

# Data Validation Package

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**January 2013**  
**Groundwater Sampling at the**  
**Gnome-Coach, New Mexico, Site**

**October 2013**



U.S. DEPARTMENT OF  
**ENERGY**

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

Potential Outliers Report

## **Attachment 2—Data Presentation**

Groundwater Quality Data  
Static Water Level Data  
Time-Concentration Graphs

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

## **Attachment 4—Trip Report**

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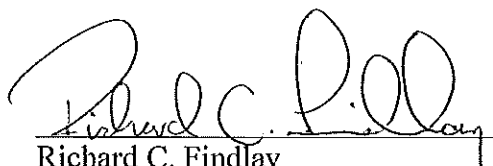
# Sampling Event Summary

**Site:** Gnome-Coach, New Mexico, Site

**Sampling Period:** January 29–30, 2013

Annual sampling was conducted January 29–30, 2013, to monitor groundwater for potential radionuclide contamination at the Gnome-Coach site in New Mexico. The sampling was performed as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated). A duplicate sample was collected from well USGS-1 and water levels were measured in all the monitoring wells onsite. Refer to the sample location map for well locations.

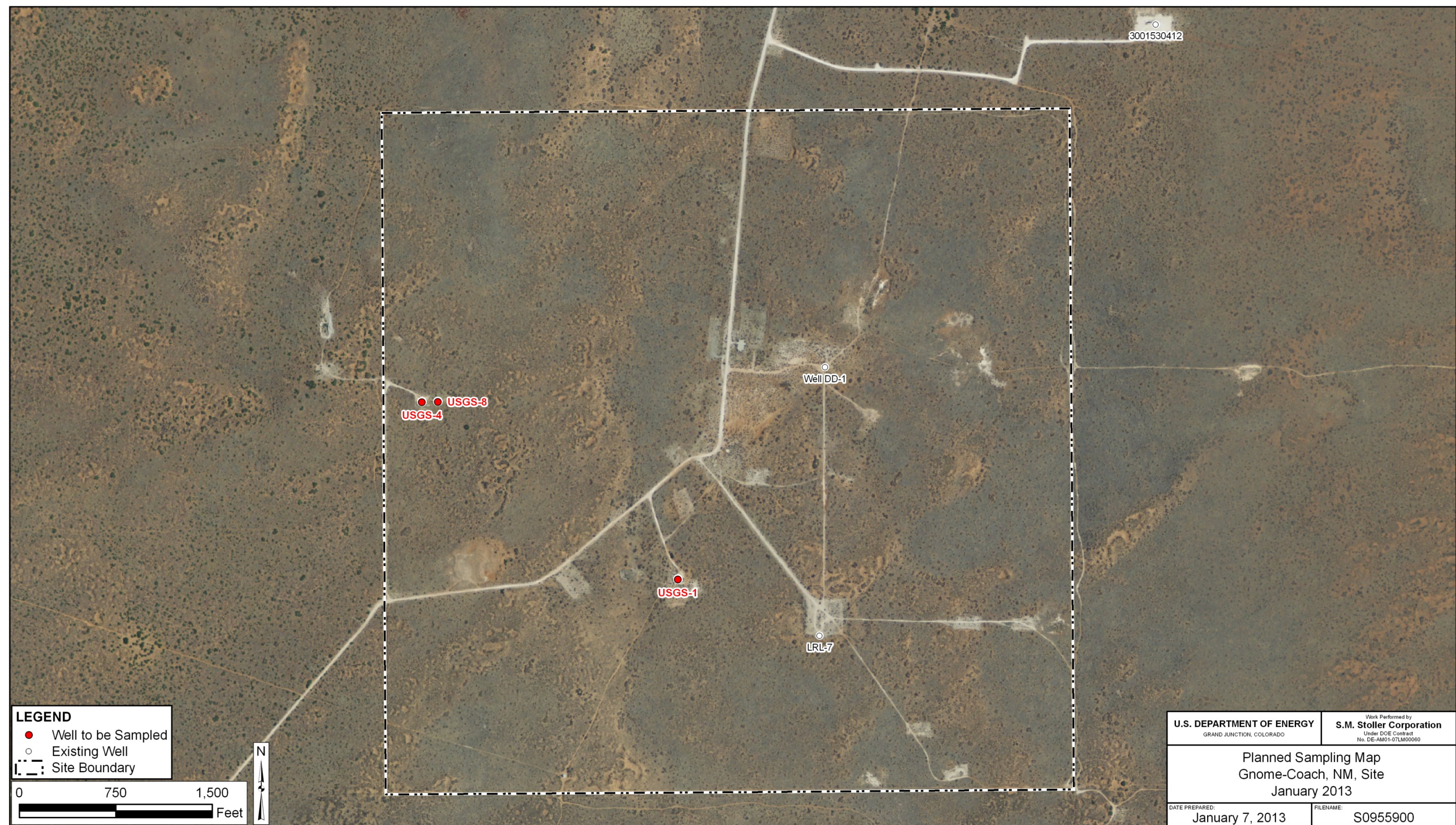
Samples were analyzed by GEL Laboratories in Charleston, South Carolina. Samples were analyzed for anions, metals, gamma-emitting radionuclides by high-resolution gamma spectrometry, strontium-90, and tritium. Additionally sample USGS-1 was analyzed for tritium using the enrichment method to achieve a lower minimum detectable concentration (MDC). Radionuclide contaminants were detected in wells USGS-4 and USGS-8. The detection of radionuclides in these wells was expected because the U.S. Geological Survey conducted a tracer test between these wells in 1963 using the dissolved radionuclides tritium, strontium-90, and cesium-137 as tracers. Radionuclide time-concentration graphs are included in this report for these wells.

  
Richard C. Findlay  
Site Lead, S.M. Stoller Corporation

10-30-2013  
Date

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*Gnome-Coach, New Mexico, Sample Location Map*



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# **Data Assessment Summary**

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## Water Sampling Field Activities Verification Checklist

<b>Project</b>	Gnome-Coach, New Mexico	<b>Date(s) of Water Sampling</b>	January 29–30, 2013
<b>Date(s) of Verification</b>	May 31, 2013	<b>Name of Verifier</b>	Stephen Donovan

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
1. Is the SAP the primary document directing field procedures?  List any Program Directives or other documents, SOPs, instructions.	Yes	Work Order letter dated January 14, 2013. Program Directive GNO-2013-01.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibration was performed on January 23, 2013.
4. Was an operational check of the field equipment conducted daily?  Did the operational checks meet criteria?	Yes Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	Yes	
7. Were the following conditions met when purging a Category I well:  Was one pump/tubing volume purged prior to sampling?  Did the water level stabilize prior to sampling? Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?  Was the flow rate less than 500 mL/min?	NA NA NA NA	Samples were collected as specified in Program Directive GNO-2013-01.

## 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	A duplicate sample was collected from well USGS-1.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA	An equipment blank was not required.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	Location ID 2443 was used for the duplicate sample.
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. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	



## Laboratory Performance Assessment

### General Information

Report Number (RIN): 13015066  
Sample Event: January 29–30, 2013  
Site(s): Gnome-Coach Site  
Laboratory: GEL Laboratories, Charleston, South Carolina  
Work Order No.: 319540, 319582  
Analysis: Metals, Wet Chemistry, Radiochemistry  
Validator: Steve Donovan  
Review Date: May 31, 2013

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/POL/S04325, continually updated) “Standard Practice for Validation of Environmental Data.” The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and 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 1.

*Table 1. Analytes and Methods*

Analyte	Line Item Code	Prep Method	Analytical Method
Bicarbonate Alkalinity	WCH-A-003	SM 2320B	SM 2320B
Chloride	MIS-A-045	EPA 300.0	EPA 300.0
Gamma Spectrometry	GAM-A-001	EPA 901.1	EPA 901.1
Metals: Ca, K, Mg, Na, SiO <sub>2</sub>	LMM-01	SW-846 3005	SW-846 6010B
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Strontium-90	GPC-A-009	EPA 905.0, Modified	EPA 905.0, Modified
Sulfate	MIS-A-045	EPA 300.0	EPA 300.0
Total Dissolved Solids	WCH-A-033	SM 2540C	SM 2540C
Tritium	LSC-A-001	EPA 906.0, Modified	EPA 906.0, Modified
Tritium, enrichment method	LMR-17	DOE EML HASL 300	DOE EML HASL 300

### 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 Number	Location	Analyte(s)	Flag	Reason
319540010	USGS-1	Potassium-40	U	Less than the decision level
319540012	USGS-8	Potassium-40	U	Less than the decision level

### Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received four water samples on February 4, 2013, accompanied by a Chain of Custody (COC) form. The cooler containing the metals and radiochemistry aliquots arrived on February 1, 2013. The air waybill numbers were listed on the Sample Receipt and Review 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 COC form was complete with no errors or omissions.

### Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 2 °C, which complies with requirements. The samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

### Detection and Quantitation Limits

The method detection limit (MDL) was reported for all metal and wet chemical analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

For radiochemical analytes (those measured by radiometric counting) the MDL and PQL are not applicable, and these results are evaluated using the MDC, Decision Level Concentration (DLC), and Determination Limit (DL). The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a “U” flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as 3 times the MDC. Results not previously “U” qualified that are less than the DL are qualified with a “J” flag as estimated values.

The reported MDCs for radiochemical analytes demonstrate compliance with contractual requirements.

### 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. Calibration and laboratory spike standards were prepared from independent sources.

#### *Method EPA 300.0, Chloride and Sulfate Spectrometry*

Calibrations were performed using six calibration standards on January 22, 2013. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration check results within the acceptance criteria. A reporting limit verification check was made to verify the linearity of the calibration curve near the PQL and all results were acceptable.

#### *Method EPA 353.2, Nitrate + Nitrite as N*

Calibrations were performed on February 12, 2013, using five calibration standards. The absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. A reporting limit verification check was made to verify the linearity of the calibration curve near the PQL and all results were acceptable.

#### *Method SW-846 6010B, Metals*

Calibrations were performed on February 6 and 8, 2013, using three standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL. The reporting limit check result met the acceptance criteria.

### Radiochemical Analysis

#### *Gamma Spectrometry*

Annual calibration of the detectors used to analyze these samples was performed between June and August 2012. Daily calibration checks were performed on February 10 and 18, 2013.

#### *Tritium*

The tritium quench calibration curve was generated on July 30, 2012, for quench numbers ranging from 131 to 359. Sample quench values were within the calibration range for all samples. Daily calibration checks were performed on March 21 and April 4, 2013.

#### *Strontium-90*

Annual calibration of the detectors used to analyze these samples was performed on March 1, 2013. Daily calibration checks were performed on April 26 and May 2, 2013.

### 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. The radiochemistry method blank results were less than the DLC.

### Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples were analyzed at the required frequency to verify the instrumental interference and background correction factors. All check sample results met the acceptance criteria.

### 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 50 times the MDL. The serial dilution data met the acceptance criteria.

### Matrix Spike Analysis

Matrix spike (MS) samples are used to measure method performance in the sample matrix. The MS data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated.

### Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative error ratio for radiochemical replicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, 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.

### Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDLs or MDCs for all analytes and all required supporting documentation.

### Electronic Data Deliverable (EDD) File

The EDD file arrived on May 13, 2013. 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.



### Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter (meq/L). Table 3 shows the total anion and cation results in groundwater samples from this event and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference of 10 percent is considered acceptable.

*Table 3. Comparison of Major Anions and Cations in Groundwater Samples*

<b>Location</b>	<b>Cations (meq/L)</b>	<b>Anions (meq/L)</b>	<b>Charge Balance (%)</b>
USGS-1	55.5	57.0	1.4
USGS-4	69.8	71.3	1.1
USGS-8	72.3	69.9	1.7

The charge balance differences for all wells were below 10 percent.

## SAMPLE MANAGEMENT SYSTEM

### General Data Validation Report

RIN: 13015066 Lab Code: GEN Validator: Stephen Donovan Validation Date: 05/31/2013  
Project: Gnome-Coach Site Analysis Type: ☒ Metals ☒ General Chem ☒ Rad ☐ Organics  
# of Samples: 4 Matrix: Water Requested Analysis Completed: Yes

#### Chain of Custody

Present: OK Signed: OK Dated: OK

#### Sample

Integrity: OK Preservation: OK Temperature: OK

#### Select Quality Parameters

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

All analyses were completed within the applicable holding times.

There are 0 detection limit failures.

There were 4 duplicates evaluated.

# SAMPLE MANAGEMENT SYSTEM

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## Metals Data Validation Worksheet

RIN: 13015066

Lab Code: GEN

Date Due: 05/05/2013

Matrix: Water

Site Code: GNO01

Date Completed: 05/13/2013

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Calcium	ICP/ES	02/08/2013	0.0000	1.0000	OK	OK	OK	99.5			2.0		0.1	106.0
Magnesium	ICP/ES	02/06/2013	0.0000	1.0000	OK	OK	OK	99.0	92.0		0.0	94.0	1.9	105.0
Potassium	ICP/ES	02/06/2013	0.0000	1.0000	OK	OK	OK	99.5	93.5		2.0	109.0	4.9	111.0
Silica	ICP/ES	02/06/2013	0.0000	1.0000	OK	OK	OK	95.8	95.4		0.0	102.0	2.6	102.0
Sodium	ICP/ES	02/08/2013	0.0000	1.0000	OK	OK	OK	103.0			1.0		0.9	88.0

# SAMPLE MANAGEMENT SYSTEM

## Radiochemistry Data Validation Worksheet

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**RIN:** 13015066      **Lab Code:** GEN      **Date Due:** 05/05/2013  
**Matrix:** Water      **Site Code:** GNO01      **Date Completed:** 05/13/2013

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
USGS-1	Actinium-228	02/10/2013						0.20
USGS-1	Americium-241	02/10/2013						1.21
Blank_Spike	Americium-241	02/11/2013				96.90		
USGS-1	Antimony-125	02/10/2013						0.89
USGS-1	Cerium-144	02/10/2013						1.97
Blank_Spike	Cerium-144	02/11/2013						
USGS-1	Cesium-134	02/10/2013						0.85
USGS-1	Cesium-137	02/10/2013						2.15
Blank_Spike	Cesium-137	02/11/2013				106.00		
USGS-1	Cobalt-60	02/10/2013						0.44
Blank_Spike	Cobalt-60	02/11/2013				98.10		
USGS-1	Europium-152	02/10/2013						1.66
USGS-1	Europium-154	02/10/2013						0.74
Blank_Spike	Europium-154	02/11/2013						
USGS-1	Europium-155	02/10/2013						2.41
USGS-1	Lead-212	02/10/2013						0.57
Blank_Spike	Lead-212	02/11/2013						
USGS-1	Potassium-40	02/10/2013						1.02
USGS-1	Promethium-144	02/10/2013						1.30
Blank_Spike	Promethium-144	02/11/2013						
USGS-1	Promethium-146	02/10/2013						1.14
USGS-1	Ruthenium-106	02/10/2013						0.57
Blank_Spike	Ruthenium-106	02/11/2013						
USGS-1	Strontium-90	04/26/2013			80.0			
2443	Strontium-90	04/26/2013			90.0			2.28
Blank_Spike	Strontium-90	04/26/2013			88.0	101.00		
2443	Strontium-90	04/26/2013			97.0		88.2	
2443	Strontium-90	04/27/2013			76.0			
Blank	Strontium-90	04/27/2013	-0.0400	U	87.0			
USGS-4	Strontium-90	05/02/2013			73.0			
USGS-8	Strontium-90	05/02/2013			77.0			
USGS-1	Thorium-234	02/10/2013						0.53



# SAMPLE MANAGEMENT SYSTEM

## Radiochemistry Data Validation Worksheet

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**RIN:** 13015066      **Lab Code:** GEN      **Date Due:** 05/05/2013  
**Matrix:** Water      **Site Code:** GNO01      **Date Completed:** 05/13/2013

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
2443	Tritium	03/21/2013						1.63
Blank	Tritium	03/21/2013	145.0000	U				
2443	Tritium	03/21/2013					94.7	
Blank_Spike	Tritium	03/21/2013				99.30		
Blank_Spike	Tritium	04/03/2013			69.0	96.20		
USGS-1	Tritium	04/04/2013			69.0			
Blank	Tritium	04/04/2013			69.0			
USGS-1	Uranium-235	02/10/2013						0.87
Blank_Spike	Uranium-235	02/11/2013						
USGS-1	Uranium-238	02/10/2013						0.53
USGS-1	Yttrium-88	02/10/2013						0.43
Blank_Spike	Yttrium-88	02/11/2013						

# SAMPLE MANAGEMENT SYSTEM

## Wet Chemistry Data Validation Worksheet

**RIN:** 13015066      **Lab Code:** GEN      **Date Due:** 05/05/2013  
**Matrix:** Water      **Site Code:** GNO01      **Date Completed:** 05/13/2013

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
ALKALINITY, Total as CaCO3	02/07/2013						104.00				
ALKALINITY, Total as CaCO3	02/13/2013						106.00	89.9			
Bicarbonate alkalinity (CaCO3)	02/07/2013									1.00	
Bicarbonate alkalinity (CaCO3)	02/13/2013									2.00	
Chloride	02/19/2013	0.000	0.9996	OK	OK	OK	95.90				
Chloride	02/19/2013						95.60				
NO2+NO3 as N	02/12/2013	0.000	1.0000	OK	OK	OK	97.30	97.1		1.00	
Sulfate	02/19/2013	0.000	0.9999	OK	OK	OK	98.00				
Sulfate	02/19/2013						98.10				
Total Dissolved Solids	02/05/2013					OK	98.10			0	

## **Sampling Quality Control Assessment**

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

### Sampling Protocol

Wells USGS-4 and USGS-8 were sampled using dedicated bladder pumps. Data from these wells are qualified with an “F” flag in the database indicating the well was purged and sampled using the low-flow sampling method, and with a “Q” because these are Category II wells. Well USGS-1 was sampled with a high flow dedicated submersible pump. The data from this well were not qualified.

### Equipment Blank Assessment

An equipment blank was not required

### 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 USGS-1. For non-radiochemical measurements, the relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results less than 5 times the PQL, the range should be no greater than the PQL. For radiochemical measurements, the relative error ratio (the ratio of the absolute difference between the sample and duplicate results and the sum of the 1-sigma uncertainties) is used to evaluate duplicate results and should be less than 3. All duplicate results met these criteria demonstrating acceptable precision.

# SAMPLE MANAGEMENT SYSTEM

## Validation Report: Field Duplicates

Page 1 of 1

RIN: 13015066    Lab Code: GEN    Project: Gnome-Coach Site    Validation Date: 05/31/2013

Duplicate: 2443

Sample: USGS-1

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Actinium-228	-1.01	U	15.1	1.00	6.34	U	13.2	1.00		0.7	pCi/L
Americium-241	-7.67	U	26.0	1.00	-16.6	U	31.2	1.00		0.4	pCi/L
Antimony-125	3.73	U	8.74	1.00	1.46	U	7.89	1.00		0.4	pCi/L
Bicarbonate alkalinity (CaCO3)	84.7			1.00	85.7			1.00	1.17		mg/L
Calcium	592000			10.00	603000			10.00	1.84		ug/L
Cerium-144	-14	U	26.3	1.00	-11.4	U	21.6	1.00		0.1	pCi/L
Cesium-134	-1.43	U	3.52	1.00	0.423	U	2.42	1.00		0.9	pCi/L
Cesium-137	-1.35	U	2.67	1.00	-2.57	U	4.20	1.00		0.5	pCi/L
Chloride	501			100.00	511			100.00	1.98		mg/L
Cobalt-60	1.47	U	3.80	1.00	-2.08	U	3.52	1.00		1.3	pCi/L
Europium-152	-3.13	U	10.8	1.00	-2.39	U	8.79	1.00		0.1	pCi/L
Europium-154	8.00	U	10.2	1.00	0.160	U	6.36	1.00		1.3	pCi/L
Europium-155	14.0	U	13.8	1.00	-8.05	U	12.6	1.00		2.3	pCi/L
Lead-212	6.16	U	8.07	1.00	6.40	U	9.14	1.00		0	pCi/L
Magnesium	122000			1.00	124000			1.00	1.63		ug/L
NO2+NO3 as N	4.66			5.00	4.84			5.00	3.79		mg/L
Potassium	10700			1.00	11200			1.00	4.57		ug/L
Potassium-40	0.00	UI	42.1	1.00	-32.6	U	40.7	1.00		1.1	pCi/L
Promethium-144	0.115	U	2.37	1.00	-1.01	U	2.55	1.00		0.6	pCi/L
Promethium-146	-2.48	U	4.25	1.00	3.44	U	4.44	1.00		1.9	pCi/L
Ruthenium-106	-7.35	U	29.2	1.00	6.05	U	28.1	1.00		0.6	pCi/L
Silica	34100			1.00	34400			1.00	0.88		ug/L
Sodium	395000			10.00	402000			10.00	1.76		ug/L
Strontium-90	-0.261	U	0.436	1.00	-0.315	U	0.314	1.00		0.2	pCi/L
Sulfate	1890			100.00	1930			100.00	2.09		mg/L
Thorium-234	126	U	344	1.00	108	U	253	1.00		0.1	pCi/L
Total Dissolved Solids	3900			1.00	3860			1.00	1.03		mg/L
Tritium	-92.7	U	205	1.00	151	U	220	1.00		1.6	pCi/L
Uranium-235	-17	U	25.4	1.00	-8.74	U	23.1	1.00		0.5	pCi/L
Uranium-238	126	U	344	1.00	108	U	253	1.00		0.1	pCi/L
Yttrium-88	-0.768	U	3.91	1.00	-1.88	U	3.78	1.00		0.4	pCi/L



### Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the 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:

Stephen Donovan 11-4-2013  
Stephen Donovan

Data Validation Lead:

Stephen Donovan 11-4-2013  
Stephen Donovan

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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 environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

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 GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-1 WELL

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	01/29/2013	N001	-1.01	U		#	27.8	15.1
Actinium-228	pCi/L	01/29/2013	N002	6.34	U		#	24.8	13.2
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	mg/L	01/29/2013	N001	84.7			#	0.725	
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	mg/L	01/29/2013	N002	85.7			#	0.725	
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/29/2013	N001	63			#		
Americium-241	pCi/L	01/29/2013	N001	-7.67	U		#	40	26
Americium-241	pCi/L	01/29/2013	N002	-16.6	U		#	52.9	31.2
Antimony-125	pCi/L	01/29/2013	N001	3.73	U		#	14.8	8.74
Antimony-125	pCi/L	01/29/2013	N002	1.46	U		#	14.8	7.89
Calcium	mg/L	01/29/2013	N001	592			#	0.5	
Calcium	mg/L	01/29/2013	N002	603			#	0.5	
Cerium-144	pCi/L	01/29/2013	N001	-14	U		#	37	26.3
Cerium-144	pCi/L	01/29/2013	N002	-11.4	U		#	35.5	21.6
Cesium-134	pCi/L	01/29/2013	N001	-1.43	U		#	6.18	3.52
Cesium-134	pCi/L	01/29/2013	N002	0.423	U		#	4.97	2.42
Cesium-137	pCi/L	01/29/2013	N001	-1.35	U		#	4.68	2.67
Cesium-137	pCi/L	01/29/2013	N002	-2.57	U		#	5.97	4.2
Chloride	mg/L	01/29/2013	N001	501			#	6.7	

**Groundwater Quality Data by Location (USEE100) FOR SITE GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-1 WELL

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Chloride	mg/L	01/29/2013	N002	511			#	6.7	
Cobalt-60	pCi/L	01/29/2013	N001	1.47	U		#	7.76	3.8
Cobalt-60	pCi/L	01/29/2013	N002	-2.08	U		#	6.05	3.52
Dissolved Oxygen	mg/L	01/29/2013	N001	1.29			#		
Enriched Tritium	pCi/L	01/29/2013	N001	1.9	U		#	2.18	1.51
Europium-152	pCi/L	01/29/2013	N001	-3.13	U		#	16.5	10.8
Europium-152	pCi/L	01/29/2013	N002	-2.39	U		#	15.7	8.79
Europium-154	pCi/L	01/29/2013	N001	8	U		#	21.3	10.2
Europium-154	pCi/L	01/29/2013	N002	0.16	U		#	13.7	6.36
Europium-155	pCi/L	01/29/2013	N001	14	U		#	21.1	13.8
Europium-155	pCi/L	01/29/2013	N002	-8.05	U		#	20.4	12.6
Lead-212	pCi/L	01/29/2013	N001	6.16	U		#	10.5	8.07
Lead-212	pCi/L	01/29/2013	N002	6.4	U		#	8.23	9.14
Magnesium	mg/L	01/29/2013	N001	122			#	0.11	
Magnesium	mg/L	01/29/2013	N002	124			#	0.11	
Nitrate + Nitrite as Nitrogen	mg/L	01/29/2013	N001	4.66			#	0.085	
Nitrate + Nitrite as Nitrogen	mg/L	01/29/2013	N002	4.84			#	0.085	
Oxidation Reduction Potential	mV	01/29/2013	N001	45			#		

**Groundwater Quality Data by Location (USEE100) FOR SITE GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-1 WELL

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	01/29/2013	N001	7.06			#		
Potassium	mg/L	01/29/2013	N001	10.7			#	0.05	
Potassium	mg/L	01/29/2013	N002	11.2			#	0.05	
Potassium-40	pCi/L	01/29/2013	N001	0	UI		#	34.2	42.1
Potassium-40	pCi/L	01/29/2013	N002	-32.6	U		#	72.8	40.7
Promethium-144	pCi/L	01/29/2013	N001	0.115	U		#	4.14	2.37
Promethium-144	pCi/L	01/29/2013	N002	-1.01	U		#	4.61	2.55
Promethium-146	pCi/L	01/29/2013	N001	-2.48	U		#	6.59	4.25
Promethium-146	pCi/L	01/29/2013	N002	3.44	U		#	8.18	4.44
Ruthenium-106	pCi/L	01/29/2013	N001	-7.35	U		#	48.4	29.2
Ruthenium-106	pCi/L	01/29/2013	N002	6.05	U		#	52.4	28.1
Silica	mg/L	01/29/2013	N001	34.1			#	0.053	
Silica	mg/L	01/29/2013	N002	34.4			#	0.053	
Sodium	mg/L	01/29/2013	N001	395			#	1	
Sodium	mg/L	01/29/2013	N002	402			#	1	
Specific Conductance	umhos /cm	01/29/2013	N001	4570			#		
Strontium-90	pCi/L	01/29/2013	N001	-.261	U		#	0.909	0.436
Strontium-90	pCi/L	01/29/2013	N002	-.315	U		#	0.716	0.314

**Groundwater Quality Data by Location (USEE100) FOR SITE GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-1 WELL

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Sulfate	mg/L	01/29/2013	N001	1890			#	13.3	
Sulfate	mg/L	01/29/2013	N002	1930			#	13.3	
Temperature	C	01/29/2013	N001	19.8			#		
Thorium-234	pCi/L	01/29/2013	N001	126	U		#	358	344
Thorium-234	pCi/L	01/29/2013	N002	108	U		#	442	253
Total Dissolved Solids	mg/L	01/29/2013	N001	3900			#	3.4	
Total Dissolved Solids	mg/L	01/29/2013	N002	3860			#	3.4	
Tritium	pCi/L	01/29/2013	N001	-92.7	U		#	371	205
Tritium	pCi/L	01/29/2013	N002	151	U		#	371	220
Turbidity	NTU	01/29/2013	N001	2.39			#		
Uranium-235	pCi/L	01/29/2013	N001	-17	U		#	33.9	25.4
Uranium-235	pCi/L	01/29/2013	N002	-8.74	U		#	34.1	23.1
Uranium-238	pCi/L	01/29/2013	N001	126	U		#	358	344
Uranium-238	pCi/L	01/29/2013	N002	108	U		#	442	253
Yttrium-88	pCi/L	01/29/2013	N001	-.768	U		#	7.42	3.91
Yttrium-88	pCi/L	01/29/2013	N002	-1.88	U		#	6.54	3.78



**Groundwater Quality Data by Location (USEE100) FOR SITE GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-4 WELL

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Actinium-228	pCi/L	01/30/2013	0001	-3.27	U	FQ	#	25.8	14.5
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	mg/L	01/30/2013	0001	53.3		FQ	#	0.725	
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/30/2013	0001	82		FQ	#		
Americium-241	pCi/L	01/30/2013	0001	5.09	U	FQ	#	42.3	25.5
Antimony-125	pCi/L	01/30/2013	0001	-2.99	U	FQ	#	15.1	8.79
Calcium	mg/L	01/30/2013	0001	620		FQ	#	0.5	
Cerium-144	pCi/L	01/30/2013	0001	6.4	U	FQ	#	43	24.5
Cesium-134	pCi/L	01/30/2013	0001	2.06	U	FQ	#	7.5	4.53
Cesium-137	pCi/L	01/30/2013	0001	-.831	U	FQ	#	5.33	2.95
Chloride	mg/L	01/30/2013	0001	998		FQ	#	6.7	
Cobalt-60	pCi/L	01/30/2013	0001	0.422	U	FQ	#	6.98	3.59
Dissolved Oxygen	mg/L	01/30/2013	N001	0.31		FQ	#		
Europium-152	pCi/L	01/30/2013	0001	-2.88	U	FQ	#	17.1	9.79
Europium-154	pCi/L	01/30/2013	0001	1.41	U	FQ	#	18.1	9.07
Europium-155	pCi/L	01/30/2013	0001	-7.16	U	FQ	#	24.6	15.2
Lead-212	pCi/L	01/30/2013	0001	6.06	U	FQ	#	12.5	8.4
Magnesium	mg/L	01/30/2013	0001	134		FQ	#	0.11	
Nitrate + Nitrite as Nitrogen	mg/L	01/30/2013	0001	0.0204	J	FQ	#	0.017	
Oxidation Reduction Potential	mV	01/30/2013	N001	-15		FQ	#		
pH	s.u.	01/30/2013	N001	6.7		FQ	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-4 WELL

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Potassium	mg/L	01/30/2013	0001	16.2		FQ	#	0.05	
Potassium-40	pCi/L	01/30/2013	0001	-6.52	U	FQ	#	91.4	44.2
Promethium-144	pCi/L	01/30/2013	0001	-1.94	U	FQ	#	5.41	3.27
Promethium-146	pCi/L	01/30/2013	0001	0.329	U	FQ	#	7.6	4.22
Ruthenium-106	pCi/L	01/30/2013	0001	12.3	U	FQ	#	59	30.9
Silica	mg/L	01/30/2013	0001	18.3		FQ	#	0.053	
Sodium	mg/L	01/30/2013	0001	665		FQ	#	1	
Specific Conductance	umhos /cm	01/30/2013	N001	5900		FQ	#		
Strontium-90	pCi/L	01/30/2013	0001	987		FQ	#	1.54	166
Sulfate	mg/L	01/30/2013	0001	1950		FQ	#	13.3	
Temperature	C	01/30/2013	N001	19.6		FQ	#		
Thorium-234	pCi/L	01/30/2013	0001	25	U	FQ	#	426	321
Total Dissolved Solids	mg/L	01/30/2013	0001	4600		FQ	#	3.4	
Tritium	pCi/L	01/30/2013	0001	10200		FQ	#	367	2040
Turbidity	NTU	01/30/2013	N001	30.2		FQ	#		
Uranium-235	pCi/L	01/30/2013	0001	-15.3	U	FQ	#	43.2	26.8
Uranium-238	pCi/L	01/30/2013	0001	25	U	FQ	#	426	321
Yttrium-88	pCi/L	01/30/2013	0001	2.72	U	FQ	#	8.34	3.84

**Groundwater Quality Data by Location (USEE100) FOR SITE GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-8 WELL

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Actinium-228	pCi/L	01/29/2013	N001	9.88	U	FQ	#	23.6	12.8
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	mg/L	01/29/2013	N001	34.5		FQ	#	0.725	
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/29/2013	N001	31		FQ	#		
Americium-241	pCi/L	01/29/2013	N001	-5.29	U	FQ	#	57.3	31.9
Antimony-125	pCi/L	01/29/2013	N001	-2	U	FQ	#	16.9	9.5
Calcium	mg/L	01/29/2013	N001	592		FQ	#	0.5	
Cerium-144	pCi/L	01/29/2013	N001	13.2	U	FQ	#	44.6	25.5
Cesium-134	pCi/L	01/29/2013	N001	0.563	U	FQ	#	5.63	3.12
Cesium-137	pCi/L	01/29/2013	N001	174		FQ	#	5.18	21.2
Chloride	mg/L	01/29/2013	N001	1040		FQ	#	6.7	
Cobalt-60	pCi/L	01/29/2013	N001	-1.9	U	FQ	#	4.74	2.84
Dissolved Oxygen	mg/L	01/29/2013	N001	0.38		FQ	#		
Europium-152	pCi/L	01/29/2013	N001	7.75	U	FQ	#	19.3	10.6
Europium-154	pCi/L	01/29/2013	N001	-.141	U	FQ	#	15.1	7.27
Europium-155	pCi/L	01/29/2013	N001	2.79	U	FQ	#	25.6	14.4
Lead-212	pCi/L	01/29/2013	N001	7.66	U	FQ	#	13	8.13
Magnesium	mg/L	01/29/2013	N001	96.8		FQ	#	0.11	
Nitrate + Nitrite as Nitrogen	mg/L	01/29/2013	N001	0.017	U	FQ	#	0.017	
Oxidation Reduction Potential	mV	01/29/2013	N001	25		FQ	#		
pH	s.u.	01/29/2013	N001	7.35		FQ	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE GNO01, Gnome-Coach Site**

REPORT DATE: 10/04/2013

Location: USGS-8 WELL

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Potassium	mg/L	01/29/2013	N001	16.7		FQ	#	0.05	
Potassium-40	pCi/L	01/29/2013	N001	62.9		UFQ	#	50.2	42.1
Promethium-144	pCi/L	01/29/2013	N001	0.0618	U	FQ	#	5.1	2.88
Promethium-146	pCi/L	01/29/2013	N001	0.0393	U	FQ	#	8.61	4.77
Ruthenium-106	pCi/L	01/29/2013	N001	-6.81	U	FQ	#	48	27.4
Silica	mg/L	01/29/2013	N001	3.62		FQ	#	0.053	
Sodium	mg/L	01/29/2013	N001	735		FQ	#	1	
Specific Conductance	umhos /cm	01/29/2013	N001	5865		FQ	#		
Strontium-90	pCi/L	01/29/2013	N001	1580		FQ	#	1.08	249
Sulfate	mg/L	01/29/2013	N001	2030		FQ	#	13.3	
Temperature	C	01/29/2013	N001	18.9		FQ	#		
Thorium-234	pCi/L	01/29/2013	N001	-36.8	U	FQ	#	494	281
Total Dissolved Solids	mg/L	01/29/2013	N001	4610		FQ	#	3.4	
Tritium	pCi/L	01/29/2013	N001	20900		FQ	#	374	4120
Turbidity	NTU	01/29/2013	N001	2.39		FQ	#		
Uranium-235	pCi/L	01/29/2013	N001	-11.8	U	FQ	#	40.5	24.9
Uranium-238	pCi/L	01/29/2013	N001	-36.8	U	FQ	#	494	281
Yttrium-88	pCi/L	01/29/2013	N001	-.617	U	FQ	#	6.66	3.38

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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## **Static Water Level Data**

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**STATIC WATER LEVELS (USEE700) FOR SITE GNO01, Gnome-Coach Site**  
**REPORT DATE: 10/04/2013**

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
USGS-1		3425.78	01/29/2013	10:00:12	NA	NA	F
USGS-4		3415.25	01/30/2013	13:10:55	425.31	2989.94	
USGS-8		3412.96	01/29/2013	14:30:30	417.88	2995.08	

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 B Below top of pump

### Water Level Measurements

Site Code	Well ID	Date	DTW (ft)	Comments
GNO01	USGS-4	1/30/13	425.31	Installed second access tube for bladder pump.
GNO01	USGS-8	1/29/13	417.88	
GNO01	USGS-8	1/30/13	418.21	
GNO01	LRL-7	1/29/13	465.22	
GNO01	LRL-7	1/30/13	465.22	
GNO01	USGS-1	1/30/13	435.00	Pump running – modified measuring point
GNO01	DD-1	1/29/13	1013.82	
GNO01	DD-1	1/30/13	1014.12	

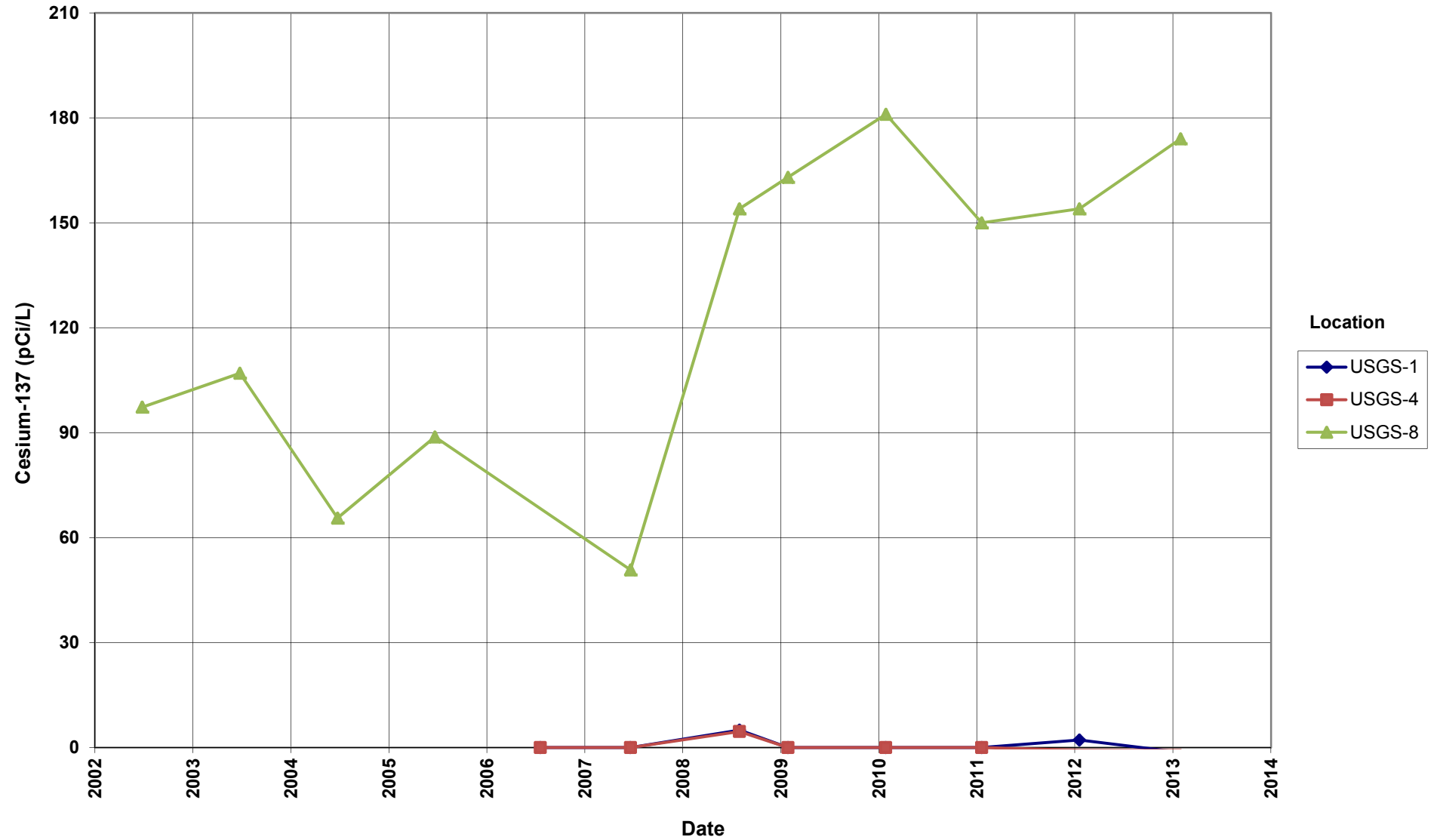
DTW = Depth to Water (all measurements obtained from north top of casing)  
ft = Feet  
ID = Identification

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## **Time-Concentration Graphs**

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# Gnome-Coach Site Cesium-137 Concentration



# Gnome-Coach Site Strontium-90 Concentration



# Gnome-Coach Site Tritium Concentration



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# **Attachment 3**

## **Sampling and Analysis Work Order**

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established 1959

Task Order LM00-502  
Control Number 13-0234

January 14, 2013

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)  
January 2013 Environmental Sampling at the Gnome-Coach, New Mexico Site

REFERENCE: Task Order LM-502-07-617, Gnome-Coach, New Mexico, Site

Dear Ms. Dayvault:

The purpose of this letter is to inform you of the upcoming sampling event at the Gnome-Coach, New Mexico, site. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring. Water quality data will be collected from monitoring wells at this site as part of the routine environmental sampling currently scheduled to begin the week of January 28, 2013.

The following list shows the monitoring wells scheduled to be sampled during this event.

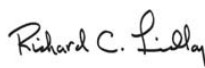
**Monitoring Wells**

USGS-1      USGS-4      USGS-8

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Well and property owners have been notified of the scheduled sampling event.

If you have any questions, please call me at 970-248-6419.

Sincerely,

 Rick C Findlay  
2013.01.14 13:13:08  
-0700'

Rick Findlay  
Site Lead

RF/lcg/dc

Jalena Dayvault  
Control Number 13-0234  
Page 2

Enclosures (3)

cc: (electronic)  
Karl Stoeckle, DOE  
Steve Donovan, Stoller  
Rick Findlay, Stoller  
Bev Gallagher, Stoller  
Lauren Goodknight, Stoller  
EDD Delivery  
rc-grand.junction  
File: GNO 410.02(A)

### Sampling Frequencies for Locations at Gnome-Coach, New Mexico

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
<b><i>Monitoring Wells</i></b>						
LRL-7					X	Bladder pump; not sampled per R. Findlay, 1/11/12
USGS-1			X			Electric pump; add a sample port to the plumbing
USGS-4			X			Bladder pump
USGS-8			X			Bladder pump

Annual sampling conducted in January

### Constituent Sampling Breakdown

Site	Gnome-Coach		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water			
Approx. No. Samples/yr	3	0			
<b>Field Measurements</b>					
Alkalinity	X				
Dissolved Oxygen	X				
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
<b>Laboratory Measurements</b>					
Alkalinity (bicarbonate)	X		10	SM 2320B	WCH-A-003
Aluminum					
Ammonia as N (NH <sub>3</sub> -N)					
Calcium	X		5	SW-846 6010	LMM-01
Chloride	X		0.5	SW-846 9056	MIS-A-039
Chromium					
Gamma Spec	X		10 pCi/L	Gamma Spectrometry	GAM-A-001
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium	X		5	SW-846 6010	LMM-01
Manganese					
Molybdenum					
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO <sub>3</sub> +NO <sub>2</sub> )-N	X		0.05	EPA 353.1	WCH-A-022
Potassium	X		5	SW-846 6010	LMM-01
Radium-226					
Radium-228					
Selenium					
Silica	X		0.2	SW-846 6010	LMM-01
Sodium	X		5	SW-846 6010	LMM-01
Strontium-90	X		1 pCi/L	Gas Proportional Counter	GPC-A-009
Sulfate	X		0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	X		10	SM2540 C	WCH-A-033
Total Organic Carbon					
Tritium	X		400 pCi/L	Liquid Scintillation	LSC-A-001
Enriched Tritium	USGS-1 only		10 pCi/L	Liquid Scintillation	LMR-15
Uranium					
Vanadium					
Zinc					
<b>Total No. of Analytes</b>	13	0			

Note: 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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*Memorandum*

Control Number N/A

DATE: February 6, 2013  
TO: Rick Findlay  
FROM: Jeff Price  
SUBJECT: Trip Report (LTHMP Sampling)

**Site:** Gnome/Coach, NM

**Dates of Sampling Event:** January 28-31, 2013

**Team Members:** David Atkinson and Jeff Price.

**Number of Locations Sampled/Analysis:** Samples collected from 3 onsite monitoring wells will be analyzed for gamma spectrometry, tritium, enriched tritium (USGS-1 only), strontium-90, NO<sub>2</sub>NO<sub>3</sub>-N, a select set of cations and metals, and a select set of anions, alkalinity, and total dissolved solids. Samples were collected and monitoring well purge water was contained as specified in the program directive.

**Locations Not Sampled/Reason:** LRL-7 was not sampled per instruction of site lead.

**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
2443	USGS-1	Duplicate	Groundwater	LCR 567

**RIN Number Assigned:** RIN 13015066.

**Sample Shipment:** Samples were shipped to GEL Laboratories on January 31, 2013.

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

Site Code	Well ID	Date	DTW (ft)	Comments
GNO01	USGS-4	1/30/13	425.31	Installed second access tube for bladder pump.
GNO01	USGS-8	1/29/13	417.88	
GNO01	USGS-8	1/30/13	418.21	
GNO01	LRL-7	1/29/13	465.22	
GNO01	LRL-7	1/30/13	465.22	
GNO01	USGS-1	1/30/13	435.00	Pump running – modified measuring point
GNO01	DD-1	1/29/13	1013.82	
GNO01	DD-1	1/30/13	1014.12	

DTW = Depth to Water (all measurements obtained from north top of casing)

ft = Feet

ID = Identification

**Site Specific Information:** Another schedule 80 PVC two inch access tube was installed in USGS-4 to a depth of 500 feet (blank casing to 480 with 20 feet of screen). The water level access tube in USGS-1 (2-inch schedule 40 PVC), which had been broken at the surface and had fallen about 60 feet into the well, was recovered by Gene Kincade. The recovered PVC was reinstalled after removing the top 17 feet of PVC. The water access tube is now set at a depth of approximately 483 feet bgs and a new none vented transducer with barometer were installed in the water level access tube on stainless steel wire. Pyeatt was onsite to survey water level measuring point (or top of casing) elevations for the wells USGS-1, USGS-4, USGS-8, and LRL-7 because of recent well head modifications.

cc: (electronic)  
Jalena Dayvault, DOE  
Steve Donovan, Stoller  
EDD Delivery