



Marathon Petroleum Company LP

Volatile Organic Compounds
Continuous Emissions Monitor - Relative Accuracy Test Audit
Vapor Recovery Unit
MPLX Terminals LLC
Flint Loading Facility
Mt Morris, MI

Report Identification Number: ENV 24-343

Prepared For:

MPLX Terminals LLC
Flint Loading Facility
6065 N Dort Hwy
Mt Morris, MI 48458

Prepared By:

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Test Date: October 23, 2024

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MEMORANDUM

November 21, 2024

TO: Renee Hermiller
FROM: Josh Hall
SUBJECT: Flint Loading Facility
Vapor Recovery Unit Emissions
Relative Accuracy Test Audit Results

On October 23, 2024, a Relative Accuracy Test Audit was conducted on the Flint Terminal's Zink VRU Continuous Emissions Monitor located at the loading facility. The purpose of the testing was to determine the relative accuracy of the CEM compared to the reference monitor. The relative accuracy was determined based on nine of the twelve tests performed. The results of the test are summarized below.

<u>Parameters</u>	<u>Relative Accuracy</u>	<u>Allowable</u>
NMHC (conc. vs. conc.)	2.15%	10% of Applicable Standard Concentration (0.93%).
NMHC (mg/L vs. mg/L)	0.43%	10% of Applicable Standard Concentration (60 mg/L).

Based upon these results, this CEM is operating within regulatory limits. If there are any questions regarding these tests, please contact me at (606)-921-2181.

J. Hall

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Certifications

1. Certification of sampling procedures by the team leader of the personnel conducting the sampling procedures and compiling the test report:

"I certify that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Report Prepared By:

Signature: 
Test Lead, Stack Testing Group

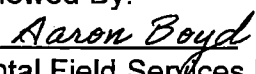
Printed Name of Person Signing: Josh Hall

Date: 11/21/2024

2. Certification of test report by the staff of the testing company who is responsible for reviewing the report:

"I certify that this test report and all attachments were reviewed in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed sampling and analysis relating to the performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Report Reviewed By:

Signature: 
Environmental Field Services Personnel

Printed Name of Person Signing: Aaron Boyd

Date: 11/25/2024

3. This report may not be reproduced without written approval from the RAD Environmental Field Services Group.

4. Deviations from Testing Protocol:
none

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I. Introduction and Summary

The Marathon Petroleum Company LP's Environmental Field Services Section performed a relative accuracy test audit on the Zink VRU located at the Flint Terminal. This facility utilizes a vapor recovery system for their bulk gasoline and diesel loading terminal. The testing was conducted on October 23, 2024. The relative accuracy was determined on the following monitor:

<u>Location</u>	<u>Monitor</u>	<u>Serial No.</u>	<u>Audit Type</u>
VRU Exhaust	IR 8400 DC	4381	RATA

The purpose of the testing was to determine the relative accuracy of the CEM from the vapor recovery unit exhaust outlet during truck loading procedures and determine the relative accuracy of the CEM compared to the reference monitor.

Test methods followed those as detailed in the Code of Federal Regulations, CFR40, Part 60, Subpart XX. Specific procedures used were EPA Methods 2A, 21, and the U.S. EPA - Office of Air Quality Planning and Standards' Alternative Method to 25B using the IR 208 and IR 8400 DC (Approval Letter Attached) and Subsection 60.503 (d) along with the guidelines of Performance Specification 8 for the relative accuracy test audit.

Testing was conducted by the following individual(s) from Marathon Petroleum Company's Refining Analytical and Development - Environmental Field Services Section Stack Testing Group:

- Josh Hall
- Aaron Boyd

The following individual(s) from MPLX Terminals LLC's Environmental Group Coordinated the testing:

- Renee Hermiller

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I. Introduction and Summary (cont.)

A total of nine runs were conducted in determining the relative accuracy of the continuous emission monitor (CEM).

The results of the test conducted on October 23, 2024 are as follows:

<u>Monitor</u>	<u>Relative Accuracy</u>	<u>Allowable</u>
IR 8400 DC (conc. vs. conc.)	2.15%	10% of Applicable Standard Concentration (0.93%).
(mg/L vs. mg/L)	0.43%	10% of Applicable Standard Concentration (60 mg/L).

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II. PROCESS DESCRIPTION

MPLX Terminals LLC's Flint Loading Facility truck loading terminal uses a Zink VRU to control, by adsorption, the organic vapors generated and recovered from trucks during the loading process. This process consists of two (2) carbon beds which continually cycle and regenerate every 30 minutes or at a minimum of 13 minutes based on the CEM smart cycle. The gas vapor, which adsorbs on the activated carbon after going through the absorbing tower, is vented to the atmosphere. After adsorption cycle is complete, the bed recycles under vacuum at 27.5 inches of water while the other bed is being utilized. During the recycle process in the carbon absorber, a dry vacuum pump pulls the hydrocarbon from the carbon. The hydrocarbon vapors from the carbon absorber are mixed with the vacuum pump seal fluid and are discharged to an absorber/separator.

The hydrocarbon vapors are condensed and separated from the seal fluid in the separator compartment and discharged back to a holding tank. Any remaining hydrocarbons pass through the packed absorber tower and are contacted by the fresh stream of gasoline which absorbs most of the remaining hydrocarbon. The small amount of hydrocarbon that is left leaves the top of the absorber and is directed back to the carbon absorber which starts the whole process again.

The VOC's sampling point is located after the turbine meter where the volume of exhaust air is measured. The exhaust is connected to a duct for total measurement.

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III. SAMPLING AND ANALYSIS PROCEDURES

A relative accuracy test audit was conducted on the MPLX Terminals Flint Loading Facility's Zink vapor recovery unit that serves the tank truck loading facility for gasoline and diesel fuel. The audit was conducted on October 23, 2024.

The test procedures used followed those as required in the Code of Federal Regulations, CFR40, Part 60, Subpart XX including EPA Methods 2A, 21, 25B along with Performance Specification 8 for relative accuracy test audit procedures and CFR40, Part 63, Subpart R.

A. Vapor Recovery Units Initial Leak Check

An initial organic vapor leak check on the vapor recovery unit was conducted during the loading process prior to testing on October 23, 2024. All connections and fittings were checked by using EPA Method 21 procedures. An RKI Instruments Gas Tracer, Organic Vapor Analyzer, was used to detect any leakage from fittings. No leaks were detected.

B. Determination of Total Organic Concentrations

The total hydrocarbon sampling and analysis of both carbon beds were determined on site using an Infrared Industries IR208 NDIR Continuous Gas Monitoring Analyzer following EPA Method 25B. The sampling port was connected from the fitting leading to the turbine meter.

Zero gas and EPA Protocol 1 calibration standards in nitrogen were used in the calibration of the IR208 instrument. Each calibration gas was sent from the bottle to the three way valve and back through the sampling line for the leak check determination and efficiency of the sampling line.

A multi-gas cylinder consisting of propane and methane was used for analyzer verification purposes prior to and following the test and during each hourly drift check.

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III. SAMPLING AND ANALYSIS PROCEDURES (cont'd.)

C. Vapor Flow Rate: Carbon Beds

The vapor volume flow rate from the exhaust was determined by using an American Turbine Meter following EPA Method 2A. The VRU's exhaust was routed through the turbine meter located inside the testing trailer. Readings were taken every minute.

D. Fuel Volume Determination

During each tanker loading process, the volume loaded was logged along with the tanker ID and purchaser. The recorded data were used in the determination of the volume of gasoline, for both accountable and total volumes.

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IV. TEST RESULTS

A summary of the relative accuracy equations is presented in Appendix A. All relative accuracy audit test field data and calculation summary data are presented in Appendix B. The CEM monitor data are presented in Appendix C. Instrument and test equipment calibration data are presented in Appendix D. US EPA approval letters are presented in Appendix E.

Based on the results of the relative accuracy audit conducted on the Infrared Industries total hydrocarbon monitor, conclusions are as follows:

1. Results of the Vapor Recovery Unit CEM Relative Accuracy Certification test series conducted on the Infrared Industries CEM located on the VRU exhaust vent are within the requirements specified or Applicable Standard specified in the applicable performance specifications.

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Appendix A

Relative Accuracy Calculation Equations

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SUMMARY OF RELATIVE ACCURACY EQUATIONS

The total organic compounds mass emissions shall be calculated as follows:

$$E = \frac{\sum_{i=1}^n M_{ei}}{L}$$

where:

E = Mass of total organic compounds emitted per
volume of gasoline loaded, mg/liter

M_{ei} = Mass of total organic compounds emitted during testing interval i,
mg

L = Total volume of fuel loaded, liters

n = Number of testing interval

$$V_{es} = V_s \times 0.02832 \times C_m \times 17.65 \times (P_b + P_x/13.6)/T_g$$

where:

V_{es} = Exhaust standard gas volume, scm, @ 20°C and 760 mm Hg

V_s = Exhaust gas volume, cf

C_m = Meter coefficient

P_b = Barometric Pressure, "Hg.

P_x = Meter Pressure, "H₂O.

T_g = Temperature of inlet gas, °R

The mass emitted during each testing interval shall be calculated as follows:

$$M_{ei} = K V_{es} C_e$$

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where:

M_{ei} = Mass of total organic compounds emitted during testing interval i,
mg

V_{es} = Exhaust gas volume, m^3 , at standard conditions

C_e = Total organic compounds concentration (as measured) at the
exhaust vent, ppmv

K = Density of calibration gas, mg/sm^3 , at standard conditions
= 1.83×10^6 , for propane

S = Standard conditions, 20°C and 760 mm Hg

The absolute value for differences of reference method vs CEM value

AVERAGE DIFFERENCE (D):

n = No. Of Data Pairs

D_i = Individual Value

$$\frac{1}{n} \sum D_i$$

Standard Deviation Value (S_d):

$$S_d = \frac{[\sum d_i^2 - [(1/n)\sum d_i]^2]^{1/2}}{n-1}$$

where:

$\sum d_i^2$ = sum of the differences squared

$[(1/n)\sum d_i]^2$ = sum of individual differences squared

n - 1 = degrees of freedom where n= number of individual values

1/2 = square root

Confidence Coefficient:

$$CC = t_{0.975} * S_d / \sqrt{n}$$

where:

$t_{0.975}$ = probability of a measurement will be biased 2.5% at a 95% level
of

confidence

S_d = Standard Deviation

\sqrt{n} = Square root of number of individual values

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Relative Accuracy (RA):

$$RA = \frac{[d] + [CC] * 100}{RM}$$

where:

[d] = Absolute Value for difference mean

[CC]= Absolute Value for Confidence Coefficient

RM = Absolute Value for Reference Method Mean

The mass concentration equivalent to 60 mg/l in percent:

$$60 \text{ mg/l equiv} = \frac{(\text{average conc, \%}) \times 60}{\text{Conc, mg/l total}}$$

where:

60 mg/l equiv = 60 milligrams / liter equivalency concentration

avg. conc, % = Average concentration of VRU outlet

60.00 = 60 mg/L applicable standard

Conc, mg/l total = Compliance test results for total volume