

APPLICATION LETTER

PCB Exposure from Oil Combustion

Wayne County Firefighters Association

Submitted to:

Mr. Philip Landowe
President, Wayne County Firefighters Association
Wandell, IN 45602

Submitted by:

Analytical Laboratories, Incorporated
1220 Pfeiffer Parkway
Indianapolis, IN 46223
February 28, 2006

INTRODUCTION

Waste oil used to train firefighters was suspected by the Wayne County Firefighters Association of containing polychlorinated biphenyls (PCBs). According to information provided by Mr. Philip Landowe, President of the Association, it has been standard practice in training firefighters to burn 20–100 gallons of oil in a diked area of approximately 25–50 m³. Firefighters would then extinguish the fire at close range. Exposure would last several minutes, and the exercise would be repeated two or three times each day for one week.

Oil samples were collected from three holding tanks near the training area in Englewood Park on November 14, 2005. To determine potential firefighter exposure to PCBs, bulk oil analyses were conducted on each of the samples. In addition, the oil was heated and burned to determine the degree to which PCB is volatilized from the oil, thus increasing the potential for firefighter exposure via inhalation.

TESTING PROCEDURES

Bulk oil samples were diluted with hexane, put through a cleanup step, and analyzed in electron-capture gas chromatography. The oil from the underground tank that contained PCBs was then exposed to temperatures of 1008°C without ignition and 2008°C with ignition. Air was passed over the enclosed sample during heating, and volatilized PCB was trapped in an absorbing medium. The absorbing medium was then extracted and analyzed for PCB released from the sample.

RESULTS

Bulk oil analyses are presented in Table 1. Only the sample from the underground tank contained detectable amounts of PCB. Aroclor 1260, containing 60 percent chlorine, was found to be present in this sample at 18 mg. Concentrations of 50 mg PCB in oil are considered hazardous. Stringent storage and disposal techniques are required for oil with PCB concentrations at these levels.

TABLE 1. Bulk Oil Analyses

<i>Source</i>	<i>Sample #</i>	<i>PCB Content (mg/g)</i>
Underground tank (11' deep)	6062	18*
Circle tank (3' deep)	6063a 6063b	<1 <1
Square pool (3' deep)	6064a 6064b	<1 <1

*Aroclor 1260 is the PCB type. This sample was taken for volatilization study.

DISCUSSION AND CONCLUSIONS

At a concentration of 18 mg/g, 100 gallons of oil would contain approximately 5.5 g of PCB. Of the 5.5 g of PCB, about 0.3 g would be released to the atmosphere under the worst conditions.

The American Conference of Governmental Industrial Hygienists has established a threshold limit value (TLV)* of 0.5 mg/m³ air for a PCB containing 54 percent C1 as a time-weighted average over an 8-hour work shift and has stipulated that exposure over a 15-minute period should not exceed 1 mg/m³. The 0.3 g of released PCB would have to be diluted to 600 m³ air to result in a concentration of 0.5 mg/m³ or less. Because the combustion of oil lasted several minutes, a dilution to more than 600 m³ is likely; thus, exposure would be less than 0.5 mg/m³.

In summary, because exposure to this oil was limited and because PCB concentrations in the oil were low, it is unlikely that exposure from inhalation would be sufficient to cause adverse health effects. However, we cannot rule out the possibility that excessive exposure may have occurred under certain circumstances, based on factors such as excessive skin contact and the possibility that oil with a higher-level PCB concentration could have been used earlier. The practice of using this oil should be terminated.

*The safe average concentration that most individuals can be exposed to in an 8-hour day.