

**Carbon Monoxide
Emissions Testing
of
EUENGINE-4 and EUENGINE-5**

Cloverland Electric Cooperative

2535 West M-28
Dafter, Michigan 49724
SRN: B6107



Cloverland
ELECTRIC COOPERATIVE

Prepared for
Cloverland Electric Cooperative
Sault Ste. Marie, Michigan

Bureau Veritas Project No. 11014-000165.00

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3.0 Summary and Discussion of Results

3.1 Objectives

The testing was performed to evaluate compliance with National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) (40 CFR Part 63, Subpart ZZZZ) by measuring the oxygen (O₂) and carbon monoxide (CO) concentrations from the outlet of the two regulated engines. The relevant emission standards are provided in Table 1-1.

3.2 Test Matrix

The emission testing was conducted to evaluate the objectives in Section 3.1. Table 3-1 presents the sampling and analytical test matrix.

Table 3-1
Test Matrix

Sampling Location	No. of Runs	Sample/Type of Pollutant	Sampling Method (USEPA)	Sampling Organization	Test Time (min)	Analytical Method
Outlet of EUDGPEAKER2	3	O ₂ CO	M3A M10	Bureau Veritas	60	Paramagnetic Infrared
Inlet of EUDGPEAKER1	3	O ₂ CO	M3A M10	Bureau Veritas	60	Paramagnetic Infrared
Outlet of EUDGPEAKER1	3	O ₂ CO	M3A M10	Bureau Veritas	60	Paramagnetic Infrared

O₂ oxygen
CO carbon monoxide

3.3 Field Test Changes and Issues

Field test changes were not required to complete the emission testing.



3.4 Results

The results of the testing are compared to the applicable emission limits in Table 3-2. Detailed results are presented in Tables 1 and 2 after the Tables Tab of this report. Graphs of the measured O₂ and CO concentrations are presented after the Graphs Tab of this report. Sample calculations are presented in Appendix B.

**Table 3-2
O₂ and CO Emissions Results Compared to Permit Emission Limits**

Date (2014)	Source ID	Parameter	Units	Average Result	Emission Limit
EUDGPEAKER2 Outlet CO Testing					
Dec 11	EUDGPEAKER2 (Engine No. 2) Outlet	O ₂	%	12.0	N/A
		CO	ppmvd	22.3	N/A
		CO	ppmvd at 15% O ₂	14.8	23
EUDGPEAKER1 CO Removal Efficiency Testing					
Dec 11	EUDGPEAKER1 (Engine No. 1) Inlet	O ₂	%	10.4	N/A
		CO	ppmvd	717	N/A
		CO	ppmvd at 15% O ₂	402	N/A
Dec 11	EUDGPEAKER1 (Engine No. 1) Outlet	O ₂	%	10.4	N/A
		CO	ppmvd	66.4	N/A
		CO	ppmvd at 15% O ₂	37.2	23
Carbon Monoxide Removal Efficiency			%	90.7	70

O₂ oxygen
 CO carbon monoxide
 N/A not applicable
 ppmvd part per million by volume, dry basis

The O₂ and CO measurements demonstrate EUDGPEAKER1 and EUDGPEAKER2 are operating within allowable limits.



4.0 Sampling and Analytical Procedures

Bureau Veritas measured emissions in accordance with United States Environmental Protection Agency sampling methods 3A and 10, identified in Table 4 to Subpart ZZZZ of Part 63—Requirements for Performance Tests. The sampling and analytical methods used during this test program are listed in the following table.

**Table 4-1
Sampling and Analytical Test Methods**

USEPA Sampling Method	Parameter	Analysis
3A	Oxygen	Paramagnetic
10	Carbon monoxide	Nondispersive infrared
205	Gas Dilution	Field verification

4.1 Test Methods

4.1.1 Oxygen and Carbon Monoxide (USEPA Methods 3A and 10)

USEPA Method 3A “Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrument Analyzer Procedure)” and USEPA Method 10 “Determination of Carbon Monoxide Emissions from Stationary Sources (Instrument Analyzer Procedure)” was used to measure O₂ and CO concentrations. Flue gas was continuously sampled from the stack and conveyed to a paramagnetic analyzer for O₂ concentration measurements and an infrared analyzer for CO concentration measurements. Flue gas was extracted from the stack through:

- A stainless-steel probe.
- Heated Teflon sample line to prevent condensation.
- A chilled Teflon impinger train (equipped with a peristaltic pump) to remove moisture from the sampled gas stream prior to entering the analyzer.
- O₂ and CO gas analyzers.



Refer to Figure 2 in the Appendix for a drawing of the USEPA Methods 3A and 10 sampling train. Data was recorded at 1-second intervals on a computer equipped with data acquisition software.

Flue gas was withdrawn from three sample points located at 16.7%, 50%, and 83.3% of the diameter of the stack. The sampling probe was moved to a new sampling point at 20-minute intervals during the 60-minute test runs.

The pollutant concentrations were measured using an O₂ and CO gas analyzers calibrated with zero-, mid-, and high-EPA-Traceability-Protocol-certified calibration gases.

A calibration error check was performed by introducing zero-, mid-, and high-level calibration gases directly into the analyzers. The calibration error check was performed to verify each analyzer response was within $\pm 2\%$ of the calibration span of the analyzer. Prior to each test run, a system-bias test was performed where known concentrations of calibration gases were introduced at the probe tip to measure if the analyzers' response was within $\pm 5\%$ of the calibration gas span. At the conclusion of each test run, an additional system-bias check was performed to evaluate the analyzers percent drift from the pre- and post-test system-bias checks. The system-bias check evaluated the analyzer drift against the $\pm 3\%$ QA/QC requirement. The analyzers' drift data was used to correct the measured flue gas concentrations. Recorded concentrations were averaged over the duration of each 60-minute test run.

4.1.2 Gas Dilution (USEPA Method 205)

A gas dilution system was used to introduce known values of calibration gases into the CO analyzers. The gas dilution system consisted of calibrated orifices. The system diluted a high-level calibration gas to within $\pm 2\%$ of predicted values. This gas divider was capable of diluting gases at 80, 60, 50, 30, and 25% increments.

Before the start of testing, the gas divider dilutions were measured to be within $\pm 2\%$ of predicted values. Three sets of dilutions at 80, 60, 50, 30, and 25% of the high level (20.01% oxygen) calibration gas were performed. In addition, a certified mid-level calibration gas (11.11 % oxygen) was introduced into the analyzer; this calibration gas concentration was within $\pm 10\%$ of the 60% gas divider dilution concentration. Refer to Appendix A for the certified calibration gas certificates and graphs of the gas dilution field calibration.



**Table 4-2
Gas Dilution Field Verification**

Gas Dilution	Expected Concentration (ppm)	Acceptable Range ¹		Actual Concentration 1 (ppm)	Actual Concentration 2 (ppm)	Actual Concentration 3 (ppm)	Pass ?
		Low (ppm)	High (ppm)				
25%	5.0	4.9	5.1	5.0	5.0	5.0	Yes
30%	6.0	5.9	6.1	6.0	6.1	6.1	Yes
50%	10.0	9.8	10.2	10.1	10.1	10.1	Yes
60%	12.0	11.8	12.3	12.1	12.1	12.1	Yes
80%	16.0	15.7	16.3	16.0	16.0	15.9	Yes

¹ Acceptable range is $\pm 2\%$ of the expected concentration

4.2 Procedures for Obtaining Process Data

Process data were recorded by Cloverland Electric personnel. Refer to Section 2.1 and 2.2 for discussions of process and control device data and Appendix E for the operating parameters recorded during testing.

4.3 Sampling Identification and Custody

Gaseous pollutant concentrations were measured using analyzers processing the flue gas in real time; therefore, recovery and analytic procedures for laboratory samples were not necessary.



5.0 QA/QC Activities

Equipment used in this emissions test program passed quality assurance/quality control (QA/QC) procedures. Refer to Appendix A for equipment calibration and inspection sheets. Field data sheets are presented in Appendix C. Computer-generated Data Sheets are presented within Appendix D.

5.1 Pretest QA/QC Activities

Before testing, the sampling equipment was cleaned, inspected, and calibrated according to procedures outlined in the applicable USEPA sampling methods and USEPA's "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods."

5.2 QA/QC Audits

The results of select sampling and equipment QA/QC audits and the acceptable tolerance are presented in the following sections. Analyzer calibration and gas certification sheets are presented in Appendix A.

5.2.1 Instrument Analyzer QA/QC Audits

The instrument analyzer sampling trains described in Section 4.1 were audited for measurement accuracy and data reliability. The analyzers passed the applicable calibration criteria. Calibration gas selection, error, bias, and drift checks are included in Appendix A. The gas cylinders used during the test program are presented in Table 5-1.



**Table 5-1
Calibration Gas Cylinder Information**

Parameter	Gas Vendor	Cylinder Serial Number	Cylinder Value	Expiration Date
Carbon Monoxide (CO)	Pangaea Gases	EB0054932	45 ppm	3/4/2022
	50% Gas Dilution		39.75 ppm	10/10/2019
	The American Gas Group	EB0003828	79.5 ppm	
	Pangaea Gases	EB0033503	504 ppm	11/12/2021
CO	The American Gas Group	EB0022434	945 ppm	10/3/2019
Oxygen (O ₂)	Airgas	CC17793	11.11%	10/31/2022
	Pangaea Gases	EB0049262	20.03%	3/6/2022
Nitrogen (N)	Airgas	CC39741	99.9995%	9/25/2022

5.3 QA/QC Blanks

Reagent and field train blanks were not applicable to this test program.

5.4 QA/QC Problems

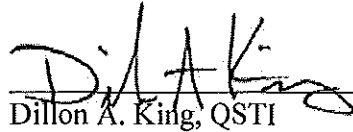
No QA/QC problems were encountered during this test program.



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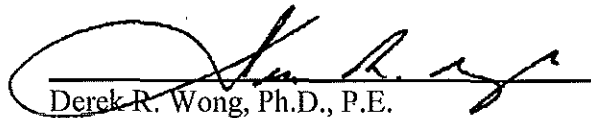
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Senior Project Manager

Health, Safety, and Environmental Services



Derek R. Wong, Ph.D., P.E.

Director and Vice President

Health, Safety, and Environmental Services



Table



Table 1
EUDGPEAKER2 Exhaust Carbon Monoxide Emissions Results
Cloverland Electric Cooperative - Manistique Station
Manistique, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014

Parameter	Units	Run 1	Run 2	Run 3	Average
Sample Time		8:15-9:15	9:30-10:30	10:45-11:45	
Duration	min	60	60	60	60
O ₂ Concentration (C _{avg})	%	12.1	12.0	11.8	11.9
Pre-test system calibration, zero gas (C ₀)	%	0.1	0.1	0.05	0
Post-test system calibration, zero gas (C ₀)	%	0.1	0.05	0.1	0
Certified low bracket gas concentration (C _{MA})	%	11.11	11.11	11.11	11.11
Pre-test system calibration, low bracket gas (C _M)	%	11.15	11.04	11.08	11.1
Post-test system calibration, low bracket gas (C _M)	%	11.04	11.08	11.05	11.1
Corrected O₂ Concentration (C_{gas})[†]	%	12.1	12.0	11.9	12.0
CO Concentration (C _{avg})	ppmvd	22.7	22.4	23.8	23.0
Pre-test system calibration, zero gas (C ₀)	ppmvd	0.1	-0.1	-0.1	0
Post-test system calibration, zero gas (C ₀)	ppmvd	-0.1	-0.1	-0.5	0
Certified low bracket gas concentration (C _{MA})	ppmvd	39.75	39.75	39.75	39.75
Pre-test system calibration, low bracket gas (C _M)	ppmvd	40.7	40.6	41.5	40.9
Post-test system calibration, low bracket gas (C _M)	ppmvd	40.6	41.5	41.2	41.1
Corrected CO Concentration (C_{gas})[†]	ppmvd	22.2	21.7	23.0	22.3
CO Concentration Corrected to 15% Oxygen	ppmvd	14.9	14.4	15.0	14.8

[†] corrected for analyzer drift

C₀ average of the initial and final system calibration bias check responses from the low-level (or zero) calibration gas, ppmv

C_{MA} actual concentration of the upscale calibration gas, ppmv

C_M Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmv

C_{gas} Average effluent gas concentration adjusted for bias, ppmv

ppmvd part per million by volume, dry basis

O₂ oxygen

CO carbon monoxide



Table 2
EUDGPEAKER1 Carbon Monoxide Removal Efficiency Results
Cloverland Electric Cooperative - Manistique Station
EUDGPEAKER2 Exhaust Carbon Monoxide Emissions Results
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014

Parameter		Units	Run 1	Run 2	Run 3	Average
Sample Time			12:35-13:35	13:45-14:45	14:55-15:55	
Duration		min	60	60	60	60
Inlet	O ₂ Concentration (C _{avg})	%	10.4	10.3	10.3	10.3
	Pre-test system calibration, zero gas (C ₀)	%	0.05	0.1	0.1	0
	Post-test system calibration, zero gas (C ₀)	%	0.1	0.1	0.14	0
	Certified low bracket gas concentration (C _{MA})	%	11.11	11.11	11.11	11.11
	Pre-test system calibration, low bracket gas (C _M)	%	11.13	11	11.1	11.1
	Post-test system calibration, low bracket gas (C _M)	%	11	11.1	11.06	11.1
	Corrected O ₂ Concentration (C _{gas}) [†]	%	10.5	10.4	10.3	10.4
	CO Concentration (C _{avg})	ppmvd	651.6	722.7	760.7	711.7
	Pre-test system calibration, zero gas (C ₀)	ppmvd	-0.8	0	0.2	-0.2
	Post-test system calibration, zero gas (C ₀)	ppmvd	0	0.2	-0.5	0
	Certified low bracket gas concentration (C _{MA})	ppmvd	503	503	503	503
	Pre-test system calibration, low bracket gas (C _M)	ppmvd	497.5	500	498	498.5
	Post-test system calibration, low bracket gas (C _M)	ppmvd	500	498	501.5	499.8
	Corrected CO Concentration (C _{gas}) [†]	ppmvd	657.0	728.6	765.6	717.0
CO Concentration Corrected to 15% Oxygen	ppmvd	372.2	408.5	425.1	402.0	
Outlet	O ₂ Concentration (C _{avg})	%	10.6	10.5	10.4	10.5
	Pre-test system calibration, zero gas (C ₀)	%	0.1	0.1	0.1	0.1
	Post-test system calibration, zero gas (C ₀)	%	0.1	0.1	0.05	0.1
	Certified low bracket gas concentration (C _{MA})	%	11.11	11.11	11.11	11.11
	Pre-test system calibration, low bracket gas (C _M)	%	11.3	11.2	11.3	11.3
	Post-test system calibration, low bracket gas (C _M)	%	11.2	11.3	11.3	11.3
	Corrected O ₂ Concentration (C _{gas}) [†]	%	10.5	10.3	10.2	10.4
	CO Concentration (C _{avg})	ppmvd	64.9	68.4	66.7	66.7
	Pre-test system calibration, zero gas (C ₀)	ppmvd	0	0	0	0
	Post-test system calibration, zero gas (C ₀)	ppmvd	0	0	0	0
	Certified low bracket gas concentration (C _{MA})	ppmvd	39.75	39.75	39.75	39.75
	Pre-test system calibration, low bracket gas (C _M)	ppmvd	39.9	40	39.7	39.9
	Post-test system calibration, low bracket gas (C _M)	ppmvd	40	39.7	40.2	40.0
	Corrected CO Concentration (C _{gas}) [†]	ppmvd	64.6	68.2	66.4	66.4
CO Concentration Corrected to 15% Oxygen	ppmvd	36.6	38.1	36.8	37.2	
CO Removal Efficiency		%	90.2	90.7	91.4	90.7

[†] corrected for [†] corrected for analyzer drift

C₀ average of C₀ average of the initial and final system calibration bias check responses from the low-level (or zero) calibration gas, ppmv

C_{MA} actual or C_{MA} actual concentration of the upscale calibration gas, ppmv

C_M Average or C_M Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmv

C_{gas} Average or C_{gas} Average effluent gas concentration adjusted for bias, ppmv

ppmvd part per million by volume, dry basis

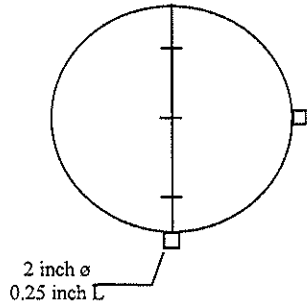
O₂ oxygen O₂ oxygen

CO carbon monoxide CO carbon monoxide



Figure

20 inch Internal Diameter



Source	Distance From Ports to Nearest Upstream Bend/Disturbance	Distance From Ports to Nearest Downstream Bend/Disturbance
EUDGPEAKER1	72 inches (3.6 diameter)	18 inches (0.9 diameter)
EUDGPEAKER2	72 inches (3.6 diameter)	18 inches (0.9 diameter)

Traverse Point	Distance From Stack Wall (inches)
3	3.4
2	10
1	16.6

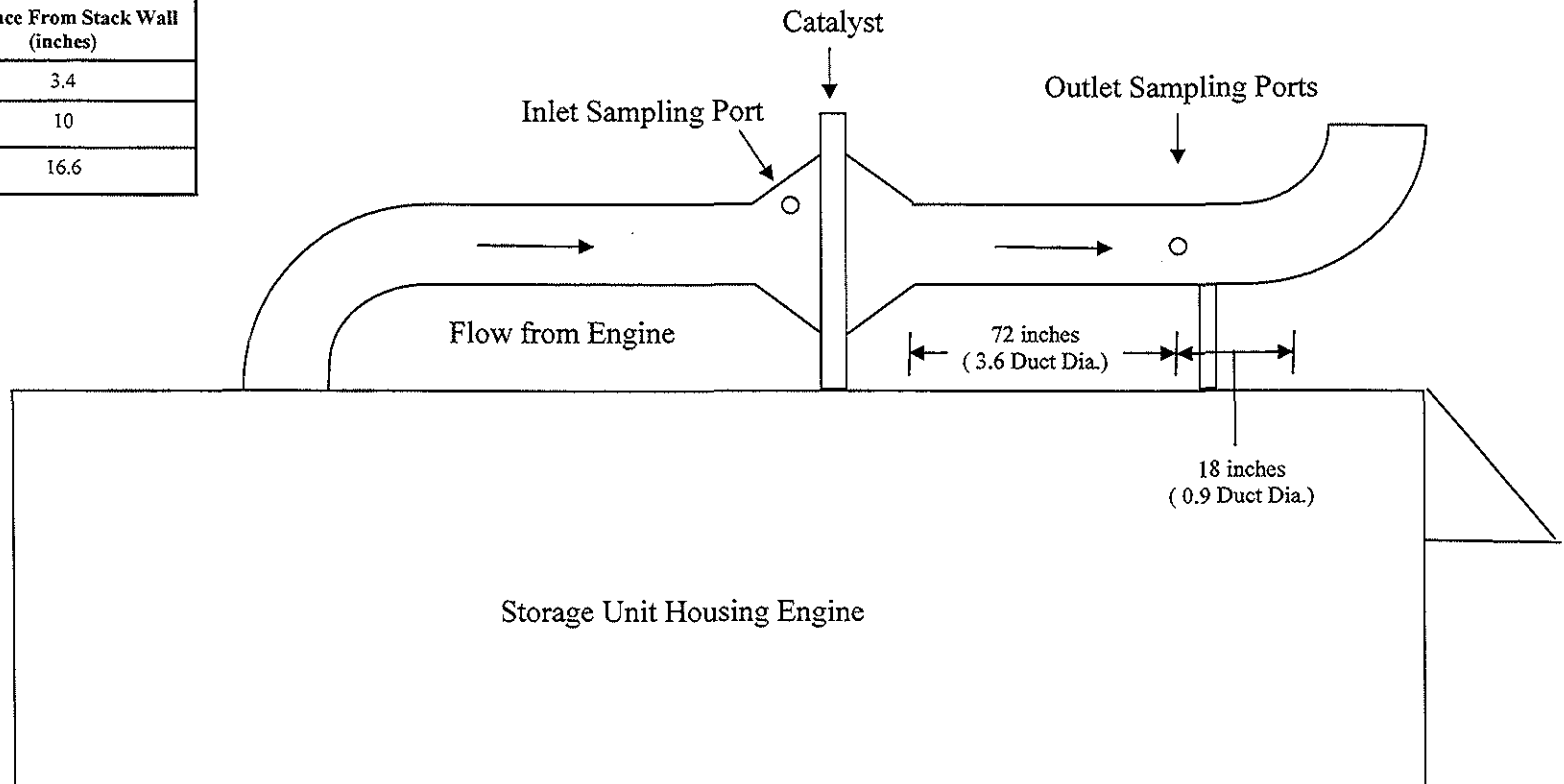


Figure 1
EUDGPEAKER1 and EUDGPEAKER2
Sampling Ports and Traverse Point Locations



Cloverland Electric Cooperative
Manistique, Michigan

Project No. 11014-000165.00

Last Revision: January 19, 2015

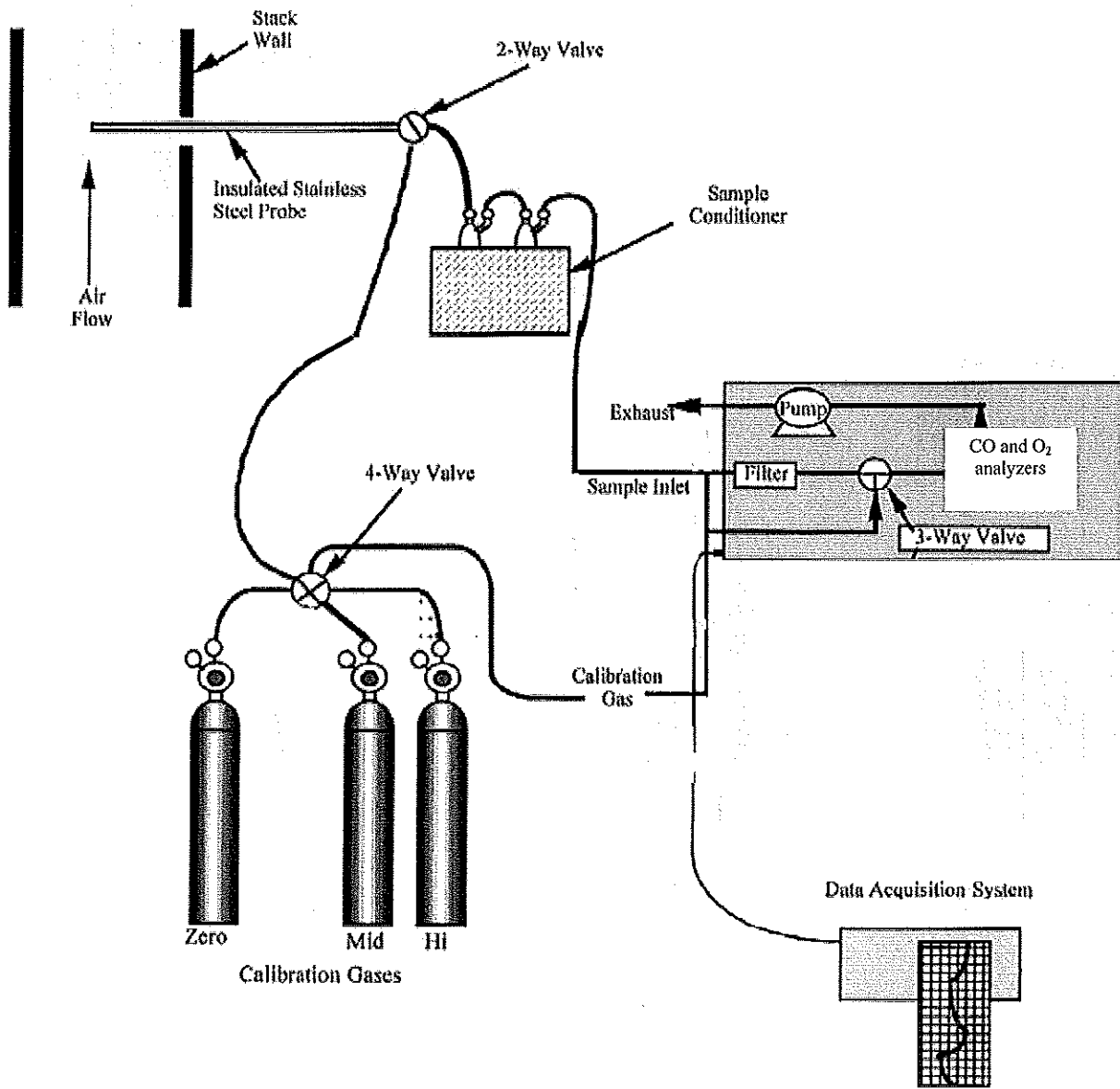


Figure 2
 USEPA Methods 3A and 10
 Sampling Train



Cloverland Electric Cooperative
 Manistique, Michigan

Project No. 11014-000165.00

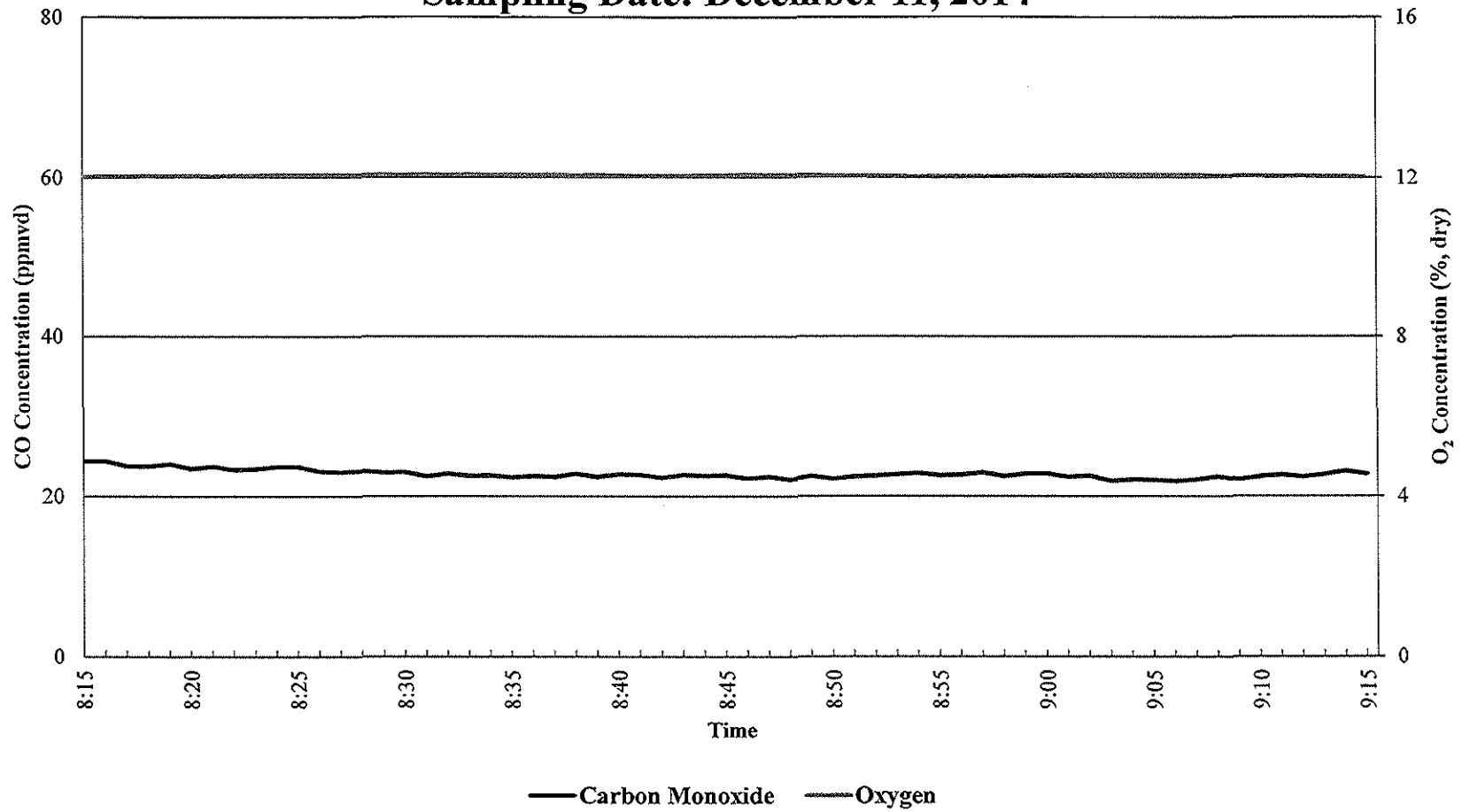
Last Revision:
 December 23, 2014



Graph

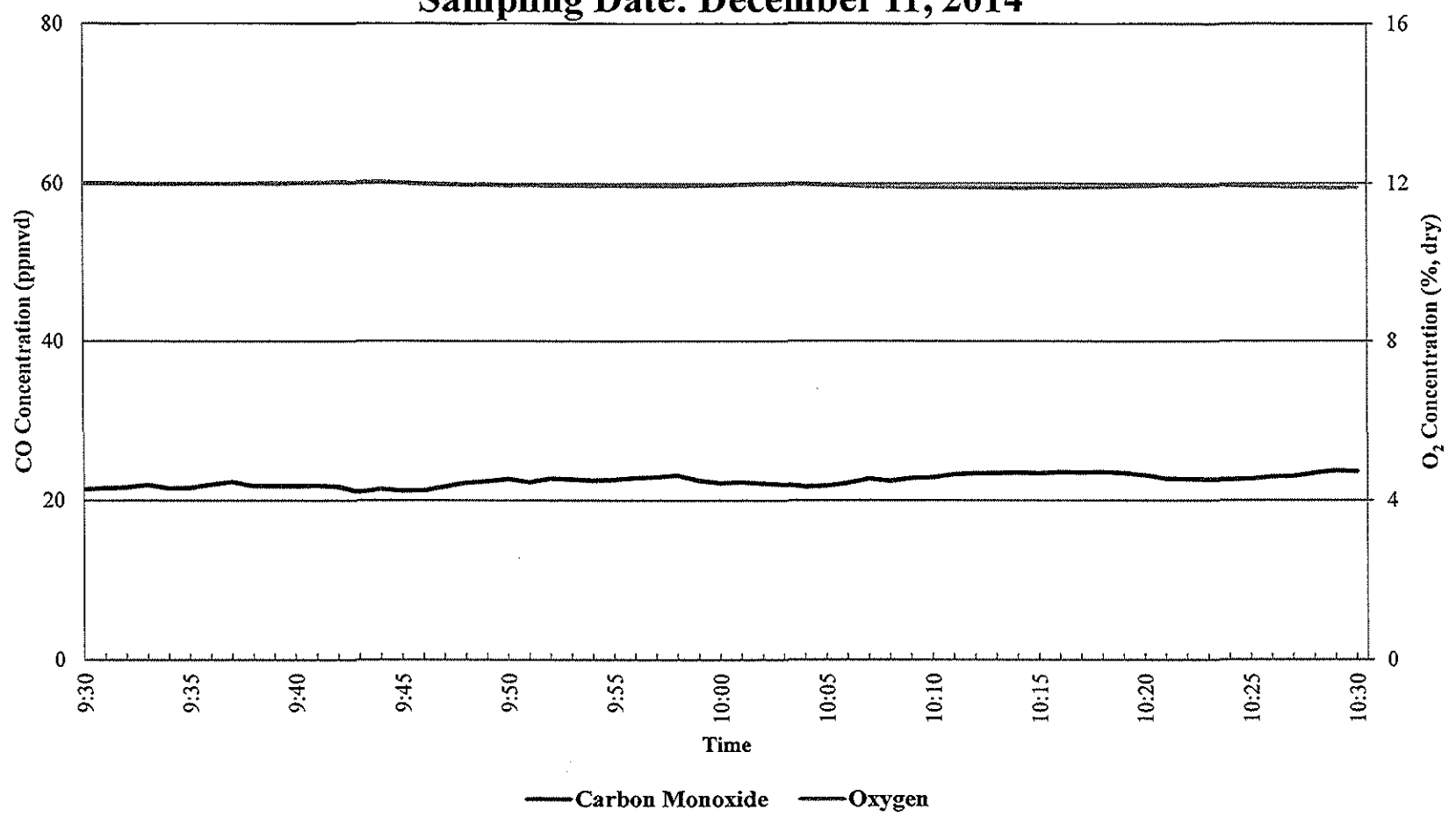


EUDGPEAKER2 Exhaust
Carbon Monoxide and Oxygen Concentrations - Run 1
Cloverland Electric Cooperative
Manistique, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014



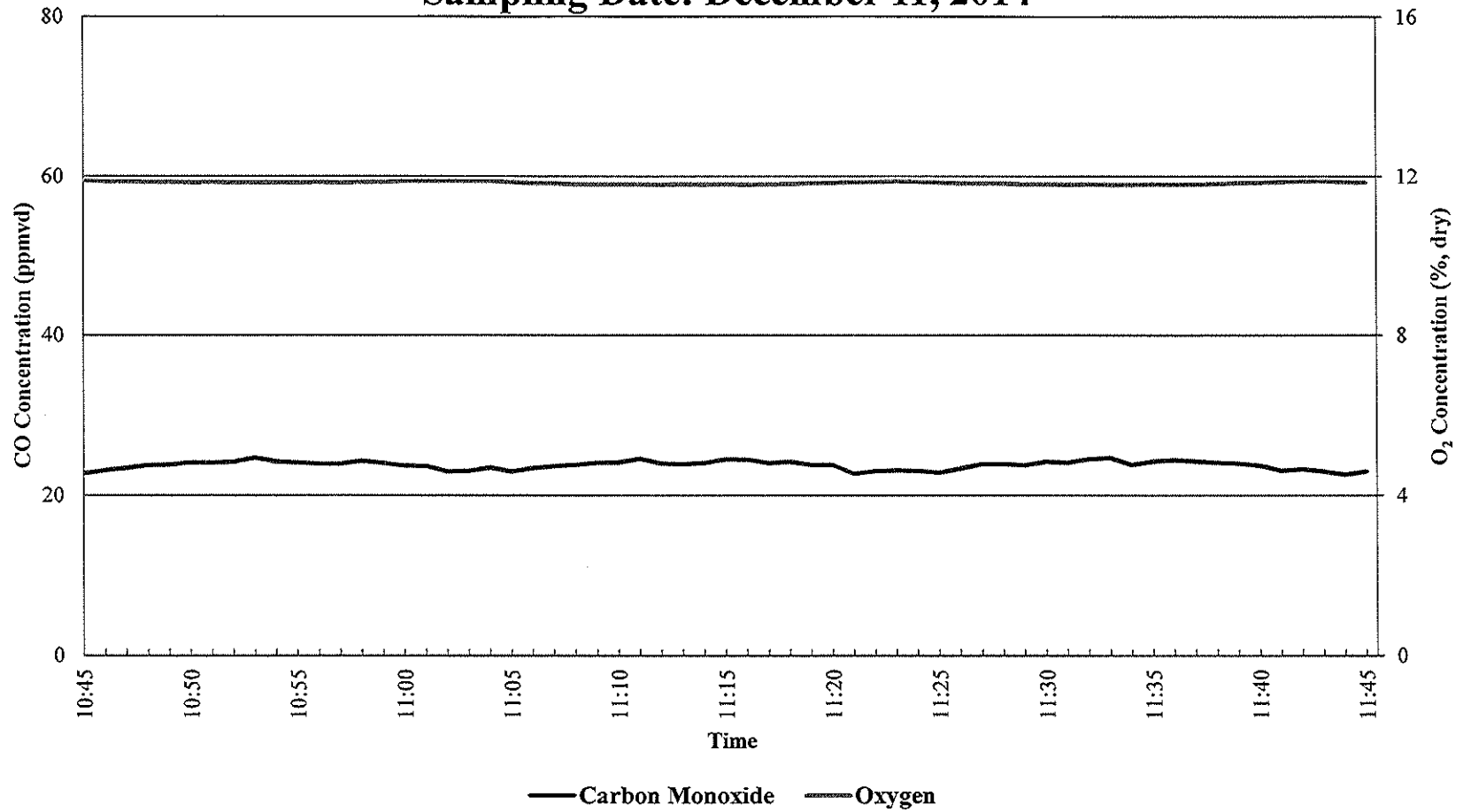


EUDGPEAKER2 Exhaust
Carbon Monoxide and Oxygen Concentrations - Run 2
Cloverland Electric Cooperative
Manistique, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014



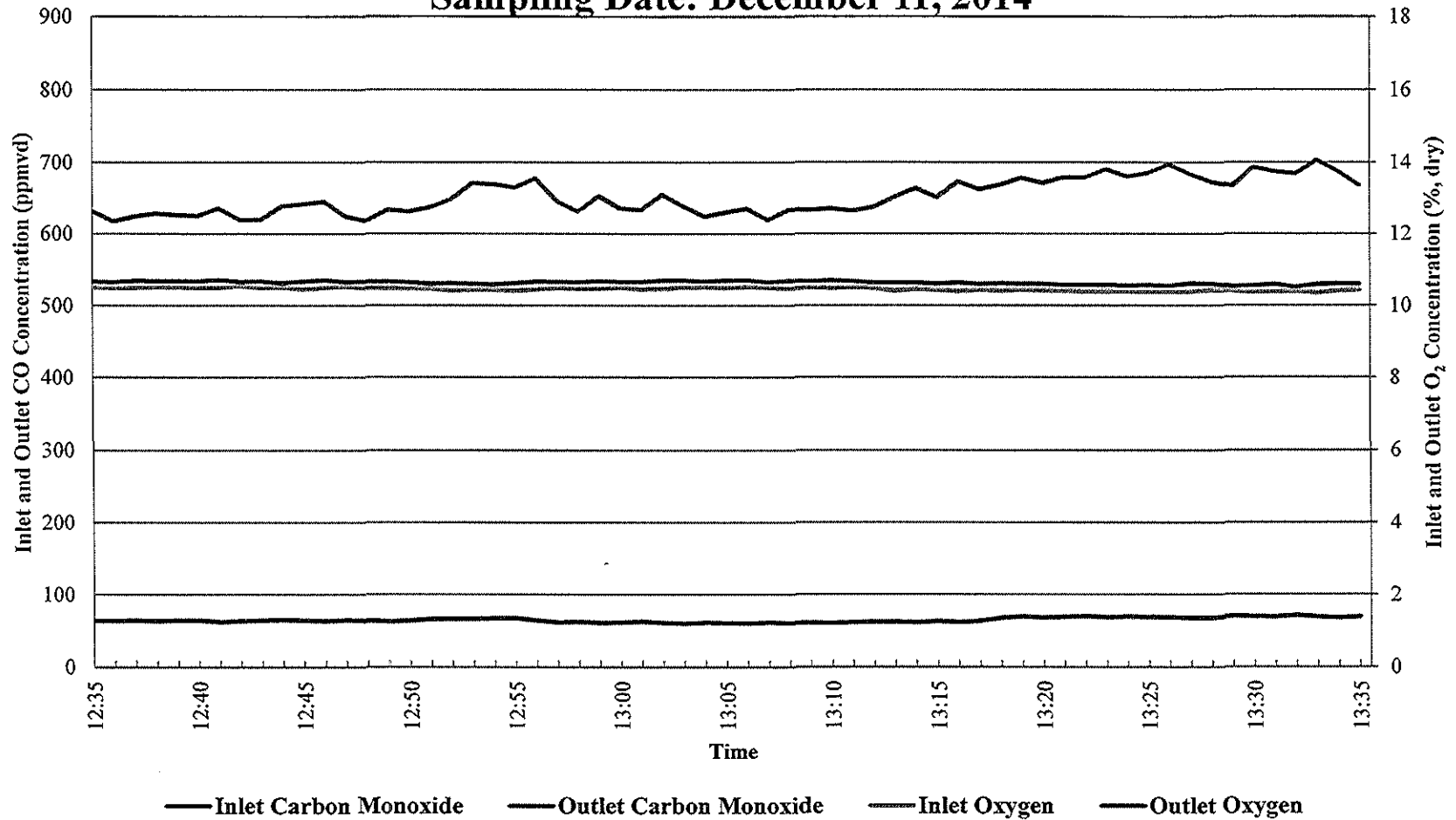


EUDGPEAKER2 Exhaust
Carbon Monoxide and Oxygen Concentrations - Run 3
Cloverland Electric Cooperative
Manistique, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014



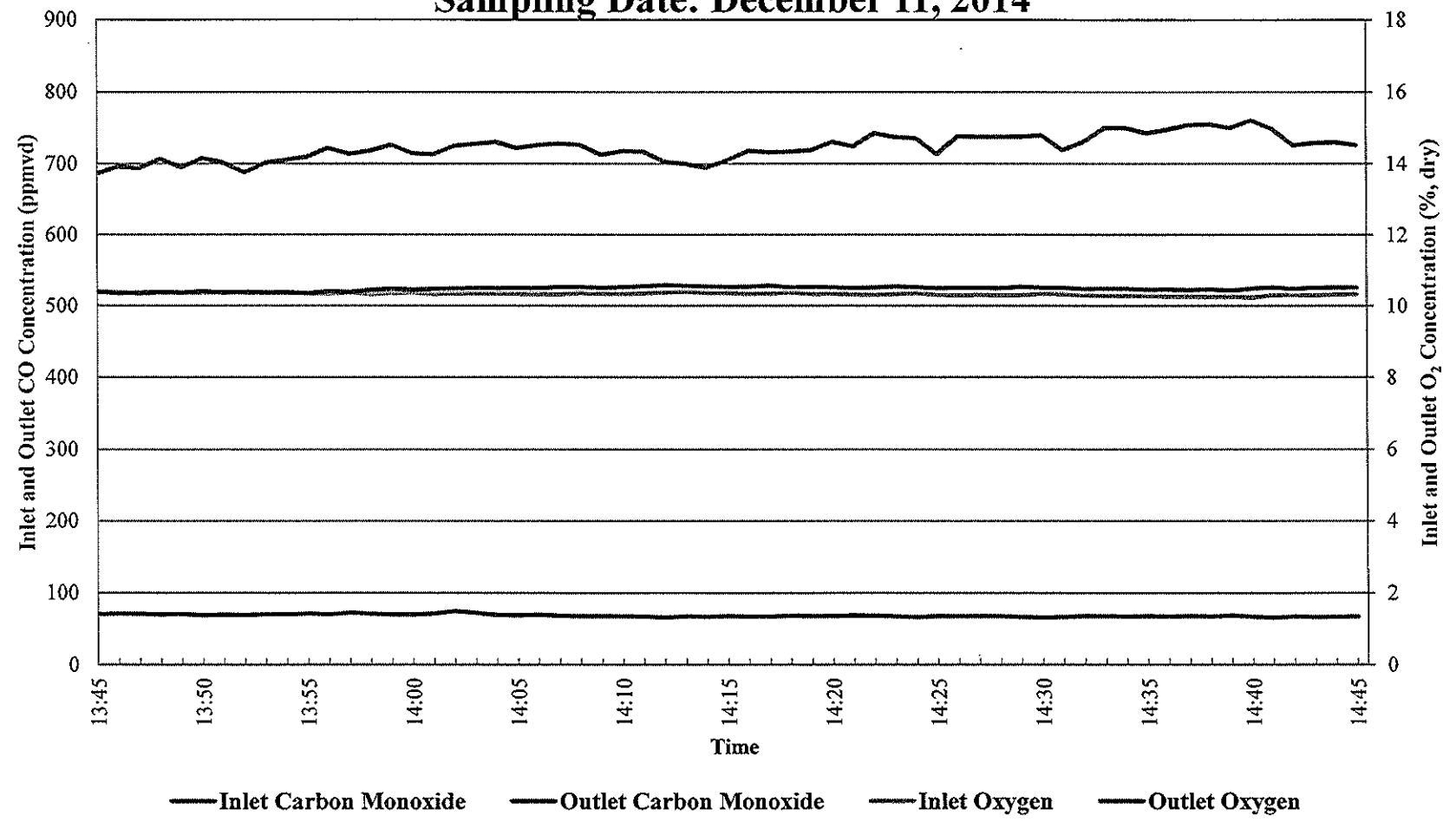


**EUDGPEAKER1 Inlet and Outlet
Carbon Monoxide and Oxygen Concentrations - Run 1
Cloverland Electric Cooperative
Manistique, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014**



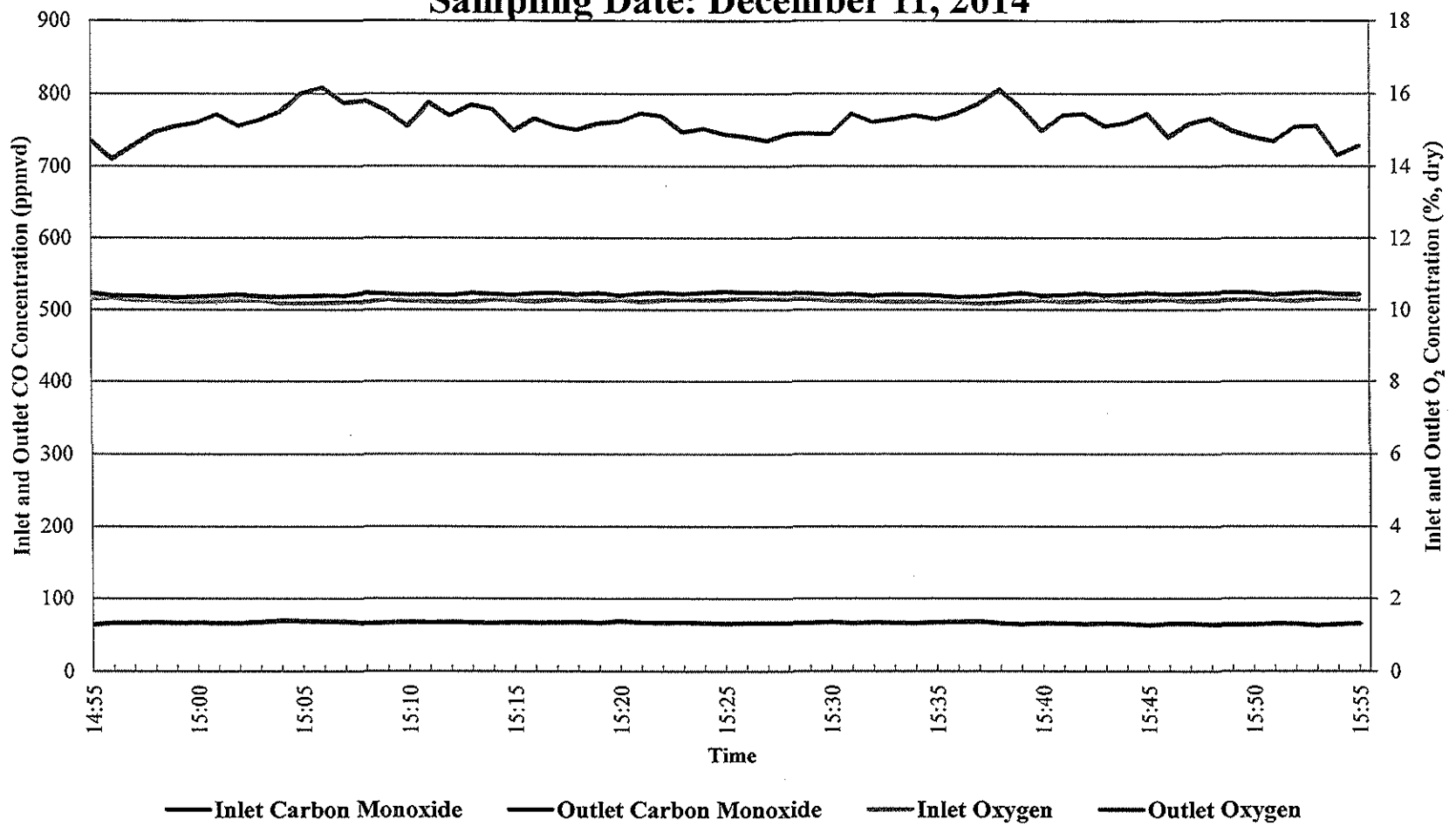


**EUDGPEAKER1 Inlet and Outlet
Carbon Monoxide and Oxygen Concentrations - Run 2
Cloverland Electric Cooperative
Manistique, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014**





**EUDGPEAKER1 Inlet and Outlet
Carbon Monoxide and Oxygen Concentrations - Run 3
Cloverland Electric Cooperative
Manistique, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 11, 2014**





Table



Table 1
EUENGINE-4 Carbon Monoxide Emissions Results
Cloverland Electric Cooperative - Dafter Station
Dafter, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 9, 2014

Parameter	Units	Run 1	Run 2	Run 3	Average
Sample Time		8:45-9:45	10:00-11:00	11:15-12:15	
Duration	min	60	60	60	60
O ₂ Concentration (C _{avg})	%	15.1	15.3	15.3	15.2
Pre-test system calibration, zero gas (C ₀)	%	0	0	0	0
Post-test system calibration, zero gas (C ₀)	%	0	0	0	0
Certified low bracket gas concentration (C _{MA})	%	11.11	11.11	11.11	11.11
Pre-test system calibration, low bracket gas (C _M)	%	11.1	11.05	11.07	11.1
Post-test system calibration, low bracket gas (C _M)	%	11.05	11.07	11.09	11.1
Average Corrected O₂ Concentration (C_{gas})[†]	%	15.2	15.3	15.4	15.3
CO Concentration (C _{avg})	ppmvd	15.0	10.1	8.3	11.1
Pre-test system calibration, zero gas (C ₀)	ppmvd	1.1	-0.1	-0.57	0.1
Post-test system calibration, zero gas (C ₀)	ppmvd	-0.1	-0.57	-0.62	-0.4
Certified low bracket gas concentration (C _{MA})	ppmvd	26	26	26	26
Pre-test system calibration, low bracket gas (C _M)	ppmvd	26	25.7	25.5	25.7
Post-test system calibration, low bracket gas (C _M)	ppmvd	25.7	25.5	25.4	25.5
Average Corrected CO Concentration (C_{gas})[†]	ppmvd	14.9	10.5	8.9	11.4
Average CO Concentration Corrected to 15% Oxygen	ppmvd	15.4	11.1	9.5	12.0

[†] corrected for analyzer drift

C₀ average of the initial and final system calibration bias check responses from the low-level (or zero) calibration gas, ppmv

C_{MA} actual concentration of the upscale calibration gas, ppmv

C_M Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmv

C_{gas} Average effluent gas concentration adjusted for bias, ppmv

ppmvd part per million by volume, dry basis

O₂ oxygen

CO carbon monoxide



Table 2
EUENGINE-5 Carbon Monoxide Emissions Results
Cloverland Electric Cooperative - Dafter Station
 Dafter, Michigan
 Bureau Veritas Project No. 11014-000165.00
 Sampling Date: December 9, 2014

Parameter	Units	Run 1	Run 2	Run 3	Average
Sample Time		10:00-11:00	11:15-12:15	12:30-13:30	
Duration	min	60	60	60	60
O ₂ Concentration (C _{avg})	%	12.2	12.3	12.2	12.2
Pre-test system calibration, zero gas (C ₀)	%	0.1	0	0.04	0
Post-test system calibration, zero gas (C ₀)	%	0	0.04	0	0
Certified low bracket gas concentration (C _{MA})	%	11.11	11.11	11.11	11.11
Pre-test system calibration, low bracket gas (C _M)	%	11.2	11.03	11.02	11.1
Post-test system calibration, low bracket gas (C _M)	%	11.03	11.02	10.95	11.0
Average Corrected O₂ Concentration (C_{gas})[†]	%	12.2	12.4	12.3	12.3
CO Concentration (C _{avg})	ppmvd	8.0	6.9	6.7	7.2
Pre-test system calibration, zero gas (C ₀)	ppmvd	0.4	-0.07	0	0.1
Post-test system calibration, zero gas (C ₀)	ppmvd	-0.07	0	0	0
Certified low bracket gas concentration (C _{MA})	ppmvd	26	26	26	26
Pre-test system calibration, low bracket gas (C _M)	ppmvd	25.8	25.3	25.5	25.5
Post-test system calibration, low bracket gas (C _M)	ppmvd	25.3	25.5	25.45	25.4
Average Corrected CO Concentration (C_{gas})[†]	ppmvd	8.0	7.1	6.8	7.3
Average CO Concentration Corrected to 15% Oxygen	ppmvd	5.4	4.9	4.7	5.0

[†] corrected for analyzer drift

C₀ average of the initial and final system calibration bias check responses from the low-level (or zero) calibration gas, ppmv

C_{MA} actual concentration of the upscale calibration gas, ppmv

C_M Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmv

C_{gas} Average effluent gas concentration adjusted for bias, ppmv

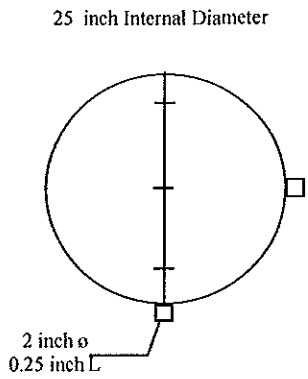
ppmvd part per million by volume, dry basis

O₂ oxygen

CO carbon monoxide

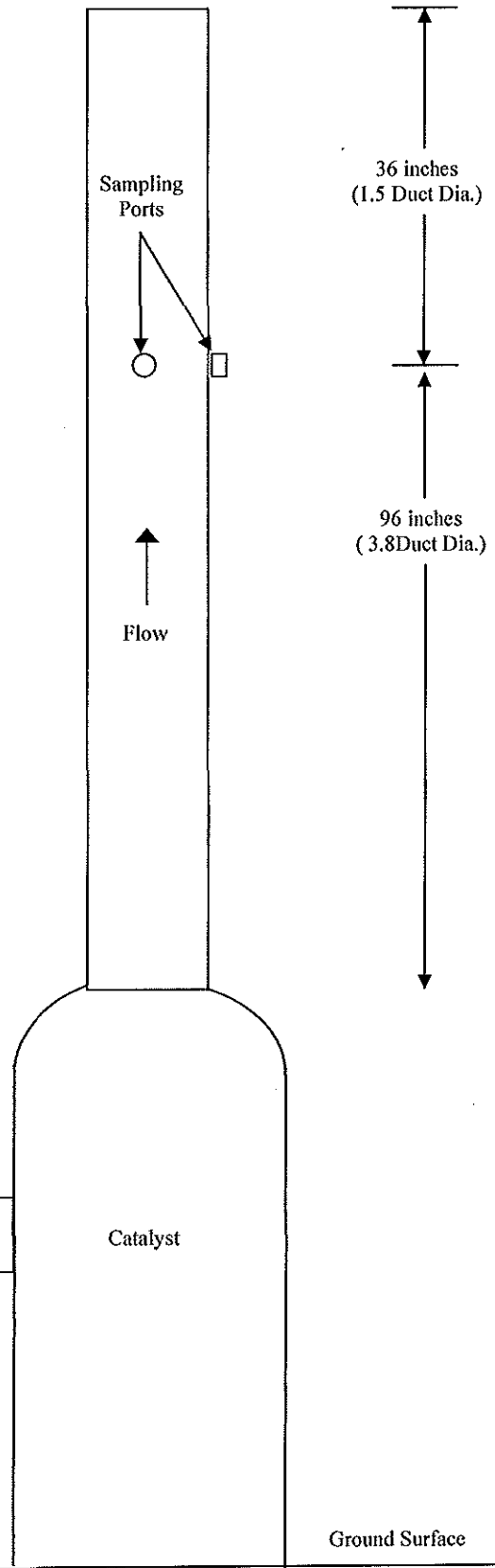


Figure



Traverse Point	Distance From Stack Wall (inches)
3	4.25
2	12.5
1	20.75

Source	Distance From Ports to Nearest Upstream Bend/Disturbance	Distance From Ports to Nearest Downstream Bend/Disturbance
EUENGINE-4	96 inches (3.8 diameter)	36 inches (1.5 diameter)
EUENGINE-5	96 inches (3.8 diameter)	36 inches (1.5 diameter)



Building Wall

From Engine →

Catalyst

Ground Surface

Figure 1
EUENGINE-4 and EUENGINE-5
Sampling Ports and Traverse Point
Locations



Cloverland Electric Cooperative
Dafer, Michigan

Project No. 11014-000165.00

Last Revision:
January 19, 2015

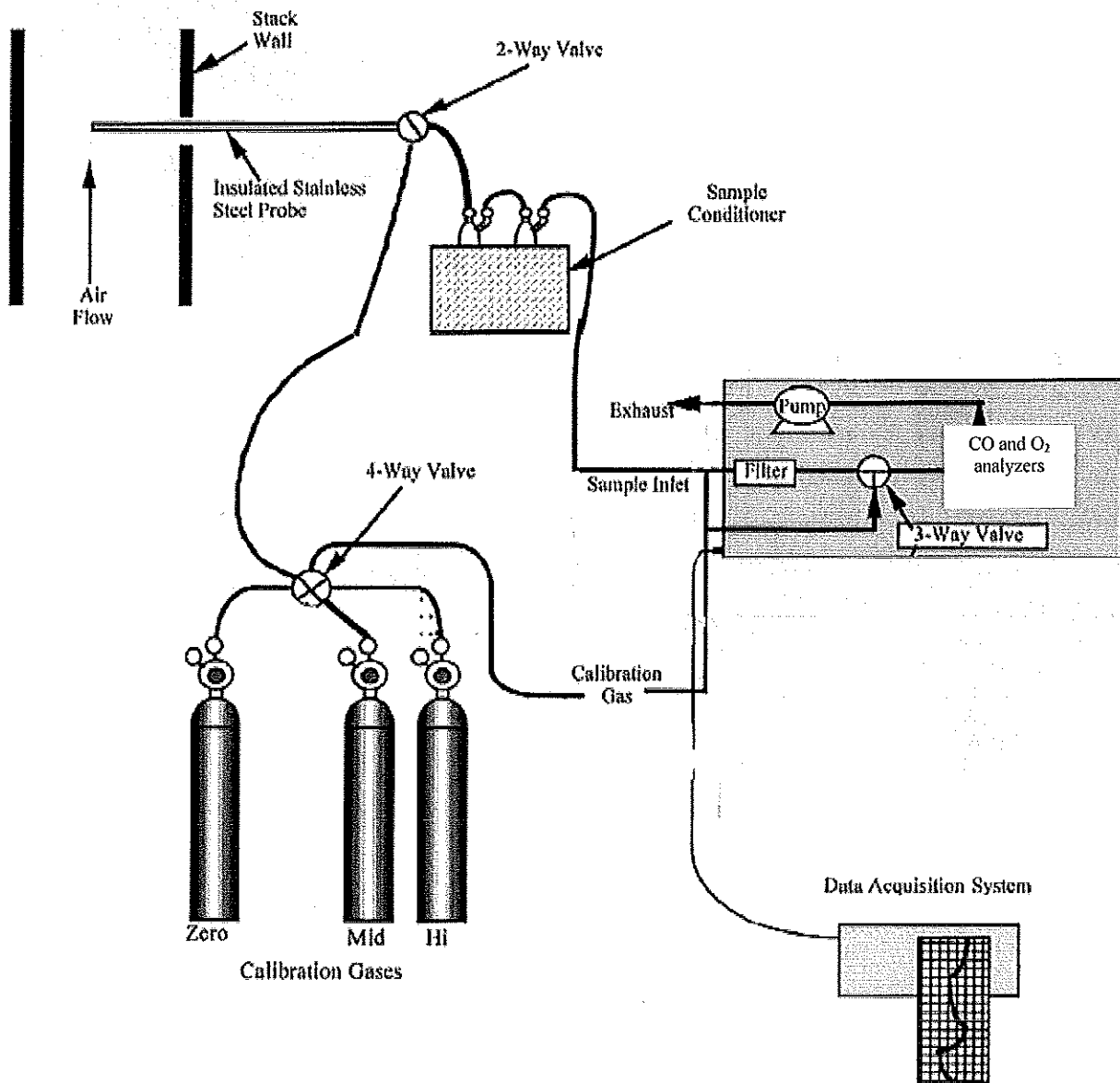


Figure 2
USEPA Methods 3A and 10
Sampling Train



BUREAU
VERITAS

Cloverland Electric Cooperative
Dafer, Michigan

Project No. 11014-000165.00

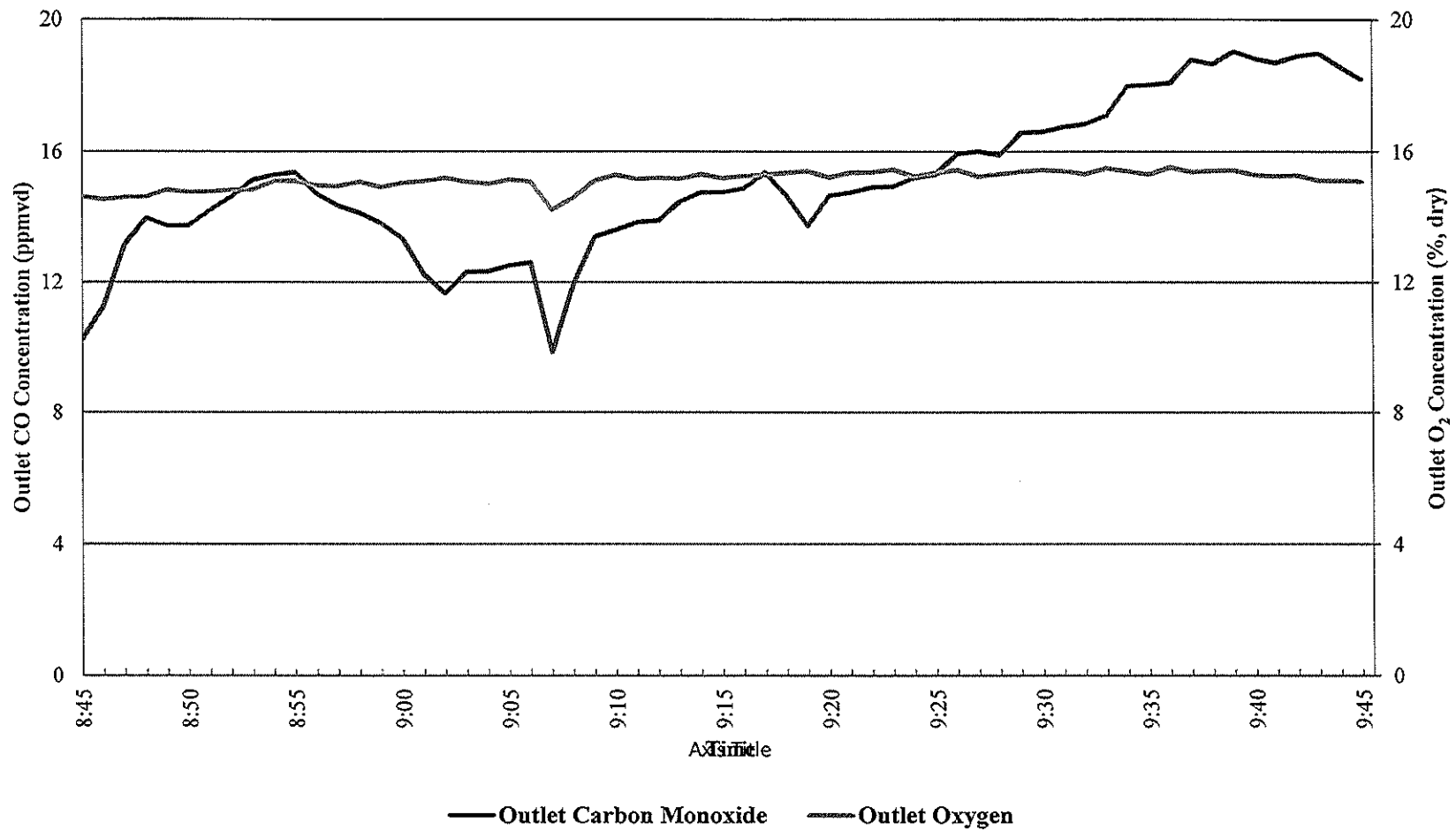
Last Revision:
December 23, 2014



**BUREAU
VERITAS**

Graph

EUENGINE-4 Carbon Monoxide and Oxygen Concentrations - Run 1
Cloverland Electric Cooperative
Dafter, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 9, 2014



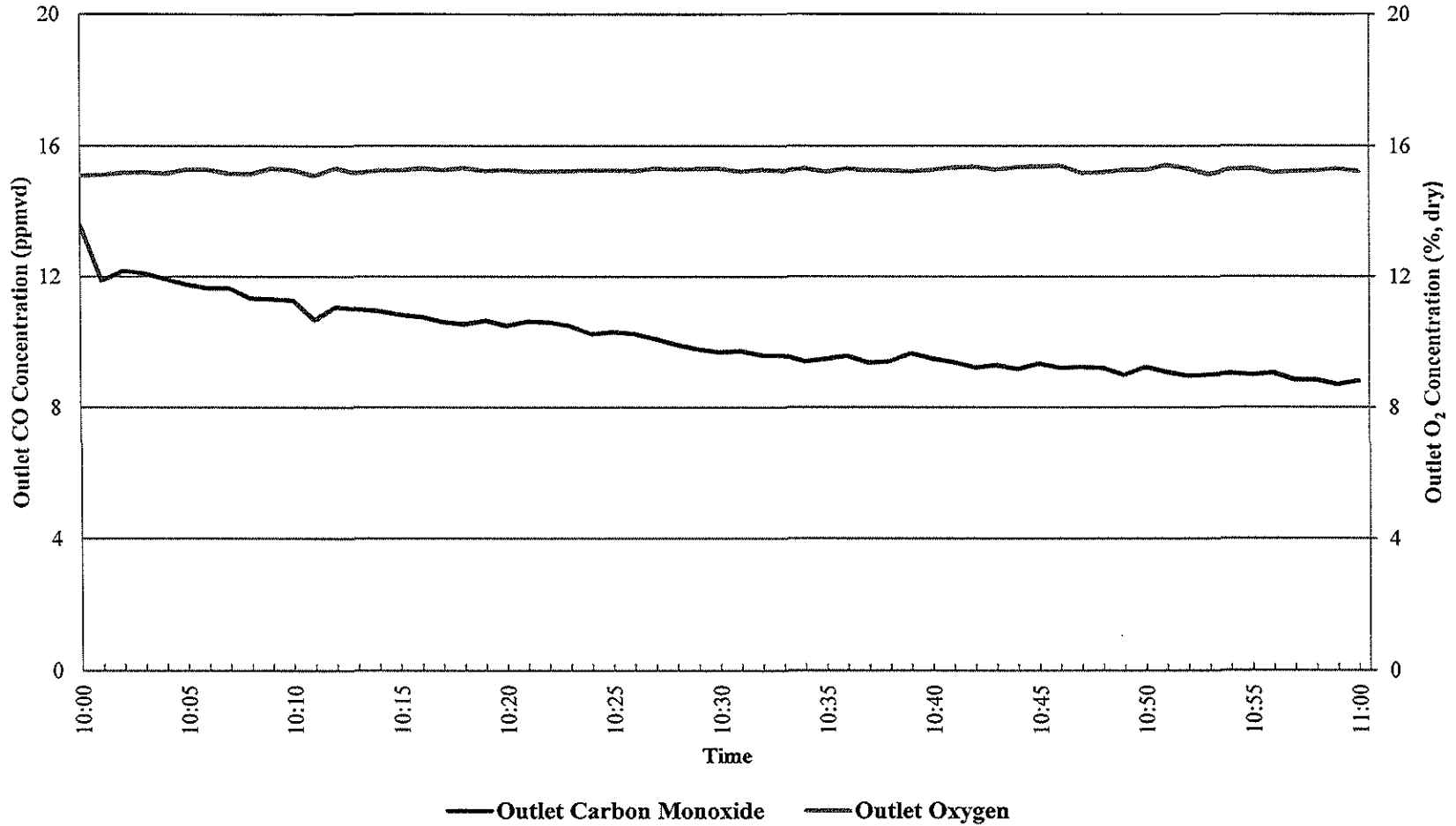
EUENGINE-4 Carbon Monoxide and Oxygen Concentrations - Run 2

Cloverland Electric Cooperative

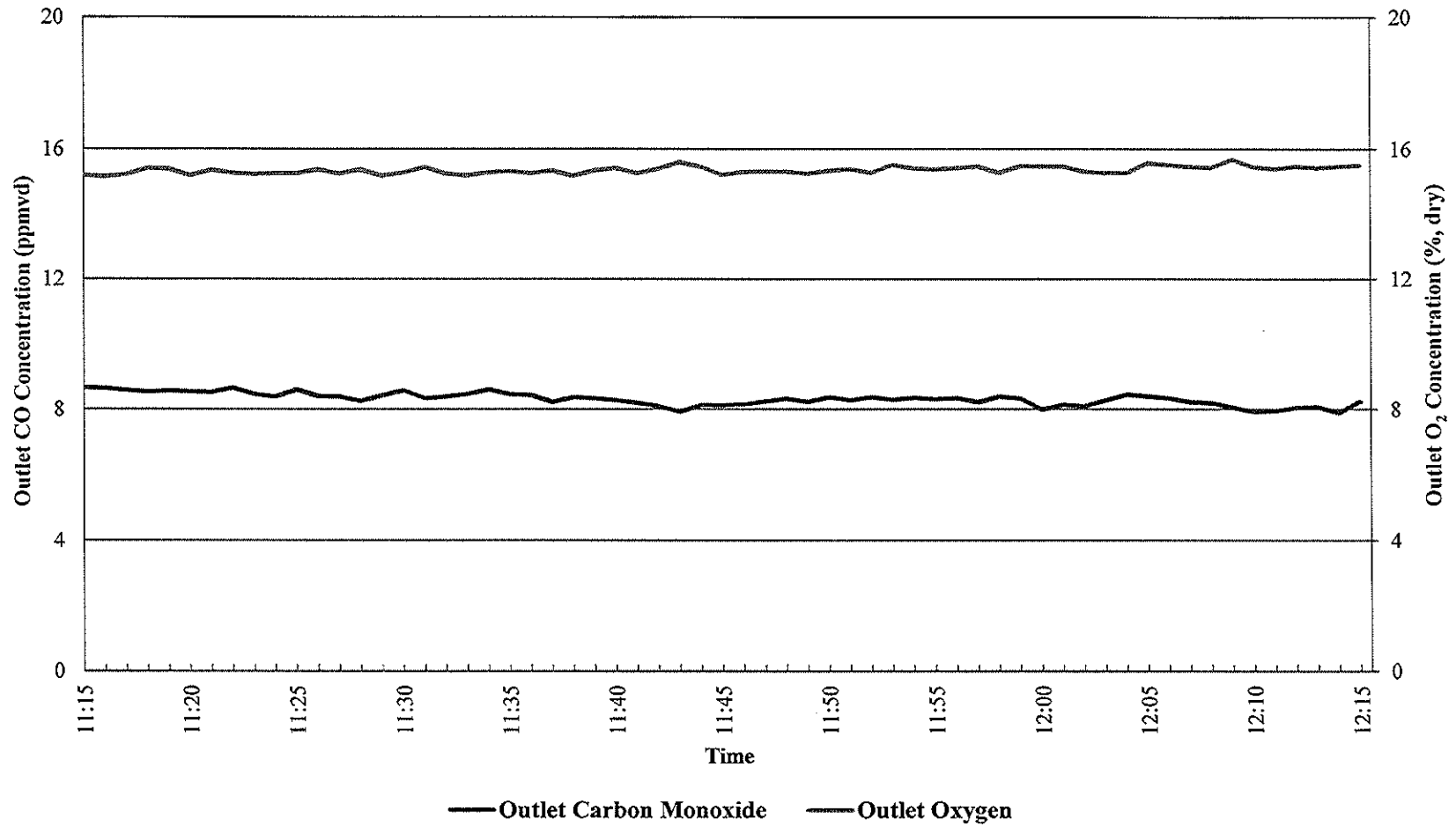
Dafter, Michigan

Bureau Veritas Project No. 11014-000165.00

Sampling Date: December 9, 2014



EUENGINE-4 Carbon Monoxide and Oxygen Concentrations - Run 3
Cloverland Electric Cooperative
Dafter, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 9, 2014



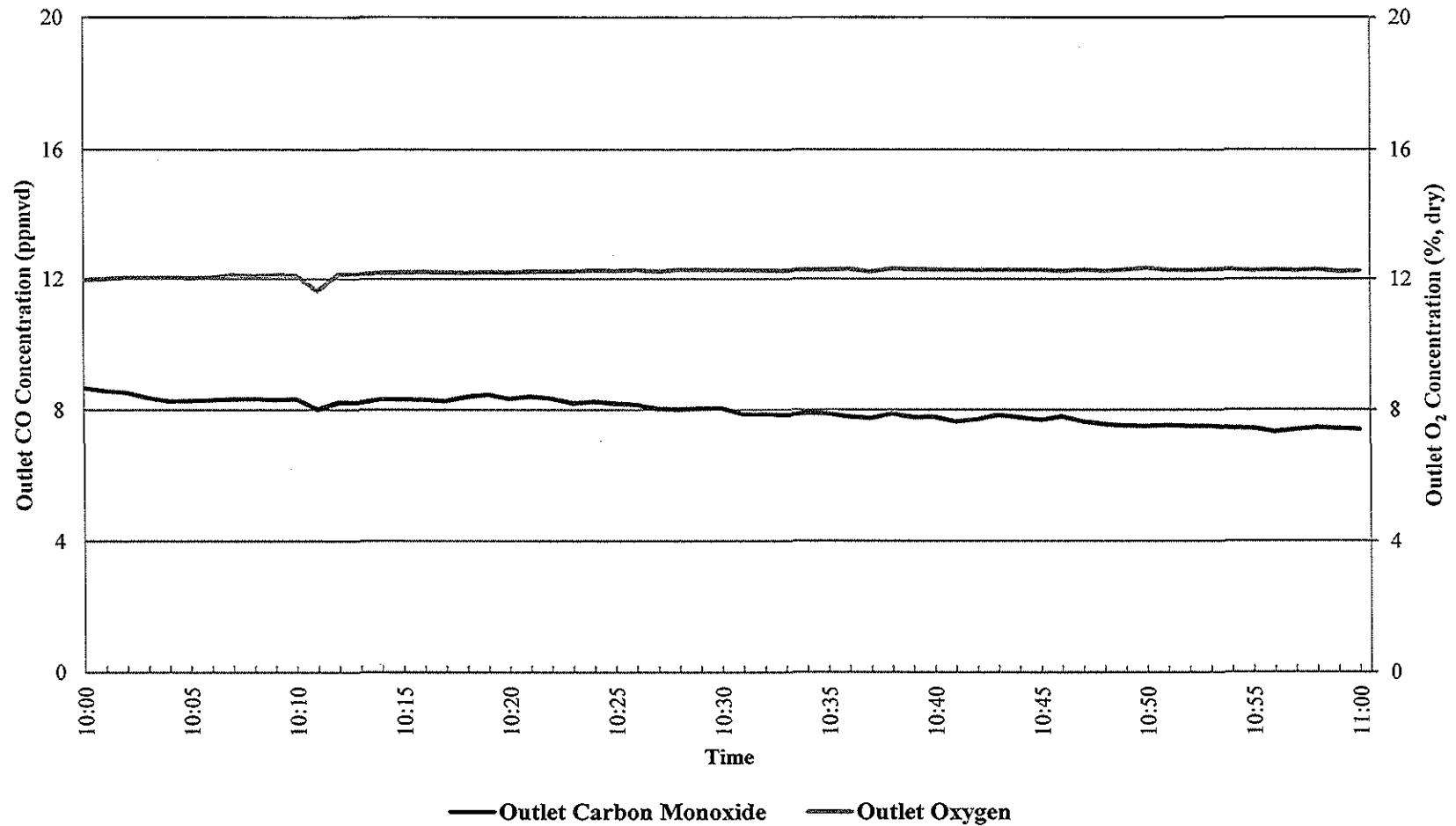
EUENGINE-5 Carbon Monoxide and Oxygen Concentrations - Run 1

Cloverland Electric Cooperative

Dafer, Michigan

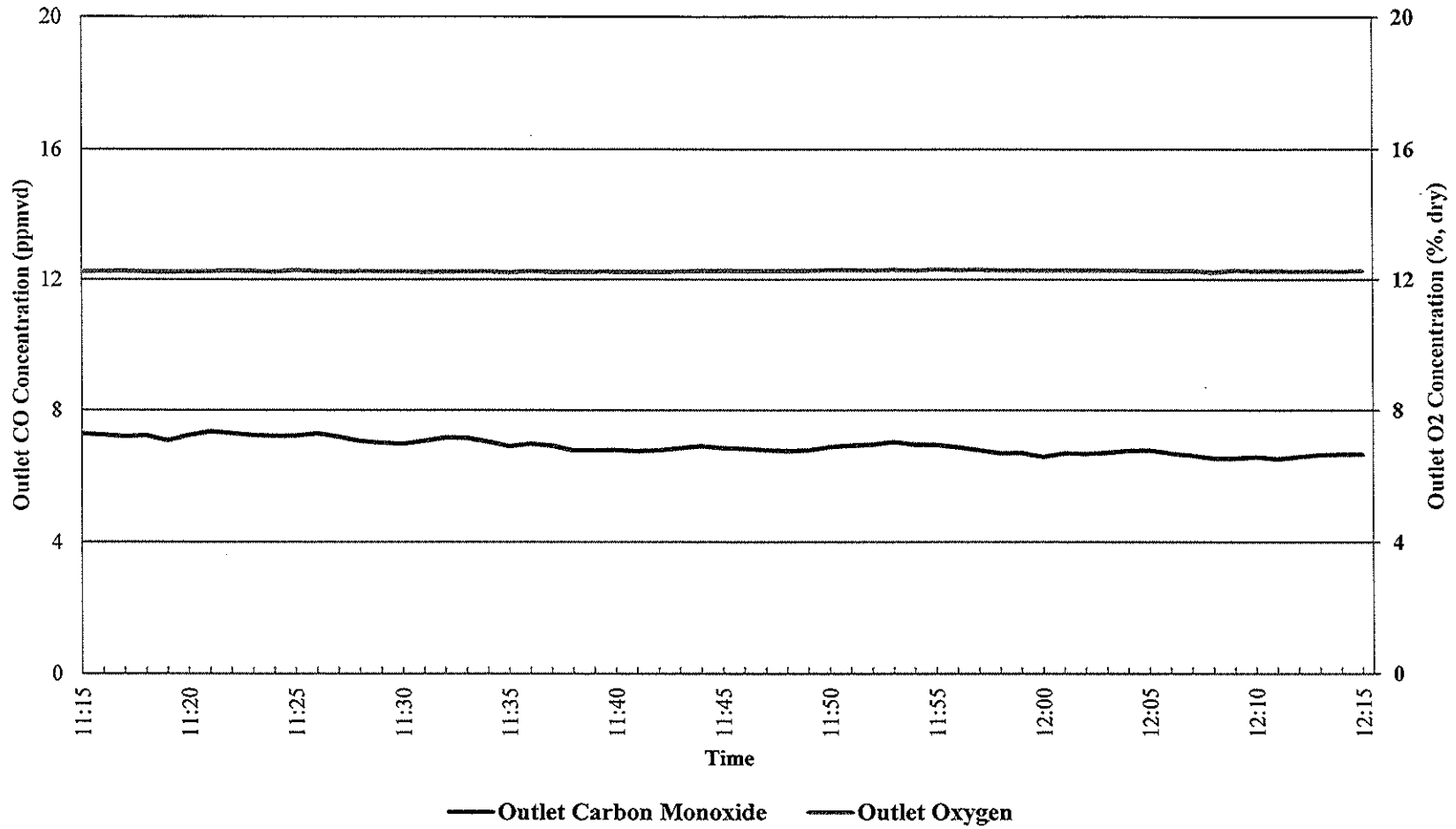
Bureau Veritas Project No. 11014-000165.00

Sampling Date: December 9, 2014





EUENGINE-5 Carbon Monoxide and Oxygen Concentrations - Run 2
Cloverland Electric Cooperative
Dafter, Michigan
Bureau Veritas Project No. 11014-000165.00
Sampling Date: December 9, 2014



EUENGINE-5 Carbon Monoxide and Oxygen Concentrations - Run 3

Cloverland Electric Cooperative

Dafter, Michigan

Bureau Veritas Project No. 11014-000165.00

Sampling Date: December 9, 2014

