

**Source Emissions Test Report  
Leed Fabrication**

**Combustor**

**Milliken, Colorado**

Test Dates:  
October 27- 28, 2011

Report prepared for:  
Leed Fabrication  
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## Certification

### Team Leader Certification:

I certify that all of the sampling and analytical procedures and data presented in this report are authentic and accurate.

A handwritten signature in black ink that reads "Dane C. Murray".

Dane Murray  
Field Team Leader

### Reviewer Certification:

I certify that all of the testing details and conclusions are accurate and valid.

A handwritten signature in black ink that reads "M. Willinger".

Marty Willinger  
Technical Writer



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## 1. Introduction

Air Pollution Testing, Inc. (APT) was contracted by Leed Fabrication (LDF) to conduct source emissions testing services at a facility near Milliken, CO.

The purpose of the testing program was to determine the concentrations and mass emission rates of non-methane/non-ethane organic compounds (NMEOC) from the exhaust stack of one (1) enclosed flare in service at the facility. Data collected was used to determine the unit's NMEOC destruction removal efficiency (DRE). Concurrent gas velocity and concentration measurements of moisture (H<sub>2</sub>O), oxygen (O<sub>2</sub>), carbon monoxide (CO) and carbon dioxide (CO<sub>2</sub>) were conducted at the exhaust sampling location for the determination of mass emission rates.

The emissions testing program contact personnel are shown in Table 1.1 below.

<b>Leed Fabrication : Incinerator DRE Testing Emissions Testing Program Contact Personnel</b>		
<i>Name, Title</i>	<i>Company, Affiliation Address</i>	<i>Phone, FAX</i>
Mr. Jim Chick, Senior Engineer	Leed Fabrication Services, Inc. 12535 Weld County Road #2 Brighton, Colorado 80601	303-659-6801 ext. 152, 303-558-8909
Mr. Dave Maiers, Operations Director	Air Pollution Testing, Inc. 5530 Marshall Street Arvada, Colorado 80002	303-420-5949 ext. 33, 303-420-5920

**Table 1.1: Emissions Testing Program Contact Personnel**

## 2. Methods

APT tested in accordance with the following United States Environmental Protection Agency (EPA) source emissions test methods (referenced in 40 CFR Part 60, Appendix A).

- *Method 1 – Sample and Velocity Traverses for Stationary Sources*
- *Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate*
- *Method 3A – Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)*
- *Method 4 – Determination of Moisture Content of Stack Gases*
- *Method 10 – Determination of Carbon Monoxide Emissions from Stationary Sources*

- *Method 18 – Measurement of Gaseous Organic Compound Emissions by Gas Chromatography*
- *Method 25A – Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer*

### 3. Test Program Summary

APT provided all necessary equipment and labor for the determination of all emission parameters detailed in Table 3.1. All gaseous emission parameters were determined using on-site gas analyzers housed in a mobile, analytical trailer to provide a temperature controlled environment for stable accurate analyzer response.

Triplicate, 60-minute test runs were conducted at the unit exhaust stack for the determination of O<sub>2</sub>, CO<sub>2</sub>, NO<sub>x</sub>, CO and NMOC (non-methane organic compounds) concentrations, as well as volumetric flow. Concurrent with emissions sampling, integrated samples of outlet gas were collected in clean, leak-free Tedlar bags which were analyzed for speciated hydro-carbon content. NMEOC DRE was determined using a carbon balance on exhaust pollutant mass emission rates.

Leed Fabrication : Incinerator DRE Testing Sampling and Analytical Methods			
<i>Gas Parameter</i>	<i>Sampling Method</i>	<i>Analytical Method</i>	<i>Laboratory</i>
gas flow	Methods 1, 2	draft gauge, thermocouple, pitot tube	APT, on-site
O <sub>2</sub> , CO <sub>2</sub>	Method 3A	paramagnetic and non-dispersive infrared analyzers	
H <sub>2</sub> O	Method 4	gravimetric	
CO	Method 10	gas filter correlation, infrared analyzer	
NMOC	Method 25A	flame ionization detector	
C <sub>2</sub> H <sub>6</sub>	Method 18	gas chromatography	APT, off-site

**Table 3.1 Emissions Sampling Methods**

### 4. Test Results Summary

The results of the testing are summarized in Tables 4.1 and 4.2. Any emission parameters not found in the tables may be found in *Appendix 1 – Testing Parameters / Sample Calculations*. The following terms are used in the tables:

- %vd – diluent concentration, dry volume percent
- %vw – moisture content, wet volume percent

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- dscfm – stack gas flow rate, dry standard (one atmosphere, 68°F) cubic feet per minute
- lb/hr – pollutant mass emission rate, pounds per hour
- ppmvd – parts per million, dry basis
- NMOC – non-methane organic compounds
- NMEOC – non-methane / non-ethane organic compounds
- % DRE – destruction removal efficiency
- C<sub>3</sub>H<sub>8</sub> – propane

<b>Leed Fabrication : Combustor DRE Testing Test Results Summary – 10/27/2010</b>				
	<u><b>Run #1</b></u>	<u><b>Run #2</b></u>	<u><b>Run #3</b></u>	<b>Average</b>
Start Time	11:35	13:43	14:58	
Stop Time	12:35	14:43	15:58	
Stack Temp (°F)	82	89	84	<b>85</b>
Stack Exhaust Flow (dscfm)	1,880	1,779	1,063	<b>1,574</b>
O <sub>2</sub> (%vd)	19.9	20.2	19.5	<b>19.9</b>
CO <sub>2</sub> (%vd)	0.8	0.5	1.0	<b>0.8</b>
H <sub>2</sub> O (%vw)	1.4	1.5	1.4	<b>1.4</b>
CO (ppmvd)	14.5	8.2	14.2	<b>12.3</b>
NMOC (ppmvd as C <sub>3</sub> H <sub>8</sub> )	22.1	24.3	19.2	<b>21.9</b>
NMEOC (ppmvd as C <sub>3</sub> H <sub>8</sub> )	12.7	21.3	17.3	<b>17.1</b>
<u><b>Exhaust Emission Data</b></u>				
CO (lb/hr)	0.1	0.1	0.1	<b>0.1</b>
NMOC (lb/hr as C <sub>3</sub> H <sub>8</sub> )	0.3	0.3	0.1	<b>0.2</b>
NMEOC (lb/hr as C <sub>3</sub> H <sub>8</sub> )	0.2	0.3	0.1	<b>0.2</b>
% DRE (NMOC carbon balance)	99.1	98.7	99.4	<b>99.1</b>
% DRE (NMEOC carbon balance)	99.5	98.8	99.5	<b>99.3</b>

**Table 4.1: Test Results Summary**