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I. INTRODUCTION

Network Environmental, Inc. was retained by Lacks Enterprises, Inc. (SRN: N2079, Kent County) to conduct VOC (total hydrocarbons) emission sampling at their 52nd Street West facility located in Kentwood, MI. The purpose of the study was to document compliance with EGLE ROP No. MI-ROP-N2079-2017. MI-ROP-N2079-2017 has established a 95% destruction efficiency (DE) limit for the thermal oxidizer at this facility.

The DE of the thermal oxidizer was determined by employing the following reference test methods:

- VOC's – U.S. EPA Method 25A
- Exhaust Gas Parameters (air flow rate, temperature, moisture & density) – U.S. EPA Reference Methods 1 through 4.

The sampling was performed on November 9, 2022 by Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc.. Assisting in the study were Ms. Karen Homrich and Mr. Paul Bosselar of Lacks Enterprises, Inc.. Ms. April Lazzaro and Mr. Trevor Drost of the Michigan Department of Environment, Great Lakes and Energy (EGLE) - Air Quality Division were present to observe the sampling and source operation.

II.1 TABLE 1
VOC DESTRUCTION EFFICIENCY (DE) RESULTS
RTO
52ND STREET WEST
LACKS ENTERPRISES, INC.
KENTWOOD, MICHIGAN
NOVEMBER 9, 2022

Sample	Time	Air Flow Rate SCFM (1)		Concentration PPM (2)		Mass Emission Rate Lbs/Hr (3)		Percent Destruction Efficiency (4)
		Inlet	Exhaust	Inlet	Exhaust	Inlet	Exhaust	
1	09:16-10:16	14,542	14,868	262.6	12.2	26.09	1.24	95.25
2	10:41-11:41	14,860	14,900	245.2	11.4	24.90	1.16	95.34
3	12:32-13:32	15,328	15,364	217.4	9.9	22.77	1.04	95.43
Average		**14,910**	**15,044**	**241.7**	**11.2**	**24.59**	**1.15**	**95.34**

(1) SCFM = Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg).
(2) PPM = Parts Per Million (v/v) On An Actual (Wet) Basis As Propane
(3) Lbs/Hr = Pounds Per Hour Calculated As Propane
(4) Destruction Efficiencies were calculated using the mass emission rates (Lbs/Hr)

III. DISCUSSION OF RESULTS

The results of the emission sampling are summarized in Table 1 (Section II.1). The results are presented as follows:

III.1 Total Hydrocarbon (VOC) Destruction Efficiency Results (Table 1)

Table 1 summarizes the VOC DE results for the thermal oxidizer as follows:

- Sample
- Time
- Air Flow Rate (SCFM) – Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- VOC Concentrations (PPM) – Parts Per Million (v/v) On An Actual (Wet) Basis As Propane
- VOC Mass Emission Rates (Lbs/Hr) – Pounds Of VOC Per Hour As Propane
- VOC Percent Destruction Efficiency (DE)

Both the inlet and exhaust concentrations (PPM) and mass rates (Lbs/Hr) are shown. The DE results were calculated using the mass rate results (Lbs/Hr).

IV. SAMPLING AND ANALYTICAL PROTOCOL

The exhaust sampling was conducted on the 42 inch I.D. exhaust stack at a location approximately six (6) duct diameters downstream and two (2) duct diameters upstream from the nearest disturbances. The inlet sampling was conducted on the 42 inch I.D. inlet duct at a location approximately six (6) duct diameters downstream and two (2) duct diameters upstream from the nearest disturbances.

IV.1 Total Hydrocarbon (VOC) – The VOC sampling was conducted in accordance with U.S. EPA Method 25A. A J.U.M. Model 3-500 flame ionization detector (FID) analyzer was used to monitor the exhaust. A Thermo Environmental, Inc. Model 51 flame ionization detector (FID) analyzer was used to monitor the inlet. Heated teflon sample lines were used to transport the gases to the analyzers. These analyzers produce instantaneous readouts of the total hydrocarbon concentrations (PPM).

The analyzers were calibrated by system injection (from the back of the stack probe to the analyzer) prior to the testing using propane calibration gases. Span gases of 991.0 PPM (inlet) and 94.9 PPM (exhaust) were used to establish the initial instrument calibrations. Calibration gases of 250.0 PPM & 491.0 PPM (for

the inlet) and 30.2 PPM & 50.6 PPM (for the exhaust) propane were used to determine the calibration error of the analyzers. After each sample, a system zero and system injection of 250.0 PPM (for the inlet) and 30.2 PPM (for the exhaust) propane were performed to establish system drift and system bias during the test period. All calibration gases used were EPA Protocol Calibration Gases. Three (3) samples were collected simultaneously from the inlet and exhaust. Each sample was sixty (60) minutes in duration.

The analyzers were calibrated to the output of the data acquisition system (DAS) used to collect the data from the sources. The analyzer averages were corrected for calibration error and drift using formula EQ.7E-5 from 40 CFR Part 60, Appendix A, Method 7E. Figure 1 is a diagram of the VOC sampling train.

IV.2 Exhaust Gas Parameters – The exhaust gas parameters (air flow rate, temperature, moisture and density) were determined in conjunction with the other sampling by employing U.S. EPA Methods 1 through 4.

Three (3) velocity traverses were conducted at both the inlet and the exhaust. Moisture was determined by employing the wet bulb/dry bulb technique. One (1) bag sample was collected from each location and analyzed by Orsat to determine gas density.

All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

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Figure 1
VOC
Sampling Train