I. INTRODUCTION

Network Environmental, Inc. was retained by Eagle Alloy, Inc. of Muskegon, Michigan to conduct an emission study at their facility. The purpose of the study was to determine the particulate emissions from their Melting Furnace Hood exhaust in order to meet the emission testing requirements of EGLE Air Permit No. 95-01G and 40 CFR Part 63 Subpart ZZZZZ (Foundry Area Source MACT). In conjunction with the particulate emission sampling, fugitive visible emission observations were also taken at the facility, in order to comply with 40 CFR Part 63 Subpart ZZZZZ.

The sampling in the study was conducted by R. Scott Cargill, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. on March 26, 2022. The following reference test methods were used to conduct the sampling:

- Particulate - U.S. EPA Method 5
- Visible Emissions - U.S. EPA Method 9
- Exhaust Gas Parameters (Air Flow Rate, Temperature, Moisture & Density) - U.S. EPA Methods 1-4

Assisting in the study were Mr. Steven Spiwak of Eagle Alloy, Inc., Ms. Jill Koebbe of Air & Water Compliance Group, LLC and the operating staff of the facility. Mr. Eric Grinstern of the Michigan Department of Environment, Great Lakes and Energy (EGLE) – Air Quality Division was present to observe the sampling and source operation.

II. PRESENTATION OF RESULTS

II.1 TABLE 1
PARTICULATE EMISSION RESULTS SUMMARY
MELTING FURNACE HOOD EXHAUST
EAGLE ALLOY, INC.
MUSKEGON, MICHIGAN
MARCH 26, 2022

Sample	Time	Air Flow Rate DSCFM (1)	Particulate Concentration	Particulate Mass Rates	
			Grains/DSCF (2)	Lbs/Hr (3)	Lbs/Ton of Metal (4)
1	08:42-09:48	8,574	0.0020	0.149	0.057
2	10:21-11:34	8,798	0.0014	0.102	0.039
3	11:47-12:54	9,078	0.0024	0.188	0.072
Average		**8,817**	**0.0019**	**0.146**	**0.056**

(1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
(2) Grains/DSCF = Grains Of Particulate Per Dry Standard Cubic Foot Of Exhaust Gas
(3) Lbs/Hr = Pounds Of Particulate Per Hour
(4) Lbs/Ton of Metal = Pounds Of Particulate Per Ton Of Metal Melted (Calculated Using A Melt Rate of 5,226 Lbs Of Metal Per Melt As Supplied By Eagle Alloy, Inc.)

III. DISCUSSION OF RESULTS

The particulate emission results are summarized in Table 1 (Section II.1). A more detailed presentation of the particulate sampling can be found in Appendix A.

III.1 Particulate Emission Results (Table 1)

Table 1 summarizes the particulate emission results as follows:

- Sample
- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Concentration (Grains/DSCF) – Grains of Particulate Per Dry Standard Cubic Foot of Exhaust Gas
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/Ton of Metal) – Pounds of Particulate Per Ton of Metal Melted

III.2 Visible Emissions

The visible emissions (VE's) observations can be found in Appendix C. Fugitive VE's from the foundry buildings were recorded in conjunction with the particulate sampling. The highest six minute average opacity reading recorded was 0.0%.

III.3 Emission Limit

EGLE Air Permit No. 95-01G and 40 CFR Part 63 Subpart ZZZZZ (Foundry Area Source MACT) have established the following emission limits for this source:

- Particulate - 0.8 Lb Per Ton of Metal Charged
- Visible Emissions - 20% opacity (6 minute average) except for one 6 minute average that does not exceed 27% opacity

IV. SOURCE DESCRIPTION

The source sampled was the exhaust of a single melting furnace. A temporary hood was placed over this melting furnace in order to isolate the emissions from this single furnace. The exhaust air from the hood is

uncontrolled and was exhausted to atmosphere through a 16 inch I.D. duct for the purpose of this sampling. Normally, the emissions from the furnace are just vented inside the facility. Particulate sampling commenced with the start of the batch (metal being charged to the furnace) and stopped when the exhaust hood had to be removed at the completion of the batch to pour off the molten metal. During runs 2 and 3, sampling was continued after the hood was removed to try to catch emissions during the pouring process. Three (3) batches (one for each test run) were sampled.

The process melt rate was 5,226 Lbs of metal per heat for each run. Each heat made 26 castings. The casting is 201 Lbs gross weight (including risers/gating, etc..) so 26 x 201 = 5,226 Lbs/Heat. The source operating parameters can be found in Appendix G.

V. SAMPLING AND ANALYTICAL PROTOCOL

The sampling location was on the 16 inch I.D. exhaust stack at a location 8.2 duct diameters downstream and 2.0 duct diameters upstream from the nearest disturbances. Eight (8) sampling points (four per port) were used for the particulate and air flow determinations. A diagram of the sampling location can be found in Appendix F.

Prior to the sampling, a preliminary velocity traverse, cyclonic/turbulent flow check was conducted. The measurement location and air flows met the criteria established in U.S. EPA Reference Method 1.

The sampling/traverse points were as follows:

Sample Point	Dimension (Inches)
1	1.07
2	4.00
3	12.00
4	14.93

V.1 Particulate - The particulate emission sampling was conducted in accordance with U.S. EPA Reference Method 5. Method 5 is an out of stack filtration method. Three (3) samples were collected from

the exhaust. The sample times and number of sample points varied due to the length of each batch. A base time of sixty-four (64) minutes (8 minutes per point) was used for the sampling. If a batch was shorter than this base time, the run was stopped. If a batch was longer than this base time, then traverse points were re-sampled as necessary until the batch ended. Each sample had a minimum sample volume of sixty (60) dry standard cubic feet. The samples were collected isokinetically from the exhaust through a heated probe and collected on a heated filter (maintained at 250 °F plus or minus 25 °F). The filters and probe/nozzle rinses were analyzed for total particulate by gravimetric analysis. All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. The particulate sampling train is shown in Figure 1.

V.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 Reference Methods 1 through 4. Moisture was determined from the Method 5 sampling train. Integrated bag samples were collected from the back of the Method 5 sampling train 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.

V.3 Visible Emissions - The VE's were determined in accordance with U.S. EPA Reference Method 9. The observations were conducted by a certified VE observer (Richard D. Eerdmans) in accordance with the method. VE's were monitored during the particulate sampling. A copy of the observer's VE certification and data sheets can be found in Appendix C.

This report was prepared by:

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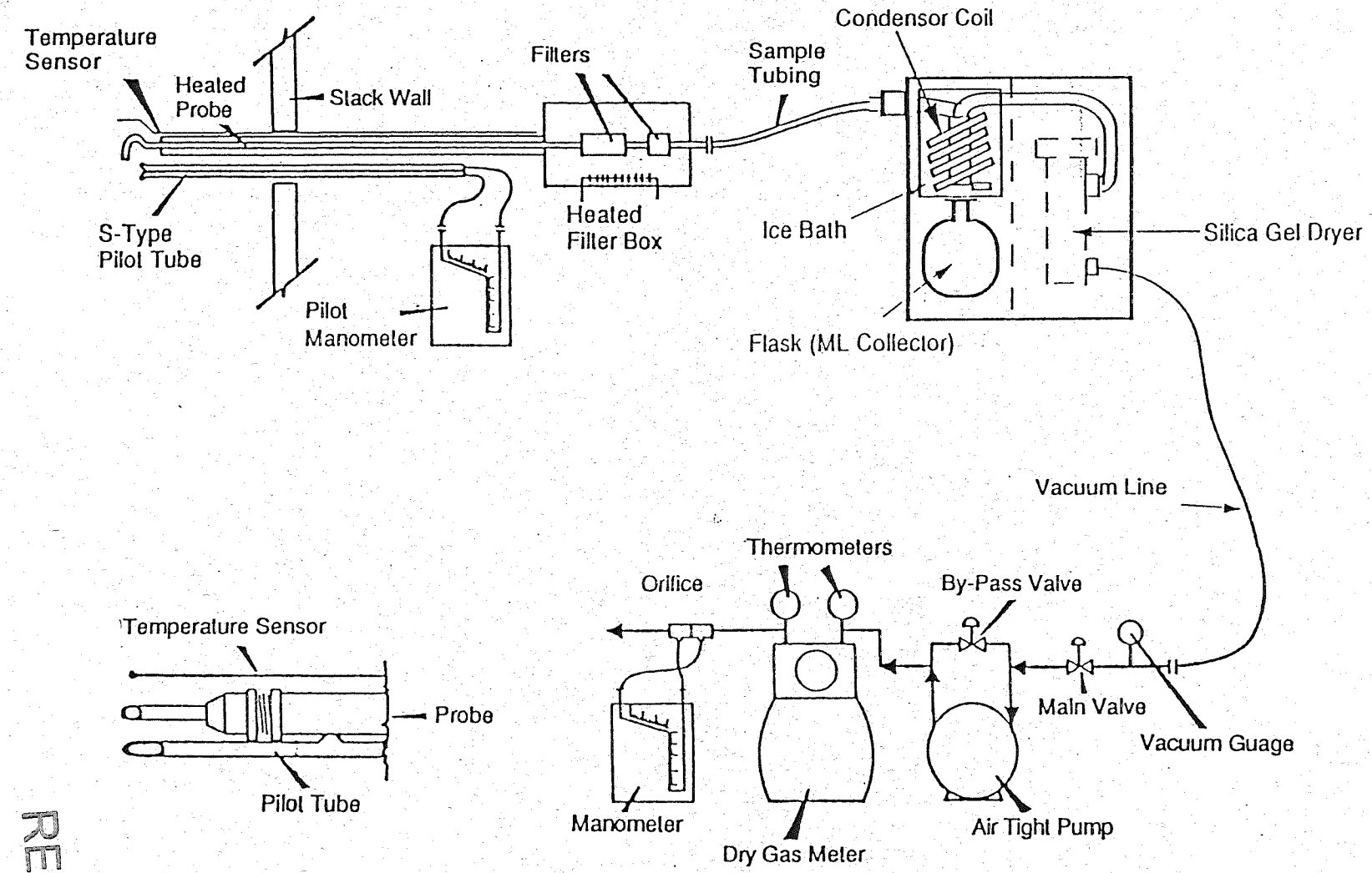

Figure 1

Particulate Sampling Train