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**Independent Review of the
Rulison Project Radiological Monitoring Reports
Produced Under the Rulison Sampling and Analysis
Plan**

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_____/s/_____
signature

January 4, 2012

1. Executive Summary

The professional health physics staff of M. H. Chew & Associates, Inc, under contract to Colorado Oil and Gas Conservation Commission (COGCC), has reviewed all of the currently available radiological reports produced in accordance with the Rulison Sampling and Analysis Plan (RSAP).

The purpose of this review is to provide an independent assessment of the data and interpretations presented in the reports. Ten reports have been prepared by URS on behalf of for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. Five reports have been produced by Olsson Associates for Laramie Energy II, LLC. The oldest report documents results of samples collected in the first quarter of 2008. The most recent report covers the third quarter of 2010.

We concur with the judgment of the drilling companies: **no verified radioactive material associated with Project Rulison nuclear test has been found in any sample associated with the commercial exploration and production of natural gas.**

2. Introduction

The professional health physics staff of MH Chew & Associates, Inc., (CAI) under contract to Colorado Oil and Gas Conservation Commission, has reviewed all of the radiological reports and associated documents performed in accordance with the Rulison Sampling and Analysis Plan that are available on the COGCC website¹ as of the publication date of this report, Ten reports have been prepared by URS on behalf of for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. Five reports have been produced by Olsson Associates for Laramie Energy II, LLC.

The following reports have been reviewed:

“Production Monitoring Report for the Furr 16-22B and Furr 16-22D, and Seven New Tier II Gas Wells, Rulison Field, Garfield County, Colorado, October 2010.” Prepared for Laramie Energy II, LLC by Olsson Associates, dated August 2011.

“SECOND QUARTER 2010 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Inc., and Williams Production RMT Inc. by URS Corporation, dated April 30, 2011.

“FIRST QUARTER 2010 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared

¹ <http://cogcc.state.co.us/Library/PiceanceBasinReports.html>

for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated September 30, 2010.

“FOURTH QUARTER AND ANNUAL 2009 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated April 30, 2010.

“Tier II Gas Wells Quarterly Production Monitoring Report, Furr 16-22D and Furr 16-22B, Rulison Field, Garfield County, Colorado, December 2009.” Prepared for Laramie Energy II, LLC by Olsson Associates, dated June 2010.

“THIRD QUARTER 2009 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated February 18, 2010.

“Tier II Gas Wells Quarterly Production Monitoring Report, Furr 16-22D and Furr 16-22B, Rulison Field, Garfield County, Colorado, October 2009.” Prepared for Laramie Energy II, LLC by Olsson Associates, dated February 2010.

“SECOND QUARTER 2009 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated October 23, 2009.

Tier II Gas Wells Quarterly Production Monitoring Report, Furr 16-22D and Furr 16-22B, Rulison Field, Garfield County, Colorado, June 2009.” Prepared for Laramie Energy II, LLC by Olsson Associates, dated October 2009.

“FIRST QUARTER 2009 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated October 9, 2009.

Tier II Gas Wells Quarterly Production Monitoring Report, Furr 16-22D and Furr 16-22B, Rulison Field, Garfield County, Colorado, April 2009.” Prepared for Laramie Energy II, LLC by Olsson Associates, dated June 2009.

“FOURTH QUARTER 2008 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated March 26, 2009.

“THIRD QUARTER 2008 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared

for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated March 16, 2009.

“SECOND QUARTER 2008 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Inc., EnCana Oil & Gas (USA) Inc., and Williams Production RMT Inc. by URS Corporation, dated November 17, 2008.

“FIRST QUARTER 2008 REPORT OPERATIONAL AND ENVIRONMENTAL MONITORING WITHIN A THREE-MILE RADIUS OF PROJECT RULISON.” Prepared for Noble Energy Production, Inc. by URS Corporation, dated August 12, 2008.

3. Results of the Review

CAI concurs with the judgment of the drilling companies: no verified radioactive material associated with Project Rulison nuclear test has been found in any sample associated with the commercial exploration and production of natural gas.

3.1. Positive Results

Out of the thousands of analytical results presented in the reports, a few have been positive. In other words these positive samples reported measurements of specific radionuclides that were:

- not naturally occurring,
- could be associated with Project Rulison, and
- were detected above the lower limit of detection for the analysis.

No sample result in any of the reports has exceeded the screening level defined in the RSAP.

A positive result that is below the screening level is not a confirmation of the presence Rulison-related radioactive material in the gas well. If a positive result below the screening level is observed the RSAP requires that the result be verified to determine its validity either through discussion with the analytical laboratory, re-analysis of existing sample, or resample and analyze. If the result is verified, the previous and subsequent analytical results are to be reviewed to determine if there is a statistically significant increasing trend. If the result is verified and exhibits a statistically significant increasing trend, then the company is to contact the COGCC, CDPHE, and DOE to discuss.

It is routine to get positive results for samples that include naturally occurring radioactive materials such as ^{40}K , ^{232}Th and its progeny, and ^{238}U and its progeny. These naturally occurring materials are detected, along with radionuclides of interest, in the gross alpha, gross beta, and gamma spectral analysis methods. The presence of these naturally occurring radionuclides is appropriately dismissed as uninformative.

3.1.1. Positive Results in Baseline Measurement of Fracking Fluids Prior to Use

Some of the positive results were associated with baseline measurements of the radioactive content of fracking water before it was injected into a well. A positive result for these radionuclides in these baseline samples (which were produced in the Rulison blast and also exist as global fallout) cannot be construed as Rulison-related and instead must be attributed to environmental background concentration above the lower limit of detection or a false-positive result. These examples are provided to demonstrate that even radionuclides that could be Rulison-related may not be.

This quote is from the SECOND QUARTER 2010 by URS:

⁹⁰Sr was detected at an activity of 2.14 ± 0.979 pCi/L in fracking fluid prior to its use in Noble's BM 26-34B and BM26-34C gas wells on the 26N Pad in June 2010. ⁹⁰Sr may be a false positive as it was not detected in the other fracking fluid sample from the same water source (PAD26NFW- CPTF-04) or in subsequent flowback fluid or produced water samples collected from these wells.

This quote is from the FOURTH QUARTER 2008 by URS:

³⁶Cl was detected in two samples, fracing water (prior to use) at Noble's 34C pad (221 ± 120 pCi/L) and

This quote is from the FOURTH QUARTER 2008 by URS:

⁸⁵Kr detected in fracing water prior to its use on Noble's 36L pad and ⁸⁵Kr, ⁹⁰Sr, and ⁹⁹Tc in fracing fluid (prior to its use) at EnCana's Federal Hagen 15-13BB gas well are not related to Project Rulison, as the fracing fluids were obtained from sources outside of the Project Rulison monitoring zone.

3.1.2. Positive Results in Produced Water and Flowback Fracking Fluids

The following quotes represent the only positive samples that required careful scrutiny.

This quote is from the SECOND QUARTER 2010 by URS:

⁹⁹Tc was detected in produced water from Noble's BM26-23B (153 ± 25.6 pCi/L) and BM26-33B (52.9 ± 23.9 pCi/L) Tier I gas wells on the 26N well pad in monitoring sector 10. ⁹⁹Tc reported at these wells appears to be false positives as ⁹⁹Tc was not detected in subsequent analyses of produced water collected from these wells during the 3rd or 4th quarter of 2010 (follow-up sampling data reported in subsequent quarterly sampling reports). The result for well BM26-33B was qualified during data validation as "J" (estimated), "Y/T" (tracer yield outside acceptable range), and "D-I" (duplicate error and indeterminant result bias), so that the result is considered uncertain. Furthermore, no other potential Project Rulison-related radionuclides, including ³H, were detected in these samples or in produced water from any of the adjacent gas wells on the 26N well pad."

This quote is from the FOURTH QUARTER 2008 by URS:

⁹⁹Tc reported in comingled flowback fluid from Noble's Tier I BM 36-13B and Tier II BM 36-13D gas wells may be a false positive, as ⁹⁹Tc was not detected in the previous flowback fluid samples or subsequent produced water samples collected at these wells.

This quote is from the FOURTH QUARTER 2008 by URS:

³⁶Cl was detected in two samples, . . . and produced water at Noble's Tier I gas well BM 35-32A gas well [241 ± 127 (J) pCi/L]. The ³⁶Cl result at BM 35-32A was qualified as estimated (J) during validation because the matrix spike was outside the upper acceptance limit which suggests a potential high bias for the result. Because of the high bias, this result may represent a false positive. Previous (April 9, 2008) and subsequent (September 18, 2008) ³⁶Cl results at BM 35-32A were not detected.

After reviewing the data and QA/QC information for these samples and in light of the fact that no tritium, which is the leading indicator of Rulison-related activity, has been measured in the produced water or natural gas, we agree with the URS analysis that these samples are false positives and that Rulison-related activity is not present in these wells.