INFORMATION SHEET

Tributary No. 3, Brockport, NY
Blood Serum PCB Sampling Program

June 2002

Prepared by

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Center for Environmental Health
Flanigan Square
547 River Street
Troy, New York 12180-2216
Background

The former 3M/Dynacolor and the former GE/Black & Decker inactive hazardous waste disposal sites are located on adjacent properties on State Street in the Village of Brockport, Monroe County. Both facilities are drained by a storm sewer system that flows to the north under the Erie Barge Canal. The storm sewer discharges into Tributary No. 3 which then discharges into Brockport Creek. Tributary No. 3 flows through a residential neighborhood north of the canal. During the summer and early fall of 2000, the New York State Department of Environmental Conservation collected samples of stream and storm sewer sediment as well as surface and subsurface soils adjacent to the creek. Many of the tributary sediment and flood plain soil samples were found to contain elevated levels of polychlorinated biphenyls (PCBs). In October and November 2001 and March 2002, GE conducted extensive soil and sediment sampling along Tributary No. 3 to define the extent of the PCB contamination. In October 2001, the New York State Department of Health offered free blood serum PCB testing to current and former residents of the eight homes adjacent to Segments #1 and 2 of Tributary No. 3 in Brockport. It is reasonable to believe that residents of these homes would have had a greater likelihood of repeated exposure to the tributary PCBs.

Why We Measure PCBs in Serum

PCBs are a large group of very stable man-made chemicals that dissolve in fat. Since many of these specific chemicals (PCB congeners) are not readily broken down or excreted, they tend to accumulate in body fat. Since blood serum contains fat such as cholesterol and triglycerides, blood serum PCB levels are a good indicator of overall exposure to PCBs. Researchers have found that several factors can affect the amount of PCBs found in a person’s blood serum. These factors include age, occupation, and sport-caught freshwater fish consumption. For example, older people tend to have higher serum PCB levels than younger people.

Blood Serum PCB Results in Brockport Residents

Blood serum samples were collected from 19 adult residents and fewer than six residents under 18 years of age. All of the people who gave a blood sample were asked questions about length of residence, contact with contaminated sediment, and exposure to the tributary as well as other possible PCB exposures such as employment and fish consumption. Table 1 shows the average level and range of levels for the 19 adults tested. We are unable to show the average level and range of levels for participants under age 18 to protect confidentiality. The average for this small group of younger participants is within the range of average PCB levels of 1-2 parts per billion reported for children from studies of the general population (see Conclusion section).

<table>
<thead>
<tr>
<th>Table 1: Blood Serum PCB levels in parts per billion (ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of people</strong></td>
</tr>
<tr>
<td>Adults</td>
</tr>
</tbody>
</table>

The total PCB levels reported in Table 1 are adjusted for laboratory recovery. Due to expected variations in the analyses, the amount of PCB recovered from the group of samples varies from
sample to sample. To account for this variation among samples, an adjusted PCB level was calculated for each sample. This is an estimate of the maximum amount of PCBs that could have been recovered from the samples, had the lab extraction techniques been 100% efficient. In general, this adjustment resulted in blood PCB values that were higher than the unadjusted values.

As age of participant increases, serum PCB levels tend to increase. Figure 1 shows a line drawn through the 19 individual points that indicate the PCB level for each person according to their age. This regression line is the best fitting line through the scattered 19 points, which are not shown to protect confidentiality. The figure shows that blood PCB levels increased sharply with age.

Because age has such a strong relationship with serum PCB levels (see Figure 1), a statistical method was used to help account for the effect of age when making comparisons of PCB levels by other factors such as gender and length of residence. This method was used in the remaining comparisons.

Men and women show similar serum PCB levels (see Figure 2). Very few participants reported eating sport-caught freshwater fish 10 or more times in their lifetime. Therefore, a comparison between fish consumers and non-consumers was not possible. Fewer than six participants reported jobs with potential PCB exposure. These participants had blood serum PCB levels similar to those with no reported occupational PCB exposure. Due to the small number of
individuals reporting possible occupational exposure, this comparison may not be very meaningful.

**Figure 3** shows average PCB levels for different groups of residents. Adults living in homes adjacent to Tributary No. 3 for a shorter time (2-13 years) had an average PCB level similar to those who lived in homes adjacent to Tributary No. 3 for a longer time (15-46 years).

![Figure 3: Average Blood Serum PCB Level Among Adults By Length of Residence](image)

Nearly every participant reported some level of exposure to Tributary No. 3, including contact with the water and/or sediment through various activities including gardening, playing, and landscaping. Therefore, comparisons in PCB level by these activities were not possible.

There are over 200 different types of PCBs. These different types of PCBs are called congeners. The blood samples collected during this investigation were analyzed for the thirty congeners that are most commonly found in human blood serum. These thirty congeners were then summed to calculate total serum PCBs. Three congeners (PCBs 180, 153, and 138) were the most prominent in the serum samples and accounted for an average of 56% of the total PCB levels. The same three congeners are the most consistently detected in human samples throughout the world and frequently account for 40-60% of the total PCBs.

**Conclusions**

In general, all people have some measurable level of PCBs in their blood. The general population may be exposed to PCBs through foods in their diet, such as meat and dairy products, which make a large contribution to total PCB body burden. Studies of populations with only this type of background exposure to these chemicals indicate that the average level in adults is somewhere between 2 and 4 ppb, with individual values ranging from 0.5 to 10 ppb. All of the adults in this investigation fell within this background range. Although there have been fewer studies of children, those that do exist suggest an average to be between 1 and 2 ppb. The average for this small group of children fell within this range.

Blood serum PCB levels in this population show one of the strongest patterns seen in other investigations: older people have higher levels than younger people. Although a statistical
method was used to at least partially account for the relationship between age and serum PCB levels, the strong association with age could not be completely eliminated. Therefore, some of the findings (Figures 2 and 3) may reflect the continued effect of age differences between the groups being compared.

The results of this sampling program indicate that people living in homes adjacent to the PCB-contaminated Tributary No. 3 in Brockport do not have levels of PCBs in their blood that are above those found in the general population. These results are consistent with several investigations of PCB levels in blood of people living near PCB-containing hazardous waste sites. Studies conducted in Massachusetts, Ohio, West Virginia, Kansas, Pennsylvania and Indiana have not shown PCB levels in blood greater than the expected background range unless the person also consumed contaminated freshwater fish or worked in a job where PCB exposure was possible 2-8. Recent studies of residents of Anniston, Alabama did find elevated PCB blood levels in people living near a very old and large chemical facility that manufactured PCBs and other chemicals from the later 1920s to early 1970s. The available evidence from the Anniston studies suggests that a major route of exposure was the consumption of contaminated local fish and farm animals (chicken, eggs, hogs).

Recommendations

Based on the results of this study, additional blood serum PCB sampling in the Brockport community is not recommended at this time. This investigation reported on individuals who, based on currently available environmental sampling data, live in the area with the greatest potential for exposure to PCBs in and along Tributary No. 3. The findings indicate that these individuals had levels of PCBs in their blood typical of the general population.

References:


For More Information Contact:

Lorraine Benton, RN  
Public Health Representative  
Bureau of Environmental and Occupational Epidemiology  
Center for Environmental Health  
New York State Department of Health  
1-800-458-1158 ext 27950