



AIR EMISSIONS TESTING FOR INDUSTRY

Relative Accuracy Test Audit

for

Marathon Petroleum Company LP

at the

Detroit Refinery in Detroit, Michigan

on the

**Coker Flare
(EU-COKERFLARE-S1)**

subject to

Permit No. MI-ROP-A9831-2012c

&

40 CFR Part 60, Appendix F



**Marathon
Petroleum Company LP**

Test Date: December 21, 2022

Erthwrks Project No. 9049.1.D4



Endorsement Page

This report was developed in accordance with the requirements designated in the applicable regulatory permit(s) and or regulatory rules. To the best of my knowledge the techniques, instrumentation, and calculations presented in this report will serve to accurately and efficiently detail the results of the test campaign requirements.

Erthwrks, Inc.

Name: Jason Dunn

Title: QC Specialist

Signature: 

This report has been reviewed for accuracy and completeness. The actions presented in this report are, to the best of my knowledge, an accurate representation of the results and findings of the test campaign. Erthwrks, Inc. operates in conformance with the requirements on ASTM D7036-04 Standard Practice for Competence of Air Emission Testing Bodies and is accredited as such by the Stack Testing Accreditation Council (STAC) and the American Association for Laboratory Accreditation (A2LA).

Erthwrks, Inc.

Name: John Wood

Title: Technical Director

Signature: 

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- B. Calibration, QAQC, and Raw Data
- C. Certificates
- D. Example Calculations
- E. CEMS Data

1.0 INTRODUCTION

1.1 Identification, location and dates of tests

Erthwrks, Inc. was contracted to conduct a relative accuracy test audit (RATA) on the hydrogen sulfide (H₂S) continuous emissions monitoring system (CEMS) associated with the Coker Flare in operation at the Detroit Refinery, located in Detroit, Michigan. The RATA test was conducted on December 21, 2022.

1.2 Purpose of Testing

This RATA was conducted to demonstrate the accuracy and reliability of the CEMS monitor installed for the Coker Flare used to demonstrate the continuous emission compliance of the unit. All testing and audit procedures were conducted in accordance with the requirements set forth in 40 CFR, Part 60, Appendix B and F, which defines the CEMS performance specifications and testing procedures.

1.3 Contact Information

Marathon Petroleum Company LP

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Facility Location:

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Detroit, MI 48217

2.0 SUMMARY OF RESULTS

Table 2.1: GBR Coker Flare RATA Results

Pollutant Measured	Performance Specification	Relative Accuracy	Applicable Limit	Pass/Fail
H ₂ S	Performance Spec. 7	14.5% <i>RARM</i>	<20%	Pass

3.0 SOURCE DESCRIPTION

3.1 Description of the process

The flare (or torch) systems are open-flame control devices used for control of waste gas streams during both routine process and emergency or upset conditions. Flare vent gas is released to the flare as a result of relief valve leakage, process upsets, process sweep gas, equipment preparation for maintenance, and supplemental gas streams.

The flare system is equipped with an H₂S monitoring system as required by the refinery Title V Permit and associated State and Federal regulations.

Table 3.1 GBR Coker Flare CEMS Description

Pollutant Measured	Analyzer Manufacturer	Analyzer Model	Detection Principle	Serial Number
H ₂ S	Siemens	Maxum II	Gas Chromatography	30032312951060

3.2 Applicable permit and source designation

The Detroit Refinery operates the Coker Flare monitoring system under the Permit No. MI-ROP-A9831-2012c, 40 CFR Part 60 Subpart Ja, and the CEMS quality assurance procedures delineated in the 40 CFR Part 60, Appendix F. Under these regulations, the Detroit Refinery is required to conduct an annual RATA to demonstrate the relative accuracy of the CEMS associated with this unit.

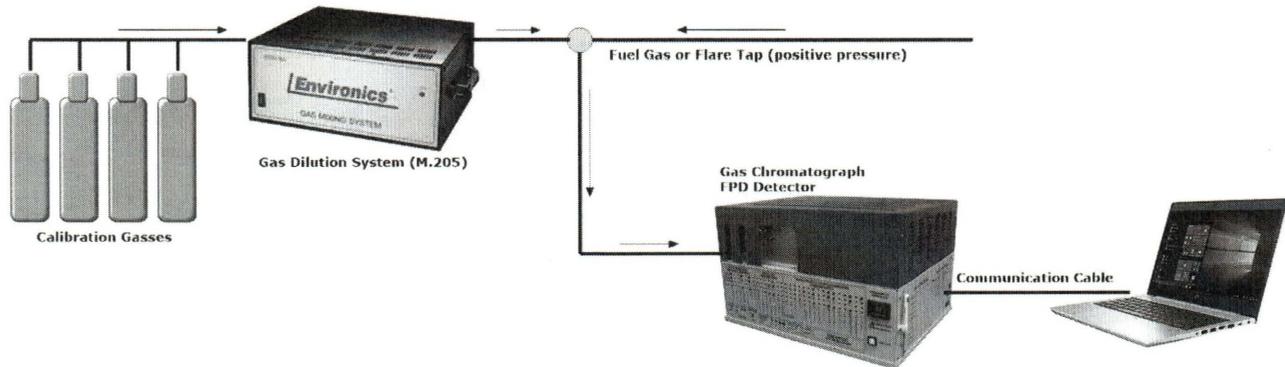
4.0 SAMPLING AND ANALYTICAL PROCEDURES

Erthwrks completed this CEMS audit project utilizing all applicable test methods specified in the USEPA Title 40 CFR Part 60, Appendix A and B. Specifically, this emission testing program entailed the execution of the 40 CFR Part 60, Appendix B, Performance Specifications 7. These documents define the specifications and test procedures for H₂S CEMS. The RATA required by these regulations was conducted utilizing a mobile emission testing laboratory.

4.1 Gaseous Sampling – H₂S

The analysis of the sample stream was conducted following all procedures as specified in USEPA Method 15. For this, Erthwrks utilized an SRI Model 8610 Gas Chromatograph (GC) equipped with an FPD detector. This instrumentation is able to separate and analyze separately each individual component. Three calibration gas concentrations, using a calibration gas dilution system, were sent to the GC and analyzed in triplicate. These triplicate values were recorded and averaged. A graphical plot of concentration versus the calibration area values was created and used to calculate the concentration of the sample. All data from this analysis and all raw gas chromatograph shots are found in Attachment B. Post-test analysis of the mid-calibration standard was performed and found to be within 5% of the original curve, therefore no additional quality assurance measurements were necessary. EPA Method 205 was utilized to dilute the H₂S calibration gas.

The figure below summarizes the Erthwrks GC Sampling System:



4.2 RATA Procedures

The RATA test is a direct comparison of the CEMS monitoring data with that data collected from an independently operated EPA reference method tests for each pollutant, following all the quality assurance and quality control procedures as required in the particular method. As required by the RATA test procedures, a minimum of nine (9) EPA reference method tests were conducted for each pollutant monitored by the CEMS system. Each of

these test runs were conducted for minimum duration of thirty (30) minutes. The results of these reference method tests were compared to CEMS measurement data from the facility data acquisition and handling system (DAHS) from the same time periods to determine the relative accuracy of the CEMS. The results of the RATA test are considered acceptable if the calculated relative accuracy when compared directly to the reference method does not exceed 20.0%. Alternatively, for affected units where the average of the reference method measurements is less than 50 percent of the emission standard, as in this case, the relative accuracy should not exceed 10% with respect to the applicable standard.

4.3 Discussion of sampling procedure or operational variances

Erthwrks, Inc. conducted the emission testing with no sampling or procedural variances. The Coker Flare operated with no operational variances.

Attachment A
Detailed Results of Emission Test



Relative Accuracy Test Audit

for

Marathon Petroleum Company LP

at the

Detroit Refinery in Detroit, Michigan

on the

**West Plant H₂S Fuel Gas
(Temporary CEMS)**

subject to

Permit No. MI-ROP-A9831-2012c

&

40 CFR Part 60, Appendix F



**Marathon
Petroleum Company LP**

Test Date: December 21, 2022
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This report was developed in accordance with the requirements designated in the applicable regulatory permit(s) and or regulatory rules. To the best of my knowledge the techniques, instrumentation, and calculations presented in this report will serve to accurately and efficiently detail the results of the test campaign requirements.

Erthwrks, Inc.

Name: Jason Dunn

Title: QC Specialist

Signature: 

This report has been reviewed for accuracy and completeness. The actions presented in this report are, to the best of my knowledge, an accurate representation of the results and findings of the test campaign. Erthwrks, Inc. operates in conformance with the requirements on ASTM D7036-04 Standard Practice for Competence of Air Emission Testing Bodies and is accredited as such by the Stack Testing Accreditation Council (STAC) and the American Association for Laboratory Accreditation (A2LA).

Erthwrks, Inc.

Name: John Wood

Title: Technical Director

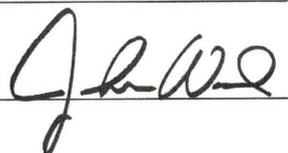
Signature: 



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- A. Detailed Results of Emissions Test
- B. Calibration, QAQC, and Raw Data
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1.0 INTRODUCTION

1.1 Identification, location and dates of tests

Erthwrks, Inc. was contracted to conduct a relative accuracy test audit (RATA) on the hydrogen sulfide (H₂S) continuous emissions monitoring system (CEMS) associated with the West Plant H₂S Fuel Gas (Temporary CEMS) in operation at the Detroit Refinery, located in Detroit, Michigan. The RATA test was conducted on December 21, 2022.

1.2 Purpose of Testing

This RATA was conducted to demonstrate the accuracy and reliability of the CEMS monitor installed for the West Plant H₂S Fuel Gas (Temporary CEMS) used to demonstrate the continuous emission compliance of the unit. All testing and audit procedures were conducted in accordance with the requirements set forth in 40 CFR, Part 60, Appendix B and F, which defines the CEMS performance specifications and testing procedures.

1.3 Contact Information

Marathon Petroleum Company LP

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Facility Location:

1300 South Fort Street
Detroit, MI 48217

2.0 SUMMARY OF RESULTS

Table 2.1: GBR West Plant H2S Fuel Gas (Temporary CEMS) RATA Results

Pollutant Measured	Performance Specification	Relative Accuracy	Applicable Limit	Pass/Fail
H ₂ S	Performance Spec. 7	0.7% <i>RAAS</i>	<10%	Pass

3.0 SOURCE DESCRIPTION

3.1 Description of the process

The flare (or torch) systems are open-flame control devices used for control of waste gas streams during both routine process and emergency or upset conditions. Flare vent gas is released to the flare as a result of relief valve leakage, process upsets, process sweep gas, equipment preparation for maintenance, and supplemental gas streams.

The flare system is equipped with an H₂S monitoring system as required by the refinery Title V Permit and associated State and Federal regulations.

Table 3.1 GBR West Plant H2S Fuel Gas (Temporary CEMS) CEMS Description

Pollutant Measured	Analyzer Manufacturer	Analyzer Model	Detection Principle	Serial Number
H ₂ S	SRI	8610C	Gas Chromatography	N12131

3.2 Applicable permit and source designation

The Detroit Refinery operates the West Plant H₂S Fuel Gas (Temporary CEMS) monitoring system under the Permit No. MI-ROP-A9831-2012c, 40 CFR Part 60 Subpart Ja, and the CEMS quality assurance procedures delineated in the 40 CFR Part 60, Appendix F. Under these regulations, the Detroit Refinery is required to conduct an annual RATA to demonstrate the relative accuracy of the CEMS associated with this unit.

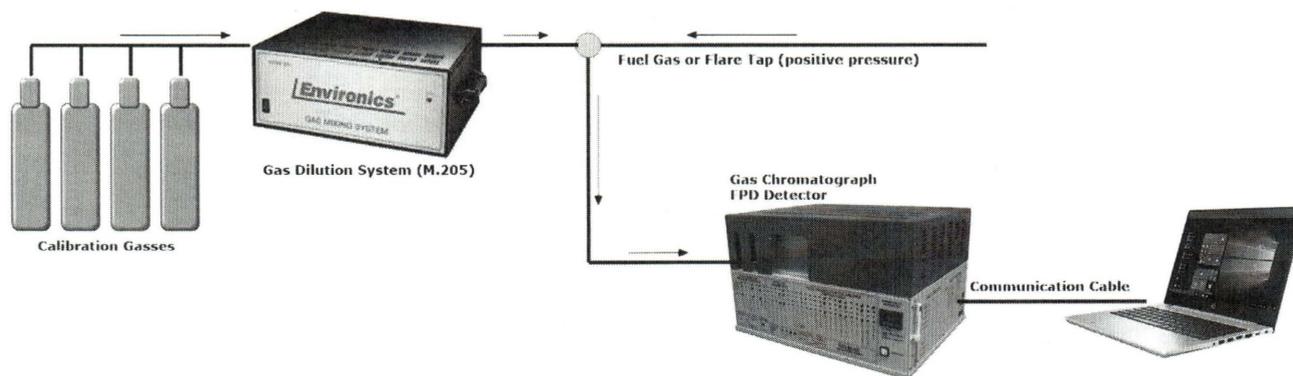
4.0 SAMPLING AND ANALYTICAL PROCEDURES

Erthwrks completed this CEMS audit project utilizing all applicable test methods specified in the USEPA Title 40 CFR Part 60, Appendix A and B. Specifically, this emission testing program entailed the execution of the 40 CFR Part 60, Appendix B, Performance Specifications 7. These documents define the specifications and test procedures for H₂S CEMS. The RATA required by these regulations was conducted utilizing a mobile emission testing laboratory.

4.1 Gaseous Sampling – H₂S

The analysis of the sample stream was conducted following all procedures as specified in USEPA Method 15. For this, Erthwrks utilized an SRI Model 8610 Gas Chromatograph (GC) equipped with an FPD detector. This instrumentation is able to separate and analyze separately each individual component. Three calibration gas concentrations, using a calibration gas dilution system, were sent to the GC and analyzed in triplicate. These triplicate values were recorded and averaged. A graphical plot of concentration versus the calibration area values was created and used to calculate the concentration of the sample. All data from this analysis and all raw gas chromatograph shots are found in Attachment B. Post-test analysis of the mid-calibration standard was performed and found to be within 5% of the original curve, therefore no additional quality assurance measurements were necessary. EPA Method 205 was utilized to dilute the H₂S calibration gas.

The figure below summarizes the Erthwrks GC Sampling System:



4.2 RATA Procedures

The RATA test is a direct comparison of the CEMS monitoring data with that data collected from an independently operated EPA reference method tests for each pollutant, following all the quality assurance and quality control procedures as required in the particular method. As required by the RATA test procedures, a minimum of nine (9) EPA reference method tests were conducted for each pollutant monitored by the CEMS system. Each of

these test runs were conducted for minimum duration of thirty (30) minutes. The results of these reference method tests were compared to CEMS measurement data from the facility data acquisition and handling system (DAHS) from the same time periods to determine the relative accuracy of the CEMS. The results of the RATA test are considered acceptable if the calculated relative accuracy when compared directly to the reference method does not exceed 20.0%. Alternatively, for affected units where the average of the reference method measurements is less than 50 percent of the emission standard, as in this case, the relative accuracy should not exceed 10% with respect to the applicable standard.

4.3 Discussion of sampling procedure or operational variances

Erthwrks, Inc. conducted the emission testing with no sampling or procedural variances. The West Plant H₂S Fuel Gas (Temporary CEMS) operated with no operational variances.

Attachment A
Detailed Results of Emission Test

Erthwrks Relative Accuracy Test Audit--H₂S RATA Performance Specification 7

West Plant Fuel Gas (Temp CEMS)

H₂S RATA--Performance Specification 7

Test Run	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10
Date	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
Start Time	8:14	8:44	9:14	9:44	10:14	10:44	11:14	11:44	12:14	12:44
End Time	8:44	9:14	9:44	10:14	10:44	11:14	11:44	12:14	12:44	13:14
RM H ₂ S (ppmvw)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
CEMS H ₂ S (ppmvw)	0.81	1.25	0.99	0.92	1.08	1.01	0.51	0.56	0.91	0.99
Abs. Diff.	-0.78	-1.22	-0.96	-0.89	-1.05	-0.98	-0.48	-0.53	-0.88	-0.96
Accept or Reject	Accept	Reject								

Applicable Standard (ppmv)

160

Mean of the Difference (d_{avg})

-0.86

Standard Deviation (S_d)

0.24

Confidence Coefficient (CC)

0.18

Relative Accuracy via AS, RA_{AS}

0.65%

← Pass

[†] RA_{AS} (Applicable Standard) must be less than 10%

Attachment B
Calibration, QAQC, and Raw Data