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Marathon Petroleum Company LP

Volatile Organic Compounds
Performance Test
Zink Vapor Recovery Unit
MPLX Terminals LLC
No Muskegon, MI Loading Facility
No Muskegon, MI

Report Identification Number: ENV 22-419

Prepared For:

MPLX Terminals LLC
No Muskegon, MI Loading Facility
3005 Holton Rd
No Muskegon, MI 49445

Prepared By:

Marathon Petroleum Company LP
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Test Date: October 18, 2022

Volatile Organic Compounds Emissions
Performance Test
Vapor Recovery Unit
MPLX Terminals LLC

MEMORANDUM

November 7, 2022

TO: Renee Hermiller
FROM: Aaron Boyd
SUBJECT: No Muskegon, MI Loading Facility
Vapor Recovery Unit Emissions
Performance Test Results

On October 18, 2022 an emissions compliance test was conducted on the MPLX Terminals LLC's No Muskegon, MI truck loading facility's Zink Vapor Recovery Unit. The purpose of the testing was to determine the volatile organic compounds (VOC's) emissions rate from the vapor recovery unit's exhaust outlet during the truck loading process at the facility.

The results of the test show that the unit is operating well withing regulatory limits. These results are summarized below:

<u>Emissions Rate (mg/L)</u>	<u>Equivalency Concentration</u>	<u>Allowable (mg/L)</u>
1.02	0.52	10

If there are any questions regarding these tests or the results, please contact me at (606)-921-6955.

A. Boyd

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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."

Signature: Aaron Boyd Printed Name of Person Signing: Aaron Boyd
Title: Technician, Stack Testing Group Date: 11/7/2022

2. Certification of test report by the senior staff person at the testing company who

"I certify that this test report and all attachments were prepared under my direction or supervision 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."

Signature: _____ Printed Name of Person Signing: _____
Title: Supervisor / Coordinator Environmental Field Date: _____
Services

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

**4. Deviations from Testing Protocol:
SN - 4290**

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Volatile Organic Compounds Emissions
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I. Introduction and Summary

The Marathon Petroleum Company's Refining Analytical and Development Department's Environmental Field Services Section conducted a volatile organic compounds emissions performance test on the No Muskegon Terminal's Vapor Recovery unit located at the No Muskegon, MI Loading Facility. This facility serves as a vapor recovery system for their bulk gasoline loading terminal. The testing was conducted on 10/18/22.

The purpose of the testing was to determine the volatile organic compounds (VOC's) emissions rate from the Zink vapor recovery unit's exhaust outlet during truck loading procedures. The calculated emission rate was compared to the regulatory emissions rate as specified in the air compliance permit for the bulk loading facility.

Test methods followed those as detailed in the Code of Federal Regulations, CFR40, Part 60, Subpart XX and Part 63, Subpart R. Specific procedures used were EPA Methods 2A, 21, 25B and Subsection 60.503 (d).

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

- Aaron Boyd
- Brandon Howard

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 63 trucks were loaded during the testing period. A total of 597,002 gallons of accountable gasoline was recorded for measurements of VOC's emissions. The testing lasted 6 hours which met the requirement of 6 hours as stated in the regulations of Subpart XX.

The test results are as follows:

Total mass of organic compounds emissions during the 6 hour test (mg as propane)	2,314,618
Emissions rate of total organic compounds, mg/liter of gasoline loaded	1.02
Emissions rate of total organic compounds, mg/liter of total volume loaded	0.86
10 mg/L equivalency concentration, total fuel loaded	0.52
10 mg/L equivalency concentration, gasoline loaded	0.44

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II. PROCESS DESCRIPTION

MPLX Terminals LLC's No Muskegon, MI 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 performance test was conducted on the No Muskegon Terminal's Vapor Recovery unit. The testing was conducted on October 18, 2022.

Test methods followed those as detailed in the Code of Federal Regulations, CFR40, Part 60, Subpart XX and Part 63, Subpart R. Specific procedures used were EPA Methods 2A, 21, 25B and Subsection 60.503 (d).

The vapor recovery unit emissions rate was determined by monitoring a number of parameters on the controlled system. These parameters included:

1. A complete leak check on the vapor recovery unit system including all of the connections and hoses at the loading bays.
2. A vapor leak check of each tank compartment of each truck loading gasoline during the loading process.
3. A determination of the vapor flow rate exhausted from the carbon bed adsorber beds.
4. A determination of the volume of fuel loaded during the test period.
5. A determination of the emissions rate of hydrocarbons during the test period.

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

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 Oct 18, 2022. 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. Tank Truck Compartments Leak Check

During the loading process of each tank truck for gasoline, an organic leak check was conducted on each compartment. The leak check consisted of checking each dome and gasket and hose connection to vent line. An exceedence of 10,000 ppm constituted a leak and was used to determine the compartment status. Leaks were logged along with the load capacity to determine accountability of each load for determining emissions rate. Only test data obtained during the loading of leak free trucks was used in the final calculation of vapor recovery organic emissions rate.

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

E. Determination of Total Organic Concentrations

The total hydrocarbon sampling and analysis of both carbon beds were determined on site using an Infrared Industries IR-208 NDIR Continuous Gas Monitoring Analyzer following EPA Method 25B. The sampling port was connected from the line leading from the turbine meter.

Zero gas and EPA Protocol 1 calibration standards in nitrogen were used in the calibration of the IR instrument. The zero gas and the low standard concentration 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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IV. Test Results

The results of the volatile organic compound emissions performance testing are summarized in Table IV-1.

The test results indicate an average emissions rate of 1.02 milligrams/liter of gasoline loaded for the test.

A total of 2,259,653 liters (597,002 gallons) of accountable gasoline was loaded into 63 separate trucks all with leak free compartments during the test period.

A summary of the emissions rate equations is presented in Appendix A.

All performance test field and calculation summary data are presented in Appendix B.

All fuel dispensing and truck tank data are presented in Appendix C.

Instrument and test equipment calibration data are presented in Appendix D.

The EPA approval letter is presented in Appendix E.

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Summary of Performance Test Results

Table: IV-I
Site: No Muskegon Terminal
Source: Zink Vapor Recovery Unit
Test Date: October 18, 2022
Test Time: 6:04-12:40 Hours

Total volume of accountable fuel loaded (diesel & gasoline), gallons	709,369
Total volume of accountable fuel loaded (diesel & gasoline), liters	2,684,962
Total volume of total gasoline loaded, gallons	597,002
Total volume of accountable gasoline loaded, gallons	597,002
Total volume of accountable gasoline loaded, liters	2,259,653
Average VOC PPM by volume concentration (propane equivalent)	448
Total mass of emissions (as propane),mg	2,314,618
Emissions rate of VOC, total gasoline loaded, mg/l	1.02
Emissions rate of VOC, total volume loaded, mg/l	0.86
10 mg/L equivalency concentration - Gasoline	0.44
10 mg/L equivalency concentration - Total Fuel	0.52
Stack gas volumetric flow rate, scfm	277.1
Displacement volume (cf)	93,300
Displacement volume (scf)	99,747
Emissions rate of VOC, lb/hr	0.85
Emissions rate of VOC, tons/yr	3.73