Marathon Petroleum Company LP

Refining Analytical & Development Department
Environmental Field Services
Stack Testing Group

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: _____ Printed Name of Person Signing: Josh Hall

   Title: Chemist, Stack Testing Group Date: 6-20-14

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: _____ Printed Name of Person Signing: Michael Campbell

   Title: Supervisor, Environmental Field Services Section Date: 7-2-14

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

4. **The testing conducted followed requirements as specified according to NELAP specifications.**

5. **Deviations from testing protocol: none**

VOLATILE ORGANIC COMPOUNDS
EMISSIONS TEST
RANE VAPOR COMBUSTION UNIT
MARATHON PETROLEUM COMPANY LP
TERMINAL, TRANSPORT AND RAIL
DETROIT LIGHT PRODUCTS TERMINAL
DETROIT, MICHIGAN

I. INTRODUCTION AND SUMMARY

The Marathon Petroleum Company LP's Environmental Field Services Section performed a performance test on the RANE I portable combustion unit located at the Detroit Light Oil Terminal. The Rane III portable combustion unit is a back-up control source that reduces emissions during loading operations.

The purpose of the testing was to determine the volatile organic emissions during truck loading procedures and compare the VOC emissions to the regulatory emissions rate as specified by the Michigan Environmental Protection Agency for bulk gasoline and distillate terminals. Testing was permitted by the State of Michigan to show compliance during normal operating conditions using the combustor.

Test methods followed those as detailed in the Code of Federal Regulations, CFR40, Part 60, 2004, Subpart XX and Part 63, 2001, Subpart R. Specific procedures used were EPA Methods 2A, 2B, 3A, 10, 21, 25B and Subsection 60.503(d).

The testing was conducted by Mr. J. Hall and Mr. K. Rakes of Refining Analytical and Development Department's Environmental Field Services Stack Testing Group. Also present was Ms. Kim Crame from Marathon Petroleum Company LP's TT&R's Environmental Group.

A total of 60 trucks was loaded with one noted violation of specific leakage detected. A total of 335,842 gallons of accountable gasoline was recorded for measurement of VOC emissions. The testing lasted six hours as specified in the Intent to Test Form and 40CFR Part 60 Subpart XX.

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II. PROCESS DESCRIPTION

Marathon Petroleum Company LP's Detroit Terminal truck loading facility utilized the portable RANE Vapor Combustion Unit to combust organic vapors displaced from tank truck during bottom loading procedures. Air is displaced from the liquid loading process to the truck compartment through the vapor collection system located on the trailer skid. The displaced vapor travels through a ten inch vapor line to the RANE portable combustion unit. Prior to the combustion unit, the vapor is dispersed through a 3000 gallon saturator tank and dispersed to the combustor. When the vapor is dispersed, a vapor blower turns on automatically and the hydrocarbon vapors are sent to the combustion unit. While the vapor saturator tank is filled to a pressure set point level (0.4" H2O pressure), the vapor combustion system is in standby mode with a pilot flame, the vapor block valve is closed, the air assist blower is off and the combustion air blower is off. Automatic start-up of the vapor combustion system is initiated by an electrical signal from the vapor equalizer tank. The start-up sequence consists of a brief purge cycle followed by a pressure valve opening dispersing vapors from the equalizer tank to the vapor blower and sent to a combustion chamber. After the pilot ignition assurance, the vapor block valve is opened and hydrocarbon vapors begin to flow from the vapor equalizer tank to the vapor combustion chamber. When the surge tank reaches its low level, the vapor block valve is closed and the blowers continue to operate until the vapor combustion unit is purged of all combustibles. The unit then shuts down in the stand-by mode to await automatic restart while the pilot is still ignited as described above. Truck loading is authorized as long as the surge tank is within its normal operating level.

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III. SAMPLING AND ANALYSIS PROCEDURES

A volatile organic compounds destruction efficiency compliance test was conducted on the MPCLP's Detroit Terminal's Rane III Portable Vapor Combustion unit that serves the tank truck loading facility for gasoline. The testing was conducted on May 8, 2014.

The test procedures used followed those as required in the Code of Federal Regulations, CFR40, Part 60, 2001, Subpart XX including EPA Methods 2A, 2B, 3A, 10, 21, 25B and Subsection 60.503.

The vapor combustion unit destruction efficiency was determined by monitoring a number of parameters on the controlled system. These parameters included:

1. A complete leak check on the vapor combustion unit system including all of the connections and hoses at the loading bays prior to initialization of the test.

2. A determination of the volume of the fuel loaded during the test period.

3. A vapor leak check of each tank compartment of each gasoline truck during the loading process.

A. Vapor Recovery Units Initial Leak Check

An initial organic vapor leak check on the vapor combustion unit was conducted during the loading process prior to testing on May 8, 2014. All connections and hose fittings were checked by using EPA Method 21 procedures. A Gas Tech GT201, Organic Vapor Analyzer, was used to detect any leakage from fittings. No leaks were detected.

III. SAMPLING AND ANALYSIS PROCEDURES (cont.)

B. Vapor Flow Rate from 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 8" vapor line connect to the inlet section. Readings were taken every 1 minute.

C. Fuel Volume Determination

During each loading process the volume loaded was logged along with the tanker ID and purchaser. A copy of the Bill of Lading was obtained for each tanker. The Bill of Lading data was used in the determination of the volume of products for both accountable and total volumes.

D. Loading Rack Backpressure

Magnehelic gauges with ranges of 0-25 inches of water were mounted on the pressure taps on each of the loading racks and the maximum pressure was recorded for every truck loaded during the test period. An exceedence of 18 inches of water during each loading period was the criteria used in determining test failure for the vapor recovery unit.

E. Determination of Total Organic Concentrations

The total hydrocarbon sampling and analysis of the combustion unit was determined on site using two HORIBA VIA 510 NDIR Total hydrocarbon Analyzers, a HORIBA VIA 510 NDIR CO2 Analyzer and a HORIBA VIA 510 CO Analyzer following EPA Methods 3A, 10 and 25B. The sampling for CO2, VOC and CO components was conducted 5 diameters downstream thru the sample probe outlet mounted inside the stack. The samples were collected through a 5 foot stainless steel probe that sampled over 50% of the stack diameter. Zero gas and EPA Protocol 1 calibration standards in nitrogen were used in the calibration of the HORIBA instruments. Each calibration gas was sent from the bottle to the three way valve and back through

III. SAMPLING AND ANALYSIS PROCEDURES (cont.)

the sampling line for the leak check determination and efficiency of the sampling line. The five standards used in the outlet calibration were ultra-pure nitrogen (<0.1 ppm) as zero gas, 252.2ppm, 449ppm, 1217ppm and 2480ppm propane in nitrogen. The four standards used in the inlet concentration were ultra-pure nitrogen (<0.1 ppm) as zero gas, 30.0%, 50% and 85% propane in nitrogen. The three standards used in the CO2 calibration were ultra-pure nitrogen (<0.1 ppm) as zero gas, 9.66% and 16.02% CO2. The four standards used in the CO calibration were ultra-pure nitrogen (<0.1 ppm) as zero gas, 198 ppm, 396 ppm and 772 ppm CO.

IV. TEST RESULTS

The results of the volatile organic compounds destruction efficiency testing are summarized in Table IV-1.

A total of 1,271,162 liters (335,842 gallons) of accountable gasoline was loaded into 60 separate leak free trucks during the 6 hour test period.

A total of 2,281,908 (602,882 gallons) of total volume was loaded into 60 separate trucks during the 6 hour test period.

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

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

The fuel dispensing and truck tank data are presented in Appendix C

The vapor collection and control specifications are presented in Appendix D.

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

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SUMMARY OF EMISSIONS TEST RESULTS

TABLE:	IV-1
COMPANY:	Marathon Petroleum Company LP's Spangler Terminal
SOURCE:	Rane III Portable Vapor Combustion Unit
TEST DATE:	May 8, 2014
TEST TIME:	1115-1715

Total volume of fuel loaded (Gasoline and non-gasoline), gallons	602,882
Total volume of fuel loaded (Gasoline and non-gasoline), liters	2,281,908
Total volume of gasoline loaded, gallons	335,842
Total volume of accountable gasoline loaded, gallons	335,842
Total volume of accountable gasoline loaded, liters	1,271,162
Average VOC ppm by volume concentration (Propane Equivalent)	6.5
Total mass of emissions (as Carbon), mg	797,047
Emissions rate of VOC, total gasoline loaded mg/L	0.63
Emissions rate of VOC, total volume loaded, mg/L	0.35
Unit Efficiency	99.996