

MEASUREMENT OF COMBUSTION PRODUCTS FROM LIQUID PCB WASTE INCINERATOR

M. Tsuji, T. Nakano, and T. Okuno

The Environmental Science Institute of Hyogo Prefecture

3-1-27 Yukihiro-cho, Suma-ku, Kobe, JAPAN 654

ABSTRACT

Liquid polychlorinated biphenyls(PCB) waste was burned at 1400°C for 2 seconds, and activated carbon for post gas treatment system were analyzed for determining combustion products. The main products were chlorophenols(CP) and trace amount of polychlorinated dioxins(PCDD) and polychlorinated dibenzofurans(PCDF) were detected.

INTRODUCTION

The use of PCB was prohibited in 1972 in Japan and PCB were withdrawn from the users. The amount of these PCB was more than 5000 tons and those have been kept in storage tanks. Incineration has been recognized as a effective treatment process for the hazardous waste (1,2). The trial burning tests of PCB waste were carried out in 1985 for the continuous incinerating of PCB waste. In a series of these test, liquid PCB of 38 tons was burned.

INCINERATION PROCESSES

Figure 1 shows flow diagram of the PCB waste incinerator. The incinerator is capable of burning liquid PCB waste 210 kg per hour. The combustion chamber temperature and retention times are 1400°C and 2 seconds, respectively.

Ensuring the proper performance of incinerator operation, O<sub>2</sub>, CO, CO<sub>2</sub>, and temperature were measured automatically(3). The combustion gasses passed through the post gas treatment systems, the water scrubber for temperature drop and eliminating HCl, and the activated carbon beds for eliminating trace of hazardous products. The used water also passed through activated carbon beds was stored in a tank for checking PCB, PCDD, and PCDF. If analytical results of water in checking tank were not achieved the emission permit limitation, the water was returned back to the storage tank and passed through the activated carbon beds again. After neutralization, waste water was discharged to the inland sea.

During the test period, PCB, PCDD, and PCDF were monitored at the site of emission stack and waste water exit. PCB emission permit limitation (<0.01mg/Nm<sup>3</sup> in air, <0.05 µg/L in water) were achieved, and levels of PCDD and PCDF were under detection limits(<0.1ng/Nm<sup>3</sup> in air, <0.003ng/L in water).

A decomposition and removal efficiency of PCB in the incinerator was more than 99.99999 percent calculated from the amount of PCB introduced into the incinerator and PCB concentration at sampling site A in Figure 1 (4). The undecomposed intermediate such as PCDD were accumulated on the activated carbon beds. After the test burning, activated carbon was analyzed for determining the contents of PCB, PCDD, and PCDF.