1.0 INTRODUCTION

1.1 Identification, Location and Dates of Test

Zeeco, Inc. was contracted by Buckeye Terminals, LLC (Buckeye) to complete a performance test of their vapor processing system at their bulk marketing terminal in River Rouge, Michigan. The facility is a petroleum bulk terminal for loading gasoline and fuel oil products onto tanker trucks. The products are bottom loaded into tanker trucks and the displaced hydrocarbon vapors are balanced to a carbon adsorption/absorption vapor recovery unit (VRU). The facility was source tested for air emissions on July 1, 2020. Troy Hardin and Steven Hubbard of Zeeco, Inc. performed the field portion of the emission test.

1.2 Purpose of Testing

The purpose of this test was to measure and document emissions to the atmosphere from the VRU and demonstrate that emissions do not exceed emission limits established in the applicable regulations. The performance test was conducted in accordance with procedures and test methods established and referenced in the Code of Federal Regulations; CFR 40, Part 60, Subpart XX and CFR 40, Part 63, Subpart BBBBBB.

1.3 Description of Source

Buckeye owns and operates a bulk marketing terminal in River Rouge, Michigan where light petroleum products are bottom loaded at seven loading bays. The terminal is equipped to load Regular, Midgrade, Premium Unleaded Gasoline fuel products as well as Diesel fuel products onto transports.

The truck loading rack is equipped with vapor recovery hoses positioned at the transport loading positions for hook up to the vapor collection system. All trucks that load must connect the vapor recovery hose before loading liquid product.

The vapor hoses have individual check valves that prevent unused hoses from leaking any vapors. The vapor pipe manifold connects the vapor hoses to the VRU. The vapor pipe system also employs a liquid knock-out tank and pressure/vacuum relief valve upstream from the VRU. The VRU is in place to minimize the emissions of VOC during the loading of trucks.

1.4 Contact Information

Buckeye Terminals, LLC
Kim Trostel
940 Buckeye Rd
Lima, OH 45804
Phone: (419) 993-8003
Cell: (419) 549-0054
E-mail: ktrostel@buckeye.com

Zeeco, Inc.
Troy Hardin
Environmental Test Technician
11505 Commonwealth Drive Suite 104
Louisville, KY 40299
Phone: (918) 607-7443
E-mail: troy_hardin@zeeco.com

2.0 SUMMARY OF RESULTS

The results of this performance test demonstrate that this source is in compliance with the applicable Federal and Local requirements. A summary of the data is presented below in Table 2-1.

The Method 21 Leak Test was performed on the day prior to testing. A portable LEL meter was calibrated using a PPM methane calibration gas. The meter was used to check for leaks around all fittings, flanges, valves as well as any other exposed potential leak source. No leaks were found in excess of 500 ppm.

Table 2-1 - Summary of Results

Regulation	Measured Result	Applicable Limit
40CFR60.503(b) 40CFR63.11092(a)(1)(i)	>500ppm*	500ppm Subpart BBBBBB
40CFR60.502(h)(i)	Highest Pressure: 16" H_2O	<18" H_2O
40CFR60.502 or Permit Limit (Accountable Products)	0.24 mg/L	10 mg/L
No Regulatory Limit (Total Products)	0.15 mg/L	NA
40CFR60.503(c)(1)	445,004 Gallons 1,864,127.64 Liters	>80,000 Gallons >300,000 Liters
40CFR60.503(c)(1)	6 Hrs	Minimum 6 Hrs
Average Inlet Conc.	31.12%	NA
Average Outlet Conc.	0.0097%	NA

* four leaking trucks were found (See Appendix A).

3.0 SOURCE DESCRIPTION

3.1 Description of Process

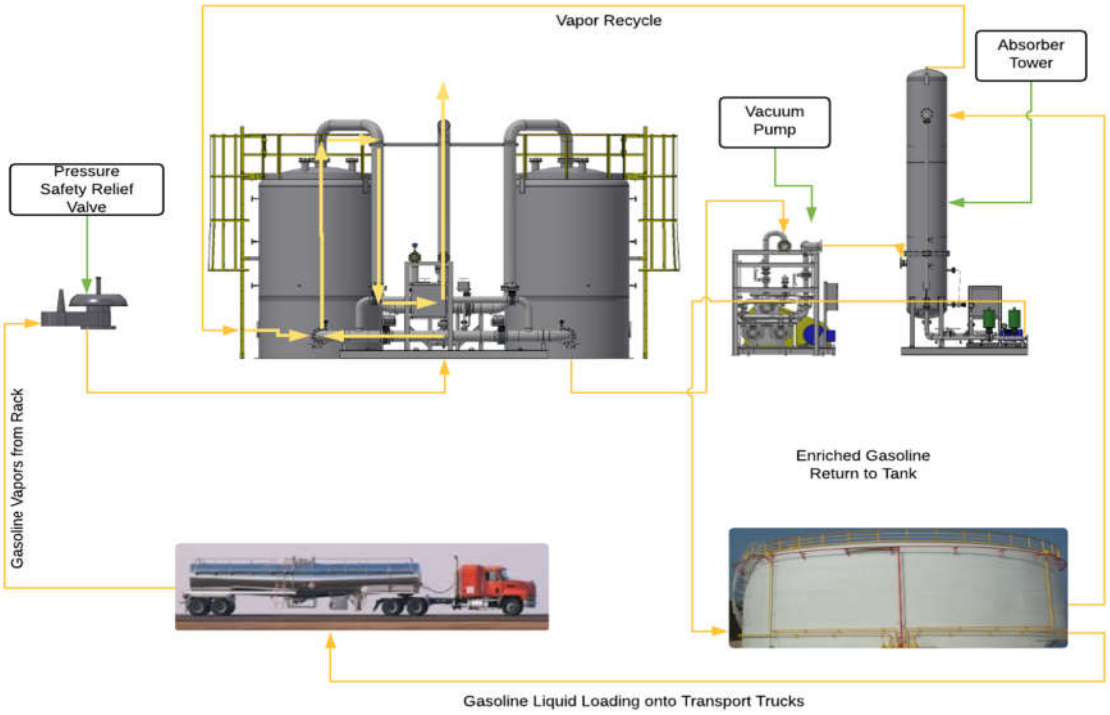
The vapor recovery unit is an engineered air pollution control device used to control emissions from the truck loading rack at the terminal in River Rouge, Michigan. It consists of two carbon adsorption beds, a product absorption column, one or more vacuum pumps and associated piping and controls that support the movement of recovered vapors through the system.

Inlet hydrocarbon vapors from the facility loading rack are fed into one of two carbon adsorption beds. These beds allow for the adsorption and collection of hydrocarbons on the effective surface area of the carbon particles. Once hydrocarbons have been adsorbed, clean (or treated) air is emitted from the unit to the atmosphere at or below the permitted limit.

While one bed is adsorbing hydrocarbons, the second bed is off line and being treated or regenerated using a vacuum pump. The vacuum recovery step returns the carbon to a relatively clean state that will allow it adsorb hydrocarbons again and again. The regeneration cycles typically occur on a 15-minute interval.

Hydrocarbon vapors desorbed from the carbon are routed to a counter current absorption column. This column uses gasoline as absorption media to collect the recovered hydrocarbons before returning them a recovery tank at the terminal. Hydrocarbons not absorbed in absorption column are returned to carbon bed that is online for additional recovery.

3.2 Typical Layout of Source



3.3 Type and quantity of materials processed during test

During the Emission Test on July 1, 2020 at the Buckeye terminal in River Rouge, Michigan, a total of 445,004 gallons, or 1,684,340 liters of gasoline product was loaded. US EPA Title 40 CFR, Part 60, Subpart XX requires a minimum of 300,000 liters of gasoline during the six-hour test.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Description of sampling and field procedures

The following methods were completed as part of the emission test:

- Method 2A - vapor volume measurement.
- Method 21 – System leak detection
- Method 25B – Inlet and Outlet Hydrocarbon concentration

Transport loading pressure was monitored as described in sub-section 60.503 (d) (i.e., 18" water column gauge test). All sampling procedures conformed to procedures outlined in New Source Performance Standards (NSPS), 40 CFR 60, Subpart XX – Section 60.503 – Test Methods and Procedures and Subpart BBBBBB. Specifically, in the field a Dwyer Magnehelic Pressure Gauge was connected to the transport vapor hose connection. Pressure readings were recorded on the truck loading data sheets. All loading bays were tested.

All vapor collection equipment, including fittings, vents and hoses were tested using the Method 21 test. This test is required by 40 CFR 63 Subpart BBBBBB requirements (prior to beginning the test). Any readings equal to or greater than 500 PPM as methane would have been considered a leak and noted and repaired prior to beginning the test.

Method 21 leak detection testing was conducted on any gasoline truck whose emissions showed obvious signs of leaks using sight, sound, and smell as an indication. In accordance with Subpart BBBBBB, Section 63.110902(a)(1)(i), any leak equal to or greater than 500 ppm vol. methane was considered a leak.

The Non-Dispersive Infrared (NDIR) analyzer, turbine flow meter, exhaust vapor thermistor and exhaust pressure transducer are connected to the VRU exhaust stack to acquire their respective data. A quad check valve assembly is employed to provide for proper VRU regeneration air flow and allow one turbine meter to satisfy both carbon vessel measurement requirements.

The barometric pressure transducer and ambient thermistor are near the VRU in order to acquire ambient atmospheric conditions for use in subsequent standardization equations.

Each transducer data channel is scaled and connected to the computer input board. Using an operations code program each input channel is read 25 times in a 5 second interval and mass, flow, concentration, temperature, and pressure values are averaged and stored in an array for subsequent use.

After 30 ten second intervals (5 minutes) the hard disk array is polled, and average values are determined for concentration, pressure, and temperature. These values along with the flow for the 5-minute period are used to compute the mass emitted for that 5-minute period. These averaged and summed values are then printed out as the 5-minute interval data and are again stored on hard disk until the six-hour test period is completed.

Upon completion of the test, the 5-minute interval data is polled to determine test averages for Inlet and Outlet VOC concentration, pressure and temperature data for all test intervals during which VRU exhaust flow was greater than zero and volume and milligram emission data is summed for all 5-minute periods to arrive at a final test period total.

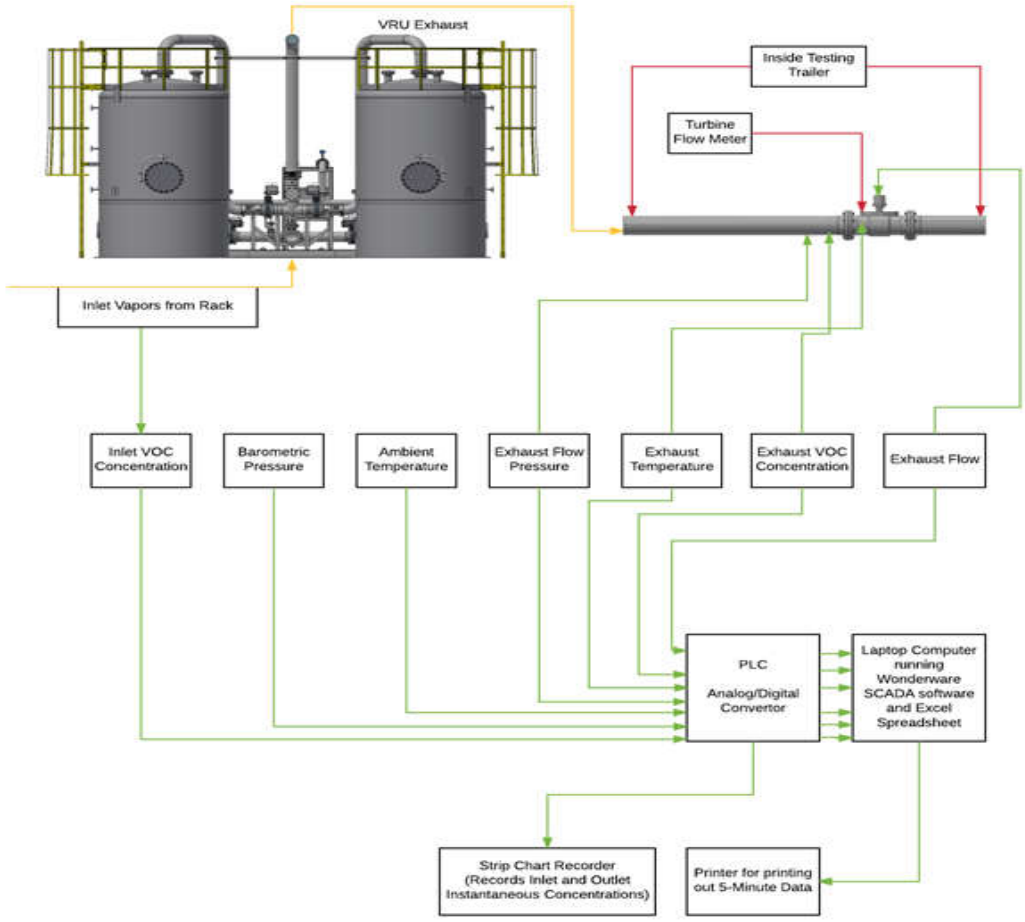
This data acquisition methodology essentially represents a series of very short (5 second) intervals during which VRU operation is measured, averaged and standardized. This effectively removes all judgmental decisions from data reduction processes and provides a technically unbiased analysis of VRU operation.

Additionally, pretest and post test vapor analyzer calibrations are conducted, along with hourly analyzer calibration drift check verification. Following the conclusion of the six hour test the loading rack volumes are calculated and final mass emission values are determined. Copies of the transport loading rack sheets, hydrocarbon analyzer strip charts and computer print outs are attached as Appendices to this test report.

The analytical equipment used during the emission test is displayed in Table 4-1 below.

Quantity	Item	Range (if applicable)	Method or Purpose
2	Thermistor Temperature Probes		Turbine Meter Std. Ambient Temp.
1	Allen Bradley PLC		Data Reduction Pkg.
1	RKI Eagle LEL Monitor	500-5000 ppm	Method 21 Leak Testing
1	Differential Pres. Transducer		Turbine Meter Std.
1	Digital Barometer		Turbine Meter Std.
1	American Meter 8" Turbine Flow Meter	60,000 SCFH	Method 2A
1	Yokogawa 6 Channel Strip Recorder		Data Recorder
1	VOC Gas Analyzer	0-2%	Exhaust TOC
1	VOC Gas Analyzer	0-100 %	Inlet TOC
2	Dwyer Magnehelic Pressure Gauge		40 CFR 60.503 (d)

4.2 Typical Layout of Test Equipment



4.3 Description of Analytical Procedures

Both VOC non-dispersive analyzers were calibrated using propane and nitrogen mixtures of approximately 0%, 25%, 50%, and 85% of full scale. A full calibration was performed immediately prior to the start of the test. During the test, hourly drift checks were performed using the 0% and 50% span gas to document acceptable span and zero drift. All pertinent field calibration data was made available for local onsite test observers.

4.4 Sampling procedure or operational variances

Zeeco, Inc. conducted the performance test with no sampling or procedural variations. Sampling procedures for Exhaust TOC and Inlet TOC followed all quality control procedures specified in EPA Method 25B. As specified in US EPA Method 25A, sampling of the exhaust was conducted from the centrally located cross section of the stack. The VRU operated with no operational variances.