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**Source Testing for Vidir
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Final Report

August 18, 2005

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**Source Testing for Vidir Gasifier Air
Emissions with Straw Feed Stock and Cyclone**

05-4357-2000

Chris Kozak - Project Manager

Submitted by
Dillon Consulting Limited

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1 BACKGROUND

Dillon Consulting Limited (Dillon) was retained by Vidir BioMass Inc.(Vidir) to conduct source testing on the Vidir Gasifier using straw feed stock. The source testing program was designed to quantify the total suspended particulate matter (PM). These measured emission rates were conducted with the Gasifier operating at the maximum system design production rate of approximately 500 pounds (227 kg) of straw per hour.

1.1 Disclaimer

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2 EMISSION SOURCE

In April 2005, Dillon performed source testing on the Vidir Gasifier exhaust stack to quantify particulate matter. Gasification is a two-step, endothermic (heat absorbing) process in which a solid fuel (i.e., biomass) is thermochemically converted into a low or medium Btu gas. In the first reaction, pyrolysis, the volatile components of the fuel are vaporized at temperatures below 600°C by a set of complex reactions. Char (fixed carbon) and ash are the pyrolysis by-products which are not vaporized. In the second step, the char is gasified through reactions with oxygen, steam, and hydrogen. Some unburned char is combusted to release the heat needed for the endothermic gasification reactions. The Vidir Gasifier as tested was equipped with a heat exchanger which reduced the exhaust gas outlet temperatures to approximately 300°F.

Because of existing equipment and building configurations, a single sample port was located on a vertical run of process piping between the heat exchanger and the exhaust blower inside of the process building. The single three-inch diameter sample port was ideally located (8 and 2 diameter criteria) on the 12-inch diameter process line.

Table 4.1: Particulate Matter Emissions from Vidir Gasifier Exhaust Stack

Location	Date (m/d/y)	Sample Time	Sample Volume (m ³) _{ref}	Exhaust Gas Temp. (°C)	Exhaust Gas Moisture (%)	Exhaust Stack Diameter (m)	Vent Gas Velocity (m/s)	Exhaust Gas Flow Rate (m ³ /s) _{ref}	Concentration (mg/m ³)	Emission Rate (g/s)
Vidir Gasifier Exhaust Stack	04/19/05	1303-1333	0.510	119	12.0	0.30	6.1	0.30	240.15	0.071
	04/19/05	1425-1455	0.531	120	10.2	0.30	6.3	0.30	243.86	0.076
	Average			120	11.1	0.30	6.2	0.30	242.01	0.074

Notes:

Reference Conditions = 298 K (25 °C) and 101.325 kPa

PM = Particulate Matter

Feed Rate = 227 kg (500 lbs) of straw per hour.

5 DISCUSSION OF RESULTS

The results of particulate matter emissions testing performed on the Vidir Gasifier exhaust stack indicate that the particulate matter concentrations in this stream range between 240 mg/m³ and 244mg/m³. The corresponding average emission rate is 0.074 g/s.

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Respectfully,
Dillon Consulting Limited


Chris Knight
Regional Manager

6 CLOSURE

This report was prepared exclusively for the purposes, project, and site location outlined in the report. The report is based on information provided to, or obtained by Dillon as indicated in the report, and applies solely to site conditions existing at the time of the site investigation. Although a reasonable investigation was conducted by Dillon, Dillon's investigation was by no means exhaustive and cannot be construed as a certification of the absence of any contaminants from the site. Rather, Dillon's report represents a reasonable review of available information within an agreed work scope, schedule, and budget. It is, therefore, possible that currently unrecognized contamination or potentially hazardous materials may exist at the site, and that the levels of contamination or hazardous materials may vary across the site. Further review and updating of the report may be required as local and site conditions, and the regulatory and planning frameworks, change over time.

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APPENDIX
STACK DATA SUMMARY SHEETS

Respectfully submitted,
Dillon Consulting Limited



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