

Data Validation Package

June 2009
Groundwater and Surface Water
Sampling at the
Gasbuggy, New Mexico, Site

October 2009

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Sampling Event Summary

Site: Gasbuggy, New Mexico

Sampling Period: June 16-17, 2009

Annual sampling was conducted at Gasbuggy, New Mexico, for the Long-Term Hydrologic Monitoring Program (LTHMP) on June 16–17, 2009, to monitor groundwater for potential radionuclide contamination. Sampling and analysis was conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated). A duplicate sample was collected from location Lower Burro Canyon.

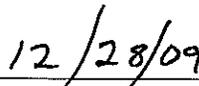
Additionally, eight produced water and gas samples were collected from area natural gas production wells. A duplicate produced water sample was collected from well 3003921647.

The water samples were analyzed for gamma-emitting radionuclides by high-resolution gamma spectrometry, gross alpha and beta (gas wells only), and tritium by ALS Laboratory Group in Fort Collins, Colorado. The natural gas samples were analyzed for carbon-14 and tritium by Isotech Laboratories in Champaign, Illinois.

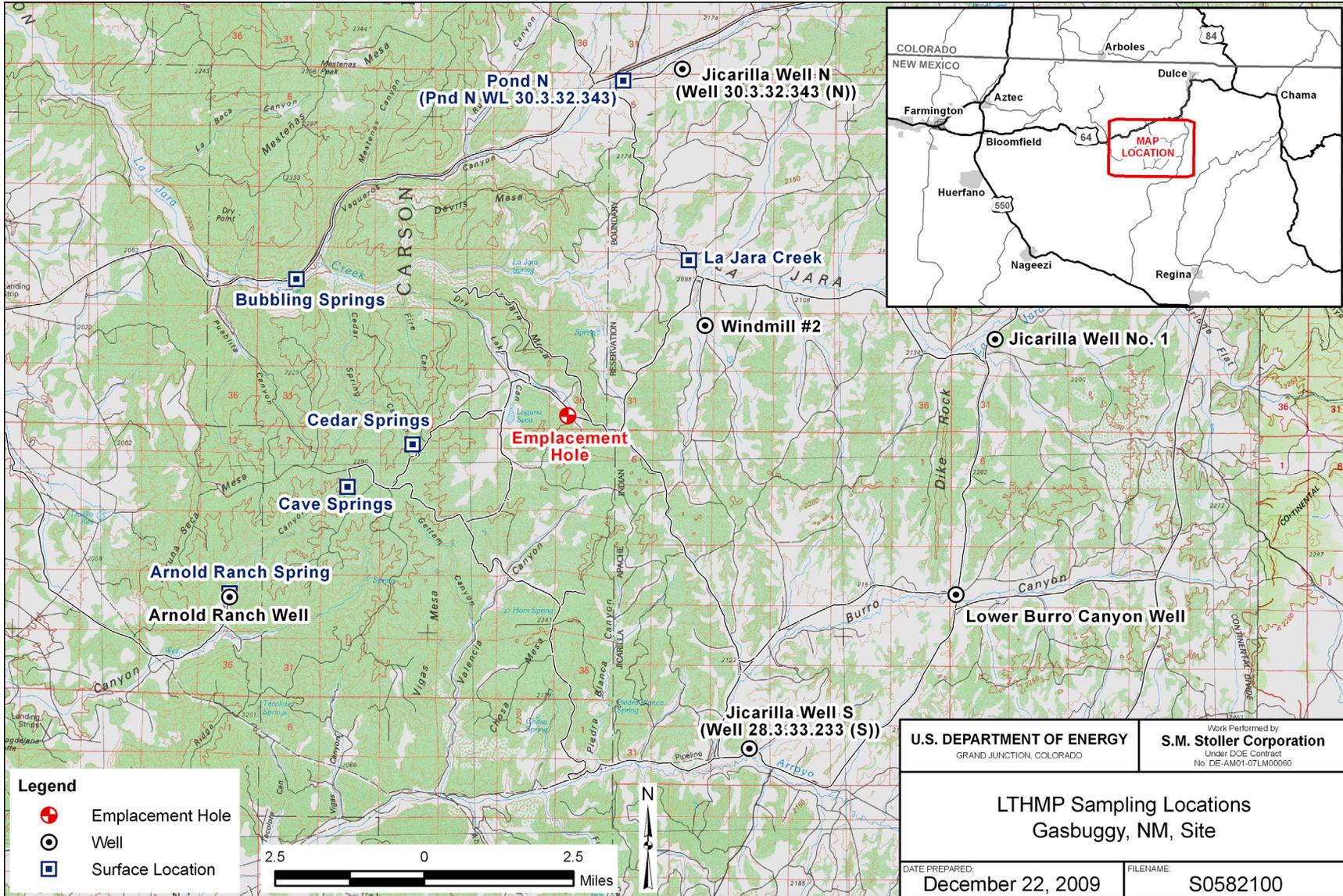
Test-related radionuclide concentrations were below the decision level concentration at all locations. Results of this monitoring at the Gasbuggy Site demonstrate that groundwater and surface water at the sampling locations in the area have not been impacted by detonation-related contaminants.



Mark Plessinger
Site Lead, S.M. Stoller



Date



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Gasbuggy, New Mexico, Sampling Locations

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>June 16-17, 2009</u>
Date(s) of Verification	<u>September 24, 2009</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 May 13, 2009</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>No</u>	<u>Bubbling Spring was dry; the two Arnold Ranch locations were not sampled because no one was home.</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 June 12, 2009.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u> <u>Yes</u>	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>Yes</u>	
6. Was the category of the well documented?	<u>Yes</u>	<u>All monitor wells are Category V.</u>
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 stabilize prior to sampling? Was the flow rate less than 500 mL/min? 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? Was one pump/tubing volume removed prior to sampling?	NA	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicate samples were collected from wells Lower Burro Canyon and 3003921647.
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? 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	Tritium was the only produced water analyte collected from well 3003921097 because of insufficient water at the well for a complete suite. A complete suite of analytes were collected from all other sampled locations.
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?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	NA	Water levels were not measured.

Laboratory Performance Assessment

General Information

Requisition No. (RIN): 09062379
Sample Event: June 16-17, 2009
Site(s): Gasbuggy, New Mexico
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 0906218
Analysis: Radiochemistry
Validator: Steve Donivan
Review Date: August 10, 2009

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), "Standard Practice for Validation of Laboratory Data," GT-9(P). The procedure was applied at Level 3, Data Validation. 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
Gamma Spectrometry	GAM-A-001	EPA 901.1	EPA 901.1
Tritium	LCS-A-001	EPA 906.0	EPA 906.0

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	Flag	Reason
0906218-4	Jicarilla Well 1	Uranium-235	J	Less than 3 times the MDC
0906218-9	Well 30.3.32.343 (N)	Potassium-40	J	Less than 3 times the MDC

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received ten water samples on June 23, 2009, accompanied by a Chain of Custody (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 sample date and time was not listed on the COC form but was available from the sample label for login. 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. The sample was shipped unpreserved and was preserved by 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.

Gamma Spectrometry

The gamma spectrometry efficiency calibrations were performed on various dates ranging from July 1, 2008 to June 15, 2009. Weekly instrument background determinations were performed on June 26, 2009. All daily calibration and background check results met the acceptance criteria.

Tritium

The tritium calibration was performed on March 15, 2009, using a constant quench approach. Samples with a quench factor outside the calibration range are spiked with nitromethane to adjust the quench factor prior to counting. A high-energy window (Window 2) was established to monitor for any potential interferences that might be present due to higher energy beta emitters that would bias the results high. All samples had Window 2 count rates within the control limits.

Radiochemical Analysis

All radiochemical results reported included the calculated two-sigma total propagated uncertainty (TPU) and minimum detectable concentration (MDC). Radiochemical results are qualified with a “J” flag (estimated) when the result is greater than the MDC, but less than 3 times the MDC. Radiochemical results are qualified with a “U” flag (not detected) when the result is greater than the MDC, but less than the two-sigma TPU.

Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. All method blank results were below the MDC.

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 TPU) 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 criteria for all analytes evaluated.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

Completeness

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

Electronic Data Deliverable (EDD) File

An EDD file arrived on July 14, 2009. 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 was manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 09062379 Lab Code: PAR Validator: Steve Donovan Validation Date: 8/10/2009

Project: Gasbuggy Site Analysis Type: Metals General Chem Rad Organics

of Samples: 10 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.

The reported detection limits are equal to or below contract requirements.

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 09062379 **Lab Code:** PAR **Date Due:** 7/21/2009
Matrix: Water **Site Code:** GSB01 **Date Completed:** 7/16/2009

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
Well 28.3.33.233	Actinium-228	06/29/2009						0.28
Well 28.3.33.233	Americium-241	06/29/2009						0.12
Blank_Spike	Americium-241	06/30/2009				99.3		
Well 28.3.33.233	Antimony-125	06/29/2009						0.88
Well 28.3.33.233	Cerium-144	06/29/2009						0.93
Well 28.3.33.233	Cesium-134	06/29/2009						0.66
Well 28.3.33.233	Cesium-137	06/29/2009						0.48
Blank_Spike	Cesium-137	06/30/2009				101.0		
Well 28.3.33.233	Cobalt-60	06/29/2009						0.16
Blank_Spike	Cobalt-60	06/30/2009				97.0		
Well 28.3.33.233	Europium-152	06/29/2009						0.69
Well 28.3.33.233	Europium-154	06/29/2009						0.54
Well 28.3.33.233	Europium-155	06/29/2009						0.97
Cedar Springs	H-3	07/07/2009						0.75
Lower Burro Can	H-3	07/07/2009					87.2	
Blank_Spike	H-3	07/09/2009				90.3		
Blank	H-3	07/09/2009	172.0000	U				
Well 28.3.33.233	Lead-212	06/29/2009						0.15
Well 28.3.33.233	Potassium-40	06/29/2009						0.85
Well 28.3.33.233	Promethium-144	06/29/2009						1.02
Well 28.3.33.233	Promethium-146	06/29/2009						0.99
Well 28.3.33.233	Ruthenium-106	06/29/2009						0.69
Well 28.3.33.233	Thorium-234	06/29/2009						0.97
Well 28.3.33.233	Uranium-235	06/29/2009						1.32
Well 28.3.33.233	Yttrium-88	06/29/2009						0.32

General Information

Requisition No. (RIN): 09062381
Sample Event: June 16-17, 2009
Site(s): Gasbuggy, New Mexico
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 0906219
Analysis: Radiochemistry
Validator: Steve Donivan
Review Date: August 10, 2009

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), "Standard Practice for Validation of Laboratory Data," GT-9(P). The procedure was applied at Level 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 3.

Table 3. 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 4. Refer to the sections below for an explanation of the data qualifiers applied.

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
0906219-5	3003921647	Gross Beta	J	Less than 3 times the MDC
0906219-8	3003929988	Gross Beta	J	Less than 3 times the MDC
0906219-10	3003921647 duplicate	Gross Beta	J	Less than 3 times the MDC

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received ten water samples on June 23, 2009, 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 with the following exceptions. Gamma spectrometry and gross alpha/beta aliquots for sample 3003921097 were listed on the COC, but not received. Gross alpha/beta analysis was performed for this sample using an acidified portion of the tritium aliquot, gamma spectrometry

was not performed. The gross alpha/beta bottle received for the duplicate sample from location 30-039-21647 was labeled with a ticket number of HHS 354, but listed on the COC form with a ticket number of HHT 816. The discrepancy was noted on the laboratory Sample Receipt Form. The laboratory was instructed by email to use the ticket number from the COC form for this sample. 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. 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

All radiochemical results reported included the calculated two-sigma TPU and MDC. Radiochemical results are qualified with a “J” flag (estimated) when the result is greater than the MDC, but less than 3 times the MDC. Radiochemical results are qualified with a “U” flag (not detected) when the result is greater than the MDC, but less than the two-sigma TPU.

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 alpha. All gross alpha sample results were below the MDC.

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 TPU) 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

Samples were diluted in a consistent and acceptable manner when 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 method limitations due to 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 File

An EDD file arrived on July 15, 2009. 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 was manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 09062381 Lab Code: PAR Validator: Steve Donovan Validation Date: 8/10/2009

Project: Gasbuggy Site Analysis Type: Metals General Chem Rad Organics

of Samples: 10 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 18 detection limit failures.

There was 1 trip/equipment blank evaluated.

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

RIN: 09062381 Lab Code: PAR

Non-Compliance Report: Detection Limits

Project: Gasbuggy Site

Validation Date: 8/10/2009

Ticket	Location	Lab Sample ID	Method Code	Lab Method	Analyte Name	Result	Qualifier	Reported Detection Limit	Required Detection Limit	Units
HHT 816	2791	0906219-10	GPC-A-001	724R10	GROSS ALPHA	6.55	U	11	2	pCi/L
HHT 816	2791	0906219-10	GPC-A-001	724R10	GROSS BETA	21.8		21	4	pCi/L
HHS 351	3003907525	0906219-2	GPC-A-001	724R10	GROSS BETA	18.4	U	20	4	pCi/L
HHS 351	3003907525	0906219-2	GPC-A-001	724R10	GROSS ALPHA	4.66	U	13	2	pCi/L
HHS 353	3003921097	0906219-3	GPC-A-001	724R10	GROSS BETA	31.4	U	40	4	pCi/L
HHS 353	3003921097	0906219-3	GPC-A-001	724R10	GROSS ALPHA	21.4	U	26	2	pCi/L
HHS 347	3003921620	0906219-4	GPC-A-001	724R10	GROSS BETA	30.1		6.7	4	pCi/L
HHS 347	3003921620	0906219-4	GPC-A-001	724R10	GROSS ALPHA	-0.0603	U	4	2	pCi/L
HHS 352	3003921647	0906219-5	GPC-A-001	724R10	GROSS BETA	37.7		21	4	pCi/L
HHS 352	3003921647	0906219-5	GPC-A-001	724R10	GROSS ALPHA	8.53	U	11	2	pCi/L
HHS 350	3003921743	0906219-6	GPC-A-001	724R10	GROSS BETA	15.4	U	20	4	pCi/L
HHS 350	3003921743	0906219-6	GPC-A-001	724R10	GROSS ALPHA	5.65	U	11	2	pCi/L
HHS 346	3003921744	0906219-7	GPC-A-001	724R10	GROSS ALPHA	3.48	U	5.7	2	pCi/L
HHS 346	3003921744	0906219-7	GPC-A-001	724R10	GROSS BETA	9.04	U	11	4	pCi/L
HHS 348	3003929988	0906219-8	GPC-A-001	724R10	GROSS BETA	39.1		24	4	pCi/L
HHS 348	3003929988	0906219-8	GPC-A-001	724R10	GROSS ALPHA	4.3	U	16	2	pCi/L
HHS 349	3003930161	0906219-9	GPC-A-001	724R10	GROSS ALPHA	1.3	U	15	2	pCi/L
HHS 349	3003930161	0906219-9	GPC-A-001	724R10	GROSS BETA	22.8	U	24	4	pCi/L

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 09062381 **Lab Code:** PAR **Date Due:** 7/21/2009
Matrix: Water **Site Code:** GSB01 **Date Completed:** 7/16/2009

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
Blank_Spike	Americium-241	06/30/2009				99.3		
Blank_Spike	Cesium-137	06/30/2009				101.0		
Blank_Spike	Cobalt-60	06/30/2009				97.0		
3003921743	GROSS ALPHA	07/02/2009						0.05
3003921743	GROSS ALPHA	07/06/2009					83.6	
Blank_Spike	GROSS ALPHA	07/07/2009				98.7		
Blank	GROSS ALPHA	07/07/2009	0.6750					
3003921743	GROSS BETA	07/02/2009						0.48
3003921743	GROSS BETA	07/06/2009					93.0	
Blank_Spike	GROSS BETA	07/07/2009				99.4		
Blank	GROSS BETA	07/07/2009	0.5010	U				
3003921620	H-3	07/08/2009						0.63
Blank_Spike	H-3	07/09/2009				90.3		
3003929988	H-3	07/09/2009					90.6	
Blank	H-3	07/09/2009	172.0000	U				

General Information

Requisition (RIN): 09062380
Sample Event: June 16-17, 2009
Site(s): Gasbuggy Site
Laboratory: Isotech Laboratories
Work Order No.: 11600
Analysis: Radiochemistry
Validator: Steve Donivan
Review Date: August 14, 2009

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), “Standard Practice for Validation of Laboratory Data”, GT-9(P). The procedure was applied at Level 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 5.

Table 5. 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 eight natural gas samples on June 25, 2009, accompanied by a COC form.

Summary

Eight 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 in the collected water were measured 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 90 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.

Sampling Quality Control Assessment

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

Sampling Protocol

All groundwater samples were collected for Category V flowing wells. Produced water samples were collected from the storage tank or separator for the well.

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 target compounds 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. Duplicate samples were collected from locations 3003921647 and Lower Burro Canyon. The radiochemical duplicate results had relative error ratios less than three, demonstrating acceptable precision.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 09062379 Lab Code: PAR Project: Gasbuggy Site Validation Date: 8/10/2009

Duplicate: 2784

Sample: Lower Burro Canyon

Analyte	Sample			Duplicate			RPD	RER	Units
	Result	Flag	Error	Result	Flag	Error			
Actinium-228	-3.71	U	14.9	9.12	U	9.96		1.4	pCi/L
Americium-241	0.181	U	3.74	3.94	U	26.2		0.3	pCi/L
Antimony-125	7.91	U	8.02	3.16	U	5.44		1.0	pCi/L
Cerium-144	7.12	U	12.6	11.5	U	12.2		0.5	pCi/L
Cesium-134	-3.25	U	3.71	-2.99	U	2.54		0.1	pCi/L
Cesium-137	-0.206	U	3.77	-0.763	U	2.54		0.2	pCi/L
Cobalt-60	-1.21	U	4.29	-1.78	U	2.85		0.2	pCi/L
Europium-152	-4.34	U	21.8	-10	U	14.4		0.4	pCi/L
Europium-154	2.92	U	22.3	6.73	U	13.8		0.3	pCi/L
Europium-155	-4.21	U	6.01	-0.322	U	6.88		0.8	pCi/L
H-3	91	U	199	12.4	U	200		0.5	pCi/L
Lead-212	-2.45	U	7.61	-0.24	U	6.57		0.4	pCi/L
Potassium-40	13.4	U	81.8	16.1	U	68.1		0	pCi/L
Promethium-144	0.294	U	6.87	3.22	U	2.69		0.8	pCi/L
Promethium-146	-0.0356	U	3.8	-3.04	U	2.62		1.3	pCi/L
Ruthenium-106	-13.8	U	30.6	-13.6	U	22.3		0	pCi/L
Thorium-234	-21.8	U	50.8	14.4	U	83.5		0.7	pCi/L
Uranium-235	-5.52	U	12.8	-6.26	U	20.9		0.1	pCi/L
Yttrium-88	1.23	U	4.44	-2.17	U	7.7		0.7	pCi/L

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 09062381 Lab Code: PAR Project: Gasbuggy Site Validation Date: 8/10/2009

Duplicate: 2791

Sample: 3003921647

Analyte	Sample			Duplicate			RPD	RER	Units
	Result	Flag	Error	Result	Flag	Error			
GROSS ALPHA	8.53	U	7.1	6.55	U	6.97		0.4	pCi/L
GROSS BETA	37.7		14.7	21.8		13.5		1.6	pCi/L

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Steve Donivan 12-28-2009
Steve Donivan Date

Data Validation Lead: Steve Donivan 12-28-2009
Steve Donivan Date

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Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the SEEPro database. The application compares the new data set with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition.

There were no potential outliers identified; 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 GSB01, Gasbuggy Site

REPORT DATE: 9/24/2009

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/16/2009	N001	0	-	0	12.4	U	#	32	19.1
Americium-241	pCi/L	06/16/2009	N001	0	-	0	3.14	U	#	8.1	4.91
Antimony-125	pCi/L	06/16/2009	N001	0	-	0	3.6	U	#	20	10
Cerium-144	pCi/L	06/16/2009	N001	0	-	0	-2.82	U	#	29	16.7
Cesium-134	pCi/L	06/16/2009	N001	0	-	0	-2.5	U	#	8.2	4.59
Cesium-137	pCi/L	06/16/2009	N001	0	-	0	-.172	U	#	8.4	4.8
Cobalt-60	pCi/L	06/16/2009	N001	0	-	0	3.47	U	#	10	6.02
Europium-152	pCi/L	06/16/2009	N001	0	-	0	-26	U	#	53	27.6
Europium-154	pCi/L	06/16/2009	N001	0	-	0	4.87	U	#	46	26.2
Europium-155	pCi/L	06/16/2009	N001	0	-	0	4.91	U	#	13	7.82
Gross Alpha	pCi/L	06/16/2009	N001	0	-	0	4.66	U	#	13	8.01
Gross Beta	pCi/L	06/16/2009	N001	0	-	0	18.4	U	#	20	12.4
Lead-212	pCi/L	06/16/2009	N001	0	-	0	-.513	U	#	14	8.42
Oxidation Reduction Potential	mV	06/16/2009	N001	0	-	0	136.6		#		
pH	s.u.	06/16/2009	N001	0	-	0	7.96		#		
Potassium-40	pCi/L	06/16/2009	N001	0	-	0	74.1	U	#	170	104
Promethium-144	pCi/L	06/16/2009	N001	0	-	0	2.49	U	#	12	7.47

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

REPORT DATE: 9/24/2009

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
Promethium-146	pCi/L	06/16/2009	N001	0	-	0	0.237	U	#	8.1	4.67
Ruthenium-106	pCi/L	06/16/2009	N001	0	-	0	15.8	U	#	71	41.8
Specific Conductance	umhos /cm	06/16/2009	N001	0	-	0	10912		#		
Temperature	C	06/16/2009	N001	0	-	0	18.2		#		
Thorium-234	pCi/L	06/16/2009	N001	0	-	0	-2.27	U	#	98	58.3
Tritium	pCi/L	06/16/2009	N001	0	-	0	134	U	#	330	203
Turbidity	NTU	06/16/2009	N001	0	-	0	9.44		#		
Uranium-235	pCi/L	06/16/2009	N001	0	-	0	19.1	U	#	19	11.6
Yttrium-88	pCi/L	06/16/2009	N001	0	-	0	-5.71	U	#	11	5.65

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

REPORT DATE: 9/24/2009

Location: 30-039-21097 WELL Jicarilla 28-3 No. 001; G-6-28N-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	06/16/2009	N001	0	-	0	21.4	U		#	26	16.9
Gross Beta	pCi/L	06/16/2009	N001	0	-	0	31.4	U		#	40	24.8
Oxidation Reduction Potential	mV	06/16/2009	N001	0	-	0	153.1			#		
pH	s.u.	06/16/2009	N001	0	-	0	7.14			#		
Specific Conductance	umhos/cm	06/16/2009	N001	0	-	0	22285			#		
Temperature	C	06/16/2009	N001	0	-	0	25.49			#		
Tritium	pCi/L	06/16/2009	N001	0	-	0	23.6	U		#	330	199
Turbidity	NTU	06/16/2009	N001	0	-	0	150.7			#		

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

REPORT DATE: 9/24/2009

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
Actinium-228	pCi/L	06/17/2009	N001	0	-	0	0.644	U	#	51	29.8
Americium-241	pCi/L	06/17/2009	N001	0	-	0	-3.78	U	#	10	5.63
Antimony-125	pCi/L	06/17/2009	N001	0	-	0	5.24	U	#	21	12.6
Cerium-144	pCi/L	06/17/2009	N001	0	-	0	7.35	U	#	50	29.5
Cesium-134	pCi/L	06/17/2009	N001	0	-	0	-2.46	U	#	9.3	5.19
Cesium-137	pCi/L	06/17/2009	N001	0	-	0	-1.52	U	#	9.6	5.36
Cobalt-60	pCi/L	06/17/2009	N001	0	-	0	-5.4	U	#	11	5.49
Europium-152	pCi/L	06/17/2009	N001	0	-	0	-9.65	U	#	52	27.8
Europium-154	pCi/L	06/17/2009	N001	0	-	0	-2.33	U	#	51	28.2
Europium-155	pCi/L	06/17/2009	N001	0	-	0	-8.13	U	#	21	11.8
Gross Alpha	pCi/L	06/17/2009	N001	0	-	0	-0.0603	U	#	4	2.29
Gross Beta	pCi/L	06/17/2009	N001	0	-	0	30.1		#	6.7	6.61
Lead-212	pCi/L	06/17/2009	N001	0	-	0	-1.33	U	#	17	9.83
Oxidation Reduction Potential	mV	06/17/2009	N001	0	-	0	-39.4		#		
pH	s.u.	06/17/2009	N001	0	-	0	7.06		#		
Potassium-40	pCi/L	06/17/2009	N001	0	-	0	-40.8	U	#	140	75.6
Promethium-144	pCi/L	06/17/2009	N001	0	-	0	7.4	U	#	9.8	6.17

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

REPORT DATE: 9/24/2009

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
Promethium-146	pCi/L	06/17/2009	N001	0	- 0	-1.68	U		#	11	6.07
Ruthenium-106	pCi/L	06/17/2009	N001	0	- 0	6.79	U		#	83	47.8
Specific Conductance	umhos /cm	06/17/2009	N001	0	- 0	1787			#		
Temperature	C	06/17/2009	N001	0	- 0	24.41			#		
Thorium-234	pCi/L	06/17/2009	N001	0	- 0	-26.6	U		#	110	66.3
Tritium	pCi/L	06/17/2009	N001	0	- 0	170	U		#	340	205
Turbidity	NTU	06/17/2009	N001	0	- 0	21.8			#		
Uranium-235	pCi/L	06/17/2009	N001	0	- 0	25.7	U		#	38	23.6
Yttrium-88	pCi/L	06/17/2009	N001	0	- 0	2.79	U		#	13	7.6

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

REPORT DATE: 9/24/2009

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	06/17/2009	N001	0	-	0	15.6	U	#	28	17.4
Americium-241	pCi/L	06/17/2009	N001	0	-	0	1.88	U	#	6.7	4.05
Antimony-125	pCi/L	06/17/2009	N001	0	-	0	3.46	U	#	16	8.59
Cerium-144	pCi/L	06/17/2009	N001	0	-	0	-4.72	U	#	24	14
Cesium-134	pCi/L	06/17/2009	N001	0	-	0	4.2	U	#	9.1	5.69
Cesium-137	pCi/L	06/17/2009	N001	0	-	0	-1.61	U	#	7	3.97
Cobalt-60	pCi/L	06/17/2009	N001	0	-	0	-208	U	#	8.1	4.54
Europium-152	pCi/L	06/17/2009	N001	0	-	0	-25	U	#	45	23.6
Europium-154	pCi/L	06/17/2009	N001	0	-	0	-12.3	U	#	42	23.3
Europium-155	pCi/L	06/17/2009	N001	0	-	0	2.49	U	#	11	6.73
Gross Alpha	pCi/L	06/17/2009	N001	0	-	0	8.53	U	#	11	7.1
Gross Alpha	pCi/L	06/17/2009	N002	0	-	0	6.55	U	#	11	6.97
Gross Beta	pCi/L	06/17/2009	N001	0	-	0	37.7		J #	21	14.7
Gross Beta	pCi/L	06/17/2009	N002	0	-	0	21.8		J #	21	13.5
Lead-212	pCi/L	06/17/2009	N001	0	-	0	-2.7	U	#	14	8.25
Oxidation Reduction Potential	mV	06/17/2009	N001	0	-	0	221.5		#		
pH	s.u.	06/17/2009	N001	0	-	0	8.6		#		

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

REPORT DATE: 9/24/2009

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
Potassium-40	pCi/L	06/17/2009	N001	0	-	0	27.3	U		#	150	86.8
Promethium-144	pCi/L	06/17/2009	N001	0	-	0	1.49	U		#	12	7.09
Promethium-146	pCi/L	06/17/2009	N001	0	-	0	-47	U		#	7.2	4.17
Ruthenium-106	pCi/L	06/17/2009	N001	0	-	0	24.8	U		#	58	35
Specific Conductance	umhos/cm	06/17/2009	N001	0	-	0	9922			#		
Temperature	C	06/17/2009	N001	0	-	0	30.21			#		
Thorium-234	pCi/L	06/17/2009	N001	0	-	0	-21.3	U		#	88	52.1
Tritium	pCi/L	06/17/2009	N001	0	-	0	77.4	U		#	330	201
Turbidity	NTU	06/17/2009	N001	0	-	0	21.4			#		
Uranium-235	pCi/L	06/17/2009	N001	0	-	0	9.96	U		#	23	14
Yttrium-88	pCi/L	06/17/2009	N001	0	-	0	4.42	U		#	7.9	4.85

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

REPORT DATE: 9/24/2009

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

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/17/2009	N001	0	-	0	5.17	U		#	44	25.8
Americium-241	pCi/L	06/17/2009	N001	0	-	0	0.657	U		#	9.1	5.37
Antimony-125	pCi/L	06/17/2009	N001	0	-	0	6.34	U		#	20	11.3
Cerium-144	pCi/L	06/17/2009	N001	0	-	0	-20.5	U		#	51	29.4
Cesium-134	pCi/L	06/17/2009	N001	0	-	0	-4.27	U		#	9.1	5.01
Cesium-137	pCi/L	06/17/2009	N001	0	-	0	-1.52	U		#	9	5.06
Cobalt-60	pCi/L	06/17/2009	N001	0	-	0	-1.21	U		#	9.7	5.26
Europium-152	pCi/L	06/17/2009	N001	0	-	0	-6.12	U		#	49	26.5
Europium-154	pCi/L	06/17/2009	N001	0	-	0	-2.68	U		#	47	26
Europium-155	pCi/L	06/17/2009	N001	0	-	0	0.369	U		#	19	11.4
Gross Alpha	pCi/L	06/17/2009	N001	0	-	0	5.65	U		#	11	6.88
Gross Beta	pCi/L	06/17/2009	N001	0	-	0	15.4	U		#	20	12.6
Lead-212	pCi/L	06/17/2009	N001	0	-	0	-933	U		#	16	9.4
Oxidation Reduction Potential	mV	06/17/2009	N001	0	-	0	-173.2			#		
pH	s.u.	06/17/2009	N001	0	-	0	7.21			#		
Potassium-40	pCi/L	06/17/2009	N001	0	-	0	-18.4	U		#	140	77.3
Promethium-144	pCi/L	06/17/2009	N001	0	-	0	5.78	U		#	8.7	5.43

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

REPORT DATE: 9/24/2009

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

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Promethium-146	pCi/L	06/17/2009	N001	0	- 0	-0.552	U		#	9.5	5.42
Ruthenium-106	pCi/L	06/17/2009	N001	0	- 0	9.96	U		#	78	45.2
Specific Conductance	umhos /cm	06/17/2009	N001	0	- 0	11172			#		
Temperature	C	06/17/2009	N001	0	- 0	21.04			#		
Thorium-234	pCi/L	06/17/2009	N001	0	- 0	-10.8	U		#	110	65.7
Tritium	pCi/L	06/17/2009	N001	0	- 0	101	U		#	330	201
Turbidity	NTU	06/17/2009	N001	0	- 0	138			#		
Uranium-235	pCi/L	06/17/2009	N001	0	- 0	12.2	U		#	34	20.5
Yttrium-88	pCi/L	06/17/2009	N001	0	- 0	-1.02	U		#	12	7.07

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

REPORT DATE: 9/24/2009

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
Actinium-228	pCi/L	06/17/2009	N001	0	- 0	14.6	U		#	31	19
Americium-241	pCi/L	06/17/2009	N001	0	- 0	1.66	U		#	7.8	4.62
Antimony-125	pCi/L	06/17/2009	N001	0	- 0	1.84	U		#	19	11.1
Cerium-144	pCi/L	06/17/2009	N001	0	- 0	-17.4	U		#	46	27.1
Cesium-134	pCi/L	06/17/2009	N001	0	- 0	-2.42	U		#	7.8	4.44
Cesium-137	pCi/L	06/17/2009	N001	0	- 0	-1.98	U		#	8.1	4.52
Cobalt-60	pCi/L	06/17/2009	N001	0	- 0	-906	U		#	9.5	5.33
Europium-152	pCi/L	06/17/2009	N001	0	- 0	13.9	U		#	39	23.3
Europium-154	pCi/L	06/17/2009	N001	0	- 0	-16.9	U		#	46	24.8
Europium-155	pCi/L	06/17/2009	N001	0	- 0	-4.73	U		#	18	10.4
Gross Alpha	pCi/L	06/17/2009	N001	0	- 0	3.48	U		#	5.7	3.58
Gross Beta	pCi/L	06/17/2009	N001	0	- 0	9.04	U		#	11	6.84
Lead-212	pCi/L	06/17/2009	N001	0	- 0	2.02	U		#	17	9.99
Oxidation Reduction Potential	mV	06/17/2009	N001	0	- 0	14.5			#		
pH	s.u.	06/17/2009	N001	0	- 0	6.52			#		
Potassium-40	pCi/L	06/17/2009	N001	0	- 0	20.6	U		#	130	78.3
Promethium-144	pCi/L	06/17/2009	N001	0	- 0	1.82	U		#	8.1	4.8

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

REPORT DATE: 9/24/2009

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
Promethium-146	pCi/L	06/17/2009	N001	0	- 0	1.03	U		#	8	4.67
Ruthenium-106	pCi/L	06/17/2009	N001	0	- 0	23	U		#	69	41.2
Specific Conductance	umhos /cm	06/17/2009	N001	0	- 0	4401			#		
Temperature	C	06/17/2009	N001	0	- 0	27.24			#		
Thorium-234	pCi/L	06/17/2009	N001	0	- 0	-26.4	U		#	100	58.9
Tritium	pCi/L	06/17/2009	N001	0	- 0	10.1	U		#	330	200
Turbidity	NTU	06/17/2009	N001	0	- 0	257			#		
Uranium-235	pCi/L	06/17/2009	N001	0	- 0	10.8	U		#	46	27.4
Yttrium-88	pCi/L	06/17/2009	N001	0	- 0	-1.81	U		#	11	6.51

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

REPORT DATE: 9/24/2009

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	06/17/2009	N001	0	-	0	17.6	U	#	29	14.2
Americium-241	pCi/L	06/17/2009	N001	0	-	0	12	U	#	66	39.8
Antimony-125	pCi/L	06/17/2009	N001	0	-	0	6.75	U	#	17	9.46
Cerium-144	pCi/L	06/17/2009	N001	0	-	0	-322	U	#	30	17.7
Cesium-134	pCi/L	06/17/2009	N001	0	-	0	-935	U	#	9.9	5.81
Cesium-137	pCi/L	06/17/2009	N001	0	-	0	1.14	U	#	7.3	4.3
Cobalt-60	pCi/L	06/17/2009	N001	0	-	0	1.32	U	#	8.7	5.08
Europium-152	pCi/L	06/17/2009	N001	0	-	0	-8.3	U	#	44	24.8
Europium-154	pCi/L	06/17/2009	N001	0	-	0	5.71	U	#	38	22.4
Europium-155	pCi/L	06/17/2009	N001	0	-	0	5.32	U	#	18	10.6
Gross Alpha	pCi/L	06/17/2009	N001	0	-	0	4.3	U	#	16	9.51
Gross Beta	pCi/L	06/17/2009	N001	0	-	0	39.1		J #	24	16
Lead-212	pCi/L	06/17/2009	N001	0	-	0	0.913	U	#	14	8.04
Oxidation Reduction Potential	mV	06/17/2009	N001	0	-	0	185.3		#		
pH	s.u.	06/17/2009	N001	0	-	0	8.45		#		
Potassium-40	pCi/L	06/17/2009	N001	0	-	0	17.2	U	#	140	84.9
Promethium-144	pCi/L	06/17/2009	N001	0	-	0	-252	U	#	7.4	4.33

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

REPORT DATE: 9/24/2009

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
Promethium-146	pCi/L	06/17/2009	N001	0	-	0	4.23	U	#	7.5	4.61
Ruthenium-106	pCi/L	06/17/2009	N001	0	-	0	2.12	U	#	63	36.9
Specific Conductance	umhos /cm	06/17/2009	N001	0	-	0	10811		#		
Temperature	C	06/17/2009	N001	0	-	0	19.9		#		
Thorium-234	pCi/L	06/17/2009	N001	0	-	0	41.8	U	#	140	86.2
Tritium	pCi/L	06/17/2009	N001	0	-	0	58.3	U	#	330	197
Turbidity	NTU	06/17/2009	N001	0	-	0	117		#		
Uranium-235	pCi/L	06/17/2009	N001	0	-	0	21.4	U	#	27	16.9
Yttrium-88	pCi/L	06/17/2009	N001	0	-	0	1.01	U	#	12	6.99

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

REPORT DATE: 9/24/2009

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/17/2009	N001	0	-	0	11.1	U		#	31	18.4
Americium-241	pCi/L	06/17/2009	N001	0	-	0	4.93	U		#	7.3	4.55
Antimony-125	pCi/L	06/17/2009	N001	0	-	0	-5.04	U		#	19	10.7
Cerium-144	pCi/L	06/17/2009	N001	0	-	0	3.27	U		#	26	15.7
Cesium-134	pCi/L	06/17/2009	N001	0	-	0	-3.5	U		#	8.1	4.52
Cesium-137	pCi/L	06/17/2009	N001	0	-	0	-6.96	U		#	8.6	4.61
Cobalt-60	pCi/L	06/17/2009	N001	0	-	0	2.86	U		#	8.5	5.08
Europium-152	pCi/L	06/17/2009	N001	0	-	0	20.8	U		#	46	27.7
Europium-154	pCi/L	06/17/2009	N001	0	-	0	-17.5	U		#	47	25.6
Europium-155	pCi/L	06/17/2009	N001	0	-	0	-5.62	U		#	13	7.2
Gross Alpha	pCi/L	06/17/2009	N001	0	-	0	1.3	U		#	15	8.86
Gross Beta	pCi/L	06/17/2009	N001	0	-	0	22.8	U		#	24	14.9
Lead-212	pCi/L	06/17/2009	N001	0	-	0	-426	U		#	15	8.79
Oxidation Reduction Potential	mV	06/17/2009	N001	0	-	0	163.1			#		
pH	s.u.	06/17/2009	N001	0	-	0	7.9			#		
Potassium-40	pCi/L	06/17/2009	N001	0	-	0	63.6	U		#	150	91.8
Promethium-144	pCi/L	06/17/2009	N001	0	-	0	1.15	U		#	12	7.38

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

REPORT DATE: 9/24/2009

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

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Promethium-146	pCi/L	06/17/2009	N001	0	-	0	-2.67	U	#	8	4.48
Ruthenium-106	pCi/L	06/17/2009	N001	0	-	0	-7.77	U	#	67	38.1
Specific Conductance	umhos/cm	06/17/2009	N001	0	-	0	11302		#		
Temperature	C	06/17/2009	N001	0	-	0	20.23		#		
Thorium-234	pCi/L	06/17/2009	N001	0	-	0	-16.1	U	#	92	54.5
Tritium	pCi/L	06/17/2009	N001	0	-	0	51.7	U	#	330	200
Turbidity	NTU	06/17/2009	N001	0	-	0	135		#		
Uranium-235	pCi/L	06/17/2009	N001	0	-	0	17.9	U	#	26	14.5
Yttrium-88	pCi/L	06/17/2009	N001	0	-	0	-1.23	U	#	10	5.78

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

REPORT DATE: 9/24/2009

Location: Jicarilla Well 1 WELL Mapping Grade GPS

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/16/2009	N001	17084 - 17084	11.1	U		#	20	12
Americium-241	pCi/L	06/16/2009	N001	17084 - 17084	1.97	U		#	4.7	2.82
Antimony-125	pCi/L	06/16/2009	N001	17084 - 17084	3.8	U		#	11	5.88
Cerium-144	pCi/L	06/16/2009	N001	17084 - 17084	-5.52	U		#	16	9.55
Cesium-134	pCi/L	06/16/2009	N001	17084 - 17084	-2.85	U		#	4.8	2.75
Cesium-137	pCi/L	06/16/2009	N001	17084 - 17084	1.18	U		#	4.7	2.79
Cobalt-60	pCi/L	06/16/2009	N001	17084 - 17084	-0.832	U		#	6.2	3.52
Europium-152	pCi/L	06/16/2009	N001	17084 - 17084	-12	U		#	30	16.6
Europium-154	pCi/L	06/16/2009	N001	17084 - 17084	-8.32	U		#	29	16.5
Europium-155	pCi/L	06/16/2009	N001	17084 - 17084	-3.49	U		#	7.9	4.63
Lead-212	pCi/L	06/16/2009	N001	17084 - 17084	-0.248	U		#	12	7.39
Oxidation Reduction Potential	mV	06/16/2009	N001	17084 - 17084	112.6			#		
pH	s.u.	06/16/2009	N001	17084 - 17084	8.84			#		
Potassium-40	pCi/L	06/16/2009	N001	17084 - 17084	28.9	U		#	130	77.3
Promethium-144	pCi/L	06/16/2009	N001	17084 - 17084	-2.22	U		#	11	6.41
Promethium-146	pCi/L	06/16/2009	N001	17084 - 17084	0.683	U		#	4.8	2.89
Ruthenium-106	pCi/L	06/16/2009	N001	17084 - 17084	16.5	U		#	43	25.8

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

REPORT DATE: 9/24/2009

Location: Jicarilla Well 1 WELL Mapping Grade GPS

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Specific Conductance	umhos/cm	06/16/2009	N001	17084 - 17084	1623			#		
Temperature	C	06/16/2009	N001	17084 - 17084	18.88			#		
Thorium-234	pCi/L	06/16/2009	N001	17084 - 17084	-9.03	U		#	81	48.6
Tritium	pCi/L	06/16/2009	N001	17084 - 17084	-10.4	U		#	330	196
Turbidity	NTU	06/16/2009	N001	17084 - 17084	9.79			#		
Uranium-235	pCi/L	06/16/2009	N001	17084 - 17084	13.5		J	#	12	7
Yttrium-88	pCi/L	06/16/2009	N001	17084 - 17084	5.29	U		#	5.6	3.58

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

REPORT DATE: 9/24/2009

Location: Lower Burro Canyon WELL Mapping Grade GPS

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/16/2009	N001	0	-	0	-3.71	U		#	26	14.9
Actinium-228	pCi/L	06/16/2009	N002	0	-	0	9.12	U		#	16	9.96
Americium-241	pCi/L	06/16/2009	N001	0	-	0	0.181	U		#	6.3	3.74
Americium-241	pCi/L	06/16/2009	N002	0	-	0	3.94	U		#	44	26.2
Antimony-125	pCi/L	06/16/2009	N001	0	-	0	7.91	U		#	14	8.02
Antimony-125	pCi/L	06/16/2009	N002	0	-	0	3.16	U		#	10	5.44
Cerium-144	pCi/L	06/16/2009	N001	0	-	0	7.12	U		#	21	12.6
Cerium-144	pCi/L	06/16/2009	N002	0	-	0	11.5	U		#	20	12.2
Cesium-134	pCi/L	06/16/2009	N001	0	-	0	-3.25	U		#	6.5	3.71
Cesium-134	pCi/L	06/16/2009	N002	0	-	0	-2.99	U		#	4.4	2.54
Cesium-137	pCi/L	06/16/2009	N001	0	-	0	-206	U		#	6.5	3.77
Cesium-137	pCi/L	06/16/2009	N002	0	-	0	-763	U		#	4.3	2.54
Cobalt-60	pCi/L	06/16/2009	N001	0	-	0	-1.21	U		#	7.7	4.29
Cobalt-60	pCi/L	06/16/2009	N002	0	-	0	-1.78	U		#	5	2.85
Europium-152	pCi/L	06/16/2009	N001	0	-	0	-4.34	U		#	39	21.8
Europium-152	pCi/L	06/16/2009	N002	0	-	0	-10	U		#	25	14.4
Europium-154	pCi/L	06/16/2009	N001	0	-	0	2.92	U		#	38	22.3

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

REPORT DATE: 9/24/2009

Location: Lower Burro Canyon WELL Mapping Grade GPS

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Europium-154	pCi/L	06/16/2009	N002	0	-	0	6.73	U		#	23	13.8
Europium-155	pCi/L	06/16/2009	N001	0	-	0	-4.21	U		#	10	6.01
Europium-155	pCi/L	06/16/2009	N002	0	-	0	-.322	U		#	12	6.88
Lead-212	pCi/L	06/16/2009	N001	0	-	0	-2.45	U		#	13	7.61
Lead-212	pCi/L	06/16/2009	N002	0	-	0	-.24	U		#	11	6.57
Oxidation Reduction Potential	mV	06/16/2009	N001	0	-	0	103.9			#		
pH	s.u.	06/16/2009	N001	0	-	0	8.3			#		
Potassium-40	pCi/L	06/16/2009	N001	0	-	0	13.4	U		#	140	81.8
Potassium-40	pCi/L	06/16/2009	N002	0	-	0	16.1	U		#	110	68.1
Promethium-144	pCi/L	06/16/2009	N001	0	-	0	0.294	U		#	12	6.87
Promethium-144	pCi/L	06/16/2009	N002	0	-	0	3.22	U		#	4.3	2.69
Promethium-146	pCi/L	06/16/2009	N001	0	-	0	-.0356	U		#	6.5	3.8
Promethium-146	pCi/L	06/16/2009	N002	0	-	0	-3.04	U		#	4.6	2.62
Ruthenium-106	pCi/L	06/16/2009	N001	0	-	0	-13.8	U		#	54	30.6
Ruthenium-106	pCi/L	06/16/2009	N002	0	-	0	-13.6	U		#	38	22.3
Specific Conductance	umhos/cm	06/16/2009	N001	0	-	0	2625			#		
Temperature	C	06/16/2009	N001	0	-	0	18.34			#		

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

REPORT DATE: 9/24/2009

Location: Lower Burro Canyon WELL Mapping Grade GPS

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Thorium-234	pCi/L	06/16/2009	N001	0	-	0	-21.8	U		#	85	50.8
Thorium-234	pCi/L	06/16/2009	N002	0	-	0	14.4	U		#	140	83.5
Tritium	pCi/L	06/16/2009	N001	0	-	0	91	U		#	330	199
Tritium	pCi/L	06/16/2009	N002	0	-	0	12.4	U		#	340	200
Turbidity	NTU	06/16/2009	N001	0	-	0	3.97			#		
Uranium-235	pCi/L	06/16/2009	N001	0	-	0	-5.52	U		#	22	12.8
Uranium-235	pCi/L	06/16/2009	N002	0	-	0	-6.26	U		#	35	20.9
Yttrium-88	pCi/L	06/16/2009	N001	0	-	0	1.23	U		#	7.6	4.44
Yttrium-88	pCi/L	06/16/2009	N002	0	-	0	-2.17	U		#	13	7.7

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

REPORT DATE: 9/24/2009

Location: Well 28.3.33.233 (S) WELL Mapping Grade GPS

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/16/2009	N001	0	-	0	-8.38	U		#	35	20.8
Americium-241	pCi/L	06/16/2009	N001	0	-	0	0	U		#	54	32.1
Antimony-125	pCi/L	06/16/2009	N001	0	-	0	5.84	U		#	13	7.91
Cerium-144	pCi/L	06/16/2009	N001	0	-	0	-4.78	U		#	27	16.2
Cesium-134	pCi/L	06/16/2009	N001	0	-	0	-1.6	U		#	5.7	3.33
Cesium-137	pCi/L	06/16/2009	N001	0	-	0	-0.857	U		#	5.6	3.22
Cobalt-60	pCi/L	06/16/2009	N001	0	-	0	-0.765	U		#	6.4	3.66
Europium-152	pCi/L	06/16/2009	N001	0	-	0	6.2	U		#	32	18.6
Europium-154	pCi/L	06/16/2009	N001	0	-	0	-1.07	U		#	32	18.6
Europium-155	pCi/L	06/16/2009	N001	0	-	0	2.01	U		#	14	8.64
Lead-212	pCi/L	06/16/2009	N001	0	-	0	1.34	U		#	12	7.31
Oxidation Reduction Potential	mV	06/16/2009	N001	0	-	0	91.2			#		
pH	s.u.	06/16/2009	N001	0	-	0	8.04			#		
Potassium-40	pCi/L	06/16/2009	N001	0	-	0	21.9	U		#	120	74.6
Promethium-144	pCi/L	06/16/2009	N001	0	-	0	4.87	U		#	5.8	3.63
Promethium-146	pCi/L	06/16/2009	N001	0	-	0	-5.42	U		#	6.4	3.6
Ruthenium-106	pCi/L	06/16/2009	N001	0	-	0	0	U		#	48	28

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

REPORT DATE: 9/24/2009

Location: Well 28.3.33.233 (S) WELL Mapping Grade GPS

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Specific Conductance	umhos/cm	06/16/2009	N001	0	- 0	2227			#		
Temperature	C	06/16/2009	N001	0	- 0	16.74			#		
Thorium-234	pCi/L	06/16/2009	N001	0	- 0	-4.94	U		#	150	87.4
Tritium	pCi/L	06/16/2009	N001	0	- 0	37.5	U		#	340	202
Turbidity	NTU	06/16/2009	N001	0	- 0	6.68			#		
Uranium-235	pCi/L	06/16/2009	N001	0	- 0	13.7	U		#	25	15.4
Yttrium-88	pCi/L	06/16/2009	N001	0	- 0	0.761	U		#	14	8.21

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

REPORT DATE: 9/24/2009

Location: Well 30.3.32.343 (N) WELL Mapping Grade GPS

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/16/2009	N001	0	-	0	19.4	U	#	32	16
Americium-241	pCi/L	06/16/2009	N001	0	-	0	7.05	U	#	43	25.5
Antimony-125	pCi/L	06/16/2009	N001	0	-	0	-3.74	U	#	20	10.5
Cerium-144	pCi/L	06/16/2009	N001	0	-	0	8.87	U	#	32	18.9
Cesium-134	pCi/L	06/16/2009	N001	0	-	0	0.768	U	#	8.5	4.99
Cesium-137	pCi/L	06/16/2009	N001	0	-	0	-2.63	U	#	9.4	5.26
Cobalt-60	pCi/L	06/16/2009	N001	0	-	0	-1.71	U	#	12	6.74
Europium-152	pCi/L	06/16/2009	N001	0	-	0	30.2	U	#	44	27.9
Europium-154	pCi/L	06/16/2009	N001	0	-	0	-9.55	U	#	51	28.3
Europium-155	pCi/L	06/16/2009	N001	0	-	0	-.348	U	#	19	11
Lead-212	pCi/L	06/16/2009	N001	0	-	0	3.82	U	#	16	9.75
Oxidation Reduction Potential	mV	06/16/2009	N001	0	-	0	180		#		
pH	s.u.	06/16/2009	N001	0	-	0	7.76		#		
Potassium-40	pCi/L	06/16/2009	N001	0	-	0	158		J #	93	68.9
Promethium-144	pCi/L	06/16/2009	N001	0	-	0	4.35	U	#	8.4	5.17
Promethium-146	pCi/L	06/16/2009	N001	0	-	0	0.672	U	#	9.1	5.33
Ruthenium-106	pCi/L	06/16/2009	N001	0	-	0	-40.4	U	#	78	42.5

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

REPORT DATE: 9/24/2009

Location: Well 30.3.32.343 (N) WELL Mapping Grade GPS

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Specific Conductance	umhos/cm	06/16/2009	N001	0	-	0	1992			#		
Temperature	C	06/16/2009	N001	0	-	0	14.9			#		
Thorium-234	pCi/L	06/16/2009	N001	0	-	0	28.4	U		#	160	98.4
Tritium	pCi/L	06/16/2009	N001	0	-	0	265	U		#	340	212
Turbidity	NTU	06/16/2009	N001	0	-	0	7.68			#		
Uranium-235	pCi/L	06/16/2009	N001	0	-	0	13.6	U		#	48	28.6
Yttrium-88	pCi/L	06/16/2009	N001	0	-	0	0.992	U		#	14	8.29

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

REPORT DATE: 9/24/2009

Location: Windmill #2 WELL Mapping Grade GPS

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/16/2009	N001	16949 - 16949	9.4	U		#	37	22
Americium-241	pCi/L	06/16/2009	N001	16949 - 16949	9.01	U		#	58	35.3
Antimony-125	pCi/L	06/16/2009	N001	16949 - 16949	6.14	U		#	17	9.48
Cerium-144	pCi/L	06/16/2009	N001	16949 - 16949	5.77	U		#	30	17.8
Cesium-134	pCi/L	06/16/2009	N001	16949 - 16949	-3.19	U		#	7.7	4.38
Cesium-137	pCi/L	06/16/2009	N001	16949 - 16949	-2.08	U		#	7.6	4.28
Cobalt-60	pCi/L	06/16/2009	N001	16949 - 16949	0.888	U		#	9.1	5.28
Europium-152	pCi/L	06/16/2009	N001	16949 - 16949	4.58	U		#	44	25.3
Europium-154	pCi/L	06/16/2009	N001	16949 - 16949	5.86	U		#	42	24.7
Europium-155	pCi/L	06/16/2009	N001	16949 - 16949	-.39	U		#	17	10.2
Lead-212	pCi/L	06/16/2009	N001	16949 - 16949	2.09	U		#	15	9.11
Oxidation Reduction Potential	mV	06/16/2009	N001	16949 - 16949	135			#		
pH	s.u.	06/16/2009	N001	16949 - 16949	9.14			#		
Potassium-40	pCi/L	06/16/2009	N001	16949 - 16949	20.1	U		#	170	98.2
Promethium-144	pCi/L	06/16/2009	N001	16949 - 16949	3.19	U		#	7.8	3.38
Promethium-146	pCi/L	06/16/2009	N001	16949 - 16949	-1.29	U		#	8.9	5.11
Ruthenium-106	pCi/L	06/16/2009	N001	16949 - 16949	-3.29	U		#	90	52.6
Specific Conductance	umhos/cm	06/16/2009	N001	16949 - 16949	1273			#		

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

REPORT DATE: 9/24/2009

Location: Windmill #2 WELL Mapping Grade GPS

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Temperature	C	06/16/2009	N001	16949 - 16949	19.75			#		
Thorium-234	pCi/L	06/16/2009	N001	16949 - 16949	-50.7	U		#	140	85.6
Tritium	pCi/L	06/16/2009	N001	16949 - 16949	50.4	U		#	330	198
Turbidity	NTU	06/16/2009	N001	16949 - 16949	7.17			#		
Uranium-235	pCi/L	06/16/2009	N001	16949 - 16949	14.2	U		#	39	23.7
Yttrium-88	pCi/L	06/16/2009	N001	16949 - 16949	-5.23	U		#	16	9.16

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.

Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 9/24/2009

Location: Cave Springs SURFACE LOCATION Mapping Grade GPS

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Oxidation Reduction Potential	mV	06/17/2009	N001	-108.7			#		
pH	s.u.	06/17/2009	N001	8.22			#		
Specific Conductance	umhos/cm	06/17/2009	N001	556			#		
Temperature	C	06/17/2009	N001	24.61			#		
Tritium	pCi/L	06/17/2009	N001	6.14	U		#	330	198
Turbidity	NTU	06/17/2009	N001	2.32			#		

Surface Water Quality Data by Location (USEE102) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 9/24/2009

Location: Cedar Springs SURFACE LOCATION Mapping Grade GPS

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Oxidation Reduction Potential	mV	06/17/2009	N001	25.8			#		
pH	s.u.	06/17/2009	N001	8.27			#		
Specific Conductance	umhos/cm	06/17/2009	N001	741			#		
Temperature	C	06/17/2009	N001	18.44			#		
Tritium	pCi/L	06/17/2009	N001	129	U		#	330	199
Turbidity	NTU	06/17/2009	N001	3.24			#		

Surface Water Quality Data by Location (USEE102) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 9/24/2009

Location: La Jara Creek SURFACE LOCATION Mapping Grade GPS

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Oxidation Reduction Potential	mV	06/16/2009	N001	158.4			#		
pH	s.u.	06/16/2009	N001	8.26			#		
Specific Conductance	umhos/cm	06/16/2009	N001	2930			#		
Temperature	C	06/16/2009	N001	23.57			#		
Tritium	pCi/L	06/16/2009	N001	70.8	U		#	330	198
Turbidity	NTU	06/16/2009	N001	69.7			#		

Surface Water Quality Data by Location (USEE102) FOR SITE GSB01, Gasbuggy Site

REPORT DATE: 9/24/2009

Location: Pnd N WL 30.3.32.343 SURFACE LOCATION Mapping Grade GPS

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Oxidation Reduction Potential	mV	06/16/2009	N001	167.2		#		
pH	s.u.	06/16/2009	N001	8.67		#		
Specific Conductance	umhos/cm	06/16/2009	N001	453		#		
Temperature	C	06/16/2009	N001	20.03		#		
Tritium	pCi/L	06/16/2009	N001	111	U	#	330	202
Turbidity	NTU	06/16/2009	N001	111		#		

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 Analysis Data

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

REPORT DATE: 10/7/2009

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	06/16/2009	0001	HHS 351	-	NATURAL GAS - DRY	0.5			#	
Tritium	pCi/L	06/16/2009	0001	HHS 351	-	NATURAL GAS - DRY	0.0514	U		#	0.0514

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

REPORT DATE: 10/7/2009

Location: 30-039-21097 WELL, Natural Gas Well - Vertical, Jicarilla 28-3 No. 001; G-6-28N-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	06/16/2009	0001	HHS 353	-	NATURAL GAS - DRY	1.3			#	
Tritium	pCi/L	06/16/2009	0001	HHS 353	-	NATURAL GAS - DRY	0.0514	U		#	0.0514

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

REPORT DATE: 10/7/2009

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	06/17/2009	0001	HHS 347	-	NATURAL GAS - DRY	1	U	#	1	
Tritium	pCi/L	06/17/2009	0001	HHS 347	-	NATURAL GAS - DRY	0.0514	U	#	0.0514	

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

REPORT DATE: 10/7/2009

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	06/17/2009	0001	HHS 352	-	NATURAL GAS - DRY	0.6			#	
Tritium	pCi/L	06/17/2009	0001	HHS 352	-	NATURAL GAS - DRY	0.0514	U		#	0.0514

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

REPORT DATE: 10/7/2009

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	06/17/2009	0001	HHS 350	-	NATURAL GAS - DRY	0.2	U	#	0.2	
Tritium	pCi/L	06/17/2009	0001	HHS 350	-	NATURAL GAS - DRY	0.0514	U	#	0.0514	

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

REPORT DATE: 10/7/2009

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	06/17/2009	0001	HHS 346	-	NATURAL GAS - DRY	0.4			#	
Tritium	pCi/L	06/17/2009	0001	HHS 346	-	NATURAL GAS - DRY	0.0514	U		#	0.0514

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

REPORT DATE: 10/7/2009

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	06/17/2009	0001	HHS 348	-	NATURAL GAS - DRY	0.3	U	#	0.3	
Tritium	pCi/L	06/17/2009	0001	HHS 348	-	NATURAL GAS - DRY	0.0545	U	#	0.0545	

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

REPORT DATE: 10/7/2009

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	06/17/2009	0001	HHS 349	-	NATURAL GAS - DRY	0.4	U	#	0.4	
Tritium	pCi/L	06/17/2009	0001	HHS 349	-	NATURAL GAS - DRY	0.0571	U	#	0.0571	

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.

Equipment Blank Data

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BLANKS REPORT

LAB: PARAGON (Fort Collins, CO)

RIN: 09062381

Report Date: 9/24/2009

Parameter	Site Code	Location ID	Sample Date	ID	Units	Result	Qualifiers Lab Data	Detection Limit	Uncertainty	Sample Type
Actinium-228	GSB01	0999	06/17/2009	N001	pCi/L	24.2	U	25	16.1	E
Americium-241	GSB01	0999	06/17/2009	N001	pCi/L	0.704	U	65	38.3	E
Antimony-125	GSB01	0999	06/17/2009	N001	pCi/L	-7.06	U	17	9.52	E
Cerium-144	GSB01	0999	06/17/2009	N001	pCi/L	-5.11	U	33	19.4	E
Cesium-134	GSB01	0999	06/17/2009	N001	pCi/L	-.534	U	9.9	5.84	E
Cesium-137	GSB01	0999	06/17/2009	N001	pCi/L	-1.87	U	7.2	4.12	E
Cobalt-60	GSB01	0999	06/17/2009	N001	pCi/L	-1.49	U	8.6	4.84	E
Europium-152	GSB01	0999	06/17/2009	N001	pCi/L	-2.26	U	40	22.7	E
Europium-154	GSB01	0999	06/17/2009	N001	pCi/L	-15.2	U	39	21.5	E
Europium-155	GSB01	0999	06/17/2009	N001	pCi/L	-4.02	U	18	10.6	E
Gross Alpha	GSB01	0999	06/17/2009	N001	pCi/L	-.0559	U	1.5	0.567	E
Gross Beta	GSB01	0999	06/17/2009	N001	pCi/L	0.203	U	2.7	1.24	E
Lead-212	GSB01	0999	06/17/2009	N001	pCi/L	-4.24	U	13	7.4	E
Potassium-40	GSB01	0999	06/17/2009	N001	pCi/L	-12	U	140	84.3	E
Promethium-144	GSB01	0999	06/17/2009	N001	pCi/L	6.28	U	6.4	4.14	E
Promethium-146	GSB01	0999	06/17/2009	N001	pCi/L	-1.84	U	7.4	4.22	E
Ruthenium-106	GSB01	0999	06/17/2009	N001	pCi/L	-12.8	U	62	35.5	E
Thorium-234	GSB01	0999	06/17/2009	N001	pCi/L	52.5	U	170	103	E

BLANKS REPORT

LAB: PARAGON (Fort Collins, CO)

RIN: 09062381

Report Date: 9/24/2009

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab Data	Detection Limit	Uncertainty	Sample Type
Tritium	GSB01	0999	06/17/2009	N001	pCi/L	90.3	U	330	201	E
Uranium-235	GSB01	0999	06/17/2009	N001	pCi/L	10.6	U	43	25.8	E
Yttrium-88	GSB01	0999	06/17/2009	N001	pCi/L	-729	U	14	8.54	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.
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- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
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- 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.

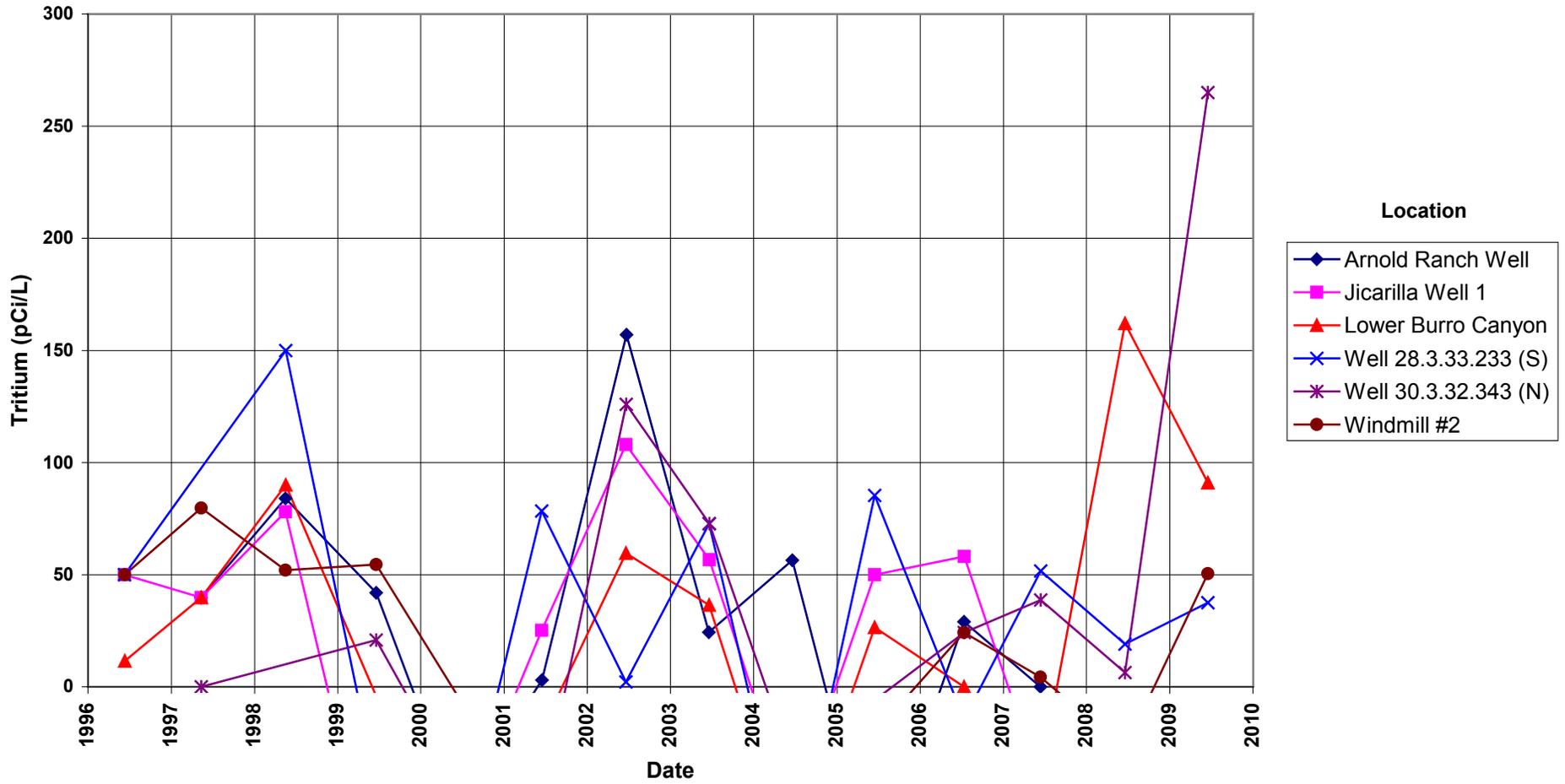
SAMPLE TYPES:

- E Equipment Blank.

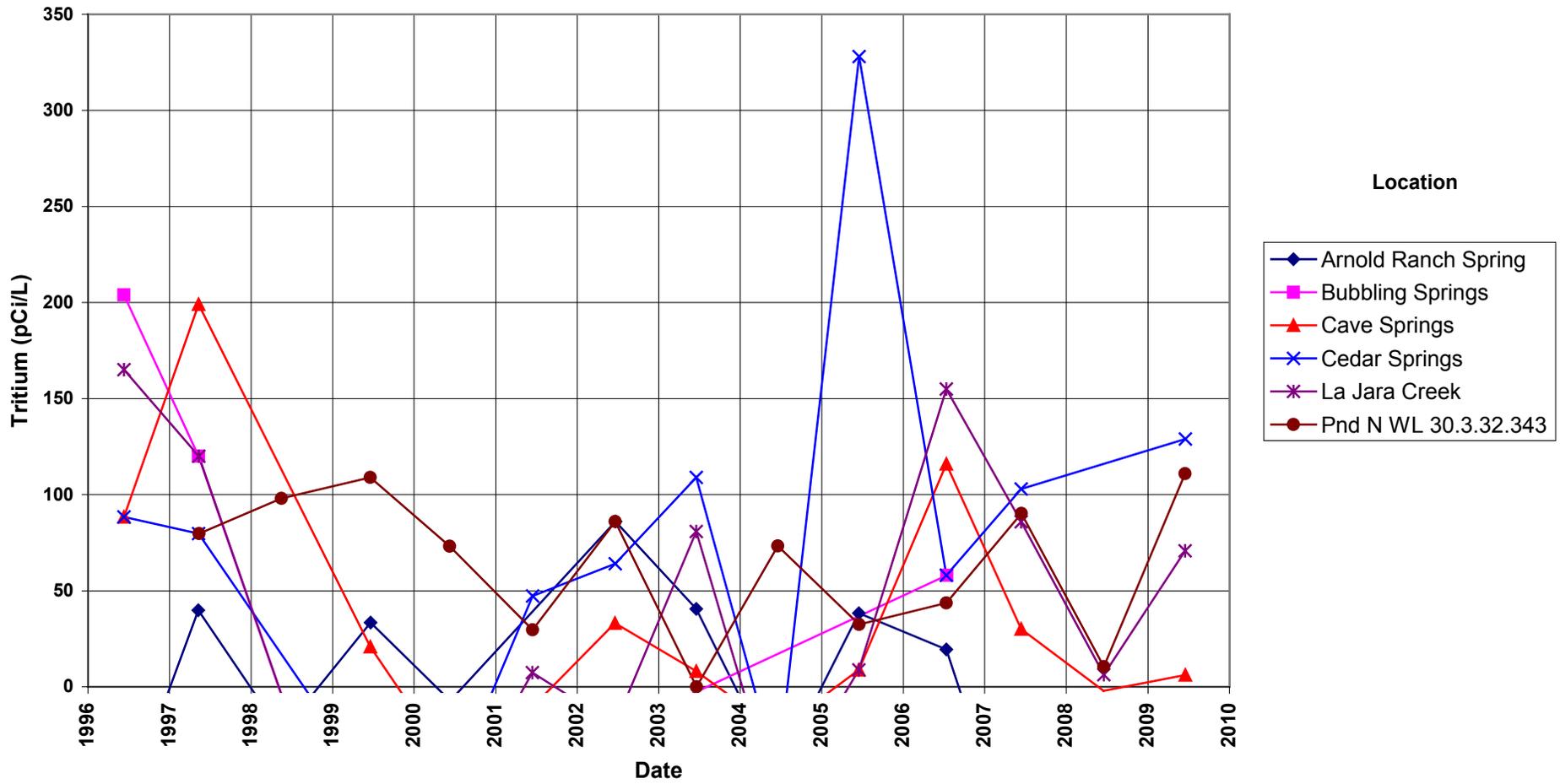
Time-Concentration Graphs

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Gasbuggy Site Groundwater Locations Tritium Concentration



Gasbuggy Site Surface Locations Tritium Concentration



Attachment 3
Sampling and Analysis Work Order

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established 1959

Task Order LM00-502
Control Number 09-0763

May 13, 2009

U.S. Department of Energy
Office of Legacy Management
ATTN: Jalena Dayvault
Site Manager
2597 B 3/4 Road
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
June 2009 Environmental Sampling Gasbuggy, NM

REFERENCE: Task Order LM00-502-07-616-402, 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. Water quality data will be collected from monitor wells, domestic wells, and surface locations at this site as part of the routine environmental sampling currently scheduled to begin the week of June 15, 2009.

The following lists show the locations scheduled to be sampled during this event.

Monitor Wells

Jicarilla Well 1 Lower Burro Canyon Well 30.3.32.343 (N) Well 28.3.33.233 (S)
Windmill #2

Domestic Well

Arnold Ranch Well

Surface Locations

Arnold Ranch Spring Bubbling Springs Cave Springs Cedar Springs
La Jara Creek Pnd N WL 30.3.32.343

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Access agreements are being reviewed and are expected to be complete by the beginning of fieldwork.

If you have any questions, please call me at (970) 248-6477.

Sincerely,

Rick Hutton
Task Order Manager

RH/lcg/dc

Enclosures (3)

cc: rc-grand.junction

cc: (electronic)

Cheri Bahrke, Stoller
Steve Donovan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Rick Hutton, Stoller
Mark Plessinger, Stoller
EDD Delivery

Constituent Sampling Breakdown

Site	Gasbuggy		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water			
Approx. No. Samples/yr	6	6			
<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					
Chloride					
Chromium					
Gamma Spec	X		10 pCi/L	Gamma Spectrometry	GAM-A-001
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N					
Potassium					
Radium-226					
Radium-228					
Selenium					
Silica					
Sodium					
Strontium					
Total Dissolved Solids					
Total Organic Carbon					
Tritium	X	X	400 pCi/L	Liquid Scintillation	LSC-A-001
Uranium					
Vanadium					
Zinc					
Total No. of Analytes	2	1			

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

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Attachment 4 Trip Report

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Memorandum

Control Number N/A

DATE: July 9, 2009
 TO: Mark Plessinger
 FROM: Jeff Price
 SUBJECT: Trip Report (LTHMP Sampling)

Site: Gas Buggy, NM

Dates of Sampling Event: June 15-17, 2009

Team Members: David Atkinson, Mark Plessinger, and Jeff Price.

Number of Locations Sampled: 5 groundwater wells, 4 surface locations, produced water from 8 natural gas wells, and natural gas from 8 natural gas wells.

Locations Not Sampled/Reason: Bubbling Spring was dry; the two Arnold Ranch locations were not sampled because no one was home. Tritium was the only produced water analyte collected from well 3003921097. A complete suite of analytes were collected from all other sampled locations.

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
2784	Lower Burro Canyon	Duplicate	Groundwater (Gamma Spec, H3)	HHS-333
2791	3003921647	Duplicate	Produced Water (Gross alpha/beta)	HHT-816
2790		Equipment Blank		HHT-701

RIN Number Assigned: Samples were assigned to RIN 09062379 (produced water), RIN 09062380 (natural gas), RIN 09062381 (groundwater and surface water).

Sample Shipment: Samples were shipped on June 22, 2009.

Water Level Measurements: Water levels were not measured.

Trip Summary

The 2009 Gasbuggy, NM, hydrologic and natural gas sampling event was conducted during the week of June 15, 2009. Dayvault with DOE–LM, and Jeff Price, David Atkinson, and Mark Plessinger with the LMS contractor staff participated in the sampling event.

On Monday, June 15, staff traveled from Grand Junction to Farmington, New Mexico. ConocoPhillips provided a safety orientation at the ConocoPhillips offices in Farmington. This safety orientation allowed staff access to the ConocoPhillips gas well site for sampling.

On Tuesday, June 16, natural gas and produced water samples were acquired from the Williams Production Co. and Dugan Production Corp. gas wells located on the Jicarilla Apache tribal property. Keith Manuel with the Jicarilla tribe accompanied staff during all sampling activities on tribal property. The produced water sample from the Williams well was acquired from the storage tank. The produced water sample from the Dugan well was acquired from the separator. Sampling of the five windmill-powered water wells and two surface water locations on tribal property was also completed on June 16.

On Wednesday, June 17, 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 for all six wells were acquired from the storage tank for each well. Jim Lovato with the Bureau of Land Management (BLM) and Sophia Marshall with the U.S. Forest Service accompanied the sampling crew to the Schalk Development wells during the afternoon. Three interns (petroleum engineering students) accompanied the BLM to the sampling locations. After completing the natural gas sampling, the two surface water sampling locations on Carson National Forest were sampled.

The natural gas production wells listed in the following table were sampled for both gas and produced water.

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
30-039-21097	G-6-28N-3W Jicarilla 28-3 No. 001	Dugan Production Corp.

All gas samples will be analyzed for tritium and carbon-14. All produced water samples, with the exception of the water sample acquired from the Dugan Production Corp. well, will be analyzed for tritium, gross alpha, gross beta, and gamma emitters by high resolution gamma spectroscopy. The Dugan well water sample volume was sufficient for tritium analysis only. Surface water samples will be analyzed for tritium; samples from the wind-mill locations will be analyzed for tritium and gamma emitters by high resolution gamma spectroscopy.

(JP/lcg)

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

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