Mercury and Dioxin Control for Municipal Waste Combustors

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ABSTRACT

The control of mercury and dioxins from waste-to-energy plants has been of prime concern for facilities around the world. In the U.S., waste-to-energy plants are called Municipal Waste Combustors (MWCs). Control technologies that were developed in Germany in the 1990's became very elaborate and often uses up to five control stages. In the U.S., simpler systems were developed based on the German experience that incorporated good control technologies on a cost-effective basis.

Today in Germany, it is common to find disposal fees at MWCs in the range of $150 to $350/ton. This is due to the high cost of air pollution control systems and the lack of competition from landfills. In the U.S., there are many landfills available with disposal fees less than $32/ton that compete with MWCs for waste. Therefore, U.S. MWCs had to implement control technologies that meet world recognized standards for dioxin and mercury emissions at cost competitive bases as well as considering local economics when selecting control technologies.

The use of carbon-based technologies is effective in controlling emissions. In addition, a new technology sodium tetra sulfide, is being considered to reduce mercury emissions. This paper discusses the current technologies being used at MWCs in the U.S.

INTRODUCTION

The November 1990 Clear Air Act Amendments directed the U.S. EPA to establish MWC emission limits for particulate matter (PM), hydrogen chloride (HCl), sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), PCDDs/PCDFs, cadmium (Cd), mercury (Hg), and lead (Pb). These emission limits were to be based on the application of maximum achievable control technology (MACT). Revised MWC air pollution regulations were subsequently proposed by EPA on September 20, 1994. EPA proposed New Source Performance Standards (NSPS) for new MWCs and Emission Guidelines (EG) for existing MWCs. NSPS and EGs for MWCs larger than 225 Mg/day in capacity were promulgated in February 1991. Tables 1, 2, and 3 present a summary of these emission standards. Table 4 is a summary of U.S. emission standards converted to the metric system which is more commonly used in the rest of the world. Tables 5a and 5b are summaries of emission standards from European countries for comparison.