UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
2890 WOODBRIDGE AVENUE
EDISON, NEW JERSEY 08837

Michael B. Kaplowitz, Chairman
Budget and Appropriations Committee
Westchester County Board of Legislators
80 Michaelian Office Building
148 Martine Avenue
White Plains, NY 10601

November 3, 2005

Dear Mr. Kaplowitz:

Thank you for your letter of August 25, 2005 in which you ask about the use of polychlorinated biphenyls (PCBs) in caulking, potential exposure risks, and management of the caulk. Below are your questions and our corresponding answers.

What are the health risks, both known and suspected, in terms of air quality and/or soil with regards to human exposure and/or direct contact? What are the possible dangers, both in disturbed and undisturbed caulk?

PCBs have been demonstrated to cause a variety of adverse health effects. PCBs have been shown to cause cancer in animals. PCBs have also been shown to cause a number of serious non-cancer health effects in animals, including effects on the immune system, reproductive system, nervous system, endocrine system and other health effects. Studies in humans provide supportive evidence for potential carcinogenic and non-carcinogenic effects of PCBs. The different health effects of PCBs may be interrelated, as alterations in one system may have significant implications for the other systems of the body. You may visit our website at www.epa.gov/pcb and www.epa.gov/iris for more discussion on the health effects of PCBs.

A preliminary assessment of the risks associated with being exposed to PCB-containing caulk was initiated in 2004 using data that were provided to EPA in response to its solicitation for information on current unauthorized PCB applications. This evaluation was based on the highest PCB concentration found: 330,000 parts per million (ppm) PCBs. A thorough assessment of this data is ongoing.

Exposure may occur via any one of several pathways: dermal contact, incidental ingestion via surface contact, and inhalation. Disturbed caulk (that which has been removed or is being

removed) is a greater exposure risk than undisturbed caulk. EPA is not aware of any visual distinguishing factors that would aid in identifying non-PCB containing caulk from PCB-containing caulk.

Should there be mandatory testing for potentially exposed school children or workers? Should there be mandatory testing for potentially contaminated caulk, soil and/or air?

The testing of caulk material may be advisable if the use of PCB-containing caulking has been previously demonstrated (e.g., presence of PCBs in a school system, similar era of construction, whether the structure has undergone renovation).

What available science is there related to PCBs and caulk? What other cases/experiences have there been in other areas of the country, particularly in Region 1?

1) A 2003 national study in Sweden:
http://dioxin2004.abstract-management.de/pdf/p260.pdf

2) Caulk in concrete joints in reservoirs was found in 84 of 178 reservoirs surveyed at a concentration of 15 to 20% PCBs. Cited in Erickson, Mitchell. 1997. Analytical Chemistry of PCBs, 2nd ed. New York: Lewis.

3) California - 1995:
A recent incident at Dunsmuir Reservoir in Alameda County demonstrates how accidental releases of PCBs can occur in local watersheds, leading eventually to PCB loading to the Estuary. Joint caulking installed in the basins of this reservoir in the late 1960s contained 15-20% PCBs. Replacement of this caulking, which began in 1992, led to release of PCBs to San Leandro Creek, where concentrations as high as 500 ppm were measured in sediment. Remediation of this contamination is being performed.

California - 2001
Consultant for water treatment system calls EPA Region 9 seeking guidance under 40 CFR § 761.62 for disposal of 14,000 linear feet of caulking with a PCB concentration of 250,000 ppm.

4) Colorado - 2005:
EPA Draft Approval and Denver Water Plan to Encapsulate PCB Contaminated Concrete at the Martson Basin #4:
The Marston Water Treatment Plant, which includes the Marston Basin #4 is a water storage facility with a 12,000,000 gallon capacity that contains treated water awaiting distribution to Denver Water customers, among whom are Denver, Littleton, and Green Mountain. In the fall of 2003, Denver Water discovered high concentrations of PCBs in the caulk in the 12 vertical expansion joints in Basin #4 during an evaluation of deteriorated caulk. The caulk had been in place for 43 years. The caulk was removed and disposed of in accordance with the PCB regulations. Testing of the underlying concrete revealed PCB concentrations as high as 1000 ppm had migrated into the concrete from the caulk. The basin had to be put into service in December 2003, so Denver Water requested and received a one-year Toxic Substances Control Act risk-based approval to encapsulate the PCB contaminated concrete. The encapsulant and concrete were to be removed in late 2004 when the Basin was out of use. Upon further evaluation of the concrete underlying the joints, Denver Water reported that removal of the contaminated concrete would undermine the integrity of the basin structure. Consequently, Denver Water has applied for a risk-based disposal approval for encapsulation of the PCB contaminated concrete. The application specifies two coats of epoxy of contrasting colors so that

wear can be easily detected. There are provisions for demonstration that the encapsulation will contain the PCBs and provisions for annual reports, inspection, repair if needed, and testing water along the expansion joints annually to assure compliance with the MCL (maximum contaminant level) of the Safe Drinking Water Act of 0.5 parts per billion (ppb) PCBs. Denver Water reports that the MCL for PCBs has not been exceeded since promulgation under the Safe Drinking Water Act in 1992.

5) Massachusetts - 2004:
"An Unrecognized Source of PCB Contamination in Schools and Other Buildings" Robert F. Herrick, Michael D. McClean, John D. Meeker, Lisa K. Baxter, and George A. Weymouth**.** ***Environ Health Perspect*** 112:1051-1053 (2004). doi:10.1289/ehp.6912 available via http://dx.doi.org/ [Online 25 March 2004].

Abstract from the Article
An investigation of 24 buildings in the Greater Boston Area revealed that one-third (8 of 24) contained caulking materials with PCB content exceeding 50 ppm by weight. These buildings included schools and other public buildings. In a university building where similar levels of PCB were found in caulking material, PCB levels in indoor air ranged from 111 to 393 ng/m3; and in dust taken from the building ventilation system, < 1 ppm to 81 ppm. In this building, the U.S. EPA mandated requirements for the removal and disposal of the PCB bulk product waste as well as for confirmatory sampling to ensure that the interior and exterior of the building were decontaminated. Although U.S. EPA regulations under the Toxic Substances Control Act stipulate procedures by which PCB-contaminated materials must be handled and disposed, the regulations do not require that materials such as caulking be tested to determine its PCB content. This limited investigation strongly suggests that were this testing done, many buildings would be found to contain high levels of PCBs in the building materials and potentially in the building environment. The presence of PCBs in schools is of particular concern given evidence suggesting that PCBs are developmental toxins. *Key words:* carcinogen, developmental toxin, environmental exposure, PCB, public buildings, remediation, schools.

6) Montana - 2005:
Potential contamination of fish may have resulted from PCBs that were used in the Bozeman hatchery. The Fish and Wildlife Service is awaiting results of tests on caulk in the raceway system. The agency also plans to sample the raceways' concrete. Concerns include whether some endangered and sensitive species at the center, such as pallid sturgeon and arctic grayling, could be harmed by the elevated levels of PCBs.

7) Rhode Island - 2001:
The initial results of the Phase II sampling of the Chafee Social Science Center show materials associated with window assembly and materials used in the assembly of the unit room ventilators located under each window as potential sources of PCBs. The goal of this phase was to quantify the level of PCBs in a variety of building materials that might be the source of the PCB residues found in the building during the Phase I sampling effort. On Feb. 16 and 17, Environmental Health and Engineering (EH&E), the Newton, Mass. consulting firm hired by URI, collected

more than 50 samples of building materials and additional dust samples from various locations within Chafee to determine PCB content. Gasket materials associated with the windows and caulking material between the masonry and the window frames tested the highest for PCB levels. PCBs represent three percent of the caulking material. The other product that tested high for PCBs is a glazing compound, a rubber sealant that seals the pane of glass to the windowsill.

What are the recommendations in terms of standards to guide decision makers in making a prudent analysis of health risk factors vs. cost risk factors?

The use of PCBs in caulking and sealant materials has never been authorized by the Environmental Protection Agency. In general, the placement of such materials pre-dates the enactment of the Toxic Substances Control Act and its use today is not authorized. Therefore, the prospect of authorizing the continued use of this material in residential settings, or where children could be exposed, is extremely unlikely. Because it is illegal and the potential for exposure may be significant, PCB-containing caulk must be removed upon discovery.

Has any other EPA Region developed protocols for removal/remediation?

Each EPA Region reviews specific remediation plans as they are received**.** Since each plan is site and technique specific**,** it is not practical to develop generic protocols.

Are there any Federal grant programs currently available to facilitate voluntary testing and/or remediation?

No.

Are there any relevant pending regulations forthcoming from Congress?

No.

Where, in your opinion, should we go from here with regards to policy?

Given the potential for high concentrations of PCBs in caulk and the potential for exposure and that the continued use of PCB-containing caulk is in violation of the regulations, it should be replaced when discovered. Remediation and disposal of this material is covered by the current PCB regulations at 40 CFR Part 761.

How are similar agencies in other countries handling these situations?

The United States is a signatory (but not yet ratifier) of two PCBs as Persistent Organic Pollutants (POPs) treaties: the United Nations Economic Commission for Europe Long Range Transport of Air Pollutant POPs and the Stockholm Convention. The objectives of the Stockholm Convention include but are not limited to the elimination of the use of PCBs, the elimination of stockpiles of PCBs, sound waste management of PCBs, and the identification of

other articles containing more than 0.005% PCBs (including caulk).

In October 2003, Norwegian construction firms began charging fees on all window sales to pay for the proper disposal of old windows laden with PCB-contaminated caulking.

What experiences have other countries had with PCBs in caulk? Have any key studies been conducted in other countries that could be of assistance?

The 2003 national study in Sweden as referenced above.

Have any products for handling, removal, etc. been developed in other countries?

Not that EPA is aware of.

If you have any further questions or comments, you may contact Daniel Kraft, of my staff at 732-321-6669.

Sincerely,

Kenneth S. Stoller, P.E., QEP, DEE
Chief
Pesticides and Toxic Substances Branch

cc: Tom Simons, EPA HQ/NPCD