

Health Consultation

Evaluation of Bound Brook Area Sediments and Surface Soils

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

OCTOBER 14, 1999

**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
New Jersey Department of Health and Senior Services
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

Statement of Issues

The Environmental Protection Agency (EPA), 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) evaluate the 1997 surface soil sampling from the banks and sediment sampling results from the streambed along the Bound Brook in order to respond to the following questions:

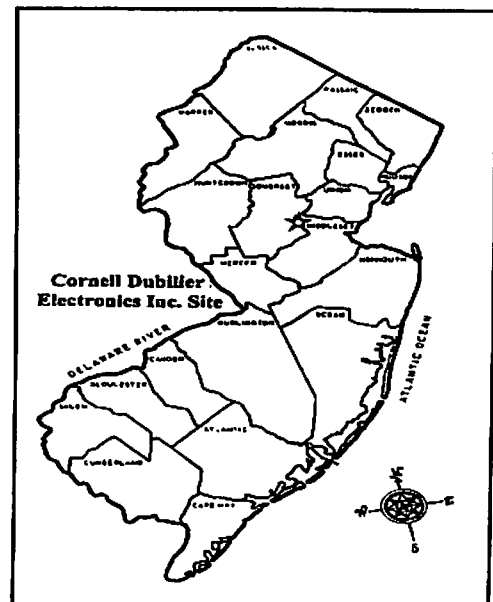
- (1) Does the data present a public health hazard?
- (2) What does ATSDR/NJDHSS recommend?

These samples were collected from locations upstream, midstream, and downstream of the Cornell-Dubilier site at transects established by USEPA. The soil and sediment samples were analyzed for total PCBs. This health consultation will focus on the 1997 Environmental Protection Agency (EPA) sampling results (conducted by *Roy F. Weston, Inc.*).⁽¹⁾ Only the public health significance of exposures to soils or sediments off-site, based primarily on the 1997 sampling event, will be evaluated in this health consultation. The pathway specifically examined is the ingestion of PCBs contaminated soil or sediments, by residents utilizing the Bound Brook. Health effects in both adults and children will be evaluated. The public health of potential exposures to other environmental media, if contaminated, will not be addressed within the context of this health consultation.

Background

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

It consists of approximately 25 acres in an industrial/residential area. The site is bordered by residences and commercial businesses from the south to the north. The Bound Brook borders the site on the northeast. The Bound Brook and the Cedar Brook converge approximately 800 meters downstream of the site. Bound Brook then flows west for approximately 3,000 meters and enters New Market Pond. Conrail railroad tracks crisscross the Bound Brook just north of the site.



From 1936 to 1962, CDE manufactured electronic parts and components, including capacitors. CDE tested transformer oils, and it is alleged that the company dumped materials contaminated with polychlorinated biphenyls (PCBs) and other hazardous substances directly onto the soil at the site. Currently known as Hamilton Industrial Park, the site is occupied by approximately 15 commercial businesses. In June 1994, soil, surface water, and sediments were sampled at site and analyzed by EPA. The results of the sample analyses indicated the presence of PCBs and trichloroethylene (TCE) in the site soils. PCBs were also detected in the sediment of the unnamed tributary of the Bound Brook. PCB contamination of more than one tenth of a mile of wetland frontage of the tributary was documented. A sediment sample collected from the stream near the back of the property indicated the presence of PCBs, 1,2 dichloroethene, TCE, and lead.

EPA initiated a study of the nearby waters of the Bound Brook in June of 1997. As part of this study, water, sediment, and fish samples were collected from the Bound Brook and New Market Pond. Fish collected from Bound Brook were found to contain PCBs at levels higher than the US Food and Drug Administration action level of 2.0 ppm. In response to the level of PCBs detected in the fish, on August 8, 1997, NJDHSS, NJDEP, and New Jersey Department of Agriculture (NJDOA) in coordination with the USEPA, issued an interim fish consumption advisory for the entire length of the Bound Brook, Middlesex County. In August of 1997, ATSDR issued a separate fish consumption advisory for the Bound Brook, New Market Pond, and the streams that feed into them. The advisory warned residents that the fish were contaminated and that eating them could cause health problems.

Site Visit

On July 13, 1999, Steve Miller and Narendra P. Singh of the New Jersey Department of Health and Senior Services (NJDHSS) visited the site. The NJDHSS was accompanied by a representative of the ATSDR Regional Office (Tom Mignone) and USEPA's On-Scene Coordinator Eric Wilson. The following observations were made during the site visit:

- The CDE property, now known as Hamilton Industrial Park, is an actively used industrial property that includes numerous brick buildings.
- A storm and drain sewer discharges into the Bound Brook on the northeastern border of the site. Conrail railroad tracks crisscross the Bound Brook just north of the site. The confluence of the Cedar Brook and the Bound Brook is approximately 800 meters downstream of the site. Bound Brook then flows west for approximately 3,000 meters and enters New Market Pond.
- Not all the areas of the Bound Brook being investigated is easily accessible to area residents. Reach 4 and 5 (as designated in study) is accessible to residents.

DISCUSSION

This section contains discussion of the health effects in persons exposed to PCBs contaminated soil or sediments associated with the CDE site. Health effects in both adults and children will be evaluated. The PCBs levels used in this health consultation are from the USEPA field sampling, (1997) of off-site contamination associated with CDE site.⁽¹⁾

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.⁽⁶⁾

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). When exposure (or dose) is below the MRL or RfD then non-cancer, adverse health effects are unlikely to occur.

MRL's 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 MRL's in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

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 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 being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

NJDHSS, NJDEP, and NJDOA in coordination with the USEPA issued a interim fish advisory for the entire length of the Bound Brook, Middlesex County and posted signs warning the public not to consume fish from 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 contaminant in the Bound Brook.

An approximate length of 2.4 miles of Bound Brook was investigated. A total of 104 transects were established within the 2.4 mile area of concern. For ease of interpretation, nine reaches were established which encompassed the above designated transects. Each transect extended from the north bank to the south bank of the Bound Brook. Within each transect, there was a total of five

sample locations. At each sample location, one surface (0-6") and one subsurface (18-24") soils/sediment sample were collected. This health consultation reviews analytical data from the surface soil/sediment samples (0-6").

PCBs were detected in many surface soil samples collected from the Bound Brook. Range of PCB concentrations in the reaches 1 to 9 are reported in the Table 1. PCBs was present at concentrations above the ATSDR comparison value (CV). Comparison values for health assessments 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 CV's for soil are used to determine which contaminants detected in soils may be at levels of potential health concern and 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.

Table 1: Reported Range of PCBs in surface soil and sediment of the Bound Brook

Reach	Range of PCBs Conc. (ppm)	Comparison Value-EMEG (child/adult)-ppm
1 (transects A-M)	N.D.- 85	1/10
2 (transects N-W)	N.D.- 22	1/10
3 (transects X-FF)	N.D.- 830	1/10
4(transects GG-WW)	N.D.- 14	1/10
5 (transects XX-III)	N.D.- 62	1/10
6(transects JJJ-WWW)	0.1 - 110	1/10
7(transects XXX-JJJJ)	N.D.- 25	1/10
8 (transects KKKK-VVVV)	N.D.- 22	1/10
9 (transects A-D)	N.D.- 0.2	1/10

N.D.= Non-Detect

EMEG=Environmental Media Evaluation Guide

Pathways Analysis and Public Health Implications

An exposure pathway is the process by which an individual is exposed to contaminants that originate from some source of contamination. 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.⁽⁶⁾ Based on the current site conditions, it is reasonable to assume that a completed exposure pathway exists to those individuals who visit the Bound Brook.

PCBs Exposure

PCBs can be absorbed into the body via ingestion, inhalation, or dermal exposure following ingestion of dust or soil, inhalation of PCB-laden dust, or direct dermal contact with PCBs in soil or dust. In humans, long-term exposure to PCBs can affect the skin and liver. PCBs have very low potential for producing acute toxic effects.

Residents visiting the Bound Brook 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 Reach 4 (14 ppm) and Reach 5 (62 ppm). These areas are easily accessible to the residents. There is the presence of a nature trail in the area of Reach 5, persons using the nature trail may be brought in direct contact with contaminated surface soils and/or sediments.

It was assumed the accessible areas of the brook 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 to the highest levels of PCBs found in Bound Brook soils/sediments (Reach 4 and 5), were below the No Observed adverse Effects Level (NOAEL) for non-carcinogenic adverse health effects (based upon animal studies) presented in the ATSDR Toxicological Profile for PCBs. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur. Therefore, the exposures to children and adults who occasionally visit Bound Brook do not constitute a public health hazard.

Child (intermediate exposure)

To evaluate the toxicological effects of intermediate oral exposure (15-364 days) for PCBs (to adults and children) it was assumed that a person would visit the site a total of 2 days per week, 20 weeks per year. This exposure factor was applied to the calculated exposure dose to evaluate the significance of PCBs exposure. For the intermediate exposure scenario for children, at the maximum concentration of PCBs detected (62 mg/kg), the calculated exposure dose were about 1000 times below the NOAEL for non-carcinogenic adverse health effects (based upon animal studies) presented in the ATSDR Toxicological Profile for PCBs. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur.

Adult (intermediate exposure)

In the intermediate exposure scenario for adults, at the maximum concentration of PCBs detected, the calculated exposure dose for adults were below the NOAEL for non-carcinogenic adverse health effects (based upon animal studies) presented in the ATSDR Toxicological Profile for PCBs. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur.

Adult (chronic exposure)

Residents (adults) visiting the Bound Brook may be exposed to PCB-contaminated surface soils. However, it is highly unlikely that residents will be exposed to contaminants in the Bound Brook on a regular basis. Therefore, chronic exposure to residents are not likely to occur. If there is a change in exposure scenario (e.g., land use change), ATSDR/NJDHSS will reevaluate the need for other additional actions at this site.

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 PCBs contamination detected in Bound Brook. As previously mentioned, we do not expect that adverse health effects would occur for the children who occasionally visit at the site.

Conclusions

Evaluation of Nature and Magnitude of Health Risks

Based on available data reviewed for the Bound Brook, the Brook currently poses a **no apparent health hazard** to children and adults who utilize the brook for recreational purposes. The ATSDR and NJDHSS have concluded that surface soils and sediment contamination does not exist at levels of public health concern for the occasional users.

Due to the presence of a nature trail in the area of Reach 5, persons using the nature trail may be brought in direct contact with contaminated surface soils and/or sediments. Health risks were estimated for the assumed completed exposure pathway associated with ingestion of contaminated surface soil. Using the highest level of contamination as a worst case scenario and conservative exposure factors, the NJDHSS has determined that residents using the site would not be exposed to PCBs at levels of public health significance. The calculated exposure dose for children and adult were well below the levels of PCBs exposure that have been shown to caused adverse health effects.

Recommendations

Cease/Reduce Exposure

1. Maintain current fish advisory and postings for the Bound Brook and New Market Pond.

Site Characterization

1. New environmental, toxicological, health outcome data, or changes in conditions as a result of implementing the proposed remedial plan, may determine the need for other additional actions at this site.

Public Health Action Plan

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. The public health actions to be implemented by ATSDR and NJDHSS are as follows:

Public Health Actions Undertaken by ATSDR and NJDHSS


1. Environmental data have been evaluated within the context of human exposure pathways and relevant public health issues.
2. NJDHSS, NJDEP, and NJDOA in coordination with the USEPA issued a interim fish advisory for the entire length of the Bound Brook, Middlesex County and posted signs warning the public not to consume fish from 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.
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

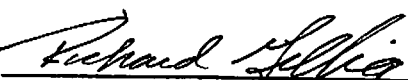
1. This document will be provided to the South Plainfield Health Department, Middlesex County, New Jersey.
2. NJDHSS and ATSDR will assist the South Plainfield Health Department (SPHD) by providing public health education materials and professional expertise to explain the potential implications of human 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. As additional data becomes available on the extent and degree of off-site contamination, provide health education to residents on ways to reduce their potential exposure to PCBs present in surface soils. ATSDR will provide an annual followup 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, AT&SDR

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Documents Reviewed

1. Roy F. Weston, Inc., Soil/Sediment Sampling Results (Figure 1 to 11), Bound Brook (Cornell-Dubilier Electronics Inc., Site), 1997.
2. US Environmental Protection Agency, Sampling Results, CDE Site, September 9, 1998.
3. National Priorities List (NPL) Update, Cornell Dubilier Electronics Inc., South Plainfield, New Jersey, EPA, September 1997.
4. Fish Consumption Advisory for Bound Brook, New Market Pond, and Spring Lake, Middlesex County, ATSDR, August 1997.
5. Bound Brook Sampling and Edible Fish Tissue Data Report, Cornell Dubilier Electronics Site, South Plainfield, New Jersey, Environmental Response Team Center, Office of Emergency and Remedial Response, EPA, July 1997.
6. Agency For Toxic Substances and Disease Registry. Health Assessment Guidance Manual. Chelsea, Michigan: Lewis Publishers, 1992.
7. ATSDR Toxicological Profile for Polychlorinated Biphenyls, US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, April 1999.
8. ATSDR Case Studies in Environmental Medicine, Polychlorinated Biphenyl Toxicity, US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, June 1990.