Report of...

Compliance Emission Testing

Performed for ...

Eagle Alloy, Inc.
Muskegon, Michigan

On ...

Various Sources

August 13-14, 2013

284.02

Network Environmental, Inc.
Grand Rapids, MI

Performed For:

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I. INTRODUCTION

Network Environmental, Inc. was retained by Eagle Alloy, Inc. to perform compliance emission sampling on the exhausts of various sources at their Muskegon, Michigan facility. The purpose of the study was to meet the testing requirements of Michigan Department of Environmental Quality (MDEQ) – Air Quality Division Permit to Install No. 95-01F. MDEQ Air Permit No. 95-01F has established the following emission limits for these sources:

Source	Pollutant	Emission Limit
Sand Coating Plant Baghouse	PM	0.010 Lbs/1000 Lbs
	$PM_{10/2.5}$	0.95 PPH
	Opacity	5%
Sand Coating Thermal Oxidizer	VOCs	4.6 PPH
Sand Thermal Reclaim Baghouse	PM	0.010 Lbs/1000 Lbs
	$PM_{10/2.5}$	1.12 PPH
	VOCs	1.83 PPH
	Opacity	5%

The following reference test methods were employed to conduct the sampling:

- PM and $PM_{10/2.5}$ – U.S. EPA Methods 17 & 202
- VOCs – U.S.EPA Method 25A
- Exhaust Gas Parameters – U.S. EPA Methods 1 through 4

The sampling was performed on August 13, 2013 on the Sand Coating Plant Baghouse Exhaust, August 13, 2013 on the Sand Coating Thermal Oxidizer Exhaust and August 14, 2013 for the Thermal Reclaim Baghouse Exhaust. The Sampling was performed by Stephan K. Byrd, R. Scott Cargill, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. Assisting with the study was Mr. Steven Spiwak of Eagle Alloy, Inc.. Ms. April Lazzaro and Mr. Rob Dickman of the Michigan Department of Environmental Quality (MDEQ) – Air Quality Division was present to observe the sampling and source operation.

I. INTRODUCTION

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II. PRESENTATION OF RESULTS

II.1 TABLE 1
$PM_{10/2.5}$[1] EMISSION RESULTS SUMMARY
SAND COATER BAGHOUSE EXHAUST
EAGLE ALLOY, INC.
MUSKEGON, MICHIGAN

Sample	Date	Time	Air Flow Rate DSCFM [2]	Concentration	Emission Rate
				Lbs/1000 Lbs, Dry [3]	Lbs/Hr [4]
1	8/13/13	09:38-13:39	18,597	0.003	0.280
2	8/13/13	14:06-15:08	19,350	0.003	0.280
3	8/13/13	15:35-16:37	18,599	0.003	0.221
Average			**18,849**	**0.003**	**0.260**

(1) $PM_{10/2.5}$ = Total Front Half Filterable and Back Half Condensible Particulate
(2) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
(3) Lbs/1000 Lbs, Dry = Pounds of Particulate Per Thousand Pounds of Exhaust Gas on a Dry Basis
(4) Lbs/Hr = Pounds of Particulate Per Hour

II.2 TABLE 2
PM[1] EMISSION RESULTS SUMMARY
SAND COATER BAGHOUSE EXHAUST
EAGLE ALLOY, INC.
MUSKEGON, MICHIGAN

Sample	Date	Time	Air Flow Rate DSCFM [2]	Concentration	Emission Rate
				Lbs/1000 Lbs, Dry [3]	Lbs/Hr [4]
1	8/13/13	09:38-13:39	18,597	0.0003	0.028
2	8/13/13	14:06-15:08	19,350	0.0003	0.029
3	8/13/13	15:35-16:37	18,599	0.0004	0.036
Average			**18,849**	**0.0004**	**0.031**

(1) PM = Total Front Half Filterable Particulate
(2) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
(3) Lbs/1000 Lbs, Dry = Pounds of Particulate Per Thousand Pounds of Exhaust Gas on a Dry Basis
(4) Lbs/Hr = Pounds of Particulate Per Hour

II.3 TABLE 3
VOC EMISSION RESULTS SUMMARY
SAND COATER THERMAL OXIDIZER EXHAUST
EAGLE ALLOY, INC.
MUSKEGON, MICHIGAN

Sample	Date	Time	Air Flow Rate SCFM (1)	Concentration PPM (2)	Emission Rate Lbs/Hr (3)
1	8/13/13	12:48-13:48	5,356	11.0	0.401
2	8/13/13	14:05-15:05	5,141	7.7	0.269
3	8/13/13	15:37-16:37	5,193	4.7	0.166
Average			**5,230**	**7.80**	**0.279**

(1) SCFM = Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 In. Hg)
(2) PPM = Parts per million on a Wet basis
(3) Lbs/Hr = Pounds of VOC Per Hour

II.4 TABLE 4
$PM_{10/2.5}$ EMISSION RESULTS SUMMARY
THERMAL RECLAIM BAGHOUSE EXHAUST
EAGLE ALLOY, INC.
MUSKEGON, MICHIGAN

Sample	Date	Time	Air Flow Rate DSCFM (2)	Concentration Lbs/1000 Lbs, Dry (3)	Emission Rate Lbs/Hr (4)
1	8/14/13	09:03-10:07	15,405	0.003	0.216
2	8/14/13	10:40-11:45	15,174	0.003	0.231
3	8/14/13	12:11-13:14	15,077	0.005	0.306
Average			**15,219**	**0.004**	**0.251**

(1) $PM_{10/2.5}$ = Total Front Half Filterable Particulate and Backhalf Condensible Particulate
(2) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 In. Hg)
(3) Lbs/1000 Lbs, Dry = Pounds of Particulate Per Thousand Pounds of Exhaust Gas on a Dry Basis
(4) Lbs/Hr = Pounds of Particulate Per Hour

II.5 TABLE 5
PM EMISSION RESULTS SUMMARY
THERMAL RECLAIM BAGHOUSE EXHAUST
EAGLE ALLOY, INC.
MUSKEGON, MICHIGAN

Sample	Date	Time	Air Flow Rate DSCFM (2)	Concentration Lbs/1000 Lbs, Dry (3)	Emission Rate Lbs/Hr (4)
1	8/14/13	09:03-10:07	15,405	0.0005	0.037
2	8/14/13	10:40-11:45	15,174	0.0004	0.028
3	8/14/13	12:11-13:14	15,077	0.0005	0.033
Average			**15,219**	**0.0005**	**0.033**

(1) PM = Total Front Half Filterable Particulate
(2) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
(3) Lbs/1000 Lbs, Dry = Pounds of Particulate Per Thousand Pounds of Exhaust Gas on a Dry Basis
(4) Lbs/Hr = Pounds of Particulate Per Hour

II.6 TABLE 6
VOC EMISSION RESULTS SUMMARY
THERMAL RECLAIM BAGHOUSE EXHAUST
EAGLE ALLOY, INC.
MUSKEGON, MICHIGAN

Sample	Date	Time	Air Flow Rate SCFM (1)	Concentration PPM (2)	Emission Rate Lbs/Hr (3)
1	8/14/13	08:59-10:02	15,623	4.0	0.425
2	8/14/13	10:16-11:22	15,376	1.9	0.199
3	8/14/13	11:33-12:33	15,309	1.5	0.156
Average			**15,436**	**2.46**	**0.260**

(1) PPM = Parts per Million on a wet basis as Propane
(2) SCFM = Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
(3) Lbs/Hr = Pounds of VOC Per Hour

III. DISCUSSION OF RESULTS

The results of the emission sampling are summarized in Tables 1-6 (Sections II.1 through II.6). The results are presented as follows:

III,1 Sand Plant Baghouse PM and $PM_{10/2.5}$ Emission Results (Tables 1 & 2)

Tables 1 and 2 summarize the Sand Plant Baghouse PM and $PM_{10/2.5}$ emission results as follows:

- Sample
- Date
- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Concentration (Lbs/1000 Lbs, Dry) – Pounds of Particulate Per Thousand Pounds of Exhaust Gas On A Dry Basis
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour

The results for PM are presented as total front half filterable particulate. PM_{10} results are presented as total particulate (front half filterable and back half condensible). A more detailed breakdown for each sample can be found in Appendix A.

III.2 Sand Plant Thermal Oxidizer VOC Emission Results (Table 3)

Table 3 summarizes the Sand Plant Thermal Oxidizer emission results as follows:

- Sample
- Date Figure 1 – Particulate Sampling Train Diagram
- Time
- Air Flow Rate (SCFM) – Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Concentration (PPM, Wet) – Parts Per Million on a Wet Basis
- Mass Emission Rate (Lbs/Hr) – Pounds of VOC Per Hour

III.3 Thermal Reclaim Baghouse Exhaust PM and $PM_{10/2.5}$ Emission Results (Table 4 and 5)

Tables 4 and 5 summarize the Thermal Reclaim Baghouse Exhaust PM and $PM_{10/2.5}$ emission results as follows:

- Sample
- Date

- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Concentration (Lbs/1000 Lbs, Dry) – Pounds of Particulate Per Thousand Pounds of Exhaust Gas On A Dry Basis
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour

The results for PM are presented as total front half filterable particulate. A more detailed breakdown for each sample can be found in Appendix A.

III.4 Thermal Reclaim Baghouse VOC Emission Results (Table 6)

Table 6 summarizes the Thermal Reclaim VOC emission results as follows:

- Sample
- Date
- Time
- Air Flow Rate (SCFM) – Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- VOC Concentration (PPM, Wet) – Parts per million on a wet basis as propane
- VOC Mass Emissions (Lbs/Hr) – Pounds of VOC Per Hour

III.5 Opacity Results

The opacity results for the Sand Plant Baghouse and the Thermal Reclaim Baghouse Exhaust were 0% for all readings.

IV. SAMPLING AND ANALYTICAL PROTOCOL

IV.1 PM and $PM_{10/2.5}$ – The total particulate sampling was conducted in accordance with U.S. EPA Method 17. The $PM_{10/2.5}$ particulate (including back half condensible analysis) sampling was conducted in accordance with U.S. EPA Methods 17 and 202. Method 17 is an in-stack filtration method. The samples were collected isokinetically on filters and in distilled water. Three (3) samples were collected from the exhaust. Each sample was sixty (60) minutes in duration and had a minimum sample volume of thirty (30) dry standard cubic feet.

The nozzle rinses and filters were analyzed gravimetrically for particulate in accordance with Method 17. The condensate (back half) was extracted and analyzed for particulate in accordance with Method 202.

All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis. The particulate and condensible sampling train is shown in Figure 1.

IV.2 VOCs - The VOC sampling was conducted in accordance with U.S. EPA Reference Method 25A. A J.U.M. 3-500 with Flame Ionization Detector gas analyzer was used to monitor the Thermal Oxidizer and Thermal Reclaim exhausts. A heated Teflon sample line was used to transport the exhaust gases to the analyzer. The analyzer produces instantaneous readouts of the VOCs concentrations (PPM). The analyzer was operated on the 0-100 ppm scale.

The analyzer was calibrated by direct injection prior to the testing. A span gas of 85.78 PPM was used to establish the initial instrument calibration. Calibration gases of 50.19 PPM and 30.37 PPM were used to determine the calibration error of the analyzer. After each sample, a system zero and system injection of 30.37 PPM were performed to establish system drift during the test period. All calibration gases were EPA Protocol 1 Certified.

The analyzer was calibrated to the output of the data acquisition system (DAS) used to collect the data from the exhaust. A diagram of the sampling train is shown in Figure 2. Three (3) samples, each sixty (60) minutes in duration, were collected from each exhaust.

IV.3 Opacity - The opacity emissions from the sources were determined in accordance with U.S. EPA Reference Method 9. The observations will be conducted by a certified VE observer in accordance with the method. Three (3) periods, each sixty (60) minutes in duration, were monitored from each source. The highest six minute averages were reported.

IV.4 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. Oxygen and carbon dioxide content were determined by orsat analysis. Moisture was determined by the isokinetic sampling trains and wet bulb/dry bulb method. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:

Stephan K. Byrd
Project Manager

This report was reviewed by:

R. Scott Cargill
Vice President

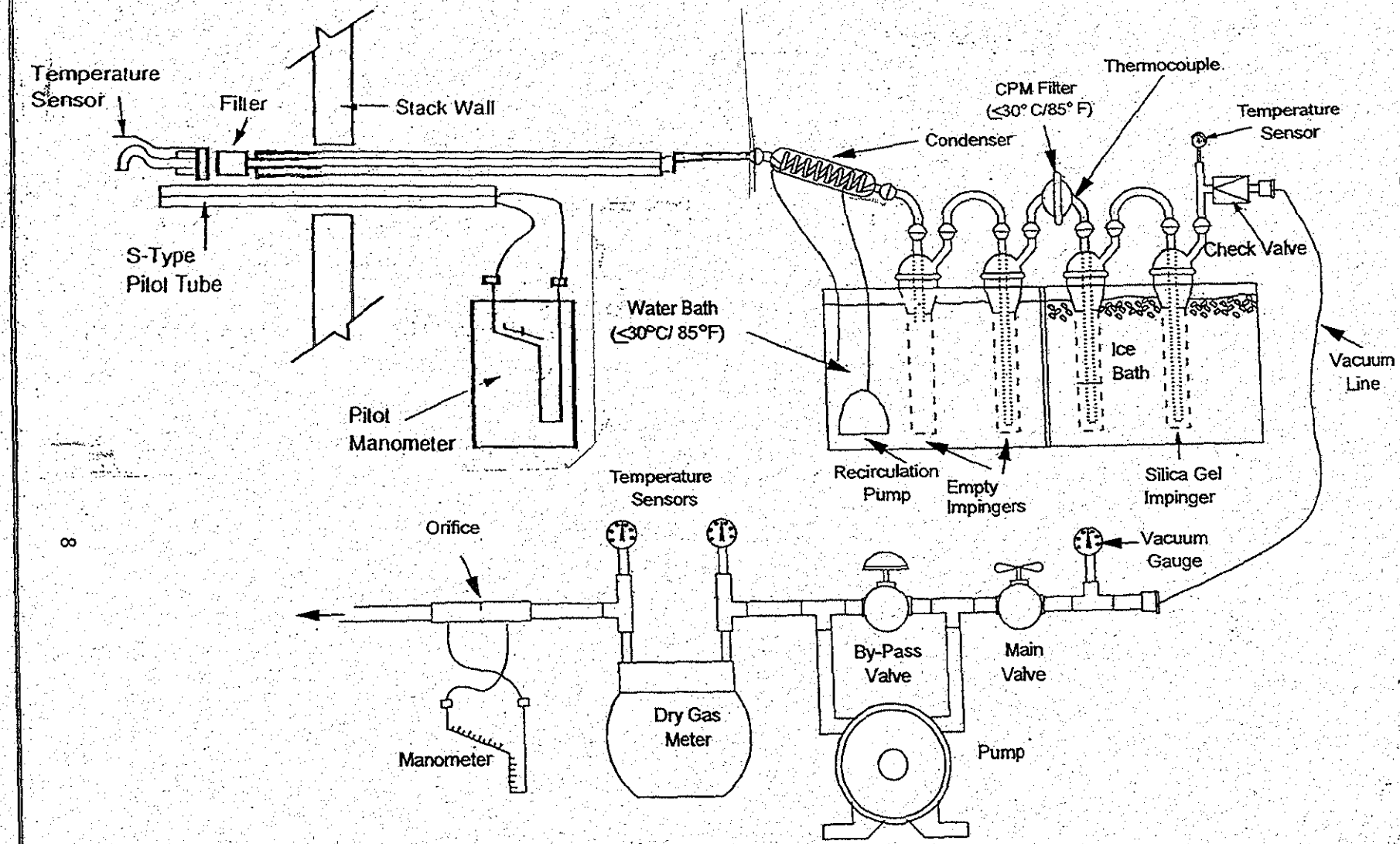

Figure 1

Methods 17 & 202 Sampling Train

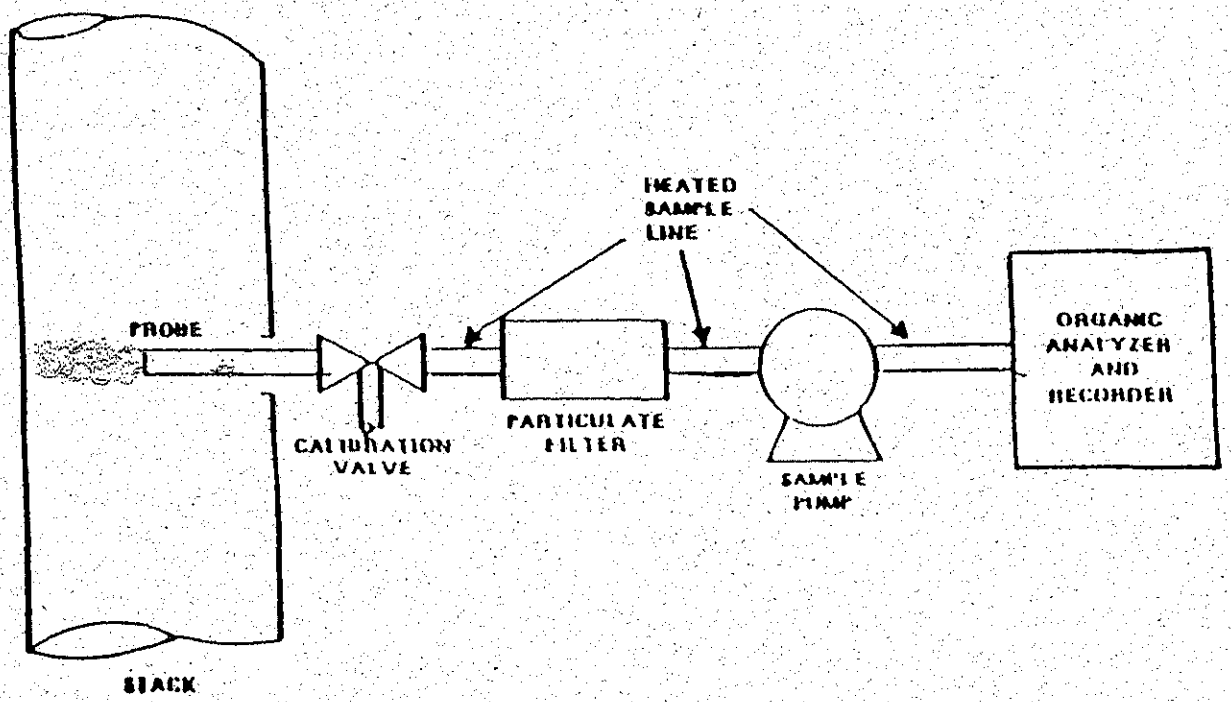

Figure 2

Method 25A Sampling Train