

Report of...

ROP Compliance Emission Sampling

Performed for...

Cadillac Casting, Inc.

Cadillac, Michigan

On...

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AIR QUALITY DIV.

Various Sources

July 25-27, 2016

029.45

Network Environmental, Inc.
Grand Rapids, MI



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

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RENEWABLE OPERATING PERMIT REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name Cadillac Casting, Inc County Wexford

Source Address 1500 Fourth Ave. City Cadillac

AQD Source ID (SRN) B2178 ROP No. MI-ROP-B2178-2014 ROP Section No. na

Please check the appropriate box(es):

Annual Compliance Certification (Pursuant to Rule 213(4)(c))

Reporting period (provide inclusive dates): From _____ To _____

- 1. During the entire reporting period, this source was in compliance with ALL terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.
- 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, EXCEPT for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))

Reporting period (provide inclusive dates): From _____ To _____

- 1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.
- 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, EXCEPT for the deviations identified on the enclosed deviation report(s).

Other Report Certification

Reporting period (provide inclusive dates): From 7-25-16 To 7-27-16

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

ROP Emission Sampling - Various Sources

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

Mark Wightman V.P. / General Manager 231 779-9600
Name of Responsible Official (print or type) Title Phone Number

Mark Wight 8/30/16
Signature of Responsible Official Date

* Photocopy this form as needed.

I. INTRODUCTION

Network Environmental, Inc. was retained by Cadillac Casting, Inc. of Cadillac, Michigan to conduct emission sampling at their facility. The purpose of the sampling was to meet the testing requirements of the State of Michigan Renewable Operating Permit (ROP) Number MI-ROP-B2178-2014.

The following is a list of the sources that were sampled and the emission limits for each source:

Source	Compound(s) Sampled	Emission Limit(s)
EUALINEMOLD (2 - Internal Packed Scrubber Exhausts)	Dimethylpropylamine (DMPA)	<u>DMPA</u> : 0.07 Lbs/Hr & 2.34 Mg/M ³
EUCOREMOLDMAKING (1 - Internal Packed Scrubber Exhaust)	Dimethylpropylamine (DMPA)	<u>DMPA</u> : 0.01 Lbs/Hr & 0.044 Tons/Year;
EUSPOBREAKSORT (2 - 80K Baghouses)	Particulate	<u>Particulate</u> : 0.27 Lbs/Ton of Metal Process & 24.0 Tons/Year

The sampling in the study was conducted over the period of July 25-27, 2016 by Stephan K. Byrd, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc.. Assisting with the study were Mr. Erik Olson of Cadillac Casting, Inc. and the operating staff of the facility. Mr. Rob Dickman and Mr. Shane Nixon of the MDEQ - Air Quality Division were present to observe portions of the sampling and source operation.

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II. PRESENTATION OF RESULTS

**II.1 TABLE 1
PARTICULATE EMISSION RESULTS
EUSPOBREAKSORT
CADILLAC CASTING, INC.
CADILLAC, MICHIGAN**

Source	Sample	Date	Time	Air Flow Rate SCFM ⁽¹⁾	Particulate Mass Rate	
					Lbs/Hr ⁽²⁾	Lbs/Ton of Metal ⁽³⁾
New 80K Baghouse	1	7/26/16	11:46-12:49	70,820	0.140	0.0064
	2	7/26/16	13:03-14:06	71,614	0.105	0.0048
	3	7/26/16	14:23-15:26	72,246	0.088	0.0029
	Average				71,560	0.111
Old 80K Baghouse	1	7/27/16	09:38-10:44	53,967	0.098	0.0040
	2	7/27/16	11:02-12:09	52,570	0.131	0.0059
	3 ⁽⁴⁾	7/27/16	12:23-13:39	55,341	6.984	0.2765
	Average				53,960	2.404

(1) SCFM = Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)

(2) Lbs/Hr = Pounds of Particulate Per Hour

(3) Lbs/Ton of Metal = Pounds of Particulate Per Ton of Metal Processed. Calculated using metal processing rates of 21.90 Tons/Hr for Sample 1, 21.90 Tons/Hr for Sample 2 and 30.48 Tons/Hr for Sample 3 on the New 80K baghouse and 24.55 Tons/Hr for Sample 1, 22.39 Tons/Hr for Sample 2 and 25.26 Tons/Hr for Sample 3 on the Old 80K baghouse. Metal processing rates were supplied by Cadillac Casting, Inc.

(4) During the third sample on the Old 80K Baghouse the baghouse went into a shakedown. The test was suspended at 12:43 and resumed at 12:52.

**II.2 TABLE 2
DIMETHYLPROPYLAMINE (DMPA) EMISSION RESULTS
EUALINEMOLD
CADILLAC CASTING, INC.
CADILLAC, MICHIGAN**

Source	Sample	Date	Time	Air Flow Rate DSCFM ⁽¹⁾	DMPA Concentration Mg/M ³ ⁽²⁾	DMPA Mass Rate
						Lbs/Hr ⁽³⁾
East DMPA Scrubber	1	7/25/16	19:06-20:06	2,817	2.89	0.031
	2	7/25/16	20:15-21:15	2,819	2.67	0.028
	3	7/25/16	21:23-22:23	2,850	1.83	0.020
	Average			2,829	2.46	0.026
West DMPA Scrubber	1	7/25/16	19:06-20:06	2,819	N.D. ⁽⁴⁾	N.D. ⁽⁴⁾
	2	7/25/16	20:15-21:15	2,919	N.D. ⁽⁴⁾	N.D. ⁽⁴⁾
	3	7/25/16	21:23-22:23	2,852	N.D. ⁽⁴⁾	N.D. ⁽⁴⁾
	Average			2,863	----	----

(1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)

(2) Mg/M³ = Milligrams Per Dry Standard Cubic Meter

(3) Lbs/Hr = Pounds of DMPA Per Hour

(4) N.D. = Non Detected At Detection Limits of 0.12 Mg/M³ & 0.0013 Lbs/Hr for the West Scrubber.

**II.3 TABLE 3
DIMETHYLPROPYLAMINE (DMPA) EMISSION RESULTS
EUCOREMOLDMAKING
CADILLAC CASTING, INC.
CADILLAC, MICHIGAN**

Source	Sample	Date	Time	Air Flow Rate DSCFM ⁽¹⁾	DMPA Concentration Mg/M ³ ⁽²⁾	DMPA Mass Rate
						Lbs/Hr ⁽³⁾
SPO DMPA Scrubber	1	7/26/16	11:28-12:28	4,231	N.D. ⁽⁴⁾	N.D. ⁽⁴⁾
	2	7/26/16	12:34-13:34	4,223	N.D. ⁽⁴⁾	N.D. ⁽⁴⁾
	3	7/26/16	13:40-14:40	4,266	N.D. ⁽⁴⁾	N.D. ⁽⁴⁾
	Average			4,240	----	----

(1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)

(2) Mg/M³ = Milligrams Per Dry Standard Cubic Meter

(3) Lbs/Hr = Pounds of DMPA Per Hour

(4) N.D. = Non Detected At Detection Limits of 0.14 Mg/M³ & 0.0023 Lbs/Hr for the EUCOREMOLDMAKING scrubber.

III. DISCUSSION OF RESULTS

The results of the emission sampling are summarized in Tables 1 through 3 (Sections II.1 through II.3).

The results are presented as follows:

III.1 EUSPOBREAKSORT Particulate Emission Results (Table 1)

Table 1 summarizes the EUSPOBREAKSORT (80K Baghouses) particulate emission results as follows:

- Source
- Sample
- Date
- Time
- Air Flow Rate (SCFM) – Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- 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 Processed

A more detailed breakdown for each sample can be found in Appendix A. During the third sample on the Old 80K Baghouse the baghouse went into a shakedown. The test was suspended at 12:43 and resumed at 12:52.

III.2 EUALINEMOLD Dimethylpropylamine (DMPA) Emission Results (Table 2)

Table 2 summarizes the EUALINEMOLD (East & West DMPA Scrubbers) DMPA emission results as follows:

- Source
- Sample
- Date
- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- DMPA Concentration (Mg/M³) – Milligrams of DMPA Per Dry Standard Cubic Meter of Exhaust Gas
- DMPA Mass Emission Rate (Lbs/Hr) – Pounds of DMPA Per Hour

III.3 EUCOREMOLDMAKING Dimethylpropylamine (DMPA) Emission Results (Table 3)

Table 3 summarizes the EUCOREMOLDMAKING DMPA emission results as follows:

- Source
- Sample
- Date
- Time

- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- DMPA Concentration (Mg/M³) – Milligrams of DMPA Per Dry Standard Cubic Meter of Exhaust Gas
- DMPA Mass Emission Rate (Lbs/Hr) – Pounds of DMPA Per Hour

IV. SAMPLING AND ANALYTICAL PROTOCOL

The sampling location for each source was as follows:

- EUALINEMOLD (2 Internal Packed Scrubbers) – 30 inch I.D. diameter ducts with 2 sample ports in a location approximately 11 duct diameters downstream and >2 duct diameters upstream from the nearest disturbances.
- EUCOREMOLDMAKING (1 – Internal Packed Scrubber) – 27 inch I.D. diameter duct with 2 sample ports in a location approximately 11 duct diameters downstream and >2 duct diameters upstream from the nearest disturbances.
- EUBREAKSORT (2-80K Baghouses) – The older 80K baghouse has a 72 inch I.D. exhaust with sample ports at a location approximately 7 duct diameters downstream and 2 duct diameters upstream from the nearest disturbances. Sixteen (16) sampling points were used for the isokinetic sampling. The newer 80K baghouse has a 69 Inch I.D. exhaust with sample ports at a location approximately 3.5 duct diameters downstream and 3.5 duct diameters upstream from the nearest disturbances. Twenty-Four (24) sampling points were used for the isokinetic sampling.

The emission sampling was conducted by employing the following reference methods:

- Particulate – U.S. EPA Method 17
- Dimethylpropylamine (DMPA) – U.S. EPA Method 18
- Exhaust Gas Parameters (air flow, temperature, moisture & density) - U.S. EPA Methods 1-4

IV.1 Particulate – The particulate emission sampling was conducted in accordance with U.S. EPA Method 17. Method 17 is an in-stack filtration method. Three (3) samples were collected from each exhaust sampled. Each sample was sixty (60) minutes in duration and had minimum sample volumes of thirty (30) dry standard cubic feet. The samples were collected isokinetically and analyzed for particulate by gravimetric analysis. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis. Figure 1 is a diagram of the particulate sampling train.

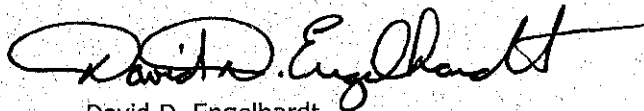
IV.2 DMPA – The sampling for DMPA was conducted by employing U.S. EPA Method 18. The samples were collected in a midget impinger (containing DI water) and on XAD sorbent tubes (2 in series) using pumps equipped with calibrated critical orifices (calibrated at approximately 500 cc/min). The samples were analyzed for DMPA by gas chromatography (GCFID). A duplicate spiked sample was run simultaneously with each sampling run. Six (6) samples (3 sample runs & 3 spiked/duplicates) were collected from each of the sources sampled. Each sample was sixty (60) minutes in duration. The final results were corrected in accordance with Method 18 by using the recovery efficiencies of the spiked samples. Also, a spiked field blank was submitted for analysis. The spiked field blank showed a 93.32% recovery. The calculations for each sample can be found in Appendix E. All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. Figure 2 is a diagram of the DMPA sampling train.

IV.3 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.

Air flow rates, temperatures and moistures were determined using the isokinetic sampling trains (when possible). All the other air flow rates & temperatures were determined by conducting three (3) velocity traverses for each stack and moisture was determined by employing the wet bulb/dry bulb technique.

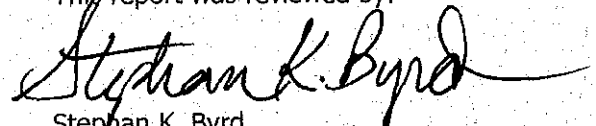
All the sources have demonstrated ambient air (20.9% O₂ & 0.0 % CO₂) gas composition in the past. The ambient air default values were used to calculate gas density for all the sources. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:



David D. Engelhardt
Vice President

This report was reviewed by:



Stephan K. Byrd
President

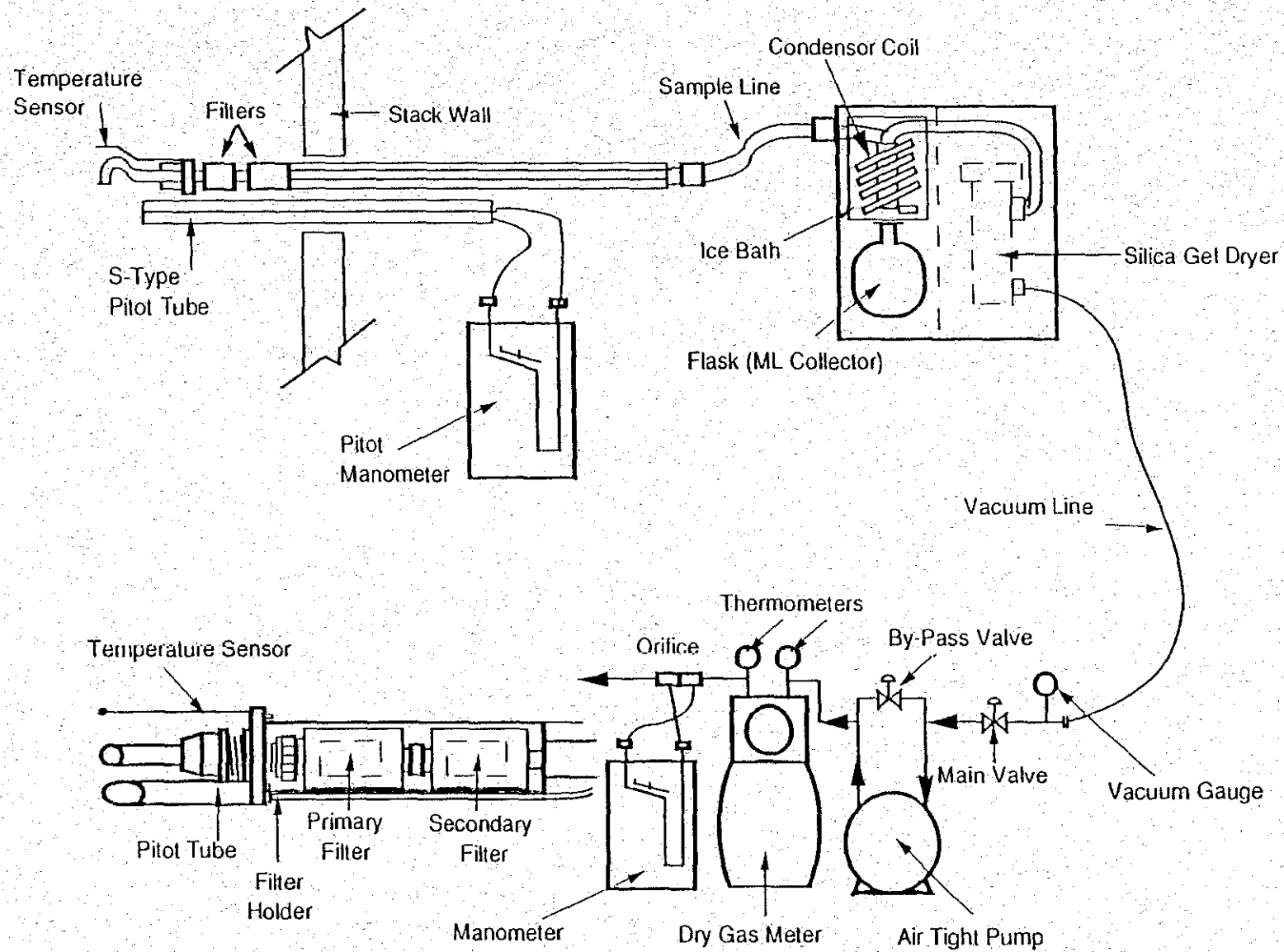


Figure 1

Particulate (Method 17)
Sampling Train

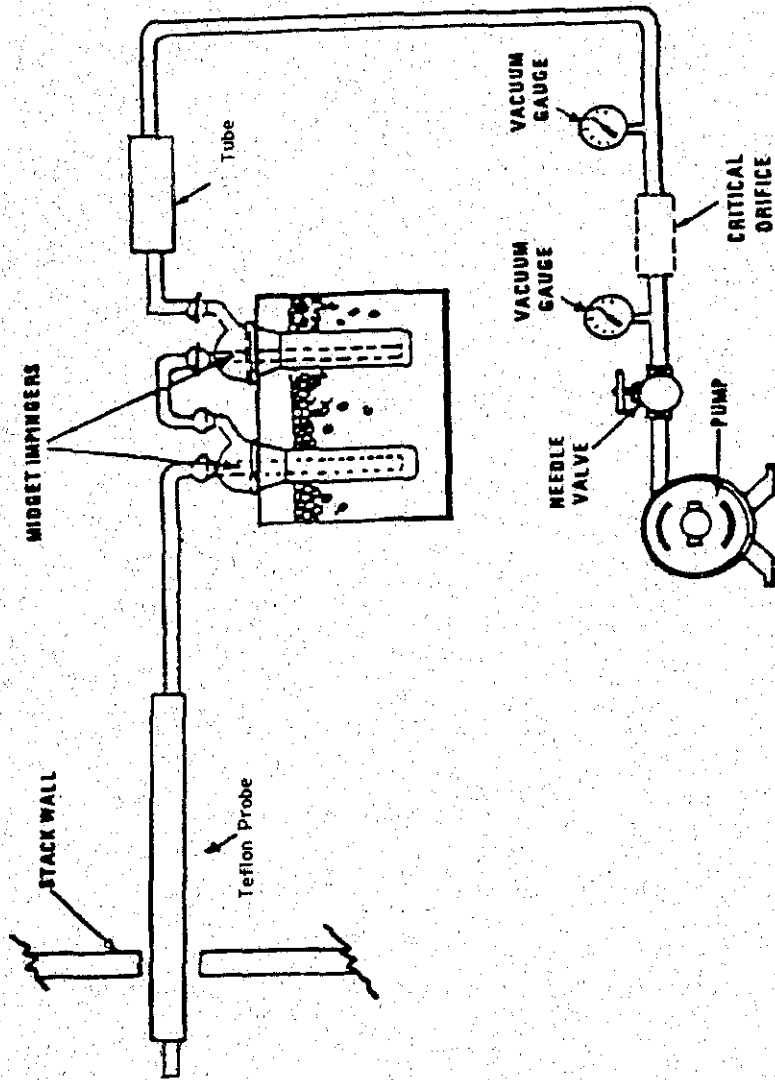


Figure 2
 DMPA (Method 18)
 Sampling Train