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AIR QUALITY DIVISION Marathon Petroleum Company LP

Volatile Organic Compounds Compliance Test Zink Vapor Recovery Unit MPLX Terminals LLC Terminals, Transport And Rail North Muskegon Loading Facility North Muskegon, MI

Report Identification No.: ENV 17-1921

Prepared For:

MPLX Terminals LLC 3005 Holton Road North Muskegon, MI 49445

Prepared By:

Marathon Petroleum Company LP Refining Analytical And Development Environmental Field Services Section 11631 U.S. RT 23 Catlettsburg, Kentucky 41129

Testing Personnel:

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Test Date:

June 6, 2017

Marathon Petroleum Company LP

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: | 9: K | ile | Rakes | ; |
|--|-------|-----|--------|------|
| Title: Technician, Stack Testing Group | Date: | 9 | 7-15-7 | 2017 |

2. Certification of test report by the senior staff person at the testing company who is responsible for checking the test report:

"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: WAND CHARDER Printed Name of Person Signing: M.M. CHARDER LL

Title: Supervisor, Stack Testing Group

Date: 09-15-2017

- 3. This report may not be reproduced without written approval from RAD Environmental Field Services.
- 4. Deviations from testing protocol: None

I. INTRODUCTION AND SUMMARY

The Marathon Petroleum Company LP's Environmental Field Services Section conducted a compliance test on the Zink Vapor Recovery Unit located at the North Muskegon Terminal Loading facility. This facility serves as a vapor recovery system for their bulk gasoline, diesel and fuel oil loading. The testing was conducted on June 6, 2017.

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 truck loading procedures. The emission rate was compared to the regulatory emissions rate as specified by the Michigan Department of Environmental Quality – Air Quality Division for the bulk gasoline terminals.

Test methods followed those as detailed in the <u>Code of Federal Regulations</u>, CFR40, Part 60, 2004, Subpart XX and Part 63, 2001, Subpart R. Specific procedures used were EPA Methods 2A, 21, 25B and Subsection 60.503 (d).

The testing was conducted by Mr. J. Hall and Mr. L. Sammons of Refining Analytical and Development's Environmental Field Services Section. Ms. Jackie Gast of MPLX Terminals LLC's Environmental Group coordinated the testing. Mr. Jeremy Howe of the Michigan Department of Environmental Quality – Air Quality Divison was onsite during the test.

I. INTRODUCTION AND SUMMARY (cont.)

A total of 532,889 gallons of accountable gasoline was recorded for measurement 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 of VRU during the 6 hour test (mg as propane) | 2,362,647 |
|---|-----------|
| Emissions rate of total organic compounds, mg/liter of gasoline loaded | 1.17 |
| Emissions rate of total organic compounds, mg/liter of total volume loaded | 1.06 |
| 10 mg/L Equivalcency Concentration, % | 0.50 |

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II. PROCESS DESCRIPTION

MPLX Terminals LLC - North Muskegon truck loading facility utilizes a Zink Vapor Recovery Unit to adsorb organic vapors emitted from the bottom tank during loading procedures. This process consists of two (2) carbon beds which continually cycle and regenerate every 15 minutes. The purpose of regeneration is to restore the carbon adsorber to a level where it will effectively adsorb hydrocarbons again. The gas vapor, which adsorbs on the activated carbon, is vented to the atmosphere. After the 15 minute 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 adsorber, a liquid ring vacuum pump pulls the hydrocarbon from the carbon. The hydrocarbon vapors from the carbon adsorber are mixed with the vacuum pump seal fluid and are discharged to an absorber/separator.

The liquid hydrocarbons 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 hydrocarbons. The small amount of hydrocarbon that is left then leaves the top of the absorber and is directed back to the carbon adsorber 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.

III. SAMPLING AND ANALYSIS PROCEDURES

A performance test was performed on the North Muskegon Terminal's Zink Vapor Recovery unit. The testing was conducted on June 6, 2017.

The test procedures used followed those as required in the <u>Code of</u> <u>Federal Regulations</u>, CFR40, Part 60, 2004, Subpart XX including EPA Methods 2A, 21 and 25B and Subsection 60.503 and CFR40, Part 63, Subpart R.

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 determination of the vapor flow rate exhausted from the carbon bed adsorber beds.
- 3. A determination of the volume of fuel loaded during the test period.
- 4. A determination of the emissions rate of hydrocarbons during the test period.

III. SAMPLING AND ANALYSIS PROCEDURES(cont)

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 June 6, 2017. All connections and hose fittings were checked using EPA Method 21 procedures. A RKI Instruments Gas Tracer, Organic Vapor Analyzer, was used to detect any leakage from fittings. No leakes were detected.

B. Vapor Flow Rate

Carbon Beds

The vapor volume flow rate from the two exhaust tees was determined by using an American Turbine Meter following EPA Method 2A. The meter was connected to a 10" tee connecting the exhaust line with an inline vacuum breaker to eliminate backflow problems. Readings were taken every 5 minutes.

C. Fuel Volume Determination

Fuel volumes were calculated using the terminal's Fuel Facs system. This data was used in the determination of the volume of products, gasoline and diesel, for both accountable and total volumes.

III. SAMPLING AND ANALYSIS PROCEDURES(cont)

D. 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 10" tee leading to the turbine meter.

Zero gas and EPA Protocol 1 calibration standards in nitrogen were used in the calibration of the IR 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. The four standards used in the initial audit calibration for propane were nitrogen as zero gas (<0.2 ppm), 0.25%, 0.50% and 0.91% propane in nitrogen. The four standards used in the initial audit calibration for methane were nitrogen as zero gas (<0.2 ppm), 4.91%, 10.00% and 19.70% methane in nitrogen.

IV. TEST RESULTS

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

The test results indicated an average emissions rate of 1.17 milligrams/liter, as propane, of gasoline loaded for the duration of the test.

A total of 2,016,985 liters (532,889 gallons) of accountable gasoline was loaded during the six hour test period June 6, 2017.

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

All performance test field and calculation summary data for the North Muskegon Vapor Recovery Unit are presented in Appendix B.

All fuel dispensing data is presented in Appendix C.

The instrument and test equipment calibration data are presented in Appendix D.

SUMMARY OF PERFORMANCE TEST RESULTS

| TABLE: COMPANY: SOURCE: TEST DATE: TEST TIME: | IV-1 MPLX Terminals LLC, North Muskegon Terminal Zink Vapor Recovery Unit June 6, 2017 0625-1225 Hrs | |
|---|--|-----------|
| Total volume o (diesel & gaso | of fuel loaded line), gallons | 589,921 |
| Total volume o (diesel & gaso | of fuel loaded line), liters | 2,232,851 |
| Total volume | of total gasoline loaded, gallons | 532,889 |
| Total volume of | of accountable gasoline loaded, gallons | 532,889 |
| Total volume o | of accountable gasoline loaded, liters | 2,016,985 |
| Average VOC (propane equ | PPM by volume concentration ivalent) | 531 |
| Total mass of | emissions (as propane),mg | 2,362,647 |
| Emissions rate | e of VOC, total gasoline loaded, mg/l | 1.17 |
| Emissions rate | e of VOC, total volume loaded, mg/l | 1.06 |
| Stack gas volu | umetric flow rate, scfm | 238.7 |
| Displacement | volume (ft ³) | 85,400 |
| Displacement | volume (scf) | 85,939 |
| Total test perio | od, minutes | 360 |
| Emissions rate | e of VOC, lb/hr | 0.87 |
| Emissions rate | e of VOC, tons/yr | 3.80 |