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**Realistic Emissions for Setting Stands for  
Municipal, Medical and Hazardous Waste Combustion Systems**

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**ABSTRACT**

Stack emissions measurements, resulting from burning actual wastes in commercial combustors with appropriate emissions control technology under usual operating conditions show significant reductions in particulate matter, acid gas, trace organic, and metal concentrations in exhaust gases from contemporary waste combustion systems. Current estimates of this industry's contribution to the national dioxin burden, for instance, indicate that it is far less than 1 percent of that from known U.S. dioxin. However, the levels set in permits are much higher, high enough to allow for the variability of the waste and of the emissions control device performance, in order to avoid exceedances during periodic compliance tests which can occur due to statistical chance. Estimates of environmental impact and health risk which have been based on trial-burn data and permit levels are thus substantially higher than those which would result based on actual average emissions during normal operation.. This paper focuses on dioxin/furan emissions from municipal, medical and hazardous waste combustion, showing their relationship to CO emissions, the emission control technology and operating temperature, as well as the variability of emissions over long term operation of toxic equivalent dioxins, PM and heavy metals.

**INTRODUCTION**

Emissions from combustion of municipal, medical and hazardous wastes are regulated under the Clean Air Act of 1990 (CAA) and the Resource Conservation and Recovery Act (RCRA). Many states have developed their own limitations, generally more stringent than the federal regulations prior to 1995, during permitting. As a result, new waste combustion systems have been developed to meet high standards. Older systems have often been retrofit or shut down.

The 1990 amendments to the CAA require federal regulation of emissions of particulate matter (PM), SO<sub>2</sub>, HCl, opacity, NO<sub>x</sub>, lead, cadmium and mercury to be equivalent to Maximum Achievable Control Technology (MACT). At MACT, the emissions levels achieved by the best performing 12 percent of operating units are to be equaled by all other installations. The EPA has estimated that overall reductions in emissions of 98 percent will be achieved based on these new standards and guidelines, compared to those of old plants required to meet only the old 0.08 gr/dsft<sup>3</sup> @ 12% CO<sub>2</sub> emissions standard, and lacking acid gas controls.

A great reduction in stack emissions from these various types of waste combustors had already taken place before the MACT standards become effective. A recent paper indicates that actual dioxin emissions from municipal waste combustors (MWCs) are 12 percent of EPA's most recent estimate; hazardous waste incinerators (HWIs) are 19 percent; cement kilns (CKs) are 8 percent (only 2 percent, with newer information); and medical waste incinerators (MWIs) are 46 percent<sup>1</sup>. In all, dioxin emissions from these sources, based on