

Report of...

Particulate Emission Sampling

Performed for the...

Michigan Sugar Company
Croswell, Michigan

On the...

Pulp Dryer Exhaust
(EU-PULPDRYER)

December 14, 2021

Project #: 022.59

By...

Network Environmental, Inc.
Grand Rapids, MI

Performed For:

**Michigan Sugar Company
122 Uptown Dr.
Suite 300
Bay City, MI 48708
Contact: Meaghan Martuch
Telephone: (989) 686-0161 EXT: 2236
Cell: (989) 780-2550
e-mail: meaghan.martuch@michigansugar.com**

At:

**Michigan Sugar Company
159 S. Howard St.
Crosswell, MI 48422**

Performed by:

**Network Environmental, Inc.
2629 Remico, Suite B
Grand Rapids, MI 49519
Contact: David D. Engelhardt
Phone: (616) 530-6330
Fax: (616) 530-0001
e-mail: netenviro@aol.com**

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I. INTRODUCTION

Network Environmental, Inc. was retained by the Michigan Sugar Company to conduct particulate emission sampling on their Pulp Dryer exhaust located in Croswell, Michigan. The purpose of the sampling was to meet the testing requirements of the Michigan Department of Environment, Great Lakes and Energy (EGLE) – Air Quality Division Renewable Operating Permit (ROP) Number MI-ROP-B2876-2019a.

The following source was sampled :

Source	Compound(s) Sampled	Emission Limit(s)
Pulp Dryer (EU-PULPDRYER)	Particulate	<u>Particulate:</u> 0.10 Lbs/1000 Lbs of exhaust gas

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

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

The sampling in the study was conducted on December 14, 2021 by R. Scott Cargill and Richard D. Eerdmans of Network Environmental, Inc.. Assisting with the study were Ms. Meaghan Martuch of the Michigan Sugar Company and the operating staff of the facility. Mr. Trevor Drost 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
PULP DRYER EXHAUST
MICHIGAN SUGAR COMPANY
CROSWELL, MICHIGAN
DECEMBER 14, 2021**

Source	Sample	Date	Time	Air Flow Rate		Concentration	Mass Rate
				SCFM ⁽¹⁾	DSCFM ⁽²⁾	Lbs/1000 Lbs, Actual ⁽³⁾	Lbs/Hr ⁽⁴⁾
Pulp Dryer	1	12/14/21	09:03-10:05	36,616	27,715	0.092	14.12
	2	12/14/21	10:32-11:37	38,333	29,102	0.094	14.67
	3	12/14/21	11:54-12:57	37,531	28,796	0.094	14.44
	Average				37,494	29,205	0.093

- (1) SCFM = Standard Cubic Feet Per Minute (Standard Temperature & Pressure = 68 °F & 29.92 in. Hg)
 (2) DSCFM = Dry Standard Cubic Feet Per Minute (Standard Temperature & Pressure = 68 °F & 29.92 in. Hg)
 (3) Lbs/1000 Lbs, Actual = Pounds Of Particulate Per Thousand Pounds Of Exhaust Gas On An Actual (Wet) Basis
 (4) Lbs/Hr = Pounds of Particulate Per Hour

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 Pulp Dryer (EU-PULPDRYER) Particulate Emission Results (Table 1)

Table 1 summarizes the Pulp Dryer 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)
 - DSCFM – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Concentration (Lbs/1000 Lbs) – Pounds Of Particulate Per Thousand Pounds Of Exhaust Gas On An Actual (Wet) Basis
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour

A more detailed breakdown for each sample can be found in Appendix A.

IV. SAMPLING AND ANALYTICAL PROTOCOL

The sampling location for the source was as follows:

- Pulp Dryer (EU-PULPDRYER) – A 72 inch I.D. diameter exhaust stack with 2 sample ports in a location that meets the 8 duct diameters downstream and 2 duct diameters upstream requirement. Twelve (12) sampling points were used for the isokinetic sampling.

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

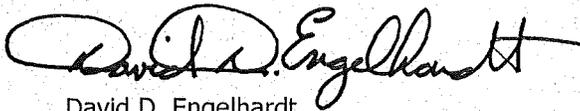
- Particulate – U.S. EPA Method 17
- Exhaust Gas Parameters (air flow, temperature, moisture & density) - U.S. EPA Methods 1-4

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 the exhaust. Each sample was a minimum of sixty (60) minutes in duration and had a minimum sample volume 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 method were incorporated in the sampling and analysis. Figure 1 is a diagram of the particulate 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.

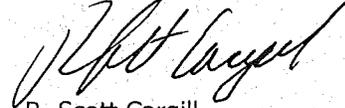
Air flow rates, temperatures and moistures were determined using the isokinetic sampling trains. Bag samples were collected from the exhaust of the isokinetic sampling trains and analyzed for %O₂ & %CO₂ by ORSAT. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:



David D. Engelhardt
Vice President

This report was reviewed by:



R. Scott Cargill
Project Manager

Temperature
Sensor

Filter

Stack Wall

Sample Line

Condensor Coil

S-Type
Pilot Tube

Ice Bath

Silica Gel Dryer

Flask (ML Collector)

Pilot
Manometer

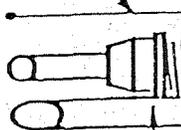
Vacuum Line

Temperature Sensor

Thermometers

Orifice

By-Pass Valve



Pilot Tube

Filter

Filter
holder

Main Valve

Vacuum Gauge

Manometer

Dry Gas Meter

Air Tight Pump

Figure 1

Particulate
Sampling Train

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