Report of an...

Air Flow Study

performed for...

Viking Energy
McBain, Michigan

on the

Wood Fired Boiler

August 5, 2015

126.31

Network Environmental, Inc.
Grand Rapids, MI

DEQ

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 (RO) Permit 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 described in General Condition No. 22 in the RO Permit and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name: Viking Energy of McBain, Inc. County: Missaukee

Source Address: 6751 W. Gerwoude Drive; McBain, MI 49657 City: McBain

AQD Source ID (SRN): N1160 RO Permit No.: MI-ROP-N1160-2012 RO Permit Section No.:

Please check the appropriate box(es):

☐ **Annual Compliance Certification (General Condition No. 28 and No. 29 of the RO Permit)**

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 RO Permit, 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 RO Permit.

☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the RO Permit, 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 RO Permit, unless otherwise indicated and described on the enclosed deviation report(s).

☐ **Semi-Annual (or More Frequent) Report Certification (General Condition No. 23 of the RO Permit)**

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

☐ 1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the RO Permit 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 RO Permit 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 08/05/15 To 08/05/15

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

Air Flow Study (Wood Fired Boiler)

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.

Thomas V. Vine	Plant Manager	231-825-2772
Name of Responsible Official (print or type)	Title	Phone Number

Signature of Responsible Official — Date: 9/9/2015

* Photocopy this form as needed.

EQP 5736 (Rev 9/01)

I. INTRODUCTION

Network Environmental, Inc. was retained by Viking Energy of McBain, Michigan to perform an air flow study on their wood fired boiler. The purpose of the study was to document the air flow rate from the wood fired boiler under normal operating conditions.

The air flow sampling was performed on August 5, 2015. Stephan K. Byrd, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. conducted the sampling in accordance with the following reference test methods:

- Exhaust Gas Parameters – U.S. EPA Methods 1 through 4

Assisting with the study were Mr. Eric Smith of Viking Energy McBain and the operating staff of the facility.

II. PRESENTATION OF RESULTS

II.1 TABLE 1
AIR FLOW RESULTS
WOOD FIRED BOILER EXHAUST
VIKING ENERGY
McBAIN, MICHIGAN
AUGUST 5, 2015

Sample	Time	Air Flow Rates	
		SCFM (1)	DSCFM (2)
1	15:04-15:15	54,679	43,782
2	15:20-15:29	54,763	43,849
3	15:37-15:46	54,970	44,014
Average		**54,804**	**43,882**

(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)

III. SAMPLING AND ANALYTICAL PROTOCOL

III.1 Moisture – The moisture sample was collected in accordance with U.S. EPA Method 4. The sample was withdrawn from the stack and passed through a condensing coil with drop out before being passed through pre-weighed silica gel. The water collected was measured to the nearest 1 ml and the silica gel was re-weighed to the nearest 1 g. The moisture collected along with the sample volume was used to determine the percent moisture in the exhaust. The sample was twenty-five (25) minutes in duration and had a minimum sample volume of twenty-one (21) standard cubic feet. A diagram of the moisture sampling train is shown in Figure 1.

III.2 Air Flows – The air flow rates were determined by employing U.S. EPA Reference Methods 1 and 2. The sampling for the source was conducted on the 71 inch I.D. exhaust stack. A total of 12 traverse points were used for the air flow determinations. The sample point dimensions are shown in Appendix C.

Velocity pressures were determined using an S-Type pitot tube. Temperatures were measured using a Type K thermocouple. A diagram of the air flow sampling train is shown in Figure 2.

III.3 Gas Density – The gas density was determined by obtaining a bag sample from the exhaust of the moisture train and Orsat analysis.

This report was prepared by:

David D. Engelhardt
Vice President

This report was reviewed by:

Stephan K. Byrd
President

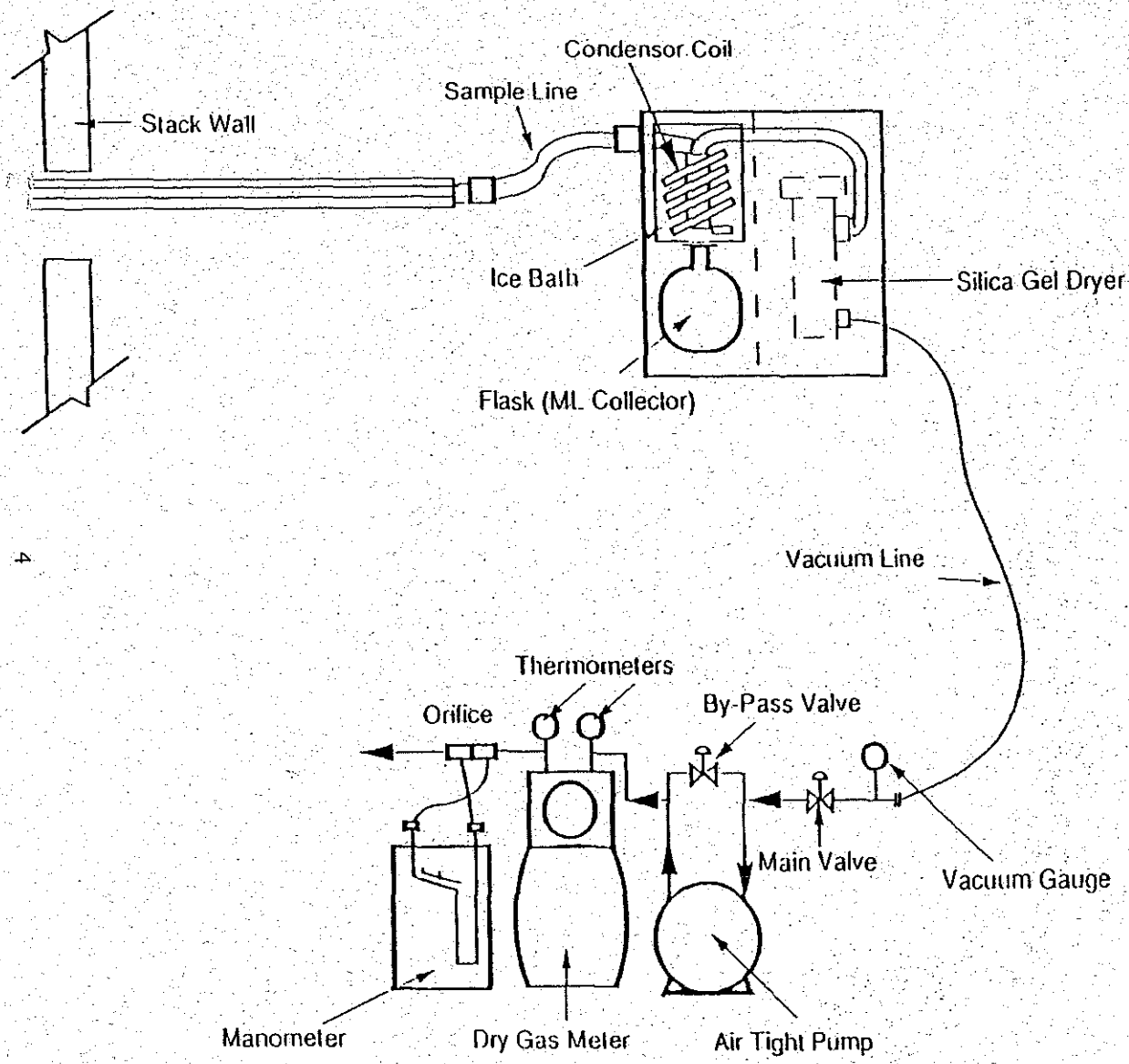

Figure 1

Moisture Sampling Train

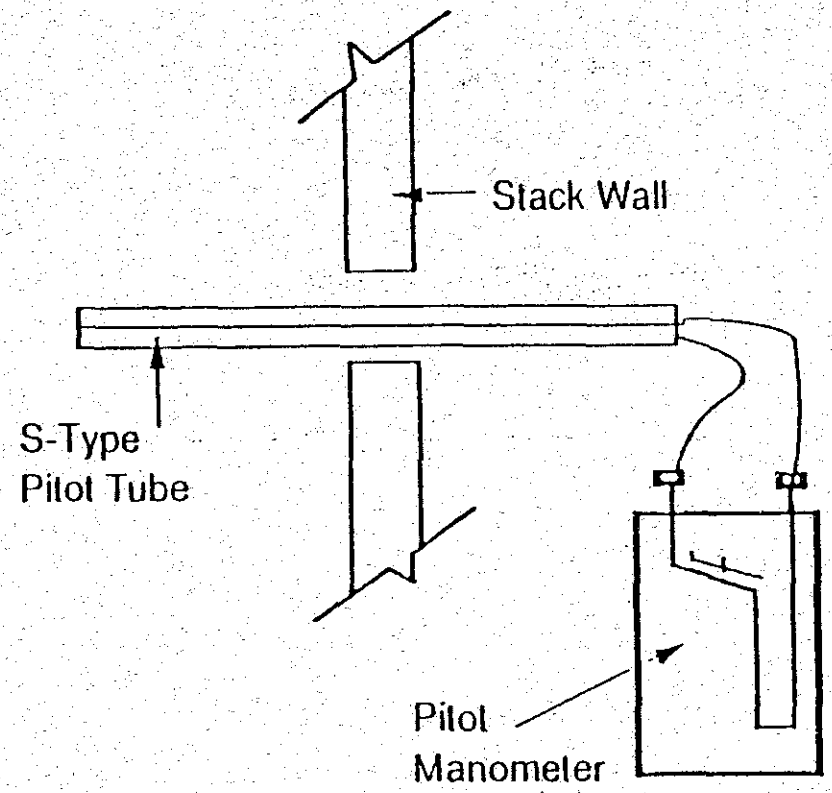

Figure 2

Air Flow Sampling Train