

**Project Rulison  
Monitoring Results  
For Water Vapor in Gas at a  
Natural Gas Compressor Station,  
Holmes Mesa, Garfield County, Colorado**

**U.S. Department of Energy Office of Legacy Management  
Grand Junction, Colorado**

Date Sampled: 16 June 2011

Purpose:

Collect a condensed, gas-phase, water sample at the Holmes Mesa Natural Gas Compressor Station.

Background:

Natural gas from local wells in the Parachute field is sent by pipelines to the Holmes Mesa Compressor Station in Garfield County, Colorado. DOE currently monitors natural gas wells at their respective well heads that supply gas and produced water to this compressor station. DOE has previously collected produced water for baseline analysis from another compressor station in the area. This sampling event provides DOE and the stakeholders with a background baseline.

Samples Collected:

- 1 condensed, gas-phase, water sample

Findings:

- No analytical result exceeded its respective screening level.

Sample Collection Location:

Water vapor is removed from the natural gas by contact with triethylene glycol (TEG). The water and condensate (BETX<sup>1</sup>) are removed from the TEG as steam, condensed and accumulated. The sample was collected from a spigot on the condenser-unit accumulation tank. The regenerated TEG is returned to the contactor unit.

Sample Name: HolmesMesa\_TEG

Sample Ticket Number: JHS 981

Requisition Identification Number (RIN): 11063883 (ALS Laboratory Group, Fort Collins, CO)

Monitoring Protocol:

*Rulison Monitoring Plan* (July 2010, LMS/RUL/S06178)

A copy is available at <http://www.lm.doe.gov/Rulison/Documents.aspx>

*Table 1a. Gas-Phase Screening and Action Concentrations for Tritium Sample Results*

Analyte	Reporting Units	Screening conc.	Action Conc.	Comment
Tritium	TU	19,293	TBD	$5.183 \times 10^{-6}$ pCi/cc/TU

The derived air effluent concentration for 50 mrem-per-year dose from tritium exposure is 0.10 pCi (tritium) / (cc of methane).

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<sup>1</sup> Benzene, toluene, ethylbenzene and xylenes.

Table 1b. Liquid-Phase Screening and Action Concentrations for Tritium and Various Analytical Method Results

Analyte	Reporting Units	Screening conc.	Action Conc.	Comment
Tritium	pCi/L	800	TBD	20,000 pCi/L = EPA drinking water standard
<b>Lab Method</b>				
Gross alpha	pCi/L	3x background	TBD	
Gross beta	pCi/L	3x background	TBD	
High-resolution gamma spectroscopy	pCi/L	20	TBD	Based on cesium-137

Table 3 Notes: See the Rulison Monitoring Plan, Table 2, for response scenarios when the screening and/or action concentrations are exceeded.  
 TU: tritium unit  
 pCi/cc/TU: picocurie per cubic centimeter per tritium unit  
 pCi/L: picocuries per liter  
 TBD: to be determined

Results Summary:

- 1 liquid sample was collected

Laboratory Qualifiers:

A “detect” is a laboratory result greater than the laboratory’s reporting threshold or minimum detectable concentration (MDC).

A “nondetect” is a laboratory result that is less than the laboratory’s MDC for that sample. The laboratory qualifies a “nondetect” with a “U.”

Data Validation Qualifiers:

A laboratory result less than three times the one-sigma total propagated uncertainty is considered a “nondetect” and assigned the data qualifier “U.” Three times the one-sigma propagated uncertainty is called the Decision Level Concentration.

A “detect” result greater than 3-times the sample MDC is assigned the data qualifier “J.”

“NA” denotes missing results.

Table 2a. Summary of Tritium Results for Liquid-Phase Samples

Collection Point	Total Sampled (gas/liquid)	Tritium (gas phase)			Tritium (liquid phase)		
		Detect	Nondetect	NA	Detect	Nondetect	NA
Regeneration unit	0/1	–	–	–	–	1	–

Table 2b. Summary of Gross Count Results for Liquid Phase-Samples

Collection Point	Total Sampled	Gross Alpha Counting			Gross Beta Counting		
		Detect	Nondetect	NA	Detect	Nondetect	NA
Regeneration unit	1	–	1	–	–	1	–

Table 2c. Summary of Potassium-40 Results for Liquid-Phase Samples

Collection Point	Total Sampled	Potassium-40		
		Detect	Nondetect	NA
Regeneration unit	1	–	1	–

## **Liquid-Phase Sample Results**

**RESULTS REPORT****RIN: 11063883****Site: Rulison Site****Site Code: RUL01 Location: HolmesMesa\_TEG****Ticket Number: JHS 981****Report Date: 07/18/2011**

Parameter	Units	Sample Date	ID	Result	TPU <sup>1</sup>	Lab	Qualifiers Data	QA
Actinium-228	pCi/L	06/16/2011	N001	0.641	17.6	U		#
Americium-241	pCi/L	06/16/2011	N001	-2.81	28.3	U		#
Antimony-125	pCi/L	06/16/2011	N001	2.65	7.64	U		#
Cerium-144	pCi/L	06/16/2011	N001	-1.76	18.6	U		#
Cesium-134	pCi/L	06/16/2011	N001	1.43	5.04	U		#
Cesium-137	pCi/L	06/16/2011	N001	1.12	3.13	U		#
Cobalt-60	pCi/L	06/16/2011	N001	-1.85	3.84	U		#
Europium-152	pCi/L	06/16/2011	N001	10.5	20.7	U		#
Europium-154	pCi/L	06/16/2011	N001	2.76	18.7	U		#
Europium-155	pCi/L	06/16/2011	N001	5.52	10.2	U		#
Lead-212	pCi/L	06/16/2011	N001	3.47	6.89	U		#
Potassium-40	pCi/L	06/16/2011	N001	-9.99	65.5	U		#
Promethium-144	pCi/L	06/16/2011	N001	2.03	3.15	U		#
Promethium-146	pCi/L	06/16/2011	N001	0.786	3.68	U		#
Ruthenium-106	pCi/L	06/16/2011	N001	-31.7	30.2	U		#
Thorium-234	pCi/L	06/16/2011	N001	-17.6	68.4	U		#
Uranium-235	pCi/L	06/16/2011	N001	-1.29	22.5	U		#
Uranium-238	pCi/L	06/16/2011	N001	-17.6	68.4	U		#
Yttrium-88	pCi/L	06/16/2011	N001	-3.74	5.26	U		#
GROSS ALPHA	pCi/L	06/16/2011	N001	-0.398	0.428	U		#
GROSS BETA	pCi/L	06/16/2011	N001	0.631	1.16	U		#
Tritium	pCi/L	06/16/2011	N001	-121	186	U		#
Chloride	MG/L	06/16/2011	N001	0.2		UN	J	#

<sup>1</sup>TPU – Total Propagated Uncertainty reported at 2-sigma.

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

LAB QUALIFIERS:

- N Matrix spike recovery outside the acceptance limits.
- U Analytical result below detection limit.

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated at Level 1 according to quality assurance guidelines.