



COMPLIANCE TEST REPORT

for

RELATIVE ACCURACY TEST AUDIT (RATA)

CONTINUOUS EMISSIONS MONITORING SYSTEM (CEMS)

CTG Turbine Units 12-1, 12-2, 13-1

**Belle River Power Plant CTGs
East China Township, Michigan**

September 22-24, 2020

**Prepared By
Environmental Management & Safety
Environmental Field Services Group
DTE Corporate Services, LLC
7940 Livernois Ave. G-4S
Detroit, MI 48210**

EGLE

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
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 Environment, Great Lakes, and Energy, Air Quality Division upon request.

Source Name Belle River, Peakers County St. Clair
Source Address 4505 King Road City China Township
AQD Source ID (SRN) B2796 ROP No. MI-ROP-B2796-2015c ROP Section No. 4

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 9/22/20 To 9/24/20

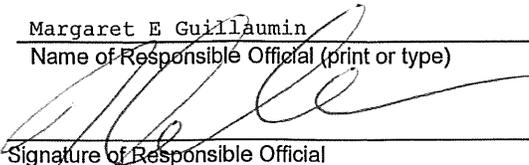
Additional monitoring reports or other applicable documents required by the ROP are attached as described:

Annual RATA testing of the CEMS on EU-CTG12-1-BP, EU-CTG12-2-BP, AND EU-CTG13-1-BP

All testing was performed according to the approved test protocol. The facility operated in accordance with ROP and federal requirements during the test periods.

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

Margaret E Guillaumin Plant Manager 810-324-3218
Name of Responsible Official (print or type) Title Phone Number


Signature of Responsible Official

11/13/2020
Date

* Photocopy this form as needed.

EQP 5736 (Rev 04/30/2019)

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EXECUTIVE SUMMARY

DTE Energy's Environmental Management and Safety Environmental Field Services Group (DTE) conducted a Relative Accuracy Test Audit (RATA) at the Belle River Power Plant (BRPP) CTGs, located in China Township, Michigan. The fieldwork, performed on September 22-24, 2020 was conducted to satisfy requirements of the Michigan Renewable Operating Permit (ROP) No. MI-ROP-B2796-2015c.

The results of the RATA testing are highlighted below:

O₂, NO_x and CO RATA Results Turbine Units 12-1, 12-2, 13-1 Belle River Power Plant September 22-24, 2020

Parameter	Unit	Date	CEMS	RM	Relative Accuracy	Limit
CO (ppm)	12-1	9-22	5.26	4.90	0.36	5 ⁽¹⁾
NO _x (lb/MMBtu)	12-1	9-22	0.027	0.029	0.002*	<0.015 ⁽²⁾
O ₂ (%)	12-1	9-22	14.81	14.97	0.16	1.0 ⁽³⁾
CO (ppm)	12-2	9-23	7.28	7.32	0.04	5 ⁽¹⁾
NO _x (lb/MMBtu)	12-2	9-23	0.024	0.025	0.001**	<0.015 ⁽²⁾
O ₂ (%)	12-2	9-23	14.91	15.03	0.12	1.0 ⁽³⁾
CO (ppm)	13-1	9-24	4.64	4.87	0.22	5 ⁽¹⁾
NO _x (lb/MMBtu)	13-1	9-24	0.024	0.028	0.004***	<0.015 ⁽²⁾
O ₂ (%)	13-1	9-24	14.90	15.04	0.14	1.0 ⁽³⁾

⁽¹⁾ Part 60 Allowable Limit

⁽²⁾ Part 75 Low Emitter Criteria (mean diff. + or - 0.015 lb/MMBtu) Allowable Limit

* A Bias Adjustment Factor (BAF) of 1.078 must be applied to DAHS per Part 75 criteria

* A Bias Adjustment Factor (BAF) of 1.061 must be applied to DAHS per Part 75 criteria

* A Bias Adjustment Factor (BAF) of 1.111 must be applied to DAHS per Part 75 criteria

⁽³⁾ Part 75 Allowable Limit



1.0 INTRODUCTION

DTE Energy's Environmental Management and Safety Environmental Field Services Group (DTE) conducted a Relative Accuracy Test Audit (RATA) at the Belle River Power Plant (BRPP) CTGs, located in China Township, Michigan. The fieldwork, performed on September 22-24, 2020 was conducted to satisfy requirements of the Michigan Permit No. MI-ROP-B2796-2015c.

Testing was performed pursuant to Title 40, *Code of Federal Regulations*, Part 60, Appendix A (40 CFR §60 App. A), Methods 3A, 7E, 10, 19, Part 75 Appendices A & B, and Part 60 Appendix B Performance Specifications 2, 3 and 4A.

The following DTE personnel participated in the testing program: Mark D. Westerberg, Senior Specialist - Environmental, Ken St. Amant, Senior Environmental Technician, and Jason Logan, Specialist. Mr. Westerberg was the project leader. Mr. Dennis Farver and Jeffery Fauser, Combustion Turbine Specialists at Belle River Power Plant (ANNEX), provided process coordination for the testing program. Mr. Matthew Karl with the Michigan Department of Environment, Great Lakes and Energy Air Quality Division (EGLE-AQD) was present to observe a portion of the testing.

2.0 SOURCE DESCRIPTION

The Belle River Power Plant is a DTE Energy facility located at 4505 King Road in China Township, Michigan. The plant has three (3) simple cycle stationary combustion turbines, referred to as Units 12-1, 12-2, and 13-1 operating as Peaker units.

Each combustion turbine includes a compressor, combustor, turbine and electric generator with a nominally rated load capacity of 100 megawatts (MW) at perfect conditions in simple cycle operation.

NO_x emissions are controlled by dry low NO_x technology and good combustion practices. CO emissions are controlled by good combustion practices and SO₂ emissions are controlled by utilizing low sulfur natural gas.



The RATA testing was performed while each Unit operated at full load conditions.

The exhaust stacks for Units 12-1, 12-2 and 13-1 are rectangular ducts approximately 60 feet tall with an internal equivalent diameter of approximately 24 feet. See Figure 1 for a diagram of Units 12-1, 12-2, and 13-1 sampling locations and stack dimensions.

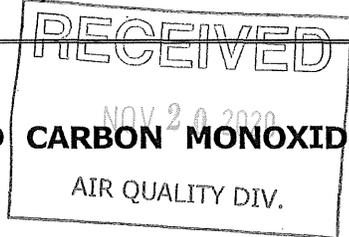
BR Peakers utilizes Thermo-Fisher Scientific Continuous Emissions Monitoring Systems (CEMS) to record emissions during unit operations. The following Units were audited:

Unit	Analyzer	Manufacturer / Model	Serial Number
EU-CTG12-1-BP	NO _x	Thermo-Fisher Sci 42IQ/LS	1190952419
EU-CTG12-1-BP	O ₂ /CO	Thermo-Fisher Sci 48IQ	1190952423
EU-CTG12-2-BP	NO _x	Thermo-Fisher Sci 42IQ/LS	1190952420
EU-CTG12-2-BP	O ₂ /CO	Thermo-Fisher Sci 48IQ	1190952421
EU-CTG13-1-BP	NO _x	Thermo-Fisher Sci 42IQ/LS	1190952418
EU-CTG13-1-BP	O ₂ /CO	Thermo-Fisher Sci 48IQ	1190952422

3.0 SAMPLING AND ANALYTICAL PROCEDURES

Emissions measurements were obtained in accordance with procedures specified in the USEPA *Standards of Performance for New Stationary Sources*. The sampling and analytical methods used in the testing program are indicated in the table below

Sampling Method	Parameter	Analysis
USEPA Method 3A	Oxygen	Instrumental Analyzer Method
USEPA Method 7E	Oxides of Nitrogen	Chemiluminescent Analyzer
USEPA Method 10	Carbon Monoxide	NDIR Instrumental Analyzer Method



3.1 OXYGEN, OXIDES OF NITROGEN AND CARBON MONOXIDE (USEPA METHODS 3A, 7E AND 10)

3.1.1 Sampling Method

Oxygen (O₂) emissions were evaluated according to Performance Specification (PS) 3 "Specifications and Test Procedures for O₂ and CO₂ Continuous Emission Monitoring Systems in Stationary Sources" utilizing USEPA Method 3A, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight (Instrumental Analyzer Method)". The O₂ analyzer utilizes a paramagnetic sensor.

Oxides of Nitrogen (NO_x) emissions were evaluated according to Performance Specification (PS) 2 "Specifications and Test Procedures for SO₂ and NO_x Continuous Emission Monitoring Systems in Stationary Sources" utilizing USEPA Method 7E, "Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)". The NO_x analyzer utilizes a Chemiluminescent detector.

Carbon monoxide (CO) emissions were evaluated following the Performance Specification (PS) 4 and 4A "Specifications and Test Procedures for Carbon Monoxide Continuous Emissions Monitoring Systems in Stationary Sources" utilizing USEPA Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources". The CO analyzer utilizes a NDIR detector.

3.1.2 O₂, NO_x and CO Sampling Train

The EPA Methods 3A, 7E and 10 sampling system (Figure 2) consisted of the following components:

- (1) Heated stainless steel sampling probe with heated filter.
- (2) Heated Teflon™ sampling line.
- (3) Universal® gas conditioner with particulate filter.
- (4) Flexible unheated Teflon™ sampling line.
- (5) Servomax 1400 O₂/CO₂ gas analyzer, TECO 48i Chemiluminescent NO_x gas analyzer and TECO 48C NDIR CO gas analyzer.
- (6) USEPA Protocol 1 calibration gases.
- (7) Data Acquisition System

3.1.3 Sampling Train Calibration

The O₂/NO_x/CO sampling trains were calibrated following the procedures outlined in USEPA Methods 3A, 7E and 10. Zero, span, and mid-range calibration gases were introduced directly into the O₂, NO_x and CO analyzers to determine the instruments linearity. A zero and mid-range span gas was then introduced through the entire sampling system to determine sampling system bias for each analyzer. Additional system calibrations were performed at the completion of each test.

3.1.4 Sampling Duration & Frequency

The RATA testing of the Units 12-1, 12-1, and 13-1 O₂, NO_x and CO CEMS consisted of nine to twelve 21-minute samples at the test platform level of each unit's exhaust stack. Sampling was conducted at three points along a single path across the duct. Sampling was performed simultaneously for O₂, NO_x and CO. Data was recorded as 1-minute averages. The results are included in Appendix A.

3.1.5 Quality Control and Assurance (O₂, NO_x and CO)

All sampling and analytical equipment were calibrated following the guidelines referenced in Methods 3A, 7E and 10. Calibration gases were EPA Protocol 1 gases. The analyzer spans for Units 12-1, 12-2, and 13-1 RATA testing were 0-18.09% (18.09, 10.04, and zero) for O₂, 0-27.68 ppm (18.44, 7.92, and zero) for NO_x, and 0-9.116 ppm (9.116, 4.960, (27.55, 13.58 for Unit 12-2) and zero) for CO. The 10.04% O₂ gas was used to zero the NO_x and



CO analyzers and the 7.92 ppm NO_x gas was used to zero the O₂ analyzer.

Calibration gas certification sheets are included in Appendix C.

3.1.6 Data Reduction

The NO_x and CO emission readings in parts per million, dry (ppm_{dry}) and O₂ emission readings in percent (%) were recorded at 4-second intervals and averaged to 1-minute increments. The O₂, NO_x and CO emissions were drift corrected utilizing pre and post-run calibration data. The O₂ data was used to convert the NO_x ppm data to pounds per million British thermal units (lb/MMBtu).

The RM data collected for the Units 12-1, 12-2, and 13-1 testing can be found in Appendix A.

Corresponding CEMS data collected during the Units 12-1, 12-2, and 13-1 testing can be found in Appendix B.

RA calculations are based upon calculations found in USEPA Methods 3A, 7E, 10, 19 and PS2, 3, 4 and 4A. Example calculations can be found in Appendix D.

4.0 OPERATING PARAMETERS

Each Unit was tested at full load conditions which were determined by plant personnel. Load in terms of megawatts (MW) are included with the CEMS data located in Appendix B.

5.0 RESULTS

Tables 1 through 3 present the RATA testing results from Units 12-1, 12-2, and 13-1, respectively. The O₂, NO_x and CO monitors passed the RATA following the specifications of 40CFR60 – Performance Specification 2, 3, 4 and 4A and 40CFR75. The O₂ relative accuracy, calculated as %, met the criteria of <1.0% mean difference for all 3 units. The CO relative accuracy, calculated as ppm met the criteria of <5 ppm mean difference for all 3 units. The NO_x relative accuracy, calculated as pounds per million British Thermal units (lb/MMBtu), met the low emitter criteria of <0.015 lb/MMBtu mean difference for all 3 units. In addition, unit (EU-CTG12-1-BP) had a bias adjustment factor (BAF) = 1.078, unit (EU-

The logo for DTE Energy Services, featuring a stylized sunburst or fan shape composed of numerous thin lines radiating from a central point, positioned to the left of the letters 'DTE'.

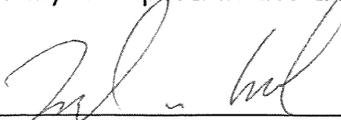
DTE

CTG12-2-BP) had a BAF = 1.061, and unit (EU-CTG13-1-BP) has a BAF = 1.111 per 40CFR75 criteria.

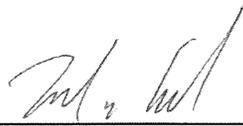


6.0 CERTIFICATION STATEMENT

"I certify that I believe the information provided in this document is true, accurate, and complete. Results of testing are based on the good faith application of sound professional judgment, using techniques, factors, or standards approved by the Local, State, or Federal Governing body, or generally accepted in the trade."



Mr. Mark D. Westerberg, QSTI

This report prepared by: 

Mr. Mark D. Westerberg, QSTI
Senior Specialist, Field Services Group
Environmental Management and Safety
DTE Energy Corporate Services, LLC

This report reviewed by: 

Mr. Jason Logan, QSTI
Environmental Specialist, Field Services Group
Environmental Management and Safety
DTE Energy Corporate Services, LLC



RESULTS TABLES