

# Blue Lake, Cold Springs 1, and Cold Springs 12

Emission Test and  
LDAR Assessment of  
Small Glycol Dehydration Units

**ANR Pipeline Company  
Mancelona Stations**

10000 Pflum Road  
Mancelona, Michigan



State Registration No. B7198

*Prepared for*  
TransCanada  
Houston, Texas

April 2, 2015

Bureau Veritas Project No. 11015-000004.00



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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION

RENEWABLE OPERATING PERMIT  
REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name ANR Storage Company, Cold Spring Blue Lake County Kalkaska

Source Address 10000 Pflum Road City Mancelona

AQD Source ID (SRN) B7198 ROP No. MI-ROP-B7198-2014a ROP Section No. C and D

Please check the appropriate box(es):

Annual Compliance Certification (Pursuant to Rule 213(4)(c))

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

1. During the entire reporting period, this source was in compliance with ALL terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.

2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, EXCEPT for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.

2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, EXCEPT for the deviations identified on the enclosed deviation report(s).

Other Report Certification

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

Test Report evaluating compliance with 40 CFR 63, Subpart HHH for the existing small glycol dehydration units. This form shall certify that the testing was conducted in accordance with the approved test plan and that the facility operating conditions were in compliance with permit requirements or at maximum routine operating conditions.

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

ANTHONY KORNYAGA DIRECTOR, FIELD OPERATIONS (248)205-7465  
Name of Responsible Official (print or type) Title Phone Number

[Signature] 4/2/2015  
Signature of Responsible Official Date

\* Photocopy this form as needed.



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## Executive Summary

TransCanada retained Bureau Veritas North America, Inc. to evaluate the closed-vent systems and/or test air emissions at the ANR Pipeline Company (ANR) Gas Storage and Compressor Stations in Mancelona, Michigan. TransCanada stores natural gas in underground reservoirs and transports gas via pipelines to other companies and end-users after the gas is processed through glycol dehydration units. Testing was conducted on the Blue Lake (Blue Lake Gas Storage Company), Cold Springs 1 (Cold Springs 1 Compressor Station), and Cold Springs 12 (Cold Springs 12 Compressor Station) glycol dehydration units. The purpose of the testing was to:

- Evaluate the glycol dehydration units' closed-vent systems for leaks.
- Measure benzene, toluene, ethylbenzene, and xylenes (BTEX) emissions from the Blue Lake and Cold Springs 1 glycol dehydration units' thermal oxidizer exhaust stacks.
- Evaluate compliance with 40 CFR Part 63, National Emissions Standards for Hazardous Air Pollutants for Source Categories, Subpart HHH, "National Emissions Standards for Hazardous Air pollutants for Natural Gas Transmission and Storage Facilities," incorporated in Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit (ROP) MI-ROP- B7198-2014a.

The glycol dehydration systems are defined as "existing small glycol dehydration units" in accordance with 40 CFR 63, Subpart HHH, and subject to:

- Leak Detection and Repair (LDAR) standards.
- Control device BTEX, total organic compound (TOC), or total hazardous air pollutants (HAPs) emission standards.

The testing was completed in accordance with United States Environmental Protection Agency (USEPA) Reference Methods 1 through 4, 18, and 21. On February 11 and 12, 2015, testing was conducted at Blue Lake and Cold Springs 1 and consisted of completion of the LDAR assessments and three 60-minute test runs for each source to measure BTEX. On February 13 and 19, 2015, testing was conducted at Cold Springs 12 and consisted of completion of the LDAR assessment.

### Leak Detection and Repair

Detailed results of the LDAR assessments are presented in Tables 3-3 through 3-5. Documentation of each LDAR assessment was recorded on LDAR Recordkeeping and Field Inspection Forms, which are included in Appendix C of this report. The results of the LDAR assessments are summarized in the following table.



### LDAR Assessment Results

| Date (2015)       | Glycol Dehydration Unit | Number of Components Evaluated | Number of Readings Below Leak Criterion of 500 ppmv | Number of Readings Exceeding Leak Criterion of 500 ppmv | Comment           |
|-------------------|-------------------------|--------------------------------|---|---|-------------------|
| Feb 11            | Blue Lake               | 29                             | 29  | 0   | No leaks detected |
| Feb 12            | Cold Springs 1          | 26                             | 26  | 0   | No leaks detected |
| Feb 13 and Feb 19 | Cold Springs 12         | 30                             | 30  | 0   | No leaks detected |

ppmv; part per million by volume

Based on the results of the LDAR assessments, no volatile organic compound (VOC) readings were measured at a concentration exceeding the criterion of a leak (i.e., 500 part per million by volume [ppmv]).

#### Performance Testing

The emission testing was conducted to evaluate compliance with the emission limit of the thermal oxidizers, which control air emissions from the glycol dehydration systems. Emission testing was conducted on the Blue Lake and Cold Springs 1 glycol dehydration units.

Test ports could not be installed for the Cold Springs 12 unit prior to the testing; therefore, emission testing was not completed at Cold Springs 12.

Detailed results of the Blue Lake and Cold Springs 1 testing are presented in Tables 1 and 2 after the Tables Tab of this report. The results of the testing are summarized in the following table.



## BTEX Emission Results Compared to Permit Emission Limits

| Date (2015)           | Glycol Dehydration Unit | Emission Unit | Parameter                  | Units | Average Result <sup>1</sup> | Emission Limit <sup>2</sup> |
|-----------------------|-------------------------|---------------|----------------------------|-------|-----------------------------|-----------------------------|
| <b>Blue Lake</b>      |                         |               |                            |       |                             |                             |
| Feb 11                | Blue Lake               | E EU BLGLYDHY | Benzene <sup>†</sup>       | lb/hr | <0.00036                    | NA                          |
|                       |                         |               | Toluene <sup>†</sup>       |       | <0.00076                    | NA                          |
|                       |                         |               | Ethylbenzene <sup>†</sup>  |       | <0.00078                    | NA                          |
|                       |                         |               | Total xylenes <sup>†</sup> |       | <0.0015                     | NA                          |
|                       |                         |               | Mass rate of BTEX          | lb/hr | <0.0034                     | NA                          |
|                       |                         |               |                            | Mg/yr | <0.0056                     | 209.76                      |
| <b>Cold Springs 1</b> |                         |               |                            |       |                             |                             |
| Feb. 12               | Cold Springs 1          | EUCS1GLYDHY   | Benzene <sup>†</sup>       | lb/hr | <0.00044                    | NA                          |
|                       |                         |               | Toluene <sup>†</sup>       |       | <0.00091                    | NA                          |
|                       |                         |               | Ethylbenzene <sup>†</sup>  |       | <0.00093                    | NA                          |
|                       |                         |               | Total xylenes <sup>†</sup> |       | <0.0019                     | NA                          |
|                       |                         |               | Mass rate of BTEX          | lb/hr | <0.0042                     | NA                          |
|                       |                         |               |                            | Mg/yr | <0.0068                     | 179.21                      |

<sup>†</sup> Corrected for spike recovery following USEPA Method 18.

<sup>1</sup> Based on typical maximum operating hours for the total withdrawal season.

<sup>2</sup> Emission limit was calculated based on the annual average daily throughput rates from 2009 through 2013 using Equation 1 of the regulation (40CFR63.1275(b)(1)(iii)).

lb/hr: pound per hour

Mg/yr: megagrams per year

NA: not applicable

BTEX: benzene, toluene, ethylbenzene, total xylenes

The BTEX measurements demonstrate that estimated annual air emissions from the thermal oxidizers controlling the glycol dehydration units are within the allowable limit.



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# 1.0 Introduction

## 1.1 Summary of Test Program

TransCanada retained Bureau Veritas North America, Inc. to evaluate the closed-vent systems and/or test air emissions at the ANR Pipeline Company (ANR) Gas Storage and Compressor Stations in Mancelona, Michigan. TransCanada stores natural gas in underground reservoirs and transports gas via pipelines to other companies and end-users after the gas is processed through glycol dehydration units. Testing was conducted on the Blue Lake (Blue Lake Gas Storage Company), Cold Springs 1 (Cold Springs 1 Compressor Station), and Cold Springs 12 (Cold Springs 12 Compressor Station) glycol dehydration units. The purpose of the testing was to:

- Evaluate the glycol dehydration units' closed-vent systems for leaks.
- Measure benzene, toluene, ethylbenzene, and xylenes (BTEX) emissions from the Blue Lake and Cold Springs 1 glycol dehydration units' thermal oxidizer exhaust stacks.
- Evaluate compliance with 40 CFR Part 63, National Emissions Standards for Hazardous Air Pollutants for Source Categories, Subpart HHH, "National Emissions Standards for Hazardous Air pollutants for Natural Gas Transmission and Storage Facilities," incorporated in Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit (ROP) MI-ROP- B7198-2014a.

The glycol dehydration systems are defined as "existing small glycol dehydration units" in 40 CFR 63, Subpart HHH, and subject to:

- Leak Detection and Repair (LDAR) standards.
- Control device BTEX, total organic compound (TOC), or total hazardous air pollutants (HAPs) emission standards.

### Leak Detection and Repair

The LDAR assessments were conducted following the LDAR plan that Bureau Veritas prepared which outlined procedures to detect volatile organic compound (VOC) leaks from equipment components of the closed-vent system and identify necessary repairs as required by 40 CFR 60, Subpart HHH and MDEQ MI-ROP-B7198-2014A.

When compliance with the emission standard is achieved using a control device or combination of control devices, the closed-vent system shall have no detectable emissions. A potential leak interface is evaluated to operate with no detectable organic emissions if the organic concentration is less than 500 parts per million by volume (ppmv).



Bureau Veritas conducted the following LDAR activities:

- Identified, tagged, and listed the components to be monitored and those that are difficult to inspect.
- Established procedures if the leak criterion is exceeded.
- Monitored components through initial visual inspection and LDAR monitoring following United States Environmental Protection Agency (USEPA) Method 21 guidelines.
- Communicated findings to TransCanada for leak repair (if applicable) and reporting by TransCanada.
- Reported the initial inspection findings.

Documentation of each LDAR assessment was recorded on LDAR Recordkeeping and Field Inspection Forms, which are included in Appendix C of this report.

#### Performance Testing

The emission testing was conducted to evaluate compliance with the emission limit of the thermal oxidizers, which control air emissions from the glycol dehydration systems. Emission testing was conducted on the Blue Lake and Cold Springs 1 glycol dehydration units.

The thermal oxidizers are subject to the following emission limit:

Unit-specific BTEX emission limit in megagrams (Mg) per year, calculated using Equation 1 of the regulation (40CFR63.1275(b)(1)(iii)):

$$EL_{\text{BTEX}} = 3.10 \times 10^{-4} \times \text{Throughput} \times C_{i,\text{BTEX}} \times 365 \frac{\text{day}}{\text{yr}} \times \frac{1 \text{ Mg}}{1 \times 10^6 \text{ gram}}$$

Where:

$EL_{\text{BTEX}}$  = Unit-specific BTEX emission limit, megagrams per year

$3.10 \times 10^{-4}$  = BTEX emission limit, grams BTEX/standard cubic meter-ppmv

Throughput = Annual average daily natural gas throughput, standard cubic meters

$C_{i,\text{BTEX}}$  = Annual average BTEX concentration of the natural gas at the inlet to the glycol dehydration unit, ppmv

The throughput values were measured at the custody transfer meter and based on annual average daily throughput rates from 2009 through 2013.



The testing was completed in accordance with USEPA Reference Methods 1 through 4, 18, and 21 identified in §63.1282 of Subpart HHH of 40 CFR Part 63—Test Methods, Compliance Procedures, and Compliance Demonstrations. Measurement of BTEX concentrations following USEPA Method 18 incorporates the analytical procedures of Occupational Health and Safety Administration (OSHA) 7 and USEPA SW-846 Method 8260.

On February 11 and 12, 2015, Bureau Veritas conducted the following for the Blue Lake and Cold Springs 1 units:

- The LDAR assessment.
- Three 60-minute test runs at the exhaust of each unit to measure BTEX concentrations.

On February 13 and 19, 2015, Bureau Veritas conducted the following for the Cold Springs 12 unit:

- The LDAR assessment.

Test ports could not be installed for the Cold Springs 12 unit prior to the testing; therefore, emission testing was not completed at Cold Springs 12.

The sampling conducted is summarized below in Table 1-1.

**Table 1-1  
Sources Tested, Parameters, and Test Dates**

| Source                                  | Test Parameter | Test Date                |
|---|----------------|--------------------------|
| <b>Blue Lake</b>                        |                |                          |
| Blue Lake thermal oxidizer exhaust      | BTEX           | February 11, 2015        |
| Closed vent system joints               | VOC leaks      |                          |
| <b>Cold Springs 1</b>                   |                |                          |
| Cold Springs 1 thermal oxidizer exhaust | BTEX           | February 12, 2015        |
| Closed vent system joints               | VOC leaks      |                          |
| <b>Cold Springs 12</b>                  |                |                          |
| Closed vent system joints               | VOC leaks      | February 13 and 19, 2015 |

BTEX: benzene, toluene, ethylbenzene, total xylenes  
 VOC: volatile organic compound