

# Health Consultation

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Evaluation of June 1999 Sediment and Soil Sampling  
in the Floodplain of Bound Brook

CORNELL DUBILIER ELECTRONICS INCORPORATED  
SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

MAY 25, 2000

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## HEALTH CONSULTATION

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Prepared By:

Hazardous Site Health Evaluation Program  
Consumer and Environmental Health Services  
Division of Environmental and Occupational Health  
New Jersey Department of Health and Senior Services  
Under a Cooperative Agreement with the  
Agency For Toxic Substances and Disease Registry

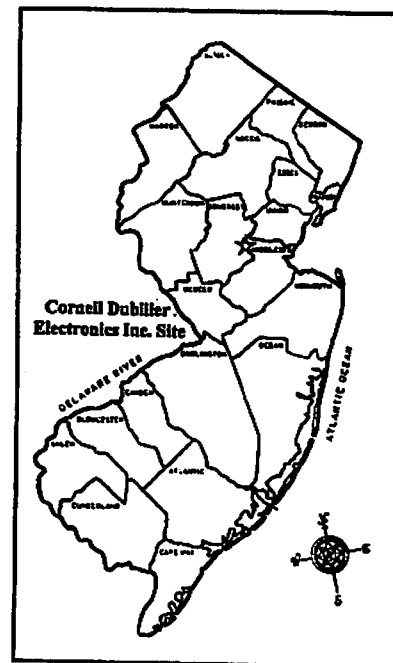
## BACKGROUND AND STATEMENT OF ISSUES

### *Statement of Issues*

The US Environmental Protection Agency (USEPA), Region II Removal Action Branch, has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) and the New Jersey Department of Health and Senior Services (NJDHSS) review the public health significance of the June 1999 surface soil and sediment sampling data from the floodplain of the Bound Brook downstream of Cornell Dubilier Electronics, Incorporated (CDE) site. This public health consultation will address the following questions:

- (1) Does the data collected in June of 1999 present a public health hazard?
- (2) What does ATSDR/NJDHSS recommend if similar levels of polychlorinated biphenyls (PCBs) are detected in residential areas?

Surface (0-2") soil and sediment samples were collected from four areas (Area 1, Area 2, Area 3 and Area 4) in the floodplain of the Bound Brook (Figure 1). Samples were analyzed for total PCBs. This public health consultation will only focus on the June 1999 USEPA sampling results.<sup>(1)</sup> The pathway specifically examined in this public health consultation is the ingestion of PCBs in contaminated soil or sediments by residents utilizing these four sampling areas. Health effects related to PCBs for both adults and children will be evaluated. The public health aspects of potential exposures to other environmental media, if contaminated, will not be addressed within the context of this public health consultation.



### *Background*

The Cornell Dubilier Electronics Incorporated (CDE) site is located at 333 Hamilton Boulevard in South Plainfield Township, Middlesex County, New Jersey (see inset).

The CDE site covers approximately 25 acres in an industrial/residential area. It is bordered by residences and commercial businesses on Hamilton Boulevard to the northwest and Spicer Avenue to the southwest. The Bound Brook and Conrail railroad border the site on the northeast. Based on 1990 U.S. Census, approximately 10,000 persons live within one mile of the site.

The site is also known as Hamilton Industrial Park and is currently occupied by approximately 15 commercial businesses in several buildings facing Hamilton Boulevard. The rear part of the site consists of an open field and wetlands.

From 1936 to 1962, CDE manufactured electronic parts and components, including capacitors. It is alleged that CDE disposed PCB-contaminated materials and other hazardous substances directly onto the soil at the site.

In June 1994, soil, surface water, and sediments were sampled at the site and analyzed by the USEPA. The results of the sample analyses indicated the presence of PCBs and trichloroethylene (TCE) in soils. PCBs were also detected in the sediment of the Bound Brook. A sediment sample collected from the stream near the back of the property indicated the presence of PCBs, 1,2-dichloroethene, TCE, and lead.

The USEPA conducted a study to evaluate PCB contamination in soils and sediments along the Bound Brook in 1997. PCB contaminations were identified from upstream, midstream and downstream of the CDE site.

In June of 1999, USEPA conducted another round of surface soil and sediment sampling in four areas in the floodplain of Bound Brook downstream of the site. These four areas were flooded by Hurricane Floyd in September of 1999. Area 1 is the Veteran's Memorial Park. This park has an athletic field, baseball field, rest areas, playground and woodland areas along the Bound Brook to the south and Cedar Brook to the north. Residential properties are located on Kaine Street to the east. People access this park through entrances on Kaine Street. The higher PCB levels were detected in the woodland and parking areas. The parking area is mostly covered by gravel. Area 2 is located between Lowden and Oakmoor Avenues, and the Cedar Brook to the South. Area 3 is a slope (drop-off) area from residential lands. This area is located north of the Bound Brook. The closest residential houses, on Fred Allen Drive, are approximately 5 to 6 feet elevated relative to this area. Area 4 is currently a vacant land which is adjacent to and on the west of stream 14-14-2-3 (named by the US Army). This area can be reached from New Market Avenue by sidewalk and is less than 50 feet away from houses on New Market and Highland Avenues.

#### *Site Visit*

On March 7, 2000, James Pasqualo, Jeff Winegar, Narendra P. Singh, Suzanne Hooper and Stella Manchun Tsai of the New Jersey Department of Health and Senior Services (NJDHSS) conducted a site visit. The NJDHSS staff were accompanied by the USEPA's On-Scene Coordinator Eric Wilson. The following observations were made during the site visit:

- The CDE site, currently known as Hamilton Industrial Park, is an actively used industrial property. All driveway and parking spaces are paved. A fence was installed to prevent trespassers from walking on a contaminated open field and wetlands at the rear part of the

- facility. Conrail railroad tracks cross the Bound Brook just northeast of the site.
- Residential houses and apartments on Spicer Avenue with indoor and outdoor (soil) PCB contamination were remediated by the USEPA—these actions included interior house decontamination and contaminated residential soil removal.
  - Area 1 is a recreational park which is easily accessible to residents. During the site visit, we saw people park their cars on the gravel-covered area and then walk dogs in the woodland areas.
  - Areas 2 and 3 have limited accessibility to the general public but are less than 50 feet away from residential areas. A bike track was found on the trail in Area 2.
  - Area 4 is currently vacant land and is accessible by the general public.

## DISCUSSION

### *Environmental Contamination; Summary of June 1999 Data*

A total of 92 surface soil (0-2") and 6 surface sediment (0-2") samples were collected on June 21, June 22 and June 23, 1999 by the USEPA and Roy F. Weston, Inc. from four areas in the floodplain of Bound Brook downstream of the CDE site. PCBs were detected in 91 of 98 surface soil/sediment samples collected. Ranges of PCB concentrations detected in Areas 1 to 4 are reported in Table 1.

Table 1. Total PCBs concentrations in mg/kg (ppm) detected in surface (0-2") soil and sediment samples in the floodplain of the Bound Brook in June of 1999.

Sampling Area	Number of Samples (Soil/Sediment)	Range of total PCBs Concentrations	Comparison Value-Chronic EMEG (child/adult)
1	32/0	N.D.- 25	1/10
2	16/4	0.06-2.0	1/10
3	26/0	2.5-7.5	1/10
4	18/2	N.D.- 0.21	1/10

N.D.= Not detected; EMEG=Environmental Media Evaluation Guide.

A total of 34 (32 and 2 duplicates) soil samples were collected from Area 1. The PCB concentrations ranged from below detection limits to 25 mg/kg. A total of 17 (16 and 1 duplicate) surface soil samples and 4 surface sediment samples were collected from Area 2. Surface soil samples ranged from 0.095 mg/kg to 2 mg/kg, and surface sediment samples from 0.06 mg/kg to 0.58 mg/kg. A total of 28 (26 and 2 duplicates) soil samples were collected from Area 3. PCB concentrations detected

ranged from 2.5 mg/kg to 7.5 mg/kg. A total of 19 (18 and 1 duplicate) surface soil and 2 surface sediment samples were collected from Area 4. PCB levels ranging from below detection limits to 0.21 mg/kg were found in soil samples. Low PCB levels (below detection limits and 0.055 mg/kg) were found in two sediment samples.

### ***Pathways Analysis and Public Health Implications***

An exposure pathway consists of a series of elements which result in persons being exposed to contaminants that originate from a site (source). A completed exposure pathway consists of five elements:

- (1) Source of contamination;
- (2) Environmental media and transport mechanisms;
- (3) Point of exposure;
- (4) Route of exposure; and
- (5) Receptor population.

A completed exposure pathway must include each of the elements that link a contaminant source to a receptor population.<sup>(2)</sup> Based on the current site conditions, it is reasonable to assume that a completed exposure pathway exists to those individuals who utilize those areas found to be contaminated.

### **Toxicological Evaluation**

This section contains a discussion of the health effects in persons exposed to PCB-contaminated surface soil or sediments associated with the CDE site. Health effects in both adults and children will be evaluated. The levels of PCBs used in this public health consultation are from the USEPA field sampling in 1999.<sup>(1)</sup>

Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is then compared to established health guidelines. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are potentially more likely to have associated illnesses or disease.<sup>(2)</sup>

Health guidelines are developed for contaminants commonly found at hazardous waste sites. Examples of health guidelines are the ATSDR's Minimal Risk Level (MRL) and the USEPA's Reference Dose (RfD). MRLs are developed for each type of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (365 days and greater). ATSDR presents these MRLs in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status. When exposure (or dose)

is below the MRL or RfD, then non-cancer, adverse health effects are unlikely to occur. Both MRL and RfD for chronic oral exposure to PCBs are  $2 \times 10^{-5}$  mg/kg/day.

Some soil/sediment samples had PCBs levels above the ATSDR comparison value (CV) (Table 1). Comparison values are contaminant concentrations in specific media that are used to select contaminants for further evaluation. The Environmental Media Evaluation Guides (EMEGs) are media-specific comparison values used to select chemical contaminants of potential concern. ATSDR EMEGs are based on the MRLs presented in the ATSDR Toxicological Profiles. ATSDR's CVs for soil are used to determine which contaminants detected in soils should be further evaluated from a public health perspective. However, soil contamination levels above an ATSDR CV does not necessarily represent a health threat and CV's should not be used for setting clean-up levels.

The toxicological effects of the contaminants detected in the environmental media have been considered singly. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance their public health significance. Additionally, individual contaminants or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical, its route of exposure, its pharmacokinetics in children and adults, and its toxicity in children and adults.

#### *PCBs Exposure At Sampling Areas*

PCBs can be absorbed into the body via ingestion or direct dermal contact with PCB-contaminated soil, or inhalation of PCB-contaminated dust. At high doses, PCBs can cause irritation of the nose and throat, and acne and rashes.

Residents visiting the sampling locations may be exposed to PCB-contaminated surface soils and sediments. To evaluate the worst-case exposure scenario, exposure doses for PCBs were calculated using the maximum reported concentrations in Area 1 (25 mg/kg), Area 2 (2 mg/kg), Area 3 (7.5 mg/kg), and Area 4 (0.21 mg/kg). Area 1 is easily accessible to the residents. Residents may not access Areas 2, 3 and 4 on a regular basis. It was assumed that the accessible area was visited by a child weighing 35 kg (elementary school age or older) and an adult weighing 70 kg. In addition, children were assumed to ingest between 100-200 milligrams (mg) of soil per visit, while the amount for adults was estimated at 50-100 mg.

#### *Child and Adult (acute exposure)*

The estimated exposure doses based on the highest levels of PCBs found in soils/sediments collected from four sampling areas were below the lowest No Observed Adverse Effects Level (NOAEL) for non-carcinogenic adverse health effects (based upon animal studies) presented in the ATSDR Toxicological Profile for PCBs of 0.001 mg/kg/day. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur. Therefore, the exposure to adults and children who occasionally visit Areas 1, 2, 3 and 4 do not constitute a public health hazard.

### ***Adult and Child (intermediate exposure)***

For the intermediate exposure scenario for adults and children, at the maximum concentration of PCBs detected in Area 1 (25 mg/kg), the calculated exposure dose was below the NOAEL for non-carcinogenic adverse health effects (based upon animal studies) presented in the ATSDR Toxicological Profile for PCBs at 0.003 mg/kg/day. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur.

### ***Adult and child (chronic exposure)***

The USEPA requested an evaluation of the potential public health significance of PCB levels in the context of chronic and residential exposure. The following evaluation based upon chronic exposure assumptions to the maximum detected concentrations of PCB's may be applied to either area 1, or a hypothetical residential area.

To evaluate the toxicological effects of chronic oral exposure (>365 days) for PCBs to adults and children, it was assumed that a person would visit the site for a total of 5 days per week, 40 weeks per year of 30 years for adults, and 10 years for child. For the chronic exposure scenario for adults at the maximum concentration of PCBs detected in Area 1 (25 mg/kg), the calculated exposure dose was below the chronic oral MRL of 0.00002 mg/kg/day for non-carcinogenic adverse health effects (based upon animal studies) presented in the ATSDR Toxicological Profile for PCBs. The chronic MRL is based on a Lowest Observed Adverse Effect Level (LOAEL) for immunological effects in monkeys<sup>(4,5)</sup>. It is highly unlikely that non-carcinogenic adverse health effects would occur. For the chronic exposure scenario for children at the maximum concentration of PCBs detected in Area 1 (25 mg/kg), the calculated exposure dose of 0.00008 mg/kg/day exceeds the chronic oral MRL of 0.00002 mg/kg/day for non-carcinogenic adverse health effects. Children often play at the baseball field and are unlikely to contact contaminated soils at the hot spots detected from the parking area and woodlands. Therefore, the mean concentration from Area 1 (2.6 mg/kg) was used to calculate exposure dose for child. The calculated exposure dose of 0.00001 mg/kg/day was below chronic oral MRL. It is unlikely that non-carcinogenic adverse health effects would occur to children exposure to mean concentration detected in Area 1.

Based upon the chronic exposure scenario for adults, the lifetime excess cancer risk ( $\sim 10^{-5}$ ) would be no apparent increased risk of cancer.

### ***Pica child***

To evaluate the toxicological effects of oral exposure to PCBs for occupants of residences, the worst-case exposure scenario was applied to a pica child with an average weight of 10 kg. The pica child is assumed to ingest 5,000 mg soils. For an acute exposure scenario with pica child, at the maximum



mean concentration of PCBs detected in Area 3 (4.32 mg/kg), the calculated exposure dose of 0.002 mg/kg/day is slightly higher than the lowest available acute oral NOAEL of 0.001 mg/kg/day for non-carcinogenic adverse health effects (hepatic effects based upon animal studies) presented in the ATSDR Toxicological Profile for PCBs. Based on this worst-case exposure scenario, it is possible but not likely that non-carcinogenic adverse health effects would occur to a pica child exposed to PCBs in a residential setting at the concentrations detected in Area 3.

### **ATSDR Child Health Initiative**

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination in their environment. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from a waste site. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than adults, which means they breathe dust, soil, and heavy vapors closer to the ground. Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most important, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care. NJDHSS/ATSDR evaluated the potential for children to be exposed to PCB contamination detected in the floodplain along the Bound Brook. As previously mentioned, it is not expected that adverse health effects would occur for the children who visit the four areas. However, it is possible that non-carcinogenic adverse health effects would occur to pica children exposed to PCBs in a residential setting at the concentrations detected in Area 3.

### **Conclusions**

#### ***Evaluation of Nature and Magnitude of Health Risks***

Based on available data reviewed for the four areas located in the floodplain of the Bound Brook, these areas currently pose **no apparent health hazard** to children and adults who utilize these areas for recreational purposes. Health risks were estimated for the assumed completed exposure pathway associated with ingestion of contaminated surface soil and sediment. Using the maximum level of contamination as a worst-case scenario and conservative exposure factors, the NJDHSS has determined that residents using the areas indicated, would not be exposed to PCBs at levels of public health significance. The calculated exposure doses for children and adults were below the levels of PCB exposure that have been shown to cause adverse health effects.

Similarly, based on reported concentrations and the exposure assumptions presented above, it is unlikely that a hypothetical resident would experience adverse health effects as a result of chronic exposure to PCB contaminated soils. However, based upon available information, the mean detected

concentration of PCBs would yield an exposure dose equivalent to the lowest available NOAEL for hepatic effects in a pica child.

### **Recommendations**

#### ***Cease/Reduce Exposure***

- None at this time.

#### ***Site Characterization***

- The data and information presented do not indicate a public health concern in a hypothetical residential scenario. However, additional sampling of actual residential areas would be necessary to determine actual environmental conditions and potential risk at nearby residential properties.

### **Public Health Action Plan (PHAP)**

The purpose of a PHAP is to ensure that this health consultation not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included is a commitment on the part of ATSDR and NJDHSS to follow up on this plan to ensure that it is implemented. Some of the public health actions to be implemented by ATSDR and NJDHSS for the Cornell Dubilier site, as a whole, are as follows:

#### **Public Health Actions Undertaken by ATSDR and NJDHSS**

1. Available environmental data have been evaluated by ATSDR/NJDHSS to determine public health concerns regarding human exposure pathways associated with PCBs detected in surface soil and sediment during the June 1999 sampling event.
2. NJDHSS, NJ Department of Environmental Protection (NJDEP), and NJ Department of Agriculture (NJDOA) in coordination with the USEPA have issued an interim fish advisory for the entire length of the Bound Brook in Middlesex County and posted warning signs to the public for fish consumption along the entire length of the Bound Brook including the New Market Pond. In August 1997, ATSDR issued a fish consumption advisory for Bound Brook, New Market Pond, and the streams that feed into them. The advisory warned residents of contaminated fish and advised the residents that consumption of the fish could be harmful to their health. These advisories are in effect and are helpful in reducing the exposure to contaminants in the Bound Brook.

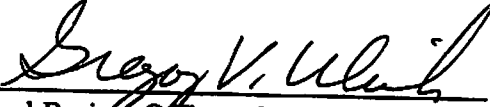
3. **NJDHSS prepared a site-specific fact sheet for the CDE site and made it available to local health agencies and other interested parties.**

#### **Public Health Actions Planned by ATSDR and NJDHSS**

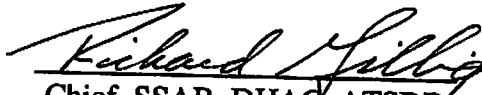
1. **This document will be provided to the South Plainfield Health Department, Middlesex County, New Jersey.**
2. **NJDHSS and ATSDR will continue to assist the South Plainfield Health Department (SPHD) by providing public health education materials and professional expertise to explain the potential implications of human exposure to PCBs. Such assistance would be primarily in the form of "fact sheets" on the potential health effects that might result from exposure to these contaminants.**
3. **NJDHSS and ATSDR will continue to assist in providing health education to residents on ways to reduce their potential exposure to PCBs present in surface soils as additional data becomes available on the extent and degree of off-site contamination. ATSDR will provide an annual follow-up to this PHAP, outlining the actions completed and those in progress. This report will be provided to persons who request it, and it will be placed in repositories that contain copies of this health consultation.**

### Certification

The Health Consultation for the CDE site was prepared by the New Jersey Department of Health and Senior Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

  
Technical Project Officer, SPS, SSAB, DHAC

The Superfund Site Assessment Branch (SSAB), Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

  
Chief, SSAB, DHAC, ATSDR

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### **Documents Reviewed**

1. Roy F. Weston, Inc., Floodplain Soil/Sediment Sampling and Analysis Summary Report. Cornell-Dubilier Electronics, South Plainfield, Middlesex County, New Jersey, 2000.
2. Agency For Toxic Substances and Disease Registry. Health Assessment Guidance Manual. Chelsea, Michigan: Lewis Publishers, 1992.
3. ATSDR Toxicological Profile for Polychlorinated Biphenyls, US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, April 1999.
4. Tryphonas H, Hayward S, O'Grady L, et al. 1989. Immunotoxicity studies of PCB (Aroclor 1254) in the adult rhesus (*Macaca mulatta*) monkey— preliminary report. *Int J Immunopharmacol* 11: 199-206.
5. Tryphonas H, Luster MI, Schiffman G, et al. 1991. Effect of chronic exposure of PCB (Aroclor 1254) on specific and low specific immune parameters in the adult rhesus (*Macaca mulatta*) monkey. *Fund Appl Toxicol* 16-773-786.



Figure 1. General Site Location; Cornell Dubilier Electronics Incorporated (CDE) Site.