Health Consultation

Cornell-Dubilier Electronics (20GZ)
(aka Hamilton Industrial Park)
South Plainfield, New Jersey
NJD981557879

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U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Exposure Investigation and Consultation Branch
Atlanta, Georgia 30333

Background and Statement of Issues:

The Region II, U.S. Environmental Protection Agency (EPA) has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) comment on the public health threat posed by indoor polychlorinated biphenyls (PCB) contamination at the Cornell-Dubilier Site in South Plainfield, New Jersey.

The Cornell-Dubilier Electronics, Inc. facility operated on the 25 acre site until the early 1960's. The company manufactured electronic parts and components, and tested transformer oils. Discarded electronic components were land filled on-site and transformer oils contaminated with PCB were reportedly dumped onto site soils. The site is currently known as the Hamilton Industrial Park and is occupied by approximately 15 industrial businesses.

At the request of EPA Region II, the NJDHSS provided a health consultation for the site in March 1997 in which they performed a pathway analysis. Consequently, through negotiations with the responsible parties, interim measures were taken by EPA to reduce exposures at the site. In addition, a health consultation was conducted by ATSDR in October 1996 commenting on soil PCB levels on site [1]. ATSDR concluded that the PCBs in surface soils posed a long-term health concern for on-site workers and trespassers. The NJDHSS has also developed a fact sheet for the site describing the contamination and addressing health concerns of workers and area residents.

On March 21, 1997, the EPA Environmental Response Team (EPAERT) supervised the collection of wipe samples from the interior surfaces of several on-site buildings. In addition, lead and cadmium wipe samples were collected from interior surfaces. The samples were collected by wiping a wet 3 inch by 3 inch cotton gauze pad over an area of 100 square centimeters.

ATSDR was provided results from 27 samples collected from 12 buildings. Two unoccupied buildings were not sampled. The wipe sampling results indicated that elevated levels of PCBs (Aroclors 1254, 1260) were present on various interior surfaces (see attached tables). Total PCBs ranged from non-detect to 680 micrograms per 100 square centimeters ($\mu g/100cm^2$). Approximately one-half of the wipe samples exceeded 10 $\mu g/cm^2$ (combined Arochlors 1254, 1260).

Cadmium concentrations ranged from non-detect to 34 $\mu g/100cm^2$. Lead concentrations ranged from non-detect to 780 $\mu g/100\ cm^2$ (see attachment).

Discussion:

PCBs:

Although PCBs are no longer made in the United States, many transformers and capacitors still contain PCBs. Spills and improper disposal and handling of PCBs, such as the case at this site, have resulted in environmental contamination. Since PCBs persist in the environment for years, and also have the ability to collect in human fatty tissue, the PCBs represent a long-term health threat to humans [2].

In humans, long-term exposure to PCBs can affect the skin and liver; reproductive, endocrine, immunosuppressive, and carcinogenic effects have been observed in animal studies [2,3]. Short-term exposure of humans to elevated levels of PCBs can result in chloracne. Exposure can occur through the inhalation and ingestion of PCB-contaminated dust, or through the absorption of PCBs through the skin. Workers can also carry contamination home on shoes and clothing exposing other members of the family.

PCB concentrations at this site have been detected as high as 680 $\mu g/100cm^2$ on indoor surfaces. PCBs at similar concentrations at other work places have been shown to raise serum PCB levels. For example, Christiani et. al. measured serum PCB levels in employees working in areas with surface concentrations of PCBs averaging 161 $\mu g/100cm^2$ [4]. Serum PCB levels in the workers ranged from 3.1 to 65 parts per billion (ppb) with a mean concentration of 15.3 ppb. The average background blood serum concentration among populations in the United States was 5 to 7.7 ppb [2]. Medical evaluation of the workers in the Christiani study showed neither chloracne or other symptomatic manifestation of toxicity nor a relationship between liver enzyme levels and serum PCB levels. Numerous studies have attempted to correlate serum PCB levels with liver associated enzymes in PCB-exposed workers, however, no conclusive association has been found [2].

EPA has developed a PCB spill cleanup policy under the Toxic Substances Control Act (TSCA). The TSCA policy is considered conservative and protective of public health. The TSCA spill policy calls for PCBs to be cleaned to 10 $\mu g/100cm^2$ for high contact surfaces. High contact in industrial settings are defined as surfaces which are repeatedly touched, often for long periods of time. Manned machinery and control panels are examples of high-contact industrial surfaces. Based on assessments of risk posed by PCBs on indoor hard surfaces, the dermal exposure route would be expected to be the route of greatest concern [5]. PCB levels on indoor surfaces of 10 $\mu g/100cm^2$ are associated with an oncogenic risk of 1×10^{-5}.

Lead and Cadmium:

The wipe samples that were collected indicated the presence of cadmium and lead on interior surfaces. However, it is difficult to assess the health risk posed by this contamination because of the uncertainty in estimating the exposure dose of a metal from a contaminated surface. Air sampling data would provide a better estimate of potential human exposure to cadmium and lead, since inhalation of contaminated dusts is the most likely route of exposure.

Conclusions:

1. Based on the available information, the site poses a potential health threat to workers due to the presence of indoor levels of PCB contamination. Although short-term effects are not likely to occur given the levels of contamination, the site does pose a potential long-term health threat to workers. Family members may also be exposed to PCBs carried home on the shoes or clothing of workers.

2. Wipe samples for lead and cadmium are useful as a qualitative indicator of contamination, but cannot be used to assess human exposures. Air sampling data would be more useful in quantitatively estimating potential human exposures.

Recommendations:

1. Have surfaces remediated to comply with TSCA PCB Spill Policy.

2. Consider conducting indoor-air sampling to determine the potential health threat posed by cadmium and lead contamination. If the building is unoccupied, conduct aggressive sampling to simulate activity.

3. If any workers are experiencing health effects, have them evaluated by a health care provider for PCB exposure.

4. This site will be considered for an exposure investigation by the ATSDR Exposure Investigation Section.

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References:

1. ATSDR Health Consultation for the Cornell-Dubilier Site, October 7, 1996.

2. Toxicological Profile for Polychlorinated Biphenyls, U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, April 1993.

3. ATSDR Case Studies in Environmental Medicine, Polychlorinated Biphenyl Toxicity, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, June 1990.

4. Persistently Elevated Polychlorinated Biphenyl Levels from Residual Contamination of Workplace Surfaces. David C. Christiani et al., American Journal of Industrial Medicine, 10:143-151, 1986.

5. Polychlorinated Biphenyls Spill Cleanup Policy, 40 CFR Part 761, U.S. EPA. April 2, 1987.