



Consumers Energy

Count on Us

Compliance Test Report

EUGLYCDEHYD01, EUGLYCDEHYD02 & EUDEHY3

40 CFR Part 63, Subpart HHH

Ray Compressor Station

State Registration Number (SRN) B6636

69333 Omo Road

Armada, Michigan 48005

Test Dates: December 9 & 10, 2014

**Report Submitted:
February 6, 2015**

**Report Revised:
February 10, 2015**

Work Order No. 23518916

Report Revision 1

**Test Performed by the Consumers Energy Company
Regulatory Compliance Testing Section
Laboratory Services Department**



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 Consumers Energy Company - Ray Compressor Station County Macomb

Source Address 69333 Omo Road City Armada

AQD Source ID (SRN) B6636 ROP No. MI-ROP-B6636-2010 ROP Section No. _____

Minor Mod Submitted on April 18, 2014

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:

Revision to 40 CFR 63 Subpart HHH Compliance Test Report

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

Ocie Gregory, Jr. Ex. Mgr. Natural Gas Compression & Storage (586) 784-2091
Name of Responsible Official (print or type) Title Phone Number
 2/11/2015
Signature of Responsible Official Date

2.0 SUMMARY OF RESULTS

Operating Data

Operating data collected during each test run included the natural gas flow rate and thermal oxidizer combustion zone temperature.

Applicable Permit Number

The Ray Compressor Station is currently operating pursuant to the terms and conditions of Renewable Operating Permit (ROP) No. MI-ROP-B6636-2010 and PTI No. 206-09.

Performance tests were conducted, as required, at the exhaust location of individual thermal oxidizers serving three (3) glycol dehydration systems.

Results

The glycol dehydration systems identified as EUGLYTCDEHYD01, EUGLYCDEHYD02 and EUDEHY3 and each associated thermal oxidizer control device operating at the Ray Compressor Station in Armada, Michigan, meet the NESHAP unit specific megagrams per year BTEX emission limit for existing small glycol dehydration units as described in 40 CFR Part 63, Subpart HHH, §63.1275(b)(1)(iii), Equation 1.

Comprehensive Glycol Dehydration and Thermal Oxidizer Process Data, BTEX Test data, Laboratory Analyses, Sample Calculations and Quality Assurance data are shown in Attachments 1 - 5. The MDEQ test protocol approval response letter is contained in Attachment 6. The following summary table illustrates the average BTEX emission rates based on performance test data obtained at each glycol dehydration system thermal oxidizer exhaust.

Summary of BTEX Concentrations and Emissions
EUGLYCDEHYD01, EUGLYCDEHYD02 and EUDEHY3
Ray Compressor Station

Source Name	BTEX Compound Concentrations, (ppmv) ¹	BTEX Emission Rate, Mg/year ¹	BTEX Emission Limit, Mg/year ²	Combustion Chamber Temperature, °F
EUGLYCDEHYD01	1.61	0.21	3.2	1496
EUGLYCDEHYD02	1.17	0.18	2.9	1445
EUDEHY3	1.13	0.29	5.7	1488

¹ The average sum of BTEX concentrations shown utilize laboratory reported minimum detection limits (MDL) because the measured BTEX concentrations at each source were non-detect or below the MDL. The BTEX emission rate, therefore, is similarly presented, based on the lab reported MDL's. Additional information on this topic is contained in the laboratory report found in Attachment 3 of this report.

² The BTEX emission limit was calculated as required by §63.1275(b)(1)(iii), Equation 1 – refer to Attachment 4

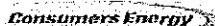
ATTACHMENT 2

BTEX Test Data

EUGLYCDEHYD01

Regulatory Compliance Testing Services
Test Data Summary Page
EUGLYCDEHYD01

Facility and Source Information				
Customer:	Ray Compressor Station			
Work Order:	23518916			
Test Date:	12/10/2014	12/10/2014	12/10/2014	
Run Number:	Run 1	Run 2	Run 3	
Stack or Duct Length, inches:	0	0	0	
Stack or Duct Width, inches:	0	0	0	
Stack or Duct Diameter, inches:	36	36	36	
Stack or Duct Area, Square Feet:	7.07	7.07	7.07	
Barometric Pressure, inches:	29.61	29.65	29.65	
Source Pollutant Test Data	Run 1	Run 2	Run 3	Average
Pollutant Meter Calibration Factor:	0.99	0.99	0.99	
Run Start Time:	10:45	12:03	13:18	
Run Stop Time:	11:45	13:03	14:18	
Duration of Pollutant Sample:	60	60	60	
Meter Start Volume, M ³ :	31.1607	31.1991	31.2170	
Meter Final Volume, M ³ :	31.1991	31.2170	31.2601	
Average Meter Temperature, °F:	69.5	78.5	81	
Pollutant Meter Leak Rate, cfm:	0.00	0.00	0.00	
Water Vapor Volume at STP:	0.313	0.153	0.306	0.26
Sample Volume, Actual Cubic Feet:	0.0304	0.0179	0.0431	0.03
Sample Volume at STP, dscf:	0.038	0.017	0.041	0.03
Sample Volume at STP, dscm:	0.0011	0.0005	0.0012	0.0009
Total Gas Sampled, scf:	0.350	0.170	0.407	0.31
Source Moisture Analysis Data	Run 1	Run 2	Run 3	Average
Moisture Meter Calibration Factor:	1.0057	1.0057	1.0057	
Run Start Time:	10:38	12:03	13:20	
Run Stop Time:	10:49	12:34	13:51	
Duration of Moisture Sample:	10.75	31.00	31.00	
Moisture Meter Start Volume:	294.028	302.13	325.61	
Moisture Meter Final Volume:	301.92	324.89	348.41	
Moisture Meter Leak Rate, ft ³ /min:	0	0	0	
Average Meter Pressure, inches:	1.75	1.75	1.75	1.7
Average Meter Temperature, °F:	56.0	57.0	57.7	56.9
Liquid Volume Collected, milliliters:	12.6	38.1	38.0	29.67
Liquid Volume Absorbed, grams:	1.1	3.1	3.1	2.44
Water Vapor Volume at STP:	0.642	1.942	1.938	1.51
Sample Volume, Actual Cubic Feet:	7.892	22.760	22.800	17.82
Sample Volume at STP, dscf:	8.069	23.179	23.190	18.15
Sample Volume at STP, dscm:	0.229	0.656	0.657	0.51
Total Gas Sampled, scf:	8.71	25.12	25.13	19.65
Percent Source Gas Moisture:	7.4	7.7	7.7	7.60
Source Gas Analysis Data	Run 1	Run 2	Run 3	Average
Percent Carbon Dioxide, dry:	4.00	4.00	4.50	4.17
Percent Oxygen, dry:	15.00	15.50	15.00	15.17
Percent Carbon Monoxide, dry:	0.0E+00	0.0E+00	0.0E+00	0.00E+00
Percent Nitrogen:	81.00	80.50	80.50	80.67
Dry Molecular Weight, lb/lb-M:	29.240	29.260	29.320	29.27
Molecular Weight, at Source:	28.411	28.390	28.448	28.42
Calculated Fuel Factor, F _o :	1.476	1.350	1.311	1.38
Fuel F-Factor, F _d :	8710	8710	8710	
Percent Excess Air:	234.96	269.47	239.92	248.12
Source Gas Density	Run 1	Run 2	Run 3	Average
Density Dry at STP, lb/cf:	0.0756	0.0756	0.0758	0.076
Density Wet at STP (68 deg. F):	0.0735	0.0734	0.0735	0.073
Density Wet at Source Conditions:	0.0195	0.0195	0.0195	0.019
Pounds of Gas Sampled, Dry:	0.6100	1.7535	1.7579	1.374
Pounds of Gas Sampled, Wet:	0.6389	1.8437	1.8479	1.444
Source Gas Velocity & Volume	Run 1	Run 2	Run 3	Average
Pitot Tube Calibration Factor:	0.84	0.84	0.84	
Average Square Root Pitot Pressure:	0.1295	0.1295	0.1295	0.1295
Static Pressure, inches water:	-0.04	-0.06	-0.05	-0.05
Gas Temperature, degrees F:	1504	1508	1508	1506.06
Average Source Gas Velocity:	14.2	14.2	14.2	14
Source Gas Flow Rate, ACFM:	6.025	6.038	6.035	6.033
Source Gas Flow Rate, SCFM:	1.603	1.600	1.598	1.600
Source Gas Flow Rate, DSCF:	1.484	1.477	1.475	1.479
Source Gas Flow Rate, DSCM:	42.0	41.8	41.7	41.8



Regulatory Compliance Testing Services
Test Data Summary Page
EUGLYCDEHYD01

Facility and Source Information				
Customer:	Ray Compressor Station			
Work Order:	23518916			
Test Date:	12/10/2014	12/10/2014	12/10/2014	
Source Gas Concentrations	Run 1	Run 2	Run 3	Average
Benzene				
Compound Molecular Weight	78.11	78.11	78.11	
Weight (ug): ¹	1.25	1.25	1.25	1.25
Concentration, mg/cubic meter	1.17	2.57	1.07	1.60
Volume of air/gram mole @ 6	24.05	24.05	24.05	
Concentration, ppm:	0.36	0.79	0.33	0.49
Ethylbenzene				
Compound Molecular Weight	106.17	106.17	106.17	
Weight (ug): ¹	1.15	1.15	1.15	1.15
Concentration, mg/cubic meter	1.08	2.36	0.99	1.48
Volume of air/gram mole @ 6	24.05	24.05	24.05	
Concentration, ppm:	0.24	0.54	0.22	0.33
Toluene				
Compound Molecular Weight	92.14	92.14	92.14	
Weight (ug): ¹	1.22	1.22	1.22	1.22
Concentration, mg/cubic meter	1.15	2.51	1.05	1.57
Volume of air/gram mole @ 6	24.05	24.05	24.05	
Concentration, ppm:	0.30	0.65	0.27	0.41
Xylenes (p, m, o)				
Compound Molecular Weight	318.50	318.50	318.50	
Weight (ug): ¹	3.83	3.83	3.83	3.83
Concentration, mg/cubic meter	3.60	7.86	3.28	4.91
Volume of air/gram mole @ 6	24.05	24.05	24.05	
Concentration, ppm:	0.27	0.59	0.25	0.37
BTEX Emission Rate				
EUGLYCDEHYD01 Annual O	8760.0	8760.0	8760.0	8,760.0
Sum of BTEX Components, p	1.177	2.573	1.074	1.6
BTEX Emission Rate, Kg/Hr:	1.76E-02	3.84E-02	1.60E-02	2.40E-02
BTEX Emission Rate, Megaga	1.76E-05	3.84E-05	1.60E-05	2.40E-05
BTEX Emission Rate, Megaga	0.15	0.34	0.14	0.21
Moisture Dry Gas Meter Sys				
	Run 1	Run 2	Run 3	Average
Pump to Office Meter Box Le	0.00	0.00	0.00	
Dry Gas Meter Calibration Fac	1.0057	1.0057	1.0057	
Y _a (calculated):	1.01	1.01	1.01	1.010
Assigned ΔH (@ 0.75 SCFM)	1.7499	1.7499	1.7499	
Actual Yds Deviation, % (mus	-0.35	-0.51	-0.29	-0.38
¹ Individual BTEX analytes were non-detect (ND) or below the Minimum Detection Limit (MDL). MDL values are provided for this source as a basis for emission rate estimates.				
² Emission Measurement Center Approved Alternative Meter Calibration Method (ALT-009)				