Report of an...

Air Flow Study

performed for...

Viking Energy
Lincoln, Michigan

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AUG 11 2017
AIR QUALITY DIVISION

on the

Wood Fired Boiler

July 25, 2017

126.34

Network Environmental, Inc.
Grand Rapids, MI

I. INTRODUCTION

Network Environmental, Inc. was retained by Viking Energy of Lincoln, 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 July 25, 2017. Stephan K. Byrd 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 was Mr. Paul Havercroft of Viking Energy Lincoln. Mr. Tom Gasloli of the Michigan Department of Environmental Quality (MDEQ) - Air Quality Division was present to observe the sampling and source operation.

II. PRESENTATION OF RESULTS

II.1 TABLE 1
AIR FLOW RESULTS
WOOD FIRED BOILER EXHAUST
VIKING ENERGY
LINCOLN, MICHIGAN
JULY 25, 2017

Sample	Time	Air Flow Rates	
		SCFM (1)	DSCFM (2)
1	16:08-16:18	56,438	45,139
2	16:32-16:42	58,387	46,698
3	17:10-17:20	57,963	46,359
Average		**57,596**	**46,065**

(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)

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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 The sample was withdrawn from the stack and passed through a condensing coil with drop out before being passed through pre-weighed silica gel.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 0.5 g. The moisture collected along with the sample volume was used to determine the percent moisture in the exhaust. The sample was thirty (30) 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 using data that was collected during the annual relative accuracy test audit (RATA).

This report was prepared by:

David D. Engelhardt
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This report was reviewed by:

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President

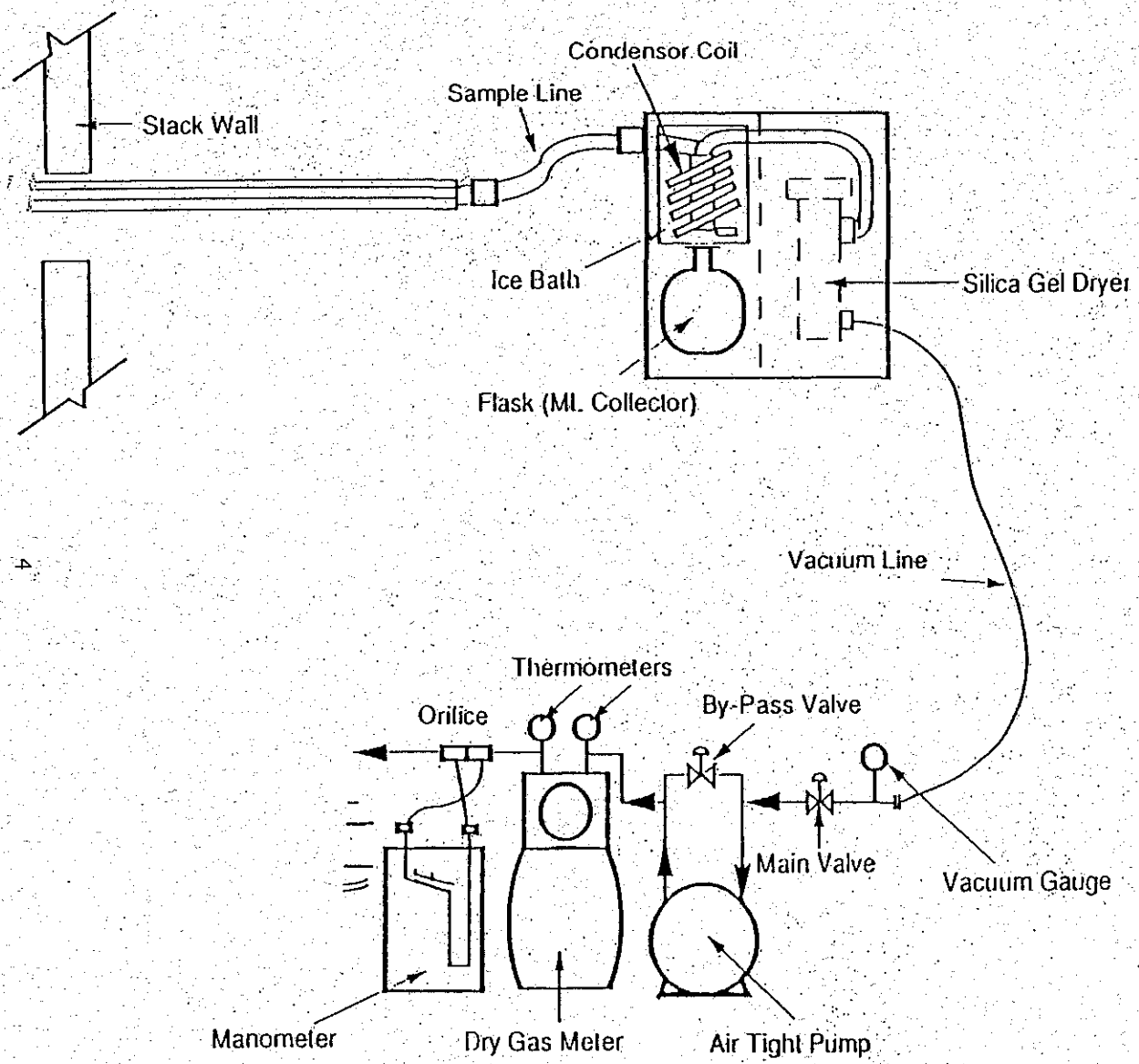

Figure 1

Moisture Sampling Train

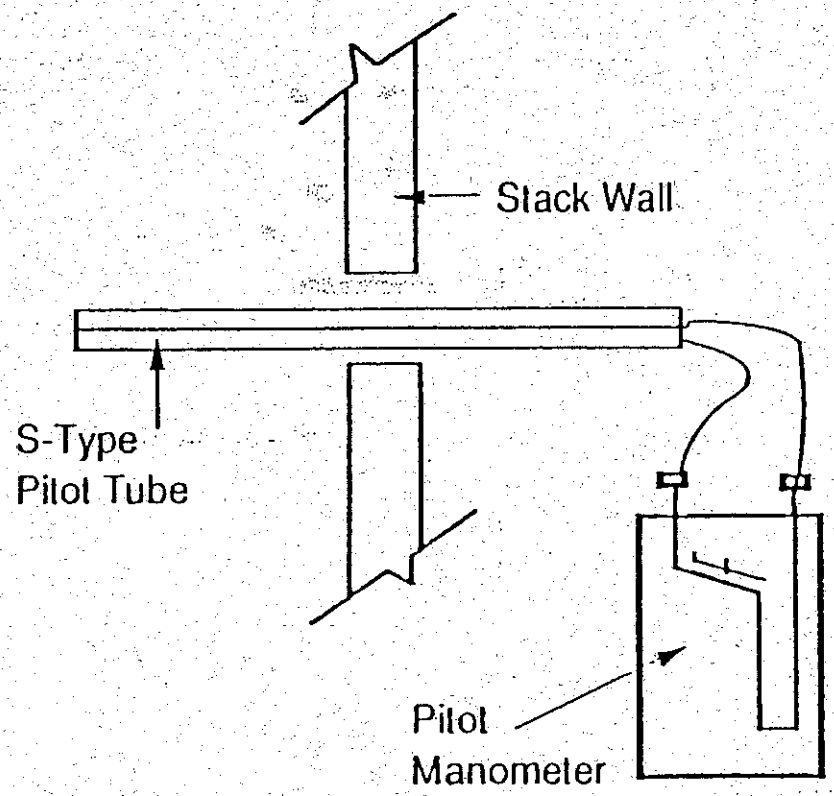

Figure 2

Air Flow Sampling Train