

Report of...

Particulate Emission Sampling

Performed for...

Morton Salt

Manistee, Michigan

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DEC 08 2014

AIR QUALITY DIV.

On the...

Pellet Production/Pretzel Salt Baghouse

October 28, 2014

203.08

By...

Network Environmental, Inc.
Grand Rapids, MI

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AIR QUALITY DIV.

I. INTRODUCTION

Network Environmental, Inc. was retained by Morton Salt of Manistee, Michigan, to conduct a particulate emission study at their facility. The purpose of this project was to conduct total particulate (front half filterable and back half condensable) emission sampling in order to demonstrate compliance with MDEQ Permit To Install No. 54-14 and 40 CFR, Part 60, Subpart 000.

Permit No. 54-14 has established the following emission limits for this source:

- PM – 0.014 Grains/DSCF
- PM 10 – 3.96 Lbs/Hr
- PM 2.5 – 3.96 Lbs/Hr

Three (3) test runs were conducted. Each test run was ninety-six (96) minutes in duration and had minimum sample volumes of sixty (60) dry standard cubic feet (as required by Subpart 000). Both the pellet production and the pretzel salt operations were running during the sampling (See Appendix B).

The total particulate (front half filterable and back half condensable) emissions were determined. By adding the condensable particulate to the filterable particulate the testing was designed to meet the PM 10 & PM 2.5 requirements of the permit.

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

- Particulate – U.S. EPA Methods 17 & 202
- Exhaust Gas Parameters (air flow rate, temperature, moisture & density) – U.S. EPA Reference Methods 1 through 4.

The sampling was performed on October 28, 2014 by Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc.. Assisting with the sampling was Mr. Donald E. Kuk of Morton Salt. Mr. Jeremy Howe and Ms. Caryn Owens of the Michigan Department of Environmental Quality (MDEQ) – Air Quality Division were present to observe the sampling and source operation.

II. PRESENTATION OF RESULTS

**II.1 TABLE 1
TOTAL PARTICULATE⁽¹⁾ EMISSION RESULTS SUMMARY
PELLET PRODUCTION/PRETZEL SALT BAGHOUSE
MORTON SALT
MANISTEE, MICHIGAN**

| Source | Sample | Date | Time | Air Flow Rate DSCFM ⁽²⁾ | Concentration Grains/DSCF ⁽³⁾ | Emission Rate Lbs/Hr ⁽⁴⁾ |
|---|----------------|----------|-------------|---------------------------------------|---|--|
| Pellet Production/ Pretzel Salt Baghouse | 1 | 10/28/14 | 09:00-10:54 | 30,175 | 0.0025 | 0.64 |
| | 2 | 10/28/14 | 12:09-13:48 | 29,989 | 0.0017 | 0.43 |
| | 3 | 10/28/14 | 14:28-16:13 | 30,167 | 0.0016 | 0.40 |
| | Average | | | 30,110 | 0.0019 | 0.49 |

- (1) Total Particulate = Front Half Filterable Particulate Plus Back Half Condensable Particulate
 (2) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
 (3) Grains/DSCF = Grains Of Particulate Per Dry Standard Cubic Foot Of Exhaust Gas
 (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 Pellet Production/Pretzel Salt Baghouse Particulate Emissions (Table 1)

Table 1 summarizes the particulate emission results for the Pellet Production/Pretzel Salt Baghouse as follows:

- Sample
- Date
- Time
- Air Flow Rate (DSCFM) – 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

III.2 Emission Limits

Permit No. 54-14 has established the following emission limits for this source:

- PM – 0.014 Grains/DSCF
- PM 10 – 3.96 Lbs/Hr
- PM 2.5 – 3.96 Lbs/Hr

IV. SOURCE DESCRIPTION

IV.1 Pellet Production – The pellet production area produces water softener pellets. The sources included in this process are; pellet briquetting machines, a vibratory screen, belt conveyors, bucket elevators and an enclosed crusher to recycle pellets. The particulate matter from this area is controlled by the baghouse known as the MAC dust collector. All the sampling was conducted during normal operation of this process. (See Appendix B).

IV.2 Pretzel Salt -- This process is a totally enclosed pretzel salt production system which includes a main crusher, a pellet press, an enclosed screw conveyor, a recycle crusher, a bucket elevator and a sizing screener. The particulate matter from this area is controlled by the baghouse known as the MAC dust collector. All the sampling was conducted during normal operation of this process (See Appendix B).

V. SAMPLING AND ANALYTICAL PROTOCOL

A schematic diagram of the sampling location can be found in Appendix F. The sampling location was as follows:

- Pellet Production/Pretzel Salt Baghouse -- On the 36 Inch I.D. exhaust stack with 2 sample ports in a location approximately 2 duct diameters downstream and 6 duct diameters upstream from the nearest disturbances. Twenty-four (24) sampling points were used for this source.

The sampling/traverse points were as follows:

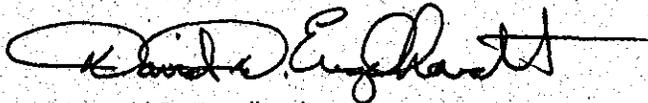
| <u>Sample Point</u> | <u>Dimension (Inches)</u> |
|---------------------|---------------------------|
| 1 | 1.00 |
| 2 | 2.41 |
| 3 | 4.25 |
| 4 | 6.37 |
| 5 | 9.00 |
| 6 | 12.82 |
| 7 | 23.18 |
| 8 | 27.00 |
| 9 | 29.63 |
| 10 | 31.75 |
| 11 | 33.59 |
| 12 | 35.00 |

V.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 ninety-six (96) minutes in duration and had minimum sample volumes of sixty (60) dry standard cubic feet. The samples were collected isokinetically and analyzed for Particulate by gravimetric analysis.

In addition to the standard front half analysis, the back half condensable particulate matter was determined in accordance with U.S. EPA Method 202 (Dry Impinger Technique). A sixty (60) minute nitrogen purge (as specified in Method 202) was conducted for the back half condensables immediately following each sample. The back half samples were extracted and analyzed for condensable 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 sampling train is shown in Figure 1.

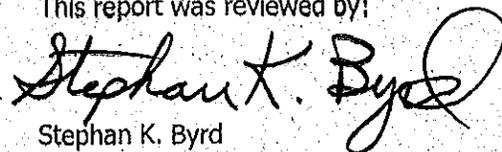
V.2 Exhaust Gas Parameters – The exhaust gas parameters (air flow rate, temperature, moisture and density) were determined in conjunction with the other sampling by employing U.S. EPA Methods 1 through 4. Air flow rates, temperatures and moistures were determined using the Method 17 sampling train. Bag samples were collected from the Method 17 sampling trains and analyzed for oxygen and carbon dioxide 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:



Stephan K. Byrd
President

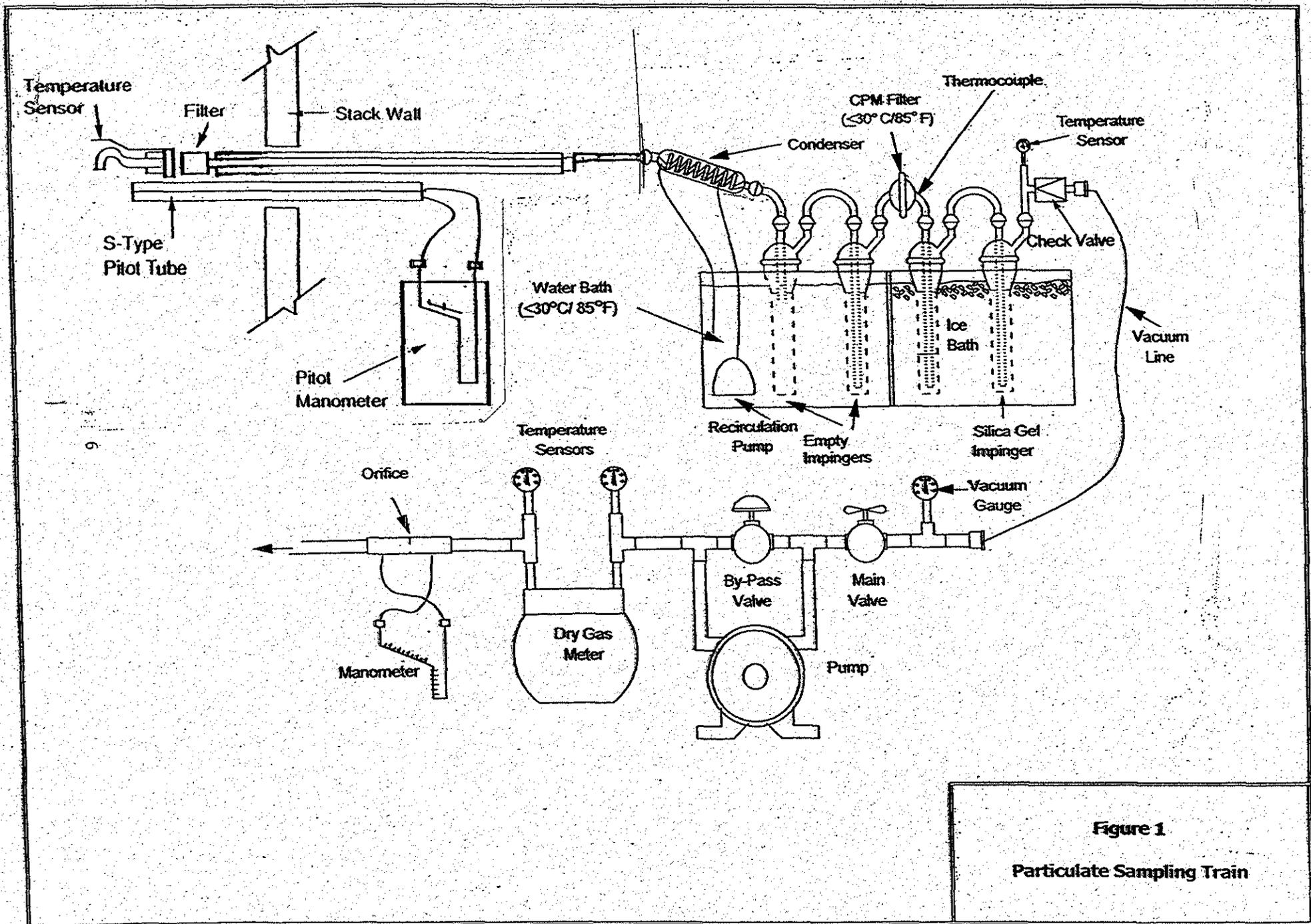


Figure 1
Particulate Sampling Train