

# Lambton Facility Update

Thursday, November 17, 2011

The Clean Harbors Lambton high temperature incinerator provides a secure, environmentally-safe destruction option for hazardous liquid wastes, which cannot be further recycled due to their chemical composition.

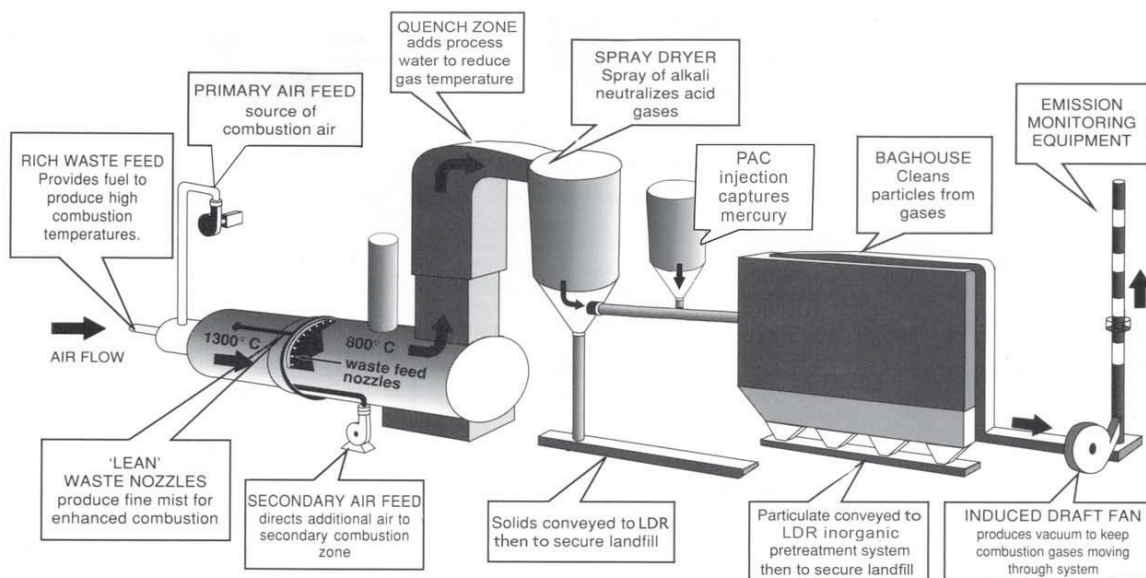
## What we burn

We destroy many types of liquid hazardous wastes created as a byproduct of industrial manufacturing. Some examples are acids and caustics, metal finishing wastes, chemical fertilizer wastes, phosphates, oily water, waste oils, organic solvents, plastic resins, amines, glycols, phenols, pigments, paints, printing inks, adhesives, pesticides, herbicides, detergents, cleaners and soap, pharmaceutical and cosmetics byproducts.

We understand that both government agencies and the public expect our environmental performance to be the best and we are committed to meeting this expectation.

## How it works

Blended feeds of “rich” materials (high heat value) and “lean” wastes (low heat value, mostly water) are injected into the incinerator’s primary and secondary zones through a series of spray nozzles.



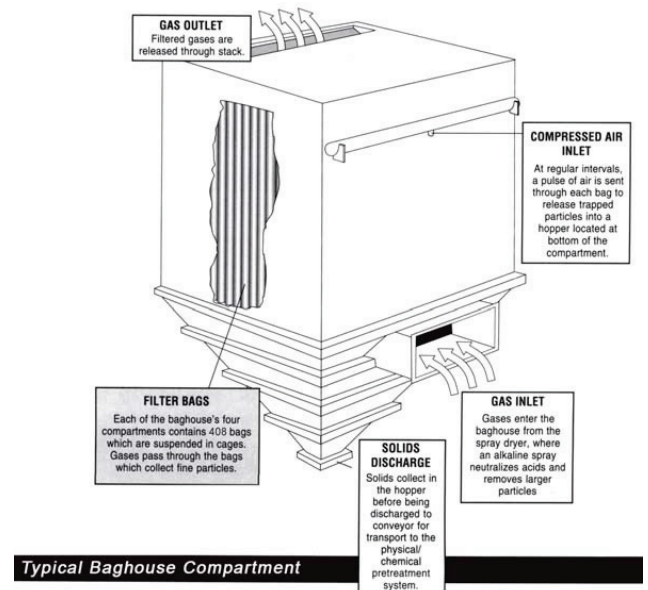
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In the primary zone, operating at temperatures above 1,300 °C with a residence time of at least two seconds, organic compounds in the waste are destroyed instantaneously with a destruction efficiency of 99.99%. The incineration process breaks the waste down into water, carbon dioxide, nitrogen and trace compounds.

In the incinerator's spray dryer, a fine mist of water and lime is introduced to neutralize acid gases and cool down the flue gas. Powdered activated carbon (PAC) is then used to trap tiny particles in the gas to capture mercury, dioxins and furans. Introduced in 2003, the PAC system effectively reduced emissions of these substances by over 80 per cent.

Before exiting the stack, the flue gas passes through the baghouse which operates like a vacuum cleaner trapping residual particles (ash). The baghouse removes particulate from the flue gas before the gas enters the stack. Four modular units, each containing 408 bags, capture the tiny ash particles on the outside of the fabric bags allowing the filtered gas to pass through and enter the base of the stack. Baghouse cleaning is performed using a pulse-jet cleaning system to inject a short burst of dry air into the top of each bag in a row by row sequence. Enclosed rotary valves and conveyors transfer the particulate collected in the baghouse



into intermediate conveyors where the particulate is collected in bags for disposal in the on-site landfill. Emissions from the baghouse are monitored using an opacity meter. The meter is sensitive enough to detect even a few bad bags. While particulate levels and opacity are not directly linkable, it is known that low particulate levels result from a well functioning baghouse, thereby confirming the good working order of the baghouse. This incinerator ash is disposed of in our secure, chemical landfill onsite.

## How we monitor stack emissions

The incinerator's continuous emission monitoring (CEM) system was among the first in North America to meet tough new certification standards set by Environment Canada and the Ontario Ministry of the Environment (MOE).

The CEM system continuously monitors stack gases for carbon monoxide, oxygen, sulphur dioxide and total hydrocarbon content. The Lambton Facility is required under its Certificate of Approval to meet strict compliance standards for each constituent measured. The analyzer technology provides instantaneous results to



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our trained operators providing the process information they need to ensure continuous compliance with emissions standards. The CEM data also allows operators to ensure maximum destruction efficiency is maintained in the system at all times.

The CEM equipment is contained within its own temperature controlled building at the base of the 68-metre stack. An opacity monitor also housed in the building, measures how effectively the incinerator's baghouse has removed fine particles from the stack exhaust gas. The incinerator stack emissions are at least 80 percent below the allowable standards. The company continually to strive for further reductions wherever possible and we are committed to a process of continuous improvement to ensure our facility is among the very best in North America.”

## Valuable information

Data collected with the CEM system is provided to the MOE routinely. Each of the CEM constituents measured provides valuable information about the effectiveness of various components that make up the incineration system. For example, measuring the in-system gases provides an early indication of the effectiveness of the spray dryer, which neutralizes acid gases.

Oxygen, carbon monoxide and hydrocarbon levels tell process operators a lot about the combustion process. Knowing these levels quickly and accurately allows staff to make minor adjustments that can maximize incineration efficiency, which in turn ensures the cleanest emissions possible.

## What is emitted from the stack?

Emissions from the incinerator stack typically consist of: oxygen (11%), carbon dioxide (7%), nitrogen (81.9%) and trace contaminants (0.1%). Emissions of greenhouse gases (CO, CO<sub>2</sub>, NO<sub>x</sub>) are very low when compared to other local industrial sources.

Annual stack emissions testing program is conducted under scrutiny by the MOE. Results demonstrate emissions of trace contaminants are well below applicable emissions limits set by government. These standards incorporate significant margins of safety designed to protect human health and the environment. In nearly all cases, concentrations of these chemicals are only a fraction (less than 1%) of the allowable limit.

The stack test is designed to represent worst case conditions where we are burning feeds that have been spiked with hard-to-burn chemicals. The stack confirms that incinerator stack emissions are meeting the air standards under the most difficult self-imposed conditions.



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## Annual stack test shows efficiency of incineration process

Conducting an annual stack test is a requirement under the incinerator's certificate of approval (C of A). The purpose of the testing is threefold:

1. Confirm the Facility's compliance with its C of A;
2. Determine stack gas concentrations of listed compounds, the corresponding ground level point of impingement concentrations, and then comparing these concentrations to relevant air standards.;
3. Determine the destruction and removal efficiency of some of the most difficult-to-burn organic hazardous constituents.

The annual program begins with the selection of an emissions sampling contractor. The selection is based on the contractor's experience with similar, large sampling programs, their performance record, and the availability of trained staff and equipment necessary to complete the test program successfully. The time frame for sampling is selected based on availability of contractor, expected weather conditions, the availability of MOE staff to monitor the test, and plant operations (i.e. planned shutdowns, etc).

Prior to the sampling program, a pre-test plan is prepared and submitted to the MOE for approval. This plan outlines methods to be used for both sampling and analysis. Upon approval of the pre-test plan, the glassware to be used in the program is prepared and proofed. Typically, due to its complexity, the sampling program takes nearly a week to complete.

Before starting the tests, the blend feed tanks are spiked with difficult-to-burn chemicals to create a "worst case" scenario. This provides the opportunity to evaluate the incinerator's destruction efficiency under the toughest conditions.

After the sampling is complete each day, the contractor completes chain of custody forms and splits feed samples. Samples are delivered to the laboratories identified in the pre-test plan and analysis is completed.

The results are reviewed by the contractor and both the analytical results and calculated point of impingement (POI) results are provided in the stack test report.

This update and the incineration reports executive summaries for 2007 through 2010 can also be found on Clean Harbors Lambton Facility website at [www.cleanharbors.com/locations/lambton](http://www.cleanharbors.com/locations/lambton).

