Data Validation Package

May 2010
Groundwater and Surface Water Sampling at the Rio Blanco, Colorado, Site

December 2010

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Rio Blanco, Colorado, Site

Sampling Period: May 11–12, 2010

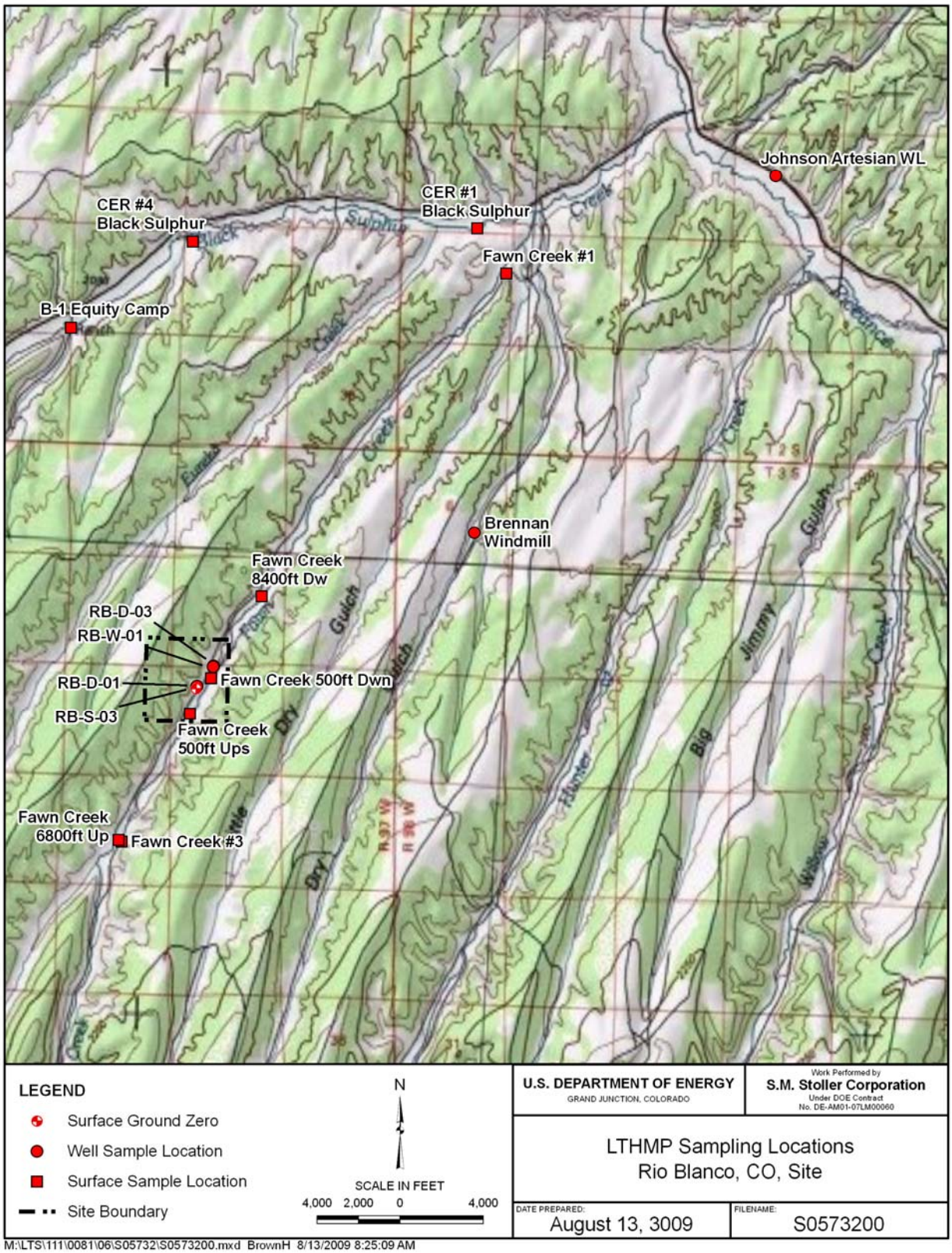
Annual sampling was conducted at the Rio Blanco, Colorado, site for the Long-Term Hydrologic Monitoring Program (LTHMP) on May 11–12, 2010, to monitor groundwater and surface water for potential radionuclide contamination. Sampling and analysis was conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated). A duplicate sample was collected from location Fawn Creek #3. Samples were analyzed by the U.S. Environmental Protection Agency (EPA) Radiation & Indoor Environments National Laboratory in Las Vegas, Nevada. Samples were analyzed for gamma-emitting radionuclides by high-resolution gamma spectroscopy and for tritium using the conventional and enrichment methods. Results of this monitoring at the Rio Blanco site demonstrate that groundwater and surface water outside the site boundaries have not been affected by project-related contaminants.

One sampling location, Brennan Windmill, yielded a reportable value of tritium activity, using the electrolytic enrichment tritium analysis method, with a value of 6.0 picocuries per liter (pCi/L). Conventional tritium analysis for this and all other locations resulted in no detectable activity. These results are consistent with background levels for tritium, well below the EPA drinking water standard for tritium of 20,000 pCi/L.

All high-resolution gamma spectrometry results for cesium-137 were below detectable concentrations. The results from this sampling event indicate that groundwater and surface water supplies in the area have not been impacted by detonation-related contaminants.

Rick Hutton
Site Lead, S.M. Stoller Corporation

12/07/10
Date



Sampling Locations, Rio Blanco, Colorado, Site

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Rio Blanco, Colorado	**Date(s) of Water Sampling**	May 11–12, 2010
Date(s) of Verification	November 24, 2010	**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 April 5, 2010.
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 May 11, 2010.
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Was the category of the well documented?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	NA	There were no Category II wells.
Was one pump/tubing volume removed prior to sampling?		
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from location Fawn Creek #3.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	An equipment blank was not required.
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 ID 2612 was used for the duplicate sample.
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the “Date Signed” fields (FDCS)?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	NA	Sample chilling was not required.
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Requisition No. (RIN): 10053036
Sample Event: May 11-12, 2010
Site(s): Rio Blanco, Colorado, Site
Laboratory: Radiation and Indoor Environments National Laboratory
Las Vegas, NV
Analysis: Radiochemistry
Validator: Steve Donivan
Review Date: November 24, 2010

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 1, Data Deliverables Examination. 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 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Gamma Spectrometry	GAM-A-001	RQA-302	RQA-302
Tritium	LSC-A-001	RQA-604	RQA-604
Tritium (enriched)	LMR-15	RQA-602	RQA-602

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample	Location	Analyte	Flag	Reason
735476	Fawn Creek 6800ft Up	Lead-212	U	Less than the Decision Level Concentration
735476	Fawn Creek 6800ft Up	Tritium	U	Less than the Decision Level Concentration
735477	Fawn Creek 500ft Ups	Tritium	U	Less than the Decision Level Concentration
735478	Fawn Creek 500ft Dwn	Tritium	U	Less than the Decision Level Concentration
735479	Fawn Creek 8400ft Dw	Lead-212	U	Less than the Decision Level Concentration
735479	Fawn Creek 8400ft Dw	Tritium	U	Less than the Decision Level Concentration
735480	Fawn Creek #1	Tritium	U	Less than the Decision Level Concentration
735481	Fawn Creek #3	Lead-212	U	Less than the Decision Level Concentration
735481	Fawn Creek #3	Tritium	U	Less than the Decision Level Concentration
735482	Cer #1 Black Sulphur	Tritium	U	Less than the Decision Level Concentration
735483	Cer #4 Black Sulphur	Tritium	U	Less than the Decision Level Concentration
735484	B-1 Equity Camp	Tritium	U	Less than the Decision Level Concentration
735485	Brennan Windmill	Tritium	U	Less than the Decision Level Concentration
735485	Brennan Windmill	Tritium, enriched	J	Less than the Determination Limit

Table 2 (continued). Data Qualifier Summary

Sample	Location	Analyte	Flag	Reason
735486	Johnson Artesian WL	Tritium	U	Less than the Decision Level Concentration
735486	Johnson Artesian WL	Tritium, enriched	U	Less than the Decision Level Concentration
735487	RB-D-01	Tritium	U	Less than the Decision Level Concentration
735488	RB-S-03	Tritium	U	Less than the Decision Level Concentration
735488	RB-S-03	Tritium, enriched	U	Less than the Decision Level Concentration
735489	RB-W-01	Lead-212	U	Less than the Decision Level Concentration
735489	RB-W-01	Tritium	U	Less than the Decision Level Concentration
735490	RB-D-03	Tritium	U	Less than the Decision Level Concentration
735490	RB-D-03	Tritium, enriched	U	Less than the Decision Level Concentration
735492	Fawn Creek #3 duplicate	Bismuth-212	U	Less than the Decision Level Concentration
735492	Fawn Creek #3 duplicate	Radium-228	U	Less than the Decision Level Concentration
735492	Fawn Creek #3 duplicate	Tritium	U	Less than the Decision Level Concentration

Sample Shipping/Receiving

The Radiation and Indoor Environments National Laboratory in Las Vegas, Nevada received 16 water samples on May 20, 2010, submitted for the determination of gamma emitting nuclides, tritium, and tritium (enrichment method). The analytical report was checked to confirm that all of the samples scheduled were received and analyzed.

Preservation and Holding Times

The sample shipment was received intact with all samples in the correct container types preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Data for this RIN were reported at Analysis Service Level B (results only) and do not include calibration data.

Radiochemical Analysis

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

Completeness

The electronic data deliverable (EDD) was the only deliverable received for this RIN.

Electronic Data Deliverable File

The EDD file arrived on October 27, 2010. 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.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 10053036 **Lab Code:** RIE **Validator:** Steve Donivan **Validation Date:** 11/24/2010

Project: Rio Blanco Site **Analysis Type:** ☐ Metals ☐ General Chem ☑ Rad ☐ Organics

# of Samples: 16 **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	
☑ Field Duplicates	There was 1 duplicate evaluated.

Sampling Quality Control Assessment

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

Sampling Protocol

Wells RB-D-01, RB-D-03, RB-S-03, and RB-W-01 were sampled using dedicated bladder pumps or a peristaltic pump with dedicated tubing. Data from these wells are qualified with a "F" flag in the database indicating the wells were purged and sampled using the low-flow sampling method. All other sample locations were domestic wells or surface water locations.

Equipment Blank Assessment

Equipment blanks are prepared and analyzed to document contamination attributable to the sample collection process. An equipment blank was not required for this sampling event.

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. A duplicate sample was collected from location Fawn Creek #3. The radiochemical relative error ratio (calculated using the one-sigma total propagated uncertainty) was less than three for all duplicates, indicating acceptable precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 10053036 **Lab Code:** RIE **Project:** Rio Blanco Site **Validation Date:** 11/24/2010

Duplicate: 2612 **Sample:** Fawn Creek #3

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Bi-212					1.98E+01		1.40E+01	1			pCi/L
Cs-137	0.00E+00	U	0.00E+00	1	0.00E+00	U	0.00E+00	1			pCi/L
H-3	1.62E+01		9.45E+01	1	-6.48E+00		9.40E+01	1		0.3	pCi/L
Ra-228					3.26E+00		4.10E+00	1			pCi/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 — 12-20-2010 (Date)

Data Validation Lead: Steve Donivan — 12-20-2010 (Date)

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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.

There were no potential outliers identified, and the data for this event are acceptable as qualified.

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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 RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Brennan Windmill WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/12/2010	N001	0	-	0	0	U		#	1.9	0
Enriched Tritium	pCi/L	05/12/2010	N001	0	-	0	6.03		J	#	3.87	2.49
Oxidation Reduction Potential	mV	05/12/2010	N001	0	-	0	150			#		
pH	s.u.	05/12/2010	N001	0	-	0	8.16			#		
Specific Conductance	umhos /cm	05/12/2010	N001	0	-	0	2230			#		
Temperature	C	05/12/2010	N001	0	-	0	8.9			#		
Tritium	pCi/L	05/12/2010	N001	0	-	0	71.3		U	#	155	95.8
Turbidity	NTU	05/12/2010	N001	0	-	0	2.75			#		

Groundwater Quality Data by Location (USEE100) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Johnson Artesian WL WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/12/2010	N001	0	-	0	0	U		#	1.7	0
Enriched Tritium	pCi/L	05/12/2010	N001	0	-	0	2.17		U	#	5.12	3.16
Oxidation Reduction Potential	mV	05/12/2010	N001	0	-	0	150			#		
pH	s.u.	05/12/2010	N001	0	-	0	8.3			#		
Specific Conductance	umhos /cm	05/12/2010	N001	0	-	0	2330			#		
Temperature	C	05/12/2010	N001	0	-	0	11.7			#		
Tritium	pCi/L	05/12/2010	N001	0	-	0	22.7		U	#	155	94.7
Turbidity	NTU	05/12/2010	N001	0	-	0	1.64			#		

Groundwater Quality Data by Location (USEE100) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: RB-D-01 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range		(Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	16628.77	-	16628.77	0	U	F	#	2.2	0
pH	s.u.	05/11/2010	N001	16628.77	-	16628.77	8.73		F	#		
Potassium-40	pCi/L	05/11/2010	N001	16628.77	-	16628.77	27.5		F	#	0	14
Specific Conductance	umhos /cm	05/11/2010	N001	16628.77	-	16628.77	29943		F	#		
Temperature	C	05/11/2010	N001	16628.77	-	16628.77	11.43		F	#		
Tritium	pCi/L	05/11/2010	N001	16628.77	-	16628.77	-22.7		UF	#	155	93.7
Turbidity	NTU	05/11/2010	N001	16628.77	-	16628.77	3.5		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: RB-D-03 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	0	-	0	0	U	F	#	2.2	0
Enriched Tritium	pCi/L	05/11/2010	N001	0	-	0	0.497		UF	#	4.46	2.72
pH	s.u.	05/11/2010	N001	0	-	0	8.87		F	#		
Specific Conductance	umhos /cm	05/11/2010	N001	0	-	0	924		F	#		
Temperature	C	05/11/2010	N001	0	-	0	9.82		F	#		
Tritium	pCi/L	05/11/2010	N001	0	-	0	-45.3		UF	#	155	93.1
Turbidity	NTU	05/11/2010	N001	0	-	0	5.42		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: RB-S-03 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range		(Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	16628.75	-	16628.75	0	U	F	#	2.2	0
Enriched Tritium	pCi/L	05/11/2010	N001	16628.75	-	16628.75	0.303		UF	#	4.54	2.76
pH	s.u.	05/11/2010	N001	16628.75	-	16628.75	8.44		F	#		
Specific Conductance	umhos /cm	05/11/2010	N001	16628.75	-	16628.75	915		F	#		
Temperature	C	05/11/2010	N001	16628.75	-	16628.75	11.04		F	#		
Tritium	pCi/L	05/11/2010	N001	16628.75	-	16628.75	42.1		UF	#	155	95.1
Turbidity	NTU	05/11/2010	N001	16628.75	-	16628.75	1.97		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: RB-W-01 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	0	-	0	0	U	F	#	2.2	0
Lead-212	pCi/L	05/11/2010	N001	0	-	0	2.95		UF	#	0	2.8
pH	s.u.	05/11/2010	N001	0	-	0	8.38		F	#		
Specific Conductance	umhos /cm	05/11/2010	N001	0	-	0	1597		F	#		
Temperature	C	05/11/2010	N001	0	-	0	10.16		F	#		
Tritium	pCi/L	05/11/2010	N001	0	-	0	-32.4		UF	#	155	93.4
Turbidity	NTU	05/11/2010	N001	0	-	0	6		F	#		

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.

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

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

Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: B-1 Equity Camp SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/12/2010	N001	0	U		#	2.1	0
Oxidation Reduction Potential	mV	05/12/2010	N001	125			#		
pH	s.u.	05/12/2010	N001	7.76			#		
Specific Conductance	umhos/cm	05/12/2010	N001	1125			#		
Temperature	C	05/12/2010	N001	8.4			#		
Tritium	pCi/L	05/12/2010	N001	25.9		U	#	155	94.8
Turbidity	NTU	05/12/2010	N001	1.51			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: CER #1 Black Sulphur SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/12/2010	N001	0	U		#	2.4	0
Oxidation Reduction Potential	mV	05/12/2010	N001	150			#		
pH	s.u.	05/12/2010	N001	7.66			#		
Specific Conductance	umhos/cm	05/12/2010	N001	1695			#		
Temperature	C	05/12/2010	N001	9.9			#		
Tritium	pCi/L	05/12/2010	N001	-32.4		U	#	155	93.4
Turbidity	NTU	05/12/2010	N001	1.66			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: CER #4 Black Sulphur SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/12/2010	N001	0	U		#	2.3	0
Oxidation Reduction Potential	mV	05/12/2010	N001	145			#		
pH	s.u.	05/12/2010	N001	7.88			#		
Specific Conductance	umhos/cm	05/12/2010	N001	1440			#		
Temperature	C	05/12/2010	N001	8.3			#		
Tritium	pCi/L	05/12/2010	N001	-6.48		U	#	155	94
Turbidity	NTU	05/12/2010	N001	1.38			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Fawn Creek #1 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/12/2010	N001	0	U		#	2.4	0
Oxidation Reduction Potential	mV	05/12/2010	N001	220			#		
pH	s.u.	05/12/2010	N001	7.48			#		
Specific Conductance	umhos/cm	05/12/2010	N001	1675			#		
Temperature	C	05/12/2010	N001	8.6			#		
Tritium	pCi/L	05/12/2010	N001	3.24		U	#	155	94.3
Turbidity	NTU	05/12/2010	N001	0.98			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Fawn Creek #3 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	0	U		#	2.4	0
Lead-212	pCi/L	05/11/2010	N001	1.55		U	#	0	2.2
Oxidation Reduction Potential	mV	05/11/2010	N001	557.3			#		
pH	s.u.	05/11/2010	N001	7.63			#		
Specific Conductance	umhos/cm	05/11/2010	N001	1415			#		
Temperature	C	05/11/2010	N001	9.65			#		
Tritium	pCi/L	05/11/2010	N001	16.2		U	#	155	94.5
Turbidity	NTU	05/11/2010	N001	2.51			#		
Bismuth-212	pCi/L	05/11/2010	N002	19.8		U	#	0	14
Cesium-137	pCi/L	05/11/2010	N002	0	U		#	1.8	0
Radium-228	pCi/L	05/11/2010	N002	3.26		U	#	0	4.1
Tritium	pCi/L	05/11/2010	N002	-6.48		U	#	155	94

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Fawn Creek 500ft Dwn SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	0	U		#	2.2	0
pH	s.u.	05/11/2010	N001	8.51			#		
Specific Conductance	umhos/cm	05/11/2010	N001	1204			#		
Temperature	C	05/11/2010	N001	11.41			#		
Tritium	pCi/L	05/11/2010	N001	13		U	#	155	94.5
Turbidity	NTU	05/11/2010	N001	17.6			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Fawn Creek 500ft Ups SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	0	U		#	2.4	0
pH	s.u.	05/11/2010	N001	8.52			#		
Specific Conductance	umhos/cm	05/11/2010	N001	1415			#		
Temperature	C	05/11/2010	N001	11.13			#		
Tritium	pCi/L	05/11/2010	N001	-9.72		U	#	155	94
Turbidity	NTU	05/11/2010	N001	9.92			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Fawn Creek 6800ft Up SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	0	U		#	2.3	0
Lead-212	pCi/L	05/11/2010	N001	2.67		U	#	0	2.7
pH	s.u.	05/11/2010	N001	8.51			#		
Specific Conductance	umhos/cm	05/11/2010	N001	1074			#		
Temperature	C	05/11/2010	N001	11.15			#		
Tritium	pCi/L	05/11/2010	N001	16.2		U	#	155	94.5
Turbidity	NTU	05/11/2010	N001	4.5			#		

Surface Water Quality Data by Location (USEE102) FOR SITE RBL01, Rio Blanco Site
REPORT DATE: 12/3/2010
Location: Fawn Creek 8400ft Dw SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cesium-137	pCi/L	05/11/2010	N001	0	U		#	2.3	0
Lead-212	pCi/L	05/11/2010	N001	2.33		U	#	0	2.6
pH	s.u.	05/11/2010	N001	8.56			#		
Specific Conductance	umhos/cm	05/11/2010	N001	1473			#		
Temperature	C	05/11/2010	N001	12.26			#		
Tritium	pCi/L	05/11/2010	N001	-38.9		U	#	155	93.3
Turbidity	NTU	05/11/2010	N001	9.8			#		

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.

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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Attachment 3
Sampling and Analysis Work Order

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Stoller established 1959

Task Order LM00-502
Control Number 10- 0507

April 5, 2010

U.S. Department of Energy
ATTN: Jack Craig
99 Research Park Road
Morgantown, WV 26505

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
May 2010 Environmental Sampling at Rio Blanco, Colorado

Reference: Task Order LM00-502-07-618-402, Rio Blanco, CO, Site

Dear Mr. Craig:

The purpose of this letter is to inform you of the upcoming sampling event at Rio Blanco, Colorado. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Rio Blanco site. Water quality data will be collected from monitoring wells, a municipal water supply well, and surface locations at this site as part of the routine environmental sampling scheduled to begin the week of May 10, 2010.

The following lists show the locations scheduled for sampling during this event.

Monitor Wells

On-site

RB-D-01 RB-D-03 RB-S-03 RB-W-01

Off-site

Johnson Artesian WL Brennan Windmill

Surface Water

On-Site

Fawn Creek 500ft Dwn Fawn Creek 500ft Ups

Off-Site

B-1 Equity Camp	CER #1 Black Sulphur	CER #4 Black Sulphur	Fawn Creek #1
Fawn Creek #3	Fawn Creek 6800ft Up	Fawn Creek 8400ft Dw	

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Notification for access to locations on private property will be conducted prior to the beginning of fieldwork.

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

Please contact me at (970) 248-6477 or Rick Findlay at (970) 248-6419 if you have any questions or concerns.

Sincerely,

Rick Hutton
Site Manager

RH/lcg/dc

Enclosures (3)

cc: (electronic)
Cheri Bahrke, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Rick Findlay, Stoller
Jack Duray, Stoller
EDD Delivery
rc-grand.junction

Sampling Frequencies for Locations at Rio Blanco, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
On-Site						
RB-D-01			X			
RB-D-03			X			
RB-S-03			X			
RB-W-01			X			
Off-Site						
Johnson Artesian WL			X			
Brennan Windmill			X			
Surface Locations						
On-Site						
Fawn Creek 500ft Dwn			X			
Fawn Creek 500ft Ups			X			
Off-Site						
B-1 Equity Camp			X			
CER #1 Black Sulphur			X			
CER #4 Black Sulphur			X			
Fawn Creek #1			X			
Fawn Creek #3			X			
Fawn Creek 6800ft Up			X			
Fawn Creek 8400ft Dw			X			

Sampling conducted in May

Constituent Sampling Breakdown

Site	Rio Blanco				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	6	9			
Field Measurements					
Alkalinity					
Dissolved Oxygen					
Redox Potential					
pH	X	X			
Specific Conductance	X	X			
Turbidity					
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride					
Chromium					
Gamma Spec	X	X	10 pCi/L	Gamma Spectrometry	GAM-A-001
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N					
Potassium					
Radium-226					
Radium-228					
Selenium					
Silica					
Tritium	X	X	400 pCi/L	Liquid Scintillation	LSC-A-001
Tritium, enriched	25% of the samples	25% of the samples	10 pCi/L	Liquid Scintillation	LMR-15
Uranium					
Vanadium					
Zinc					
Total No. of Analytes	3	3			

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

Attachment 4
Trip Report

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Stoller
established 1959
Grand Junction Office

Memorandum

Control Number N/A

DATE: May 18, 2010

TO: Rick Hutton

FROM: Jeff Price

SUBJECT: Trip Report (LTHMP Sampling)

Site: Rio Blanco, CO

Dates of Sampling Event: May 12-13, 2010

Team Members: Dan Sellers and Jeff Price.

Number of Locations Sampled: 2 on-site wells, 4 private wells, and 9 surface locations.

Locations Not Sampled/Reason: None.

Quality Control Sample Cross Reference: The following is the false identification assigned to the quality control sample:

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2612	Fawn Creek #3	Duplicate	Surface water	IGS 585

RIN Number Assigned: Samples were assigned to RIN 10053036 (EPA Lab).

Sample Shipment: Samples were shipped on May 17, 2010.

Water Level Measurements: Water levels are presented in the following table.

Site Code	Well ID	Date	Time	DTW (ft)	Comments
RBL01	RB-W-01	5/13/2009	13:40	18.13	Peristaltic.
RBL01	RB-D-03	5/13/2009	14:15	6.82	Peristaltic.
RBL01	RB-S-03	5/14/2009	14:50	39.33	Dedicated bladder pump.
RBL01	RB-D-01	5/14/2009	11:15	56.45	Dedicated bladder pump & drop tube.

DTW = Depth to Water (all measurements obtained from north top of casing)
Ft = Feet
ID = Identification

Trip Summary

Stoller personnel Dan Sellers and Jeff Price drove from the Grand Junction office to the Rio Blanco site and began sampling on May 12, 2010. Jeff Price returned on May 13 and completed the sampling.

Sample Locations

RB-D-01 (On-site well)
RB-S-03 (On-site well)
RB-D-03 (Private well)
RB-W-01 (Private well)
Johnson Artesian Well (Private well)
Brennan Windmill (Private well)
Fawn Creek 500ft Dwn (Surface Location)
Fawn Creek 500ft Ups (Surface Location)
B-1 Equity Camp (Surface Location)
CER #1 Black Sulphur (Surface Location)
CER #4 Black Sulphur (Surface Location)
Fawn Creek #1 (Surface Location)
Fawn Creek #3 (Surface Location)
Fawn Creek 6800ft Up (Surface Location)
Fawn Creek 8400ft Dw (Surface Location)

All locations were analyzed for tritium and gamma spec; a select set of locations were analyzed for enriched tritium. All samples were submitted for analysis by the EPA lab in Las Vegas. A duplicate sample was collected from spring Fawn Creek #3 (sample identified as 2612). Copies of the sample collection logs and chain of custody documentation are maintained at the Grand Junction office.

(JP/lcg)

cc: Jack Craig, DOE
Cheri Bahrke, Stoller
Steve Donivan, Stoller
Jack Duray, Stoller
Rick Findlay, Stoller
Rex Hodges, Stoller
Mark Plessinger, Stoller
EDD Delivery