N001	9.1	-	23.3	1.1		F	#		
Uranium	mg/L	11/05/2008	N001	9.1	-	23.3	0.69		F	#	0.000072	
Uranium	mg/L	11/05/2008	N002	9.1	-	23.3	0.72		F	#	0.000072	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0710 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	N001	9.8	-	26.8	0.0015	B	F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	9.8	-	26.8	0.0023	E	F	#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	9.8	-	26.8	235		F	#		
pH	s.u.	11/04/2008	N001	9.8	-	26.8	7.56		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	9.8	-	26.8	510		F	#		
Sulfate	mg/L	11/04/2008	N001	9.8	-	26.8	82		F	#	2.5	
Temperature	C	11/04/2008	N001	9.8	-	26.8	12.68		F	#		
Turbidity	NTU	11/04/2008	N001	9.8	-	26.8	0.65		F	#		
Uranium	mg/L	11/04/2008	N001	9.8	-	26.8	0.0047		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0716 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	N001	9.78 - 14.78	0.28		F	#	0.00014	
Manganese	mg/L	11/04/2008	N002	9.78 - 14.78	0.29		F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	9.78 - 14.78	0.14		F	#	0.00045	
Molybdenum	mg/L	11/04/2008	N002	9.78 - 14.78	0.14		F	#	0.00045	
Oxidation Reduction Potential	mV	11/04/2008	N001	9.78 - 14.78	55		F	#		
pH	s.u.	11/04/2008	N001	9.78 - 14.78	7.13		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	9.78 - 14.78	1160		F	#		
Sulfate	mg/L	11/04/2008	N001	9.78 - 14.78	340		F	#	5	
Sulfate	mg/L	11/04/2008	N002	9.78 - 14.78	350		F	#	5	
Temperature	C	11/04/2008	N001	9.78 - 14.78	12.32		F	#		
Turbidity	NTU	11/04/2008	N001	9.78 - 14.78	1.56		F	#		
Uranium	mg/L	11/04/2008	N001	9.78 - 14.78	0.23		F	#	0.000036	
Uranium	mg/L	11/04/2008	N002	9.78 - 14.78	0.23		F	#	0.000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/04/2008	N001	45.1 - 55.1	0.19		F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	45.1 - 55.1	0.0058		F	#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	45.1 - 55.1	-9		F	#		
pH	s.u.	11/04/2008	N001	45.1 - 55.1	7.37		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	45.1 - 55.1	1981		F	#		
Sulfate	mg/L	11/04/2008	N001	45.1 - 55.1	750		F	#	10	
Temperature	C	11/04/2008	N001	45.1 - 55.1	11.24		F	#		
Turbidity	NTU	11/04/2008	N001	45.1 - 55.1	1.36		F	#		
Uranium	mg/L	11/04/2008	N001	45.1 - 55.1	0.000045	B	UF	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/05/2008	N001	18.24	-	23.24	0.94		F	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	18.24	-	23.24	0.12		F	#	0.00023	
Oxidation Reduction Potential	mV	11/05/2008	N001	18.24	-	23.24	271		F	#		
pH	s.u.	11/05/2008	N001	18.24	-	23.24	7.16		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	18.24	-	23.24	3809		F	#		
Sulfate	mg/L	11/05/2008	N001	18.24	-	23.24	1800		F	#	25	
Temperature	C	11/05/2008	N001	18.24	-	23.24	13.91		F	#		
Turbidity	NTU	11/05/2008	N001	18.24	-	23.24	1.71		F	#		
Uranium	mg/L	11/05/2008	N001	18.24	-	23.24	0.21		F	#	0.000018	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0719 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/05/2008	N001	38.47 - 48.47	0.18		FQ	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	38.47 - 48.47	0.014		FQ	#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	38.47 - 48.47	227		FQ	#		
pH	s.u.	11/05/2008	N001	38.47 - 48.47	7.9		FQ	#		
Specific Conductance	umhos /cm	11/05/2008	N001	38.47 - 48.47	1242		FQ	#		
Sulfate	mg/L	11/05/2008	N001	38.47 - 48.47	440		FQ	#	5	
Temperature	C	11/05/2008	N001	38.47 - 48.47	11.82		FQ	#		
Turbidity	NTU	11/05/2008	N001	38.47 - 48.47	6.17		FQ	#		
Uranium	mg/L	11/05/2008	N001	38.47 - 48.47	0.00057		FQ	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0720 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	N001	7.94	-	12.94	0.00029	B	F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	7.94	-	12.94	0.0014		F	#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	7.94	-	12.94	253		F	#		
pH	s.u.	11/04/2008	N001	7.94	-	12.94	7.29		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	7.94	-	12.94	729		F	#		
Sulfate	mg/L	11/04/2008	N001	7.94	-	12.94	160		F	#	2.5	
Temperature	C	11/04/2008	N001	7.94	-	12.94	12.51		F	#		
Turbidity	NTU	11/04/2008	N001	7.94	-	12.94	0.96		F	#		
Uranium	mg/L	11/04/2008	N001	7.94	-	12.94	0.0051		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/04/2008	N001	44.43	-	54.43	0.003	B	F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	44.43	-	54.43	0.0027		F	#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	44.43	-	54.43	154		F	#		
pH	s.u.	11/04/2008	N001	44.43	-	54.43	8.7		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	44.43	-	54.43	893		F	#		
Sulfate	mg/L	11/04/2008	N001	44.43	-	54.43	300		F	#	2.5	
Temperature	C	11/04/2008	N001	44.43	-	54.43	11.39		F	#		
Turbidity	NTU	11/04/2008	N001	44.43	-	54.43	5.01		F	#		
Uranium	mg/L	11/04/2008	N001	44.43	-	54.43	0.000087	B	UF	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/05/2008	N001	11.1	-	16.1	0.00014	U	FJ	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	11.1	-	16.1	0.072		F	#	0.00023	
Oxidation Reduction Potential	mV	11/05/2008	N001	11.1	-	16.1	231		F	#		
pH	s.u.	11/05/2008	N001	11.1	-	16.1	7.04		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	11.1	-	16.1	1043		F	#		
Sulfate	mg/L	11/05/2008	N001	11.1	-	16.1	280		F	#	5	
Temperature	C	11/05/2008	N001	11.1	-	16.1	14.07		F	#		
Turbidity	NTU	11/05/2008	N001	11.1	-	16.1	0.93		F	#		
Uranium	mg/L	11/05/2008	N001	11.1	-	16.1	0.29		F	#	0.000018	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/05/2008	N001	45.99	-	55.99	0.44		F	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	45.99	-	55.99	0.00026	B	UF	#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	45.99	-	55.99	104		F	#		
pH	s.u.	11/05/2008	N001	45.99	-	55.99	7.11		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	45.99	-	55.99	3799		F	#		
Sulfate	mg/L	11/05/2008	N001	45.99	-	55.99	2000		F	#	25	
Temperature	C	11/05/2008	N001	45.99	-	55.99	11.07		F	#		
Turbidity	NTU	11/05/2008	N001	45.99	-	55.99	0.8		F	#		
Uranium	mg/L	11/05/2008	N001	45.99	-	55.99	0.000068	B	UF	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/05/2008	N001	14.71	-	19.71	0.0028	B	F	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	14.71	-	19.71	0.0033		F	#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	14.71	-	19.71	231		F	#		
pH	s.u.	11/05/2008	N001	14.71	-	19.71	7.04		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	14.71	-	19.71	782		F	#		
Sulfate	mg/L	11/05/2008	N001	14.71	-	19.71	110		F	#	2.5	
Temperature	C	11/05/2008	N001	14.71	-	19.71	13.7		F	#		
Turbidity	NTU	11/05/2008	N001	14.71	-	19.71	1.4		F	#		
Uranium	mg/L	11/05/2008	N001	14.71	-	19.71	0.0085		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0730 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/05/2008	N001	38.62	-	48.62	0.047		F	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	38.62	-	48.62	0.0048		F	#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	38.62	-	48.62	88		F	#		
pH	s.u.	11/05/2008	N001	38.62	-	48.62	7.41		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	38.62	-	48.62	949		F	#		
Sulfate	mg/L	11/05/2008	N001	38.62	-	48.62	180		F	#	2.5	
Temperature	C	11/05/2008	N001	38.62	-	48.62	12.1		F	#		
Turbidity	NTU	11/05/2008	N001	38.62	-	48.62	4.01		F	#		
Uranium	mg/L	11/05/2008	N001	38.62	-	48.62	0.0098		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0735 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2008	N001	-4906.66	-	-4891.66	0.17		F	#	0.00014	
Molybdenum	mg/L	11/03/2008	N001	-4906.66	-	-4891.66	0.0016		F	#	0.000045	
Oxidation Reduction Potential	mV	11/03/2008	N001	-4906.66	-	-4891.66	145		F	#		
pH	s.u.	11/03/2008	N001	-4906.66	-	-4891.66	7.42		F	#		
Specific Conductance	umhos /cm	11/03/2008	N001	-4906.66	-	-4891.66	1529		F	#		
Sulfate	mg/L	11/03/2008	N001	-4906.66	-	-4891.66	630		F	#	10	
Temperature	C	11/03/2008	N001	-4906.66	-	-4891.66	11.46		F	#		
Turbidity	NTU	11/03/2008	N001	-4906.66	-	-4891.66	1.15		F	#		
Uranium	mg/L	11/03/2008	N001	-4906.66	-	-4891.66	0.00025		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0784 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	N001	1.65	-	6.65	0.39		F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	1.65	-	6.65	0.016		F	#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	1.65	-	6.65	85		F	#		
pH	s.u.	11/04/2008	N001	1.65	-	6.65	7.97		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	1.65	-	6.65	6270		F	#		
Sulfate	mg/L	11/04/2008	N001	1.65	-	6.65	3400		F	#	25	
Temperature	C	11/04/2008	N001	1.65	-	6.65	12.85		F	#		
Turbidity	NTU	11/04/2008	N001	1.65	-	6.65	2.51		F	#		
Uranium	mg/L	11/04/2008	N001	1.65	-	6.65	0.0063		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0788 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	N001	1.41	-	13.41	0.0022	B	F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	1.41	-	13.41	0.026		F	#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	1.41	-	13.41	89		F	#		
pH	s.u.	11/04/2008	N001	1.41	-	13.41	7.43		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	1.41	-	13.41	1783		F	#		
Sulfate	mg/L	11/04/2008	N001	1.41	-	13.41	610		F	#	10	
Temperature	C	11/04/2008	N001	1.41	-	13.41	10.76		F	#		
Turbidity	NTU	11/04/2008	N001	1.41	-	13.41	1.81		F	#		
Uranium	mg/L	11/04/2008	N001	1.41	-	13.41	0.033		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/05/2008	N001	6.2	-	18.2	0.36		F	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	6.2	-	18.2	0.5		F	#	0.0023	
Oxidation Reduction Potential	mV	11/05/2008	N001	6.2	-	18.2	196		F	#		
pH	s.u.	11/05/2008	N001	6.2	-	18.2	7.12		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	6.2	-	18.2	6310		F	#		
Sulfate	mg/L	11/05/2008	N001	6.2	-	18.2	4000		F	#	25	
Temperature	C	11/05/2008	N001	6.2	-	18.2	10.78		F	#		
Turbidity	NTU	11/05/2008	N001	6.2	-	18.2	2.12		F	#		
Uranium	mg/L	11/05/2008	N001	6.2	-	18.2	1.3		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0809 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2008	N001	10.5	-	19.4	0.81		F	#	0.00014	
Molybdenum	mg/L	11/03/2008	N001	10.5	-	19.4	0.0015		F	#	0.000045	
Oxidation Reduction Potential	mV	11/03/2008	N001	10.5	-	19.4	46		F	#		
pH	s.u.	11/03/2008	N001	10.5	-	19.4	7.43		F	#		
Specific Conductance	umhos /cm	11/03/2008	N001	10.5	-	19.4	877		F	#		
Sulfate	mg/L	11/03/2008	N001	10.5	-	19.4	300		F	#	2.5	
Temperature	C	11/03/2008	N001	10.5	-	19.4	12.62		F	#		
Turbidity	NTU	11/03/2008	N001	10.5	-	19.4	0.52		F	#		
Uranium	mg/L	11/03/2008	N001	10.5	-	19.4	0.0055		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/05/2008	N001	9.5	-	14.5	0.0039	B	F	#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	9.5	-	14.5	0.0046		F	#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	9.5	-	14.5	236		F	#		
pH	s.u.	11/05/2008	N001	9.5	-	14.5	7.31		F	#		
Specific Conductance	umhos /cm	11/05/2008	N001	9.5	-	14.5	900		F	#		
Sulfate	mg/L	11/05/2008	N001	9.5	-	14.5	150		F	#	2.5	
Temperature	C	11/05/2008	N001	9.5	-	14.5	11.79		F	#		
Turbidity	NTU	11/05/2008	N001	9.5	-	14.5	3.23		F	#		
Uranium	mg/L	11/05/2008	N001	9.5	-	14.5	0.019		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/04/2008	N001	6.6	-	11.6	0.5		F	#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	6.6	-	11.6	0.024		F	#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	6.6	-	11.6	82		F	#		
pH	s.u.	11/04/2008	N001	6.6	-	11.6	7.39		F	#		
Specific Conductance	umhos /cm	11/04/2008	N001	6.6	-	11.6	1529		F	#		
Sulfate	mg/L	11/04/2008	N001	6.6	-	11.6	470		F	#	10	
Temperature	C	11/04/2008	N001	6.6	-	11.6	10.78		F	#		
Turbidity	NTU	11/04/2008	N001	6.6	-	11.6	1.64		F	#		
Uranium	mg/L	11/04/2008	N001	6.6	-	11.6	0.034		F	#	0.0000036	

Groundwater Quality Data by Location (USEE100) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0828 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	N001	-	0.016			#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	-	0.003			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	-	236			#		
pH	s.u.	11/04/2008	N001	-	8.75			#		
Specific Conductance	umhos /cm	11/04/2008	N001	-	763			#		
Sulfate	mg/L	11/04/2008	N001	-	200			#	2.5	
Temperature	C	11/04/2008	N001	-	12.34			#		
Turbidity	NTU	11/04/2008	N001	-	6.24			#		
Uranium	mg/L	11/04/2008	N001	-	0.000067	B	U	#	0.0000036	

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: 1/12/2009
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	11/05/2008	0001	0.51			#	0.00014	
Molybdenum	mg/L	11/05/2008	0001	0.013			#	0.00009	
Oxidation Reduction Potential	mV	11/05/2008	N001	200			#		
pH	s.u.	11/05/2008	N001	7.73			#		
Specific Conductance	umhos/cm	11/05/2008	N001	1315			#		
Sulfate	mg/L	11/05/2008	0001	370			#	10	
Temperature	C	11/05/2008	N001	8.02			#		
Turbidity	NTU	11/05/2008	N001	67.2			#		
Uranium	mg/L	11/05/2008	0001	0.13			#	0.0000072	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0749 SURFACE LOCATION 8/26/97 State plane east changed from 589532.71 to an estimation close to river

Parameter	Units	Sample Date	ID	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	N001	0.095			#	0.00014	
Molybdenum	mg/L	11/04/2008	N001	0.023			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	133			#		
pH	s.u.	11/04/2008	N001	7.97			#		
Specific Conductance	umhos/cm	11/04/2008	N001	3753			#		
Sulfate	mg/L	11/04/2008	N001	2300			#	25	
Temperature	C	11/04/2008	N001	18.15			#		
Turbidity	NTU	11/04/2008	N001	9.8			#		
Uranium	mg/L	11/04/2008	N001	0.0019			#	0.0000036	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/04/2008	0001	0.021	E		#	0.00014	
Molybdenum	mg/L	11/04/2008	0001	0.0014			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	217			#		
pH	s.u.	11/04/2008	N001	7.37			#		
Specific Conductance	umhos/cm	11/04/2008	N001	858			#		
Sulfate	mg/L	11/04/2008	0001	290			#	2.5	
Temperature	C	11/04/2008	N001	5.97			#		
Turbidity	NTU	11/04/2008	N001	12.9			#		
Uranium	mg/L	11/04/2008	0001	0.0063			#	0.0000036	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0796 SURFACE LOCATION Was possibly historically sampled ~900 ft E from current location

Parameter	Units	Sample Date	ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/03/2008	0001	0.02			#	0.00014	
Molybdenum	mg/L	11/03/2008	0001	0.0016			#	0.000045	
Oxidation Reduction Potential	mV	11/03/2008	N001	194			#		
pH	s.u.	11/03/2008	N001	7.42			#		
Specific Conductance	umhos/cm	11/03/2008	N001	884			#		
Sulfate	mg/L	11/03/2008	0001	300			#	2.5	
Temperature	C	11/03/2008	N001	9.89			#		
Turbidity	NTU	11/03/2008	N001	10.9			#		
Uranium	mg/L	11/03/2008	0001	0.006			#	0.0000036	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
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	11/03/2008	N001	0.095			#	0.00014	
Molybdenum	mg/L	11/03/2008	N001	0.0018			#	0.000045	
Oxidation Reduction Potential	mV	11/03/2008	N001	150			#		
pH	s.u.	11/03/2008	N001	8.72			#		
Specific Conductance	umhos/cm	11/03/2008	N001	1250			#		
Sulfate	mg/L	11/03/2008	N001	290			#	10	
Temperature	C	11/03/2008	N001	10.02			#		
Turbidity	NTU	11/03/2008	N001	4.04			#		
Uranium	mg/L	11/03/2008	N001	0.0046			#	0.0000036	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0811 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/05/2008	N001	0.025			#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	0.0015			#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	218			#		
pH	s.u.	11/05/2008	N001	8.2			#		
Specific Conductance	umhos/cm	11/05/2008	N001	823			#		
Sulfate	mg/L	11/05/2008	N001	280			#	2.5	
Temperature	C	11/05/2008	N001	5.47			#		
Turbidity	NTU	11/05/2008	N001	7.92			#		
Uranium	mg/L	11/05/2008	N001	0.0059			#	0.0000036	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0812 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/05/2008	N001	0.031			#	0.00014	
Molybdenum	mg/L	11/05/2008	N001	0.0015			#	0.000045	
Oxidation Reduction Potential	mV	11/05/2008	N001	202			#		
pH	s.u.	11/05/2008	N001	8.26			#		
Specific Conductance	umhos/cm	11/05/2008	N001	804			#		
Sulfate	mg/L	11/05/2008	N001	290			#	2.5	
Temperature	C	11/05/2008	N001	4.24			#		
Turbidity	NTU	11/05/2008	N001	7.86			#		
Uranium	mg/L	11/05/2008	N001	0.006			#	0.0000036	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0822 SURFACE LOCATION west-side irrigation ditch

Parameter	Units	Sample Date	ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	0001	0.1			#	0.00014	
Molybdenum	mg/L	11/04/2008	0001	0.0062			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	198			#		
pH	s.u.	11/04/2008	N001	7.88			#		
Radium-226	pCi/L	11/04/2008	0001	0.315		U	#	0.15	0.187
Radium-228	pCi/L	11/04/2008	0001	0.63	U		#	0.63	0.388
Specific Conductance	umhos/cm	11/04/2008	N001	2137			#		
Sulfate	mg/L	11/04/2008	0001	1100			#	10	
Temperature	C	11/04/2008	N001	9.45			#		
Turbidity	NTU	11/04/2008	N001	29.2			#		
Uranium	mg/L	11/04/2008	0001	0.0075			#	0.0000036	

Surface Water Quality Data by Location (USEE102) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009
Location: 0823 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	11/04/2008	0001	0.0077			#	0.00014	
Molybdenum	mg/L	11/04/2008	0001	0.0033			#	0.000045	
Oxidation Reduction Potential	mV	11/04/2008	N001	228			#		
pH	s.u.	11/04/2008	N001	8.47			#		
Specific Conductance	umhos/cm	11/04/2008	N001	1153			#		
Sulfate	mg/L	11/04/2008	0001	380			#	5	
Temperature	C	11/04/2008	N001	8.85			#		
Turbidity	NTU	11/04/2008	N001	11.6			#		
Uranium	mg/L	11/04/2008	0001	0.0043			#	0.0000036	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

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Equipment Blank Data

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BLANKS REPORT
LAB: PARAGON (Fort Collins, CO)
RIN: 08101898
Report Date: 1/12/2009

Parameter	Site Code	Location ID	Sample Date	ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Manganese	RVT01	0999	11/05/2008	N001	mg/L	0.00014	U		0.00014		E
Molybdenum	RVT01	0999	11/05/2008	N001	mg/L	0.00015	B	U	0.000045		E
Sulfate	RVT01	0999	11/05/2008	N001	mg/L	0.5	U		0.5		E
Uranium	RVT01	0999	11/05/2008	N001	mg/L	0.000039	B	U	0.0000036		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: 1/12/2009

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	11/04/2008	17:08:29	9.99	4936.59	
0110	O	4944.35	11/04/2008	17:03:06	9.45	4934.9	
0111	O	4946.87	11/04/2008	17:09:58	9.51	4937.36	
0700	U	4951.38	11/04/2008	12:18:35	6.03	4945.35	
0702	D	4931	11/05/2008	15:19:20	6.69	4924.31	
0705	D	4930.8	11/05/2008	12:47:07	6.79	4924.01	
0707	D	4931	11/05/2008	13:10:24	5.81	4925.19	
0709	D	4930.7	11/04/2008	17:16:12	3.04	4927.66	
0710	U	4947.9	11/04/2008	10:50:32	5.54	4942.36	
0716	O	4939.12	11/04/2008	13:55:22	8.77	4930.35	
0717	O	4938.8	11/04/2008	13:35:12	8.35	4930.45	
0718	D	4937.6	11/05/2008	15:00:53	8.45	4929.15	
0719	D	4937.55	11/05/2008	15:30:30	7.99	4929.56	
0720	C	4940.46	11/04/2008	09:20:07	5.21	4935.25	
0721	C	4940.47	11/04/2008	09:40:02	8.21	4932.26	
0722R		4937.06	11/05/2008	16:10:29	9.08	4927.98	
0723	D	4936.01	11/05/2008	16:35:02	7.87	4928.14	
0724	U	4941.36	11/04/2008	13:19:29	7.39	4933.97	
0725	U	4941.66	11/04/2008	13:27:04	7.7	4933.96	
0726	U	4942	11/04/2008	13:28:20	6.33	4935.67	
0727	U	4951.69	11/04/2008	14:51:30	10.14	4941.55	
0728	U	4946.01	11/04/2008	13:29:01	8.19	4937.82	
0729	D	4932.75	11/05/2008	08:05:28	6.67	4926.08	
0730	D	4933.08	11/05/2008	08:45:34	7.31	4925.77	
0732	U	4945.07	11/04/2008	17:10:58	8.12	4936.95	
0733	U	4946.76	11/04/2008	09:57:28	7.73	4939.03	
0734	U	4946.08	11/04/2008	10:00:59	8.69	4937.39	
0735	D	4934.16	11/03/2008	15:45:08	10.27	4923.89	
0736	U	4946	11/04/2008	12:20:35	6.35	4939.65	

STATIC WATER LEVELS (USEE700) FOR SITE RVT01, Riverton Processing Site
REPORT DATE: 1/12/2009

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
0784	U	4945.45	11/04/2008	15:35:22	6.82	4938.63	
0788	C	4935.09	11/04/2008	16:55:44	9.33	4925.76	
0789	D	4933.66	11/05/2008	11:05:04	9.51	4924.15	
0809		4932.09	11/03/2008	16:15:14	7.85	4924.24	
0824		4928.27	11/05/2008	10:15:40	6.01	4922.26	
0826		4936.98	11/04/2008	16:25:50	8.14	4928.84	

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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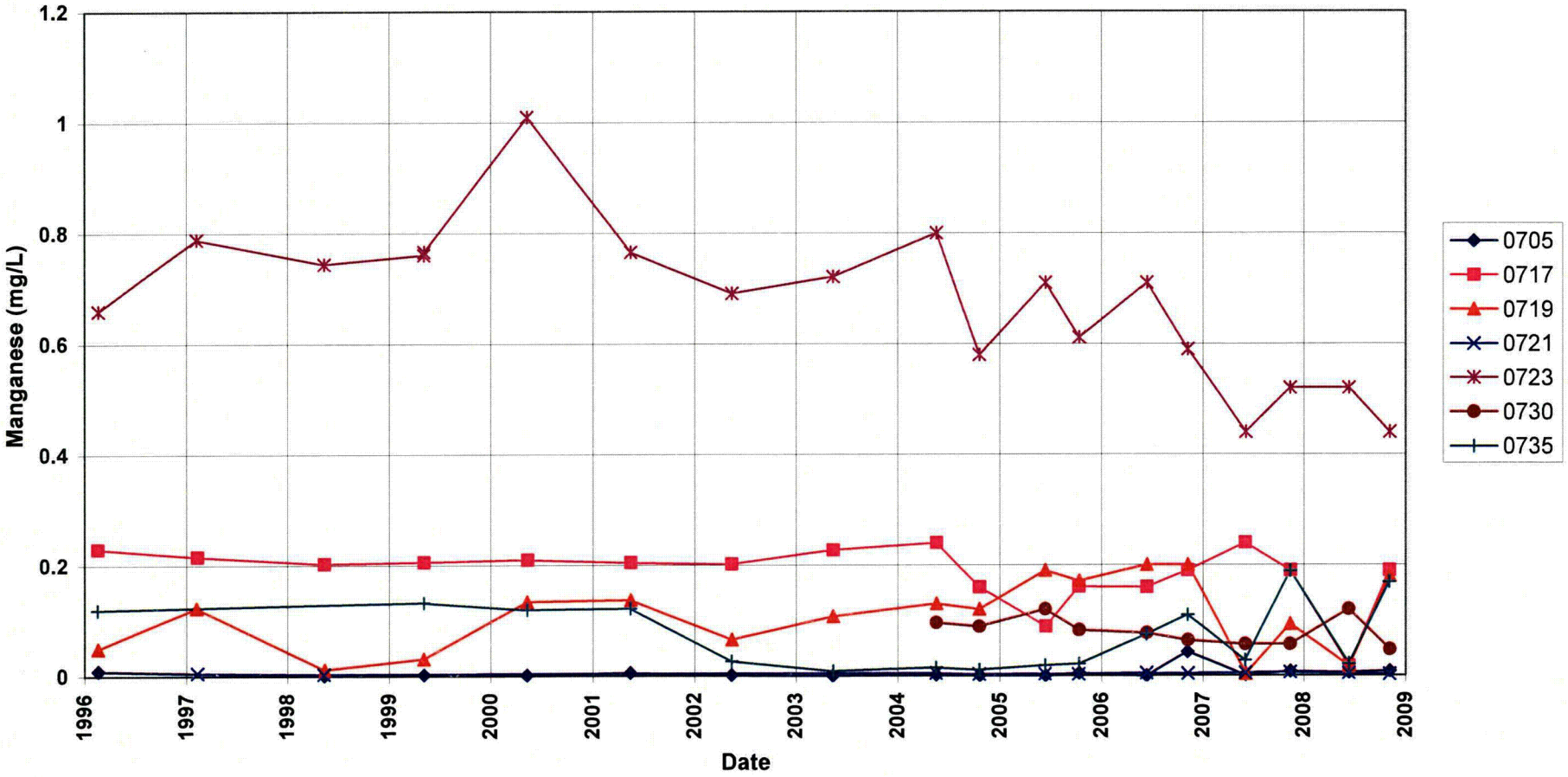
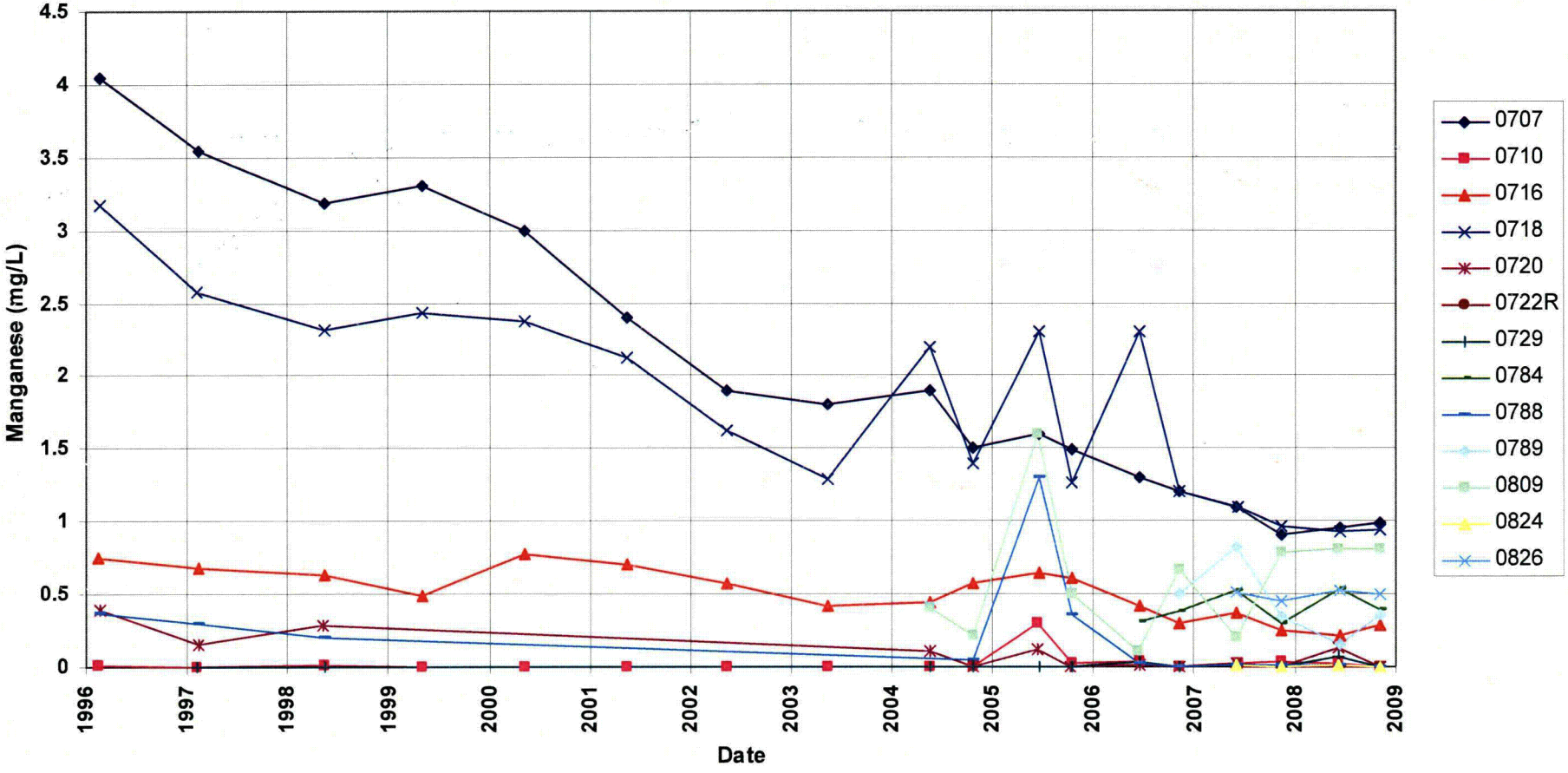
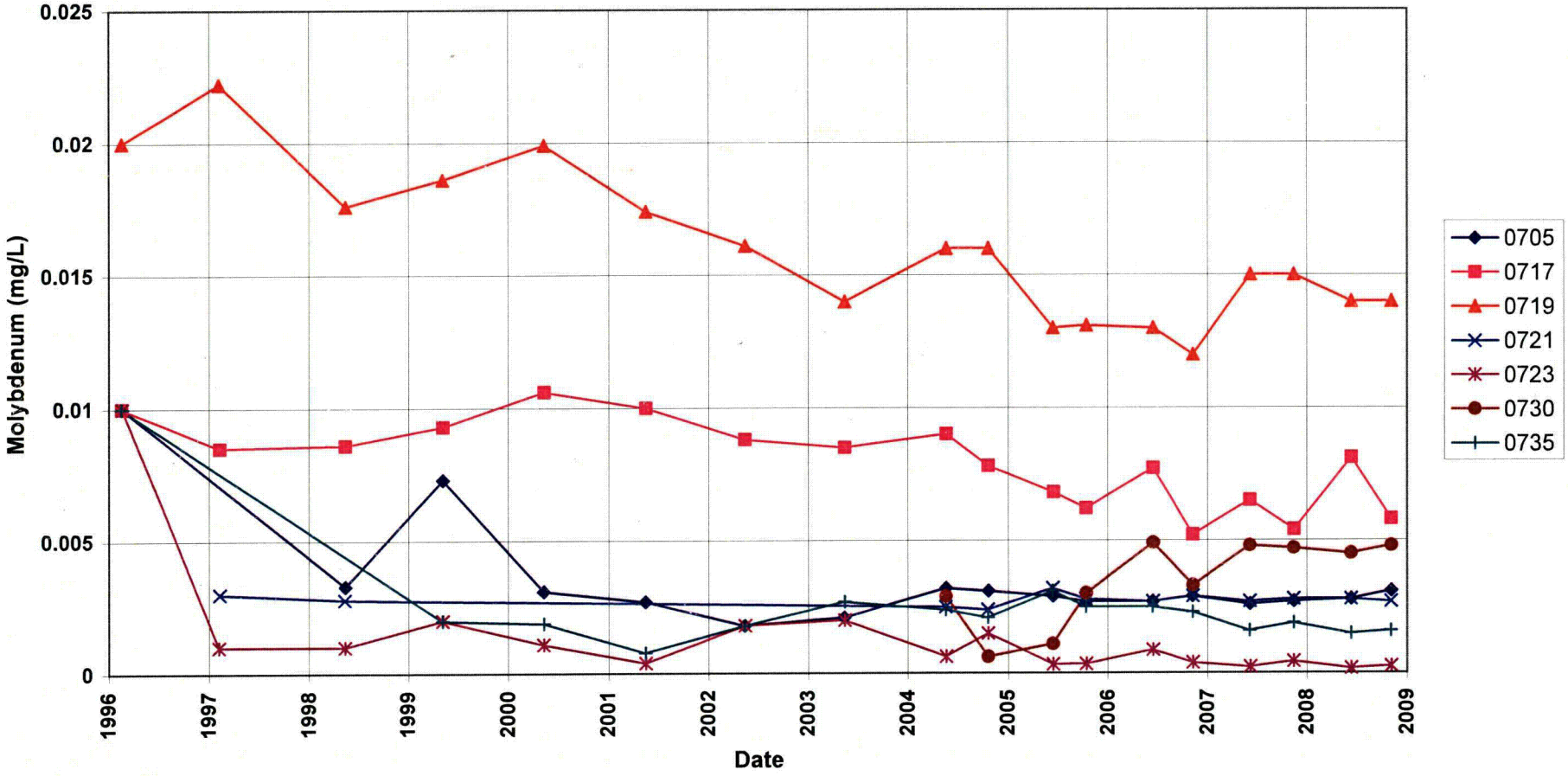
Riverton Processing Site
Semi-Confined Aquifer Locations
Manganese Concentration



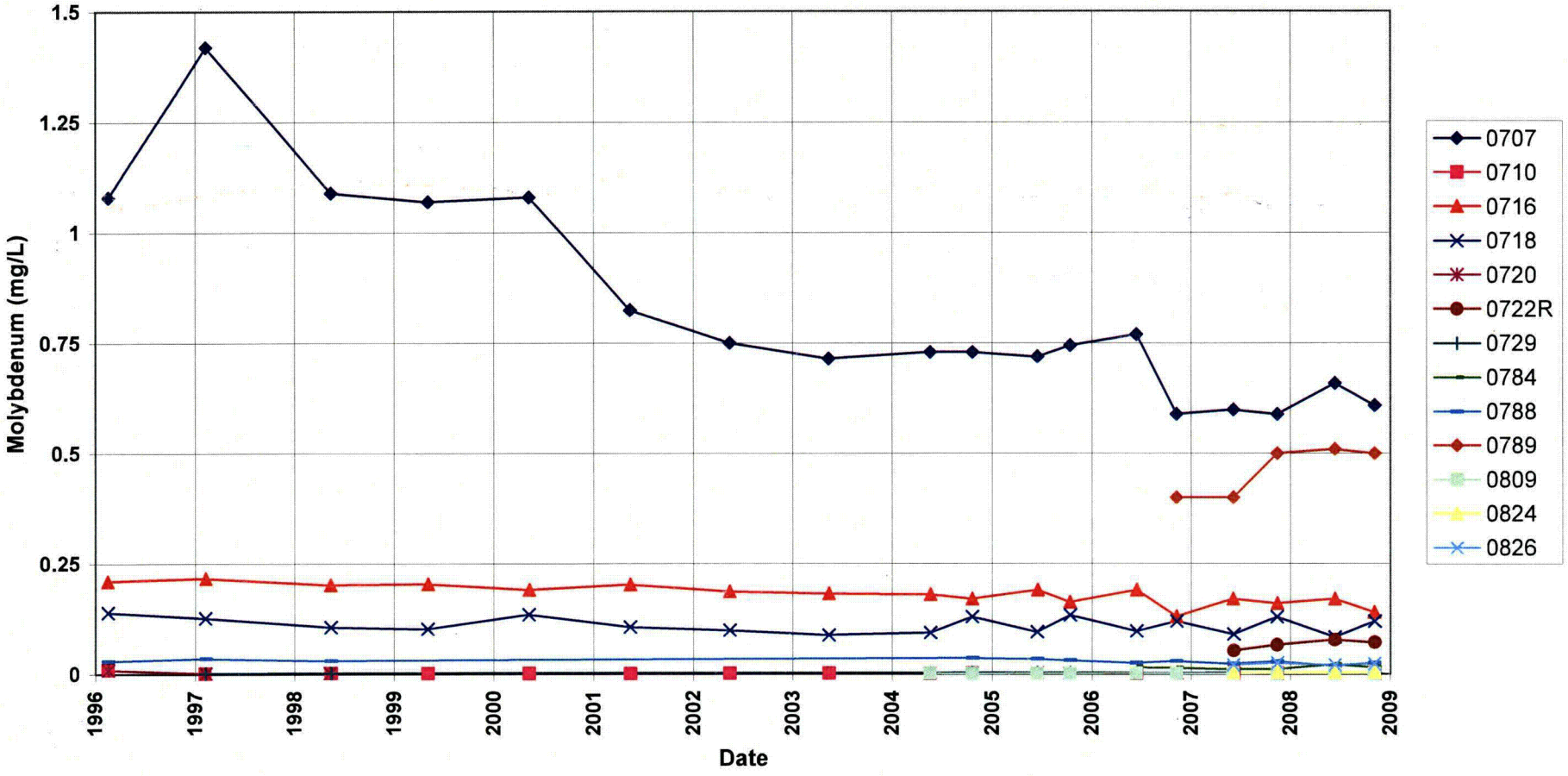
Riverton Processing Site
Surficial Aquifier Locations
Manganese Concentration



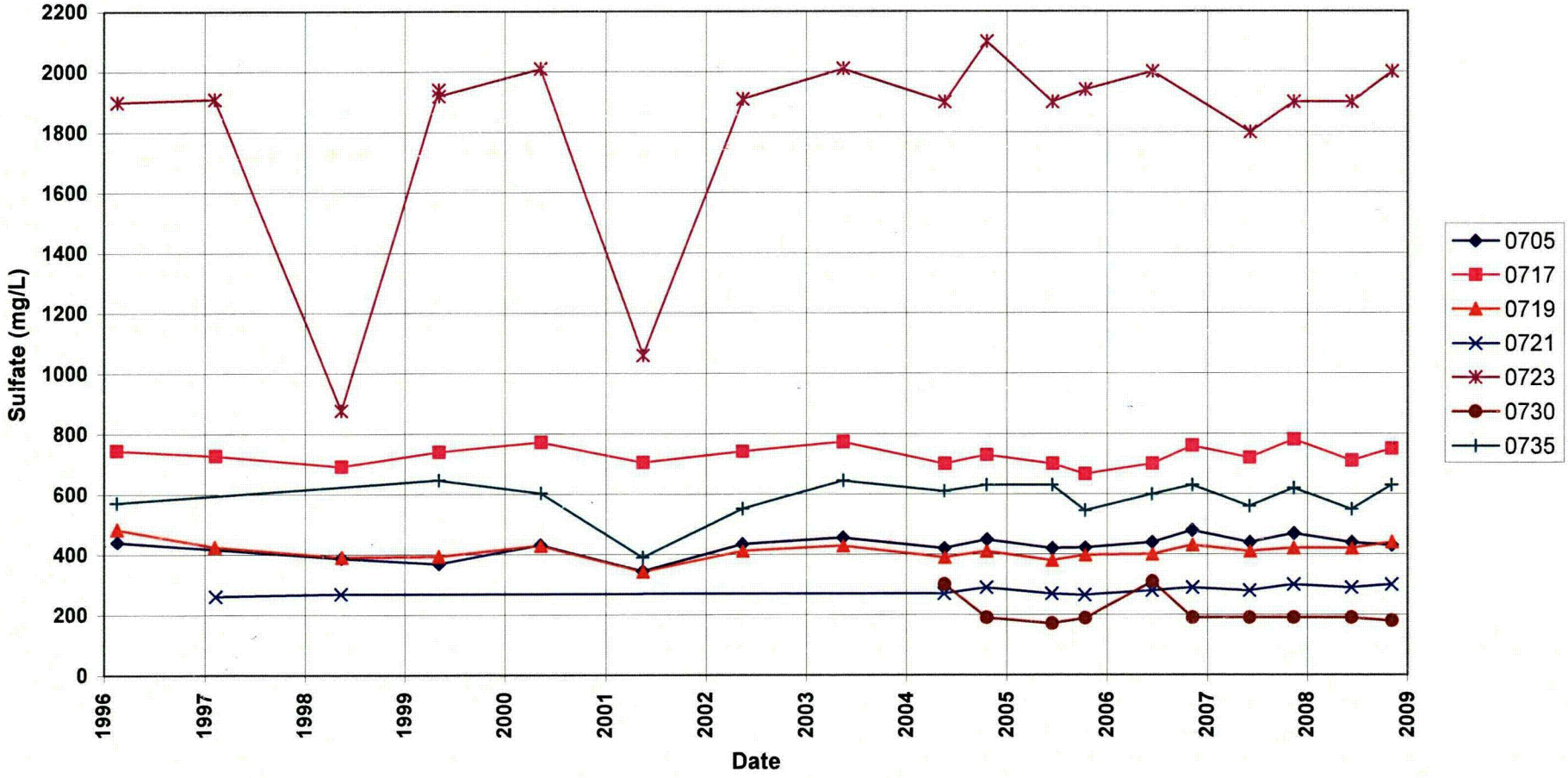
Riverton Processing Site
Semi-Confined Aquifer Locations
Molybdenum Concentration



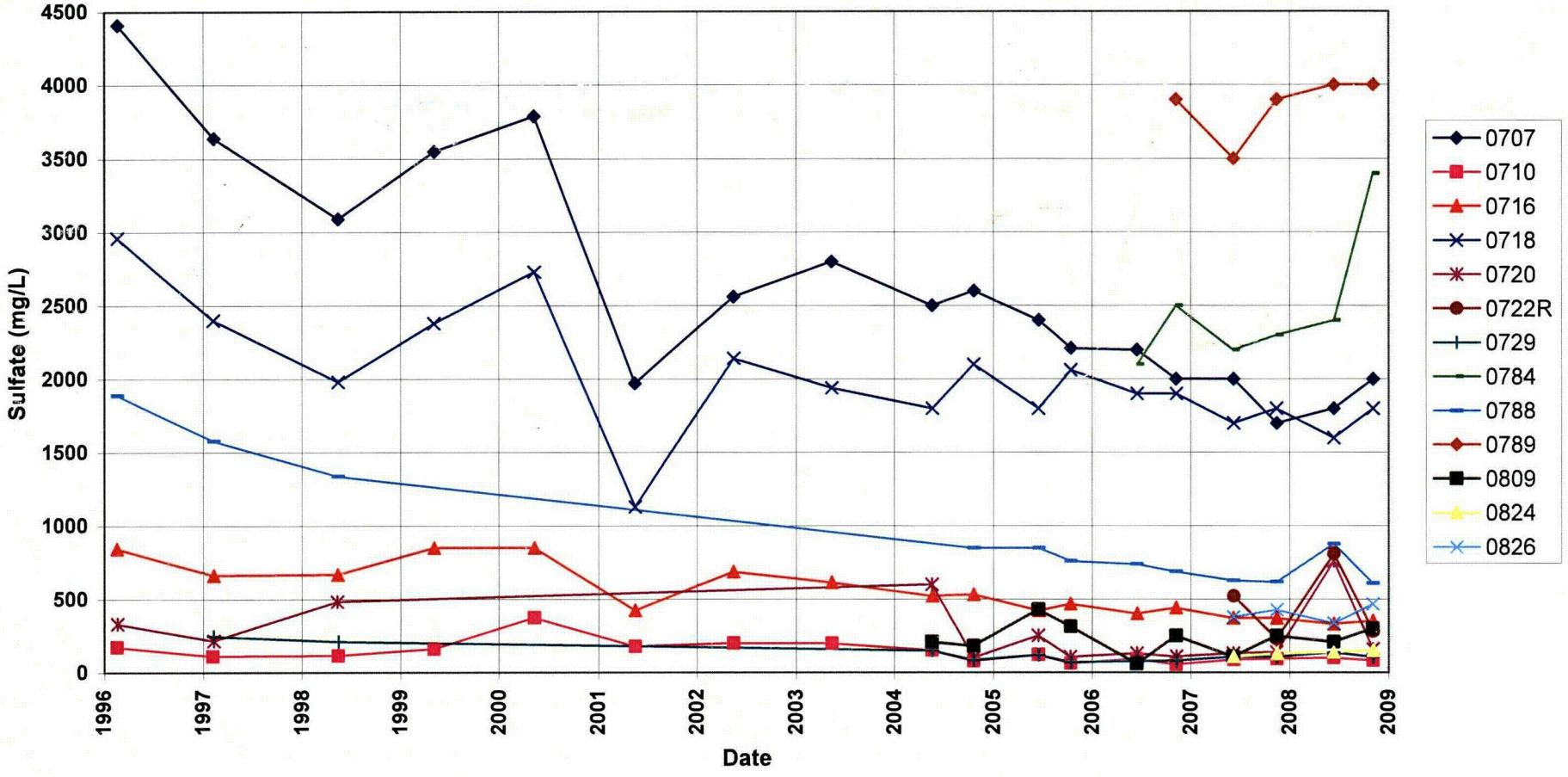
Riverton Processing Site
Surficial Aquifier Locations
Molybdenum Concentration



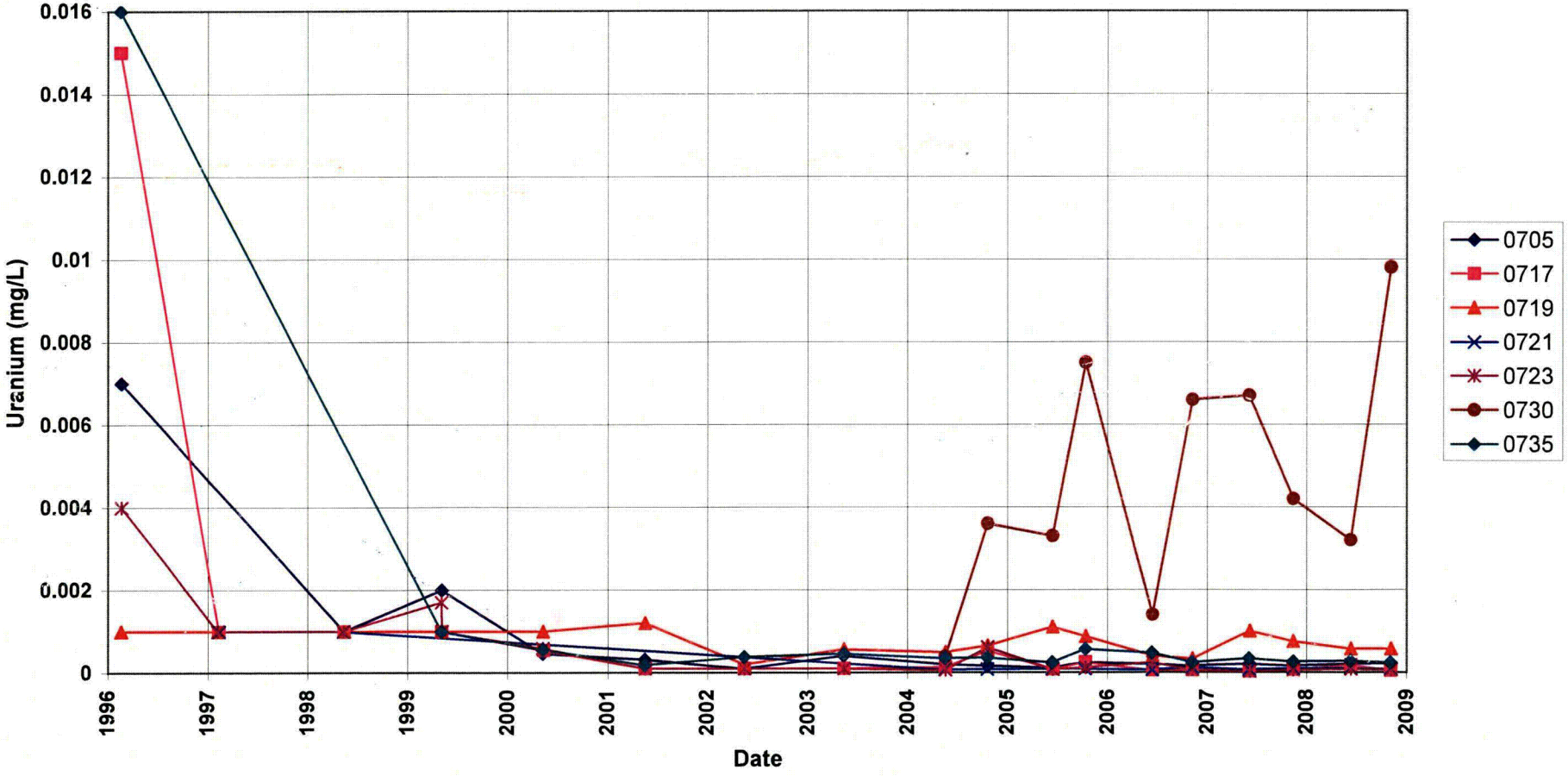
Riverton Processing Site
Semi-Confined Aquifer Locations
Sulfate Concentration



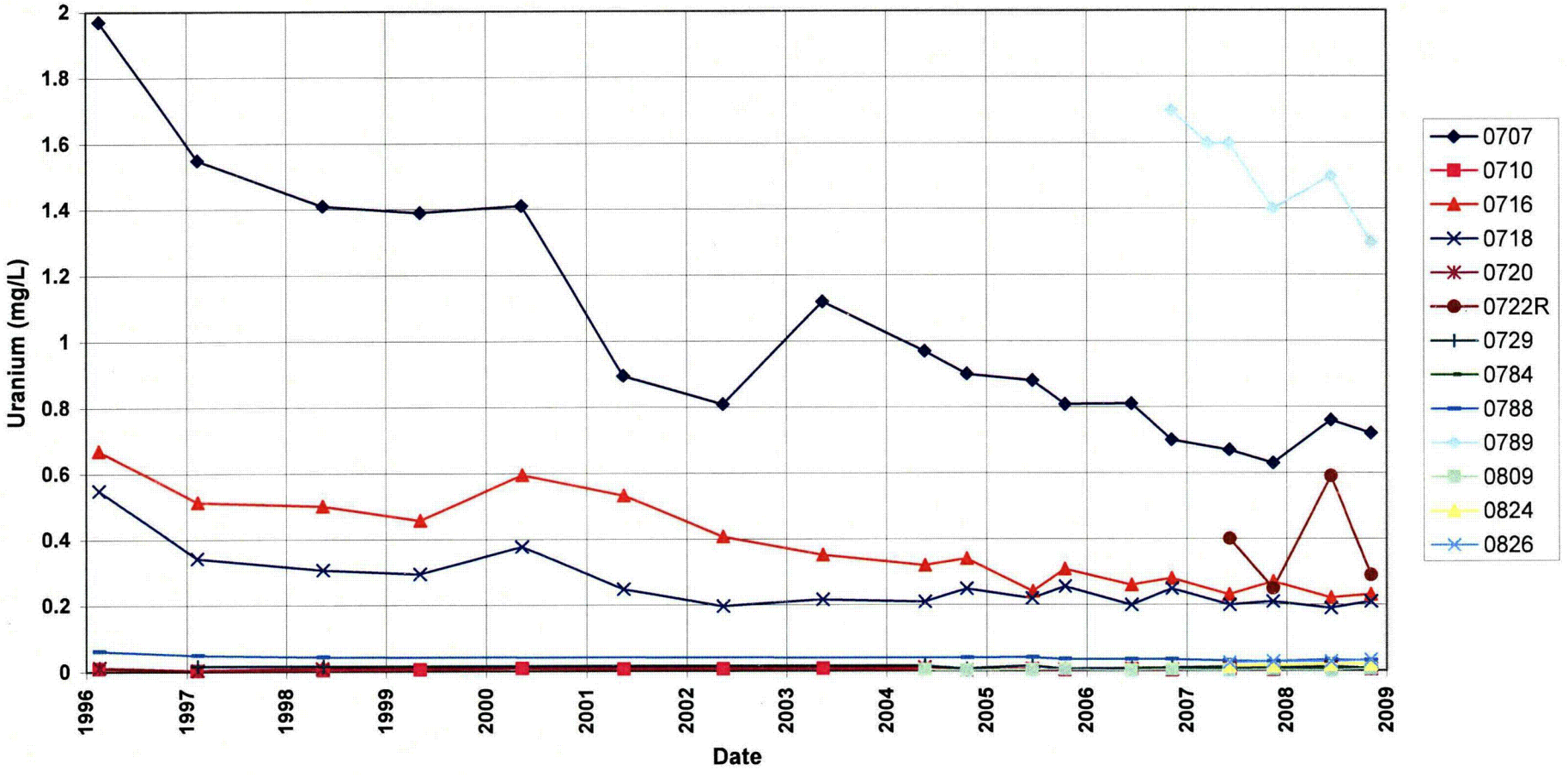
Riverton Processing Site
Surficial Aquifer Locations
Sulfate Concentration



Riverton Processing Site
Semi-Confined Aquifer Locations
Uranium Concentration



Riverton Processing Site
Surficial Aquifer Locations
Uranium Concentration



Attachment 3
Sampling and Analysis Work Order

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Stoller established 1959

Task Order LM00-501
Control Number 09-0024

October 1, 2008

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 2008 Environmental Sampling at Riverton, Wyoming

REFERENCE: LM00-501-02-117-402, 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 3, 2008.

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	788 Sf	824
707 Sf	717 Se	720 Sf	723 Se	735 Se	789 Sf	826
710 Sf	718 Sf	721 Se	729 Sf	784 Sf	809 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

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.

If you have any questions, please call me at extension 6654.

Sincerely,

Sam Campbell 2008.10.02 14:30:54 -06'00'

Sam Campbell
Site Lead

SC/lcg/hc
Enclosures (3)

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

\\Condor\home\L40048\My Documents\Ground Water\RVT\0811rvt-ltr.doc

Constituent Sampling Breakdown

Site	Riverton				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	50	18			
Field Measurements					
Alkalinity	X	X			
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					
Gross Alpha			2 pCi/L	EPA 900.0	GPC-A-001
Gross Beta			4 pCi/L	EPA 900.0	GPC-A-001
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 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 19, 2008

TO: Distribution

FROM: Sam E. Campbell

SUBJECT: Trip Report

Site: Riverton, Wyoming, Processing Site.

Dates of Sampling Event: November 3 to November 5, 2008.

Team Members: Sam Campbell and Joe Trevino

Number of Locations Sampled: 20 monitor wells, 9 surface water locations, and 5 domestic wells.

Locations Not Sampled/Reason: None.

Location Specific Information: All field data was collected electronically with the Field Data Collection System (sampled locations) and the Water Level Recorder (water level only locations).

Monitor wells 0705 and 0719 were purged and sampled using Category II criteria; all other monitor wells were purged and sampled using Category I criteria.

Samples collected from surface water locations 0747, 0794, 0796, 0822, and 0823 were filtered because the measured turbidity was greater than 10 NTUs; samples from all other locations were collected without filtering.

At the time of sampling, there was no surface-water-flow between the Oxbow Lake and the Little Wind River.

The Little Wind River continues to erode the bank toward monitor well 0735; the bank is now 6 feet from the well.
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	0716	Duplicate	GLW-326
2645	0707	Duplicate	GLW-327
2646	Equipment Blank	Equipment Blank	GLW-328

Requisition Numbers Assigned: All samples were assigned to report identification number (RIN) 08101898 and were shipped to Paragon Analytics on November 7, 2008.

Water Level Measurements: Water levels were measured at all sampled monitor wells and 12 additional monitor wells.

Well Inspection Summary: Concrete pads at monitor wells 0725 and 0726 have deteriorated; all other wells were in good shape.

Equipment: All equipment functioned properly.

Regulatory: The Wind River Environmental Quality Commission (WREQC) observed sampling activities and split samples at monitor wells 0718 and 0719.

Institutional Controls

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

Site Issues: None

Disposal Cell/Drainage Structure Integrity: Not applicable.
Vegetation/Noxious Weed Concerns: Not applicable.
Maintenance Requirements: None.

Access Issues: None.

Corrective Action Required/Taken: New concrete pads are needed around monitor wells 0725 and 0726

(SEC/lcg)

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