

Data Validation Package

July 2010
Natural Gas and
Produced Water Sampling
at the Gasbuggy, New Mexico, Site

January 2011



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

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Sampling Event Summary

Site: Gasbuggy Site, Rio Arriba County, New Mexico

Sampling Period: July 6–7, 2010

Annual natural gas and produced water monitoring was conducted for gas wells adjacent to Section 36, where the Gasbuggy test was conducted, in accordance with the draft Long-Term Surveillance and Maintenance Plan for the Gasbuggy Site, Rio Arriba County, New Mexico. 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). Natural gas samples were collected for tritium and carbon-14 analysis. Produced water samples were collected and analyzed for tritium, gamma-emitting radionuclides (by high-resolution gamma spectrometry), gross alpha, and gross beta. An additional water sample was collected from well 29–6 Water Hole for analysis of tritium and gamma-emitting radionuclides. A duplicate produced water sample was collected from well 30-039-21743.

Refer to Table 1 for produced water sample analytical results. Low levels of gross alpha and/or gross beta activity were detected in samples of produced water from four of the natural gas production wells; four of the results were below the determination limit and are estimated values. The low levels are representative of natural background radioactivity and do not indicate the presence of detonation-related radionuclides. Gas well 30-039-07525 yielded insufficient water to allow gamma spectrometry analysis. Gas well 30-039-30161 yielded no water for analysis.

Table 1. Gasbuggy Natural Gas Production Well Produced Water Sample Analysis Results

Sample Location (API #)	Collection Date	Tritium (pCi/L)	Gamma Spectroscopy (pCi/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
Indian A No. 002 (30-039-07525)	07/06/2010	ND	NA	ND	ND
Many Canyons 29-04-25 No. 123 (30-039-30161)	07/07/2010	NA	NA	NA	NA
Many Canyons 29-04-26 No. 133 (30-039-29988)	07/07/2010	ND	ND	ND	43.5 ^a
Schalk 29-4 No. 007 (30-039-21620)	07/07/2010	ND	ND	4.9 ^a	41.0
Schalk 29-4 No. 014 (30-039-21744)	07/07/2010	ND	ND	ND	ND
Schalk 29-4 No. 017 (30-039-21743)	07/07/2010	ND	ND	ND	24.2 ^a
Valencia Canyon Unit No. 037 (30-039-21647)	07/07/2010	ND	ND	ND	38.9 ^a
Water Well 29-6 Water Hole	07/06/2010	ND	ND	NA	NA

^a Estimated value.

pCi/L = picocuries per liter.

ND = Result below decision level concentration.

NA = Not analyzed.

Refer to Table 2 for natural gas sample analytical results. A trace amount (0.03 pCi/L) of carbon-14 was detected in the natural gas sample collected from well Schalk 29-4 No. 007. For comparison, carbon-14 concentrations measured in the gas produced from the Gasbuggy

chimney after the detonation were on the order of 1,000 pCi/L, five orders of magnitude greater than the currently detected concentration, indicating that the carbon-14 detected in this gas well is not associated with the detonation.

Table 2. Gasbuggy Natural Gas Production Well Gas Sample Analysis Results

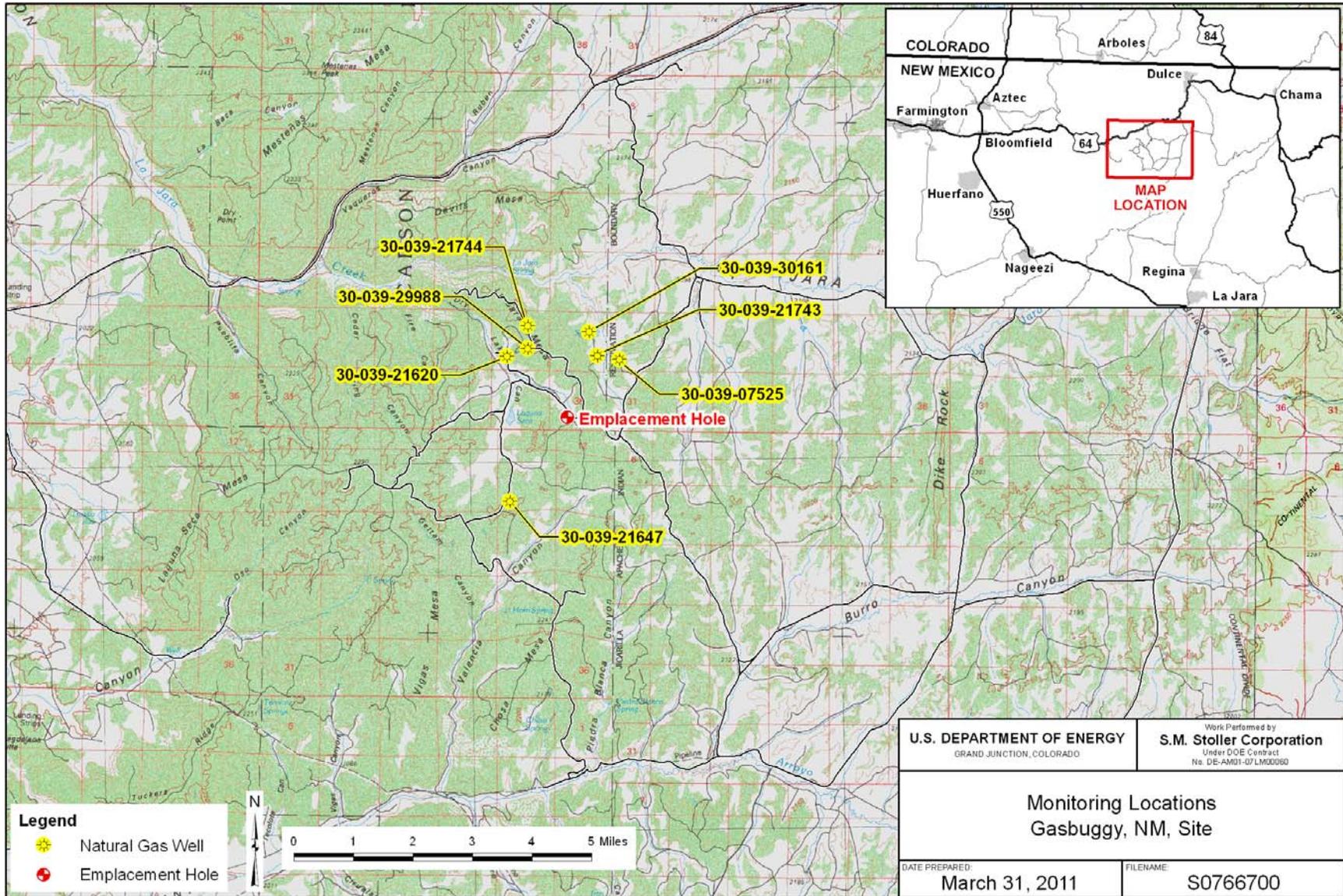
Sample Location (API #)	Collection Date	Tritium (pCi/L)	Carbon-14 (pCi/L)
Indian A No. 002 (30-039-07525)	07/06/2010	ND	ND
Many Canyons 29-04-25 No. 123 (30-039-30161)	07/07/2010	ND	ND
Many Canyons 29-04-26 No. 133 (30-039-29988)	07/07/2010	ND	ND
Schalk 29-4 No. 007 (30-039-21620)	07/07/2010	ND	0.03
Schalk 29-4 No. 014 (30-039-21744)	07/07/2010	ND	ND
Schalk 29-4 No. 017 (30-039-21743)	07/07/2010	ND	ND
Valencia Canyon Unit No. 037 (30-039-21647)	07/07/2010	ND	ND

ND = Result below laboratory method detection limit.
Concentrations are in picocuries per liter (pCi/L) of methane.



Mark Plessinger
Site Lead, S.M. Stoller Corporation

1/3/11
Date



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Gas Sampling Locations at the Gasbuggy, New Mexico, Site

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	<u>Gasbuggy, New Mexico</u>	Date(s) of Water Sampling	<u>July 6–7, 2010</u>
Date(s) of Verification	<u>November 30, 2010</u>	Name of Verifier	<u>Steve Donovan</u>

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order Letter dated June 2, 2010.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	<u>Tritium and gross alpha/beta were the only produced water analytes collected from well 30–039–07525 because of the lack of water. No produced water was collected from well 30–039–30161 because of the lack of water. An additional water sample was collected from well 29-6 Water Hole.</u>
3. Was a pre-trip calibration conducted as specified in the above-named documents?	<u>Yes</u>	<u>Pre-trip calibration was performed on July 6, 2010.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>NA</u>	<u>Field measurements were not required for produced water samples.</u>
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>NA</u>	
6. Was the category of the well documented?	<u>Yes</u>	<u>All wells were Category IV.</u>
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	<u>NA</u>	
Did the water level stabilize prior to sampling?	<u>NA</u>	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	<u>NA</u>	
Was the flow rate less than 500 mL/min?	<u>NA</u>	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<u>NA</u>	

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	
Was one pump/tubing volume removed prior to sampling?	NA	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate water sample was collected at location 30-039-21743.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	One equipment blank was collected.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number?	Yes	Location IDs 2790 and 2976 were used for the QC samples.
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDSC) 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 (FDSC)?	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?	NA	

Laboratory Performance Assessment

General Information

Requisition (RIN): 10063162
Sample Event: July 6–7, 2010
Site(s): Gasbuggy, New Mexico, Site
Laboratory: Isotech Laboratories
Work Order No.: 13364
Analysis: Radiochemistry
Validator: Steve Donivan
Review Date: September 16, 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. The data were examined to assess the completeness of the deliverables, identify any reporting errors, and assess the usability of the data based on the results of the field duplicate and the laboratory’s evaluation of their data, as described in the narrative provided. The data are acceptable as received. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Natural Gas Analysis	LMG-01	NA	Gas Chromatography
Carbon-14 and Tritium	LMG-03	Combustion	Liquid Scintillation Counting

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

Isotech Laboratories received seven natural gas samples on July 13, 2010, 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 COC form was complete with no errors or omissions.

Summary

Seven natural gas samples were received at Isotech Laboratories and analyzed by gas chromatography to determine the natural gas composition. The samples were then combusted with the resulting water collected for analysis. Carbon-14 and tritium were measured in the water collected by liquid scintillation counting. There were no analytical difficulties noted by the laboratory.

Completeness

The results of the gas chromatography analysis were reported in volume percent showing sample methane concentrations ranging from 83 percent to 88 percent methane.

The carbon-14 results were reported in percent modern carbon. The tritium results were reported in tritium units. Tritium was not detected at levels above the method detection limit in any of the samples.

General Information

Requisition No. (RIN): 10063193
Sample Event: July 6–7, 2010
Site(s): Gasbuggy, New Mexico, Site
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1007117
Analysis: Radiochemistry
Validator: Steve Donivan
Review Date: October 29, 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 2, Data Deliverables Verification. 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 4.

Table 4. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Gross Alpha/Beta	GPC-A-001	PA SOP702R19	PA SOP724R10
Gamma Spectrometry	GAM-A-001	PA SOP739R9	PA SOP713R10
Tritium	LCS-A-001	PA SOP700R10	PA SOP704R9

Data Qualifier Summary

Analytical results were qualified as listed in Table 5. Refer to the sections below for an explanation of the data qualifiers applied.

Table 5. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
1007117-1	30-039-21743 Dup	Gross Beta	J	Less than 3 times the MDC
1007117-2	29-6 Water Hole	Potassium-40	U	Nuclide identification not confirmed
1007117-5	30-039-21620	Gross Alpha	J	Less than 3 times the MDC
1007117-5	30-039-21620	Promethium-144	U	Nuclide identification not confirmed
1007117-6	30-039-21647	Gross Beta	J	Less than 3 times the MDC
1007117-7	30-039-21743	Gross Beta	J	Less than 3 times the MDC
1007117-9	30-039-29988	Gross Beta	J	Less than 3 times the MDC

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received nine water samples on July 13, 2010, accompanied by a COC form. The COC form was checked to confirm that 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. Copies of the air waybills were included with the receiving documentation.

Preservation and Holding Times

The sample shipment was received intact at ambient temperature which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses with the following exception. The preserved aliquot of sample 30-039-07525 was received with a pH greater than two. The sample aliquot was acidified to a pH less than two at the laboratory upon receipt. Sample analysis was completed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

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 the two sigma total propagated uncertainty.

Gamma Spectrometry

Activity concentrations above the MDC were reported in some instances where minimum nuclide identification criteria were not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the ‘diagnostic’ peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Sample results for gamma-emitting radionuclides that do not meet the identification criteria are qualified with a “U” flag as not detected.

Method Blank

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. All method blank results were below the MDC with the exception of gross beta. All associated sample gross beta results that were above the MDC were greater than 5 times the blank concentration.

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.

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference value for the chloride matrix spike replicate was not provided and could not be calculated from raw data. The radiochemical relative error ratio (calculated using the one-sigma total propagated uncertainty) for the sample replicates was less than three for all duplicates, indicating acceptable precision.

Matrix Spike Analysis

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

Detection Limits/Dilutions

Sample dilution was not required. The required detection limits were met for all analytes with the following exceptions. The required detection limits were not met for gross alpha and gross beta because of the elevated levels of dissolved solids in the samples.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable (EDD) File

The EDD file arrived on August 11, 2010. The Sample Management System EDD validation module was used to verify that the EDD files were complete and in compliance with requirements. The module compares the contents of the 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 results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 10063193 Lab Code: PAR Validator: Steve Donovan Validation Date: 10/29/2010
Project: Gasbuggy Site Analysis Type: Metals General Chem Rad Organics
of Samples: 9 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 14 detection limit failures.

There was 1 trip/equipment blank evaluated.

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

RIN: 10063193 Lab Code: PAR

Non-Compliance Report: Detection Limits

Project: Gasbuggy Site

Validation Date: 10/29/2010

Ticket	Location	Lab Sample ID	Method Code	Lab Method	Analyte Name	Result	Qualifier	Reported Detection Limit	Required Detection Limit	Units
IHX 496	2790	1007117-1	GPC-A-001	724R10	GROSS BETA	35.8		21	4	pCi/L
IHX 496	2790	1007117-1	GPC-A-001	724R10	GROSS ALPHA	2.36	U	15	2	pCi/L
IHX 493	30-039-07525	1007117-4	GPC-A-001	724R10	GROSS BETA	55.3	U	89	4	pCi/L
IHX 493	30-039-07525	1007117-4	GPC-A-001	724R10	GROSS ALPHA	-1.15	U	43	2	pCi/L
IHX 489	30-039-21620	1007117-5	GPC-A-001	724R10	GROSS BETA	41		6.5	4	pCi/L
IHX 489	30-039-21620	1007117-5	GPC-A-001	724R10	GROSS ALPHA	4.89		3.8	2	pCi/L
IHX 494	30-039-21647	1007117-6	GPC-A-001	724R10	GROSS ALPHA	1.94	U	15	2	pCi/L
IHX 494	30-039-21647	1007117-6	GPC-A-001	724R10	GROSS BETA	38.9		21	4	pCi/L
IHX 492	30-039-21743	1007117-7	GPC-A-001	724R10	GROSS BETA	24.2		22	4	pCi/L
IHX 492	30-039-21743	1007117-7	GPC-A-001	724R10	GROSS ALPHA	-2.34	U	16	2	pCi/L
IHX 488	30-039-21744	1007117-8	GPC-A-001	724R10	GROSS BETA	14.8	U	22	4	pCi/L
IHX 488	30-039-21744	1007117-8	GPC-A-001	724R10	GROSS ALPHA	0.517	U	13	2	pCi/L
IHX 490	30-039-29988	1007117-9	GPC-A-001	724R10	GROSS BETA	43.5		21	4	pCi/L
IHX 490	30-039-29988	1007117-9	GPC-A-001	724R10	GROSS ALPHA	0.16	U	15	2	pCi/L

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 10063193 **Lab Code:** PAR **Date Due:** 8/10/2010
Matrix: Water **Site Code:** GSB01 **Date Completed:** 8/12/2010

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
2790	Americium-241	07/24/2010						0.20
Blank_Spike	Americium-241	07/25/2010				90.50		
2790	Antimony-125	07/24/2010						0
2790	Cesium-137	07/24/2010						0.74
Blank_Spike	Cesium-137	07/25/2010				102.00		
2790	Cobalt-60	07/24/2010						0.04
Blank_Spike	Cobalt-60	07/25/2010				97.50		
2790	GROSS ALPHA	08/02/2010						0.79
Blank_Spike	GROSS ALPHA	08/03/2010				86.10		
2976	GROSS ALPHA	08/03/2010					82.5	
Blank	GROSS ALPHA	08/03/2010	0.2240	U				
2790	GROSS BETA	08/02/2010						1.07
Blank_Spike	GROSS BETA	08/03/2010				107.00		
2976	GROSS BETA	08/03/2010					106.0	
Blank	GROSS BETA	08/03/2010	1.1200					
2790	H-3	08/07/2010						0.52
Blank_Spike	H-3	08/08/2010				101.00		
30-039-29988	H-3	08/08/2010					103.0	
Blank	H-3	08/08/2010	-19.4000	U				

Sampling Quality Control Assessment

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

Equipment Blank Assessment

Equipment blanks are prepared and analyzed to document contamination attributable to the sample collection process. One equipment blank was submitted with these samples. There were no analytes detected in this blank.

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 30-039-21743. The radiochemical duplicate results had relative error ratios less than three, demonstrating acceptable precision.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 10063193 Lab Code: PAR Project: Gasbuggy Site Validation Date: 10/29/2010

Duplicate: 2790

Sample: 30-039-21743

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Actinium-228	11.3	U	15.8	1	-3.3	U	11.7	1		1.5	pCi/L
Americium-241	-17.8	U	33.6	1	-9.14	U	27	1		0.4	pCi/L
Antimony-125	3.53	U	10	1	2.49	U	4.43	1		0.2	pCi/L
Cerium-144	7.8	U	16.9	1	1.49	U	12.3	1		0.6	pCi/L
Cesium-134	-4.07	U	4.3	1	-2.72	U	2.26	1		0.5	pCi/L
Cesium-137	1.65	U	4.14	1	0.641	U	1.96	1		0.4	pCi/L
Cobalt-60	-1.16	U	4.87	1	-1.84	U	2.11	1		0.3	pCi/L
Europium-152	-3.62	U	23.4	1	-5.48	U	11	1		0.1	pCi/L
Europium-154	13.7	U	24	1	-4.5	U	11	1		1.4	pCi/L
Europium-155	-2.46	U	10	1	1.42	U	6.82	1		0.6	pCi/L
GROSS ALPHA	-2.34	U	9.27	1	2.36	U	8.75	1		0.7	pCi/L
GROSS BETA	24.2		13.9	1	35.8		14.3	1		1.1	pCi/L
H-3	-71.1	U	161	1	19.3	U	163	1		0.8	pCi/L
Lead-212	-2.93	U	8.35	1	2.79	U	5.75	1		1.1	pCi/L
Potassium-40	-23.4	U	83.5	1	-107	U	52	1		1.7	pCi/L
Promethium-144	4.22	U	4.14	1	2.24	U	2	1		0.8	pCi/L
Promethium-146	0.689	U	4.58	1	-1.55	U	2.29	1		0.9	pCi/L
Ruthenium-106	8.08	U	37.6	1	-5.64	U	19.7	1		0.6	pCi/L
Thorium-234	-36.8	U	95.9	1	-13.7	U	59.9	1		0.4	pCi/L
Uranium-235	-9.86	U	23.1	1	15.7	U	12.1	1		1.9	pCi/L
Yttrium-88	4.22	U	4.91	1	-1.31	U	3.29	1		1.8	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
Steve Donivan

12-29-2010
Date

Data Validation Lead:

Steve Donivan
Steve Donivan

12-29-2010
Date

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Attachment 1

Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 29-6 Water Hole WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	07/06/2010	N001	0	-	0	26.2	U		#	44	27.2
Americium-241	pCi/L	07/06/2010	N001	0	-	0	-2.08	U		#	34	19.7
Antimony-125	pCi/L	07/06/2010	N001	0	-	0	-1.53	U		#	17	9.87
Cerium-144	pCi/L	07/06/2010	N001	0	-	0	9.78	U		#	30	17.8
Cesium-134	pCi/L	07/06/2010	N001	0	-	0	-1.87	U		#	8.1	4.6
Cesium-137	pCi/L	07/06/2010	N001	0	-	0	-2.48	U		#	8.3	4.61
Cobalt-60	pCi/L	07/06/2010	N001	0	-	0	3.4	U		#	7.7	4.65
Europium-152	pCi/L	07/06/2010	N001	0	-	0	8.51	U		#	42	24.6
Europium-154	pCi/L	07/06/2010	N001	0	-	0	-8.05	U		#	50	28
Europium-155	pCi/L	07/06/2010	N001	0	-	0	-0.894	U		#	16	9.55
Lead-212	pCi/L	07/06/2010	N001	0	-	0	0.682	U		#	17	9.87
Oxidation Reduction Potential	mV	07/06/2010	N001	0	-	0	61.9			#		
pH	s.u.	07/06/2010	N001	0	-	0	6.47			#		
Potassium-40	pCi/L	07/06/2010	N001	0	-	0	132		U	#	87	62.7
Promethium-144	pCi/L	07/06/2010	N001	0	-	0	-3.21	U		#	9.2	5.15
Promethium-146	pCi/L	07/06/2010	N001	0	-	0	-2.14	U		#	8.5	4.81
Ruthenium-106	pCi/L	07/06/2010	N001	0	-	0	15.2	U		#	75	44.6
Specific Conductance	umhos/cm	07/06/2010	N001	0	-	0	2452			#		

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 29-6 Water Hole WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
								Lab	Data QA		
Temperature	C	07/06/2010	N001	0	-	0	20.84		#		
Thorium-234	pCi/L	07/06/2010	N001	0	-	0	29.1	U	#	160	97.4
Tritium	pCi/L	07/06/2010	N001	0	-	0	-9.69	U	#	270	163
Turbidity	NTU	07/06/2010	N001	0	-	0	0.89		#		
Uranium-235	pCi/L	07/06/2010	N001	0	-	0	-2.24	U	#	48	28.6
Yttrium-88	pCi/L	07/06/2010	N001	0	-	0	4.96	U	#	14	8.49

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.

Produced Water Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-07525 WELL Indian A No. 002; N-30-29N-3W; Producing Well

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Gross Alpha	pCi/L	07/06/2010	N001	0 - 0	-1.15	U		#	43	24.4
Gross Beta	pCi/L	07/06/2010	N001	0 - 0	55.3	U		#	69	43
Tritium	pCi/L	07/06/2010	N001	0 - 0	-83	U		#	280	162

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21620 WELL SCHALK 29-4 No. 007; K-26-29N-4W; Producing Well

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	07/07/2010	N001	0	-	0	13.3	U	#	39	23.6
Americium-241	pCi/L	07/07/2010	N001	0	-	0	-289	U	#	9.6	5.65
Antimony-125	pCi/L	07/07/2010	N001	0	-	0	3.35	U	#	16	8.87
Cerium-144	pCi/L	07/07/2010	N001	0	-	0	-15.2	U	#	31	17.9
Cesium-134	pCi/L	07/07/2010	N001	0	-	0	-2.78	U	#	7.1	4.06
Cesium-137	pCi/L	07/07/2010	N001	0	-	0	4.08	U	#	6.8	4.21
Cobalt-60	pCi/L	07/07/2010	N001	0	-	0	-758	U	#	7.8	4.39
Europium-152	pCi/L	07/07/2010	N001	0	-	0	8.07	U	#	36	21.3
Europium-154	pCi/L	07/07/2010	N001	0	-	0	-826	U	#	41	23.8
Europium-155	pCi/L	07/07/2010	N001	0	-	0	-162	U	#	15	8.99
Gross Alpha	pCi/L	07/07/2010	N001	0	-	0	4.89		J #	3.8	2.61
Gross Beta	pCi/L	07/07/2010	N001	0	-	0	41		#	6.5	7.99
Lead-212	pCi/L	07/07/2010	N001	0	-	0	-2.96	U	#	14	7.98
Potassium-40	pCi/L	07/07/2010	N001	0	-	0	-557	U	#	140	80.4
Promethium-144	pCi/L	07/07/2010	N001	0	-	0	8.46		U #	6.7	4.45
Promethium-146	pCi/L	07/07/2010	N001	0	-	0	2.52	U	#	7.9	4.76
Ruthenium-106	pCi/L	07/07/2010	N001	0	-	0	-19.3	U	#	69	39.6

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21620 WELL SCHALK 29-4 No. 007; K-26-29N-4W; Producing Well

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Thorium-234	pCi/L	07/07/2010	N001	0	-	0	-47.1	U		#	110	64.6
Tritium	pCi/L	07/07/2010	N001	0	-	0	106	U		#	270	167
Uranium-235	pCi/L	07/07/2010	N001	0	-	0	-4.65	U		#	37	21.9
Yttrium-88	pCi/L	07/07/2010	N001	0	-	0	-2.12	U		#	12	7.24

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21647 WELL VALENCIA CANYON UNIT No. 037; M-14-28N-4W; Producing Well

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	07/07/2010	N001	0 - 0	2.48	U		#	46	27.3
Americium-241	pCi/L	07/07/2010	N001	0 - 0	3.61	U		#	7.3	4.48
Antimony-125	pCi/L	07/07/2010	N001	0 - 0	1.34	U		#	19	10.1
Cerium-144	pCi/L	07/07/2010	N001	0 - 0	-1.98	U		#	26	15.3
Cesium-134	pCi/L	07/07/2010	N001	0 - 0	0.129	U		#	7.3	4.26
Cesium-137	pCi/L	07/07/2010	N001	0 - 0	0.158	U		#	10	5.86
Cobalt-60	pCi/L	07/07/2010	N001	0 - 0	1.22	U		#	9.3	5.33
Europium-152	pCi/L	07/07/2010	N001	0 - 0	-18.4	U		#	49	25.8
Europium-154	pCi/L	07/07/2010	N001	0 - 0	10	U		#	48	28.1
Europium-155	pCi/L	07/07/2010	N001	0 - 0	-4.39	U		#	13	7.37
Gross Alpha	pCi/L	07/07/2010	N001	0 - 0	1.94	U		#	15	8.66
Gross Beta	pCi/L	07/07/2010	N001	0 - 0	38.9		J	#	21	14.7
Lead-212	pCi/L	07/07/2010	N001	0 - 0	1.86	U		#	16	9.35
Potassium-40	pCi/L	07/07/2010	N001	0 - 0	-5.8	U		#	150	88.8
Promethium-144	pCi/L	07/07/2010	N001	0 - 0	-1.18	U		#	8.5	4.88
Promethium-146	pCi/L	07/07/2010	N001	0 - 0	-6.12	U		#	9.1	5.23
Ruthenium-106	pCi/L	07/07/2010	N001	0 - 0	-1.34	U		#	72	41.5

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21647 WELL VALENCIA CANYON UNIT No. 037; M-14-28N-4W; Producing Well

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Thorium-234	pCi/L	07/07/2010	N001	0	-	0	-52.3	U		#	93	54.9
Tritium	pCi/L	07/07/2010	N001	0	-	0	-50.6	U		#	270	161
Uranium-235	pCi/L	07/07/2010	N001	0	-	0	8.41	U		#	26	15
Yttrium-88	pCi/L	07/07/2010	N001	0	-	0	-.307	U		#	18	10.7

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21743 WELL SCHALK 29-4 No. 017; I-25-29N-4W; Producing Well

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	07/07/2010	N001	0 - 0	11.3	U		#	26	15.8
Actinium-228	pCi/L	07/07/2010	N002	0 - 0	-3.3	U		#	20	11.7
Americium-241	pCi/L	07/07/2010	N001	0 - 0	-17.8	U		#	58	33.6
Americium-241	pCi/L	07/07/2010	N002	0 - 0	-9.14	U		#	45	27
Antimony-125	pCi/L	07/07/2010	N001	0 - 0	3.53	U		#	17	10
Antimony-125	pCi/L	07/07/2010	N002	0 - 0	2.49	U		#	7.7	4.43
Cerium-144	pCi/L	07/07/2010	N001	0 - 0	7.8	U		#	28	16.9
Cerium-144	pCi/L	07/07/2010	N002	0 - 0	1.49	U		#	20	12.3
Cesium-134	pCi/L	07/07/2010	N001	0 - 0	-4.07	U		#	7.6	4.3
Cesium-134	pCi/L	07/07/2010	N002	0 - 0	-2.72	U		#	3.9	2.26
Cesium-137	pCi/L	07/07/2010	N001	0 - 0	1.65	U		#	7	4.14
Cesium-137	pCi/L	07/07/2010	N002	0 - 0	0.641	U		#	3.3	1.96
Cobalt-60	pCi/L	07/07/2010	N001	0 - 0	-1.16	U		#	8.6	4.87
Cobalt-60	pCi/L	07/07/2010	N002	0 - 0	-1.84	U		#	3.7	2.11
Europium-152	pCi/L	07/07/2010	N001	0 - 0	-3.62	U		#	41	23.4
Europium-152	pCi/L	07/07/2010	N002	0 - 0	-5.48	U		#	19	11
Europium-154	pCi/L	07/07/2010	N001	0 - 0	13.7	U		#	40	24

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21743 WELL SCHALK 29-4 No. 017; I-25-29N-4W; Producing Well

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Europium-154	pCi/L	07/07/2010	N002	0	- 0	-4.5	U		#	19	11
Europium-155	pCi/L	07/07/2010	N001	0	- 0	-2.46	U		#	17	10
Europium-155	pCi/L	07/07/2010	N002	0	- 0	1.42	U		#	11	6.82
Gross Alpha	pCi/L	07/07/2010	N001	0	- 0	-2.34	U		#	16	9.27
Gross Alpha	pCi/L	07/07/2010	N002	0	- 0	2.36	U		#	15	8.75
Gross Beta	pCi/L	07/07/2010	N001	0	- 0	24.2		J	#	22	13.9
Gross Beta	pCi/L	07/07/2010	N002	0	- 0	35.8		J	#	21	14.3
Lead-212	pCi/L	07/07/2010	N001	0	- 0	-2.93	U		#	14	8.35
Lead-212	pCi/L	07/07/2010	N002	0	- 0	2.79	U		#	9.5	5.75
Potassium-40	pCi/L	07/07/2010	N001	0	- 0	-23.4	U		#	140	83.5
Potassium-40	pCi/L	07/07/2010	N002	0	- 0	-107	U		#	87	52
Promethium-144	pCi/L	07/07/2010	N001	0	- 0	4.22	U		#	6.7	4.14
Promethium-144	pCi/L	07/07/2010	N002	0	- 0	2.24	U		#	3.2	2
Promethium-146	pCi/L	07/07/2010	N001	0	- 0	0.689	U		#	7.8	4.58
Promethium-146	pCi/L	07/07/2010	N002	0	- 0	-1.55	U		#	3.9	2.29
Ruthenium-106	pCi/L	07/07/2010	N001	0	- 0	8.08	U		#	64	37.6
Ruthenium-106	pCi/L	07/07/2010	N002	0	- 0	-5.64	U		#	33	19.7

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21743 WELL SCHALK 29-4 No. 017; I-25-29N-4W; Producing Well

Parameter	Units	Sample		Depth Range			Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)					Data	QA		
Thorium-234	pCi/L	07/07/2010	N001	0	-	0	-36.8	U	#	160	95.9	
Thorium-234	pCi/L	07/07/2010	N002	0	-	0	-13.7	U	#	100	59.9	
Tritium	pCi/L	07/07/2010	N001	0	-	0	-71.1	U	#	270	161	
Tritium	pCi/L	07/07/2010	N002	0	-	0	19.3	U	#	270	163	
Uranium-235	pCi/L	07/07/2010	N001	0	-	0	-9.86	U	#	39	23.1	
Uranium-235	pCi/L	07/07/2010	N002	0	-	0	15.7	U	#	20	12.1	
Yttrium-88	pCi/L	07/07/2010	N001	0	-	0	4.22	U	#	8	4.91	
Yttrium-88	pCi/L	07/07/2010	N002	0	-	0	-1.31	U	#	5.6	3.29	

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21744 WELL SCHALK 29-4 No. 014; B-26-29N-4W; Producing Well

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	07/07/2010	N001	0 - 0	-7.66	U		#	21	12.4
Americium-241	pCi/L	07/07/2010	N001	0 - 0	11.2	U		#	34	20.8
Antimony-125	pCi/L	07/07/2010	N001	0 - 0	1.07	U		#	9.5	5.62
Cerium-144	pCi/L	07/07/2010	N001	0 - 0	-11.7	U		#	26	15.3
Cesium-134	pCi/L	07/07/2010	N001	0 - 0	-1.62	U		#	6.8	4.03
Cesium-137	pCi/L	07/07/2010	N001	0 - 0	-965	U		#	4.3	2.52
Cobalt-60	pCi/L	07/07/2010	N001	0 - 0	-.0184	U		#	4.6	2.66
Europium-152	pCi/L	07/07/2010	N001	0 - 0	2.77	U		#	23	13.5
Europium-154	pCi/L	07/07/2010	N001	0 - 0	-8.52	U		#	24	13.7
Europium-155	pCi/L	07/07/2010	N001	0 - 0	1.79	U		#	14	8.57
Gross Alpha	pCi/L	07/07/2010	N001	0 - 0	0.517	U		#	13	7.66
Gross Beta	pCi/L	07/07/2010	N001	0 - 0	14.8	U		#	22	13.9
Lead-212	pCi/L	07/07/2010	N001	0 - 0	1.4	U		#	10	6.32
Potassium-40	pCi/L	07/07/2010	N001	0 - 0	-104	U		#	95	55.4
Promethium-144	pCi/L	07/07/2010	N001	0 - 0	1.93	U		#	4.1	2.48
Promethium-146	pCi/L	07/07/2010	N001	0 - 0	0.931	U		#	4.7	2.78
Ruthenium-106	pCi/L	07/07/2010	N001	0 - 0	-8.34	U		#	42	24.2

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-21744 WELL SCHALK 29-4 No. 014; B-26-29N-4W; Producing Well

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Thorium-234	pCi/L	07/07/2010	N001	0 - 0	-32.6	U		#	100	61.1
Tritium	pCi/L	07/07/2010	N001	0 - 0	-32.3	U		#	270	163
Uranium-235	pCi/L	07/07/2010	N001	0 - 0	6.24	U		#	25	15
Yttrium-88	pCi/L	07/07/2010	N001	0 - 0	2.34	U		#	7	4.24

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-29988 WELL MANY CANYONS 29 04 26 No. 133; J-26-29N-4W; Producing Well, New Well 9/07

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	07/07/2010	N001	0	-	0	8.26	U		#	58	34.3
Americium-241	pCi/L	07/07/2010	N001	0	-	0	-18.1	U		#	68	39.6
Antimony-125	pCi/L	07/07/2010	N001	0	-	0	1.04	U		#	21	12
Cerium-144	pCi/L	07/07/2010	N001	0	-	0	9.24	U		#	40	23.7
Cesium-134	pCi/L	07/07/2010	N001	0	-	0	6.49	U		#	7.3	4.71
Cesium-137	pCi/L	07/07/2010	N001	0	-	0	-1.25	U		#	8.4	4.71
Cobalt-60	pCi/L	07/07/2010	N001	0	-	0	-3.67	U		#	9.6	5.03
Europium-152	pCi/L	07/07/2010	N001	0	-	0	5.54	U		#	51	29.5
Europium-154	pCi/L	07/07/2010	N001	0	-	0	-1.18	U		#	46	25.6
Europium-155	pCi/L	07/07/2010	N001	0	-	0	-8.17	U		#	24	13.8
Gross Alpha	pCi/L	07/07/2010	N001	0	-	0	0.16	U		#	15	8.67
Gross Beta	pCi/L	07/07/2010	N001	0	-	0	43.5		J	#	21	15.2
Lead-212	pCi/L	07/07/2010	N001	0	-	0	2.65	U		#	17	10.2
Potassium-40	pCi/L	07/07/2010	N001	0	-	0	-30.8	U		#	160	91.6
Promethium-144	pCi/L	07/07/2010	N001	0	-	0	0.497	U		#	9.2	5.33
Promethium-146	pCi/L	07/07/2010	N001	0	-	0	-2.88	U		#	11	6.04
Ruthenium-106	pCi/L	07/07/2010	N001	0	-	0	19.8	U		#	74	43.7

Groundwater Quality Data by Location (USEE100) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-29988 WELL MANY CANYONS 29 04 26 No. 133; J-26-29N-4W; Producing Well, New Well 9/07

Parameter	Units	Sample		Depth Range			Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)					Data	QA		
Thorium-234	pCi/L	07/07/2010	N001	0	-	0	-11.7	U		#	180	105
Tritium	pCi/L	07/07/2010	N001	0	-	0	20.2	U		#	270	162
Uranium-235	pCi/L	07/07/2010	N001	0	-	0	-17.1	U		#	45	26.2
Yttrium-88	pCi/L	07/07/2010	N001	0	-	0	-.0119	U		#	15	8.68

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.

Natural Gas Data

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Gas Matrix Chemistry Data by Location (USEE510) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-07525 WELL, Natural Gas Well - Vertical, Indian A No. 002; N-30-29N-3W; Producing Well

Parameter	Units	Sample Date ID	Ticket Number	Elev. Range (Ft)	Matrix Subtype	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Carbon-14	pMC	07/06/2010	0001	IHW 786	-	NATURAL GAS - DRY	0.6	U	#	0.6	
Tritium	pCi/L	07/06/2010	0001	IHW 786	-	NATURAL GAS - DRY	0.0514	U	#	0.0514	

Gas Matrix Chemistry Data by Location (USEE510) FOR SITE GSB01, Gasbuggy Site**REPORT DATE: 12/15/2010****Location: 30-039-21620 WELL, Natural Gas Well - Vertical, SCHALK 29-4 No. 007; K-26-29N-4W; Producing Well**

Parameter	Units	Sample Date ID	Ticket Number	Elev. Range (Ft)	Matrix Subtype	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Carbon-14	pMC	07/07/2010	0001	IHW 788	-	NATURAL GAS - DRY	0.9			#	
Tritium	pCi/L	07/07/2010	0001	IHW 788	-	NATURAL GAS - DRY	0.0601	U		#	0.0601

Gas Matrix Chemistry Data by Location (USEE510) FOR SITE GSB01, Gasbuggy Site**REPORT DATE: 12/15/2010****Location: 30-039-21647 WELL, Natural Gas Well - Vertical, VALENCIA CANYON UNIT No. 037; M-14-28N-4W; Producing Well**

Parameter	Units	Sample Date ID	Ticket Number	Elev. Range (Ft)	Matrix Subtype	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Carbon-14	pMC	07/07/2010	0001	IHW 790	-	NATURAL GAS - DRY	0.8	U	#	0.8	
Tritium	pCi/L	07/07/2010	0001	IHW 790	-	NATURAL GAS - DRY	0.056	U	#	0.056	

Gas Matrix Chemistry Data by Location (USEE510) FOR SITE GSB01, Gasbuggy Site**REPORT DATE: 12/15/2010****Location: 30-039-21743 WELL, Natural Gas Well - Vertical, SCHALK 29-4 No. 017; I-25-29N-4W; Producing Well**

Parameter	Units	Sample Date ID	Ticket Number	Elev. Range (Ft)	Matrix Subtype	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Carbon-14	pMC	07/07/2010	0001	IHW 792	-	NATURAL GAS - DRY	0.7	U	#	0.7	
Tritium	pCi/L	07/07/2010	0001	IHW 792	-	NATURAL GAS - DRY	0.056	U	#	0.056	

Gas Matrix Chemistry Data by Location (USEE510) FOR SITE GSB01, Gasbuggy Site**REPORT DATE: 12/15/2010****Location: 30-039-21744 WELL, Natural Gas Well - Vertical, SCHALK 29-4 No. 014; B-26-29N-4W; Producing Well**

Parameter	Units	Sample Date ID	Ticket Number	Elev. Range (Ft)	Matrix Subtype	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Carbon-14	pMC	07/07/2010	0001	IHW 787	-	NATURAL GAS - DRY	0.7	U	#	0.7	
Tritium	pCi/L	07/07/2010	0001	IHW 787	-	NATURAL GAS - DRY	0.0514	U	#	0.0514	

Gas Matrix Chemistry Data by Location (USEE510) FOR SITE GSB01, Gasbuggy Site**REPORT DATE: 12/15/2010****Location: 30-039-29988 WELL, Natural Gas Well - Angle, MANY CANYONS 29 04 26 No. 133; J-26-29N-4W; Producing Well, New Well 9/07**

Parameter	Units	Sample Date ID	Ticket Number	Elev. Range (Ft)	Matrix Subtype	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Carbon-14	pMC	07/07/2010	0001	IHW 789	-	NATURAL GAS - DRY	0.6	U	#	0.6	
Tritium	pCi/L	07/07/2010	0001	IHW 789	-	NATURAL GAS - DRY	0.0514	U	#	0.0514	

Gas Matrix Chemistry Data by Location (USEE510) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 12/15/2010

Location: 30-039-30161 WELL, Natural Gas Well - Angle, MANY CANYONS 29 4 25 No. 123; G-25-29N-4W; Producing Well, New Well 06/07

Parameter	Units	Sample Date ID	Ticket Number	Elev. Range (Ft)	Matrix Subtype	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Carbon-14	pMC	07/07/2010	0001	IHW 791	-	NATURAL GAS - DRY	1.2	U	#	1.2	
Tritium	pCi/L	07/07/2010	0001	IHW 791	-	NATURAL GAS - DRY	0.054	U	#	0.054	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

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Equipment Blank Data

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BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)

RIN: 10063193

Report Date: 12/15/2010

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab Data	Detection Limit	Uncertainty	Sample Type
Actinium-228	GSB01	0999	07/07/2010	N001	pCi/L	6.05	U	50	29.7	E
Americium-241	GSB01	0999	07/07/2010	N001	pCi/L	10	U	72	43	E
Antimony-125	GSB01	0999	07/07/2010	N001	pCi/L	-7.2	U	21	11.9	E
Cerium-144	GSB01	0999	07/07/2010	N001	pCi/L	-.425	U	39	23	E
Cesium-134	GSB01	0999	07/07/2010	N001	pCi/L	-.0307	U	8.7	5.06	E
Cesium-137	GSB01	0999	07/07/2010	N001	pCi/L	0.467	U	8.4	4.9	E
Cobalt-60	GSB01	0999	07/07/2010	N001	pCi/L	-2.04	U	8.6	4.65	E
Europium-152	GSB01	0999	07/07/2010	N001	pCi/L	3.18	U	42	24.2	E
Europium-154	GSB01	0999	07/07/2010	N001	pCi/L	1.99	U	44	25.5	E
Europium-155	GSB01	0999	07/07/2010	N001	pCi/L	4.84	U	24	14.1	E
Gross Alpha	GSB01	0999	07/07/2010	N001	pCi/L	0.438	U	1.1	0.643	E
Gross Beta	GSB01	0999	07/07/2010	N001	pCi/L	1.06	U	1.8	1.13	E
Lead-212	GSB01	0999	07/07/2010	N001	pCi/L	5.37	U	12	7.22	E
Potassium-40	GSB01	0999	07/07/2010	N001	pCi/L	-51.9	U	190	109	E
Promethium-144	GSB01	0999	07/07/2010	N001	pCi/L	5.16	U	8.2	5.1	E
Promethium-146	GSB01	0999	07/07/2010	N001	pCi/L	1.01	U	8.9	5.24	E
Ruthenium-106	GSB01	0999	07/07/2010	N001	pCi/L	-24.1	U	81	45.9	E
Thorium-234	GSB01	0999	07/07/2010	N001	pCi/L	-4.07	U	190	112	E

BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)

RIN: 10063193

Report Date: 12/15/2010

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab Data	Detection Limit	Uncertainty	Sample Type
Tritium	GSB01	0999	07/07/2010	N001	pCi/L	20.8	U	270	164	E
Uranium-235	GSB01	0999	07/07/2010	N001	pCi/L	1.22	U	38	22.2	E
Yttrium-88	GSB01	0999	07/07/2010	N001	pCi/L	-2.46	U	16	9.09	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.

Attachment 2
Sampling and Analysis Work Order

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established 1959

Task Order LM00-502
Control Number 10-0647

June 2, 2010

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
July 2010 Environmental Sampling at Gasbuggy, New Mexico

Reference: Task Order LM00-502-07-616, Gasbuggy, NM, Site

Dear Ms. Dayvault:

The purpose of this letter is to inform you of the upcoming sampling event at Gasbuggy, New Mexico. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring at the Gasbuggy site. Natural gas and produced water will be collected from gas wells at this site as part of the environmental sampling currently scheduled to begin the week of July 5, 2010.

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

30-039-07525	30-039-21620	30-039-21647	30-039-21743
30-039-21744	30-039-29988	30-039-30161	

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.

A water sample will be obtained from a water-supply well completed in the Ojo Alamo formation if permission to sample is received from the well owner.

Please contact me at (970) 248-6378 if you have any questions or concerns.

Jalena Dayvault
Control Number 10-0647
Page 2

Sincerely,



Mark Plessinger
Site Lead

MP/lcg/dc
Enclosures (3)

cc: (electronic)
Cheri Bahrke, Stoller
Steve Donovan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Rick Hutton, Stoller
EDD Delivery
rc-grand.junction

Sampling Frequencies for Locations at Gasbuggy, New Mexico

Location ID	Quarterly	Semiannually	Annually	Every 5 Years	Not Sampled	Notes
Monitoring Wells						
Jicarilla Well 1				X		Windmill; next in 6/2014
Lower Burro Canyon				X		Windmill; next in 6/2014
Well 30.3.32.343 (N)				X		Windmill; next in 6/2014
Well 28.3.33.233 (S)				X		Windmill; next in 6/2014
Windmill #2				X		Windmill; next in 6/2014
Surface Locations						
Bubbling Springs				X		Next in 6/2014
Cave Springs				X		Next in 6/2014
Cedar Springs				X		Next in 6/2014
La Jara Creek				X		Next in 6/2014
Pnd N WL 30.3.32.343				X		Next in 6/2014
Gas and Produced Water Locations						
30-039-07525			X			
30-039-21097					X	
30-039-21620			X			
30-039-21647			X			
30-039-21743			X			
30-039-21744			X			
30-039-29988			X			
30-039-30161			X			

Annual sampling conducted in June

Constituent Sampling Breakdown

Site	Gasbuggy				Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water	Gas	Produced Water			
Approx. No. Samples/yr	5	5	8	8			
<i>Field Measurements</i>							
Alkalinity							
Dissolved Oxygen	X	X					
Redox Potential	X	X					
pH	X	X					
Specific Conductance	X	X					
Turbidity	X						
Temperature	X	X					
<i>Laboratory Measurements</i>							
Aluminum							
Ammonia as N (NH3-N)							
Calcium							
Carbon-14			X		NA	Liquid Scintillation	LMG-03
Chloride							
Chromium							
Gamma Spec	X			X	10 pCi/L	Gamma Spectrometry	GAM-A-001
Gross Alpha				X	2 pCi/L	EPA 900.0	GPC-A-001
Gross Beta				X	4 pCi/L	EPA 900.0	GPC-A-001
Iron							
Lead							
Magnesium							
Strontium							
Tritium	X	X	X	X	400 pCi/L	Liquid Scintillation	LSC-A-001
Uranium							
Vanadium							
Zinc							
Total No. of Analytes	2	1	2	4			

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 3 Trip Report

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Memorandum

Control Number N/A

DATE: July 21, 2010
TO: Mark Plessinger
FROM: Jeff Price
SUBJECT: Trip Report (LTHMP Sampling)

Site: Gas Buggy, NM

Dates of Sampling Event: July 6–8, 2010

Team Members: David Atkinson and Jeff Price.

Number of Locations Sampled: 1 groundwater well, produced water from 6 natural gas wells, and natural gas from 7 natural gas wells.

Locations Not Sampled/Reason: Tritium and gross alpha/beta were the only produced water analytes collected from well 30–039–07525, and because of the lack of water, no produced water was collected at location 30–039–30161. These two gas wells were shut in at the time of sampling and therefore no water was being produced. A complete suite of analytes, including natural gas, was collected from all other sampled locations. Field measurements were not taken on the produced water samples.

Quality Control Sample Cross Reference: The following are the false identifications assigned to the quality control samples:

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2790	30–039–21743	Duplicate	Produced Water	IHX 496
2976	NA	Equipment Blank	DI	IHX 499

RIN Number Assigned: Samples were assigned to RIN 10063193 (water) and RIN 10063162 (natural gas).

Sample Shipment: Samples were shipped on July 12, 2010.

Water Level Measurements: NA.

Trip Summary

The 2010 Gasbuggy, NM, sampling event was conducted July 6-8, 2010. Jalena Dayvault with DOE-LM, and Jeff Price, David Atkinson, and Mark Plessinger with the LMS contractor staff participated in the sampling event.

On Tuesday July 6, the sampling crew traveled from Grand Junction to the site. Natural gas and produced water samples (taken from the separator) were acquired from the Williams Production Co. well number 30-039-07525, located on the Jicarilla Apache tribal property. Keith Manwell with the Jicarilla tribe accompanied staff during the sampling of this well.

On Wednesday July 7, natural gas and produced water samples were acquired from six gas wells located on the Carson National Forest, operated by three different gas producers. The gas producers (ConocoPhillips, Black Hills Gas Resources, and Schalk Development) were met at Gasbuggy ground zero at different scheduled times and accompanied staff to the gas wells for sampling. Produced water samples were collected from the storage tanks for five of the six wells. Well 30-039-30161 did not have any produced water. In addition, a water sample was collected from water well 29-6 Water Hole for analysis of tritium and gamma spectroscopy.

The following table is a list of natural gas wells sampled.

Gas Well ID (API #)	Alternate Gas Well ID	Gas Well Operator
30-039-21744	B-26-29N-4W Schalk 29-4 No. 014	John E. Schalk
30-039-21620	K-26-29N-4W Schalk 29-4 No. 007	John E. Schalk
30-039-29988	J-26-29N-4W Many Canyons 29 04 26 No. 133	Black Hills Gas Resources, Inc.
30-039-30161	G-25-29N-4W Many Canyons 29 4 25 No. 123	Black Hills Gas Resources, Inc.
30-039-21743	I-25-29N-4W Schalk 29-4 No. 17	John E. Schalk
30-039-07525	N-30-29N-3W Indian A No. 002	Williams Production Co., LLC
30-039-21647	M-14-28N-4W Valencia Canyon Unit No. 037	ConocoPhillips

All gas samples will be analyzed for tritium and carbon-14. All produced water samples will be analyzed for tritium, gross alpha, gross beta, and gamma emitters by high resolution gamma spectroscopy. The water sample volume collected at well 30-039-07525 was sufficient for tritium and gross alpha/beta analysis only.

(JP/lcg)

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