Public Health Assessment for

CORNELL DUBILIER ELECTRONICS INCORPORATED
SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY
CERCLIS NO. NJD981557879
SEPTEMBER 20, 2000

U.S. DEPARTMENT OF HEALTH
Public Health Service
Agency for

PUBLIC HEALTH ASSESSMENT

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

Prepared by:

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

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in the format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several health consultations - the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly, chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-56), Atlanta, GA 30333.

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ACRONYMS

ATSDR	Agency for Toxic Substances and Disease Registry
EPA	United States Environmental Protection Agency
FDA	United States Food and Drug Administration
NJDEP	New Jersey Department of Environmental Protection
NJDHSS	New Jersey Department of Health and Senior Services
NJDOA	New Jersey Department of Agriculture
SPHD	South Plainfield Health Department
MCPHD	Middlesex County Public Health Department

SUMMARY

The Cornell Dubilier Electronics, Incorporated (CDE) site (also known as the Hamilton Industrial Park) is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey. From 1936 until 1962, CDE manufactured electronic parts and components, including capacitors, at the site. CDE also tested transformer oils. It is alleged that the company dumped materials that were contaminated with polychlorinated biphenyls (PCBs) and other hazardous substances directly onto the ground.

In 1994 the U.S. Environmental Protection Agency (EPA) found that on-site soil contained PCBs and trichloroethylene at levels that were significantly above background. PCBs were also found in soil and indoor dust at residential properties located across the street from the CDE site at levels of public health concern. Fish collected from the nearby Bound Brook contained PCBs at levels above the U.S. Food and Drug Administration tolerance level, resulting in a fish consumption advisory for the entire length of the Bound Brook, New Market Pond, and the streams that feed into them.

In addition to this public health assessment, the Agency for Toxic Substances and Disease Registry (ATSDR) and the New Jersey Department of Health and Senior Services (NJDHSS) have completed several (9) health consultations for the CDE site between 1996 and 2000. The ATSDR and NJDHSS have concluded that the CDE site, in its present state, poses a public health hazard to area residents because site-related contaminants are migrating to off-site properties and local waterways. Supportive findings include PCBs in fish collected in surface water near the site that exceed FDA tolerance levels for PCBs; elevated levels of PCBs were detected in indoor dust and the surface soils at residential properties that may pose a health concern or potential health concern to the residents; and, workers and trespassers (adults and children) are likely exposed to PCBs at the site at levels of public health concern.

The ATSDR and the NJDHSS have prepared fact sheets for the CDE site for distribution through the local health department to area residents. The NJDHSS will also assist the Middlesex County Public Health Department (MCPHD) in providing community and health care provider education. The Piscataway Township Health Department (PTHD) has posted warning signs at the New Market Pond in English and Spanish advising people not to eat fish from the pond. The PTHD also checks the signs weekly, and replaces them as necessary. The NJDHSS will assist the PTHD in developing signs that are easily understandable by individuals who do not read English or Spanish regarding the consumption of fish from the New Market Pond. In addition, the NJDHSS will determine what additional languages are likely to be spoken in Piscataway for the purpose of developing signs in languages other than English and Spanish.

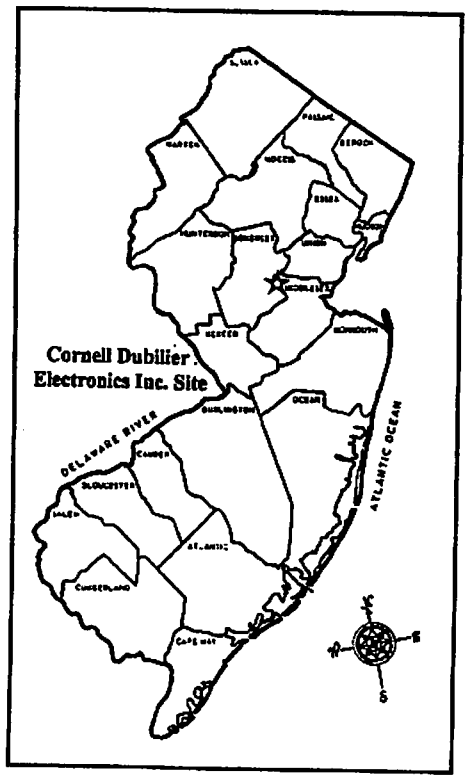
BACKGROUND

The ATSDR and the NJDHSS have completed several (9) health consultations for the CDE site between 1996 and 2000. This public health assessment summarizes and evaluate the activities undertaken and/or planned by the ATSDR and the NJDHSS at the site.

A. Site Description and History

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. An unnamed tributary of the Bound Brook borders the property on the southeast. The Bound Brook and the unnamed tributary 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 unnamed tributary just north of the site. Other industries are scattered to the northeast and east of the site, on the side opposite the Conrail tracks.

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. Numerous companies have rented locations at the site and operated businesses there over the years. A paved driveway is used to enter the industrial park, and the grounds surrounding the buildings are paved. A vacant field at the back of the buildings is fenced and posted with signs indicating the presence of hazardous material.



In June 1994, soil, surface water, and sediments were sampled and analyzed by EPA. The results of the sample analyses indicated that concentrations of PCBs and trichloroethylene (TCE) in on-site soils were significantly above background levels (background levels are levels typical of naturally occurring concentrations or of concentrations found in uncontaminated areas). EPA conducted additional soil and sediment sampling in February, 1996. PCBs, alpha-chlordane, and TCE were detected in the soil samples, and PCBs were detected in sediment samples, at levels significantly above background levels.

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. At least two fisheries are known to exist within the target distance limit. A sediment sample collected from the stream near the back of the property indicated the presence of PCBs, TCE, 1,2-dichloroethene, and lead. PCBs, 1,2-dichloroethene, TCE, and heavy metals were also detected in surface water samples collected from the same location. In addition, EPA collected soil samples from residential properties bordering the site and initiated a study of the nearby waters of the Bound Brook in June 1997. As part of this study, samples of sediment and fish were collected from the Bound Brook and New Market Pond. Fish collected from the Bound Brook were found to contain PCBs at levels higher than the U.S. Food and Drug Administration (FDA) tolerance level of 2.0 parts per million (ppm). In response to the level of PCBs detected in the fish, on August 8, 1997, the NJDEP, the NJDHSS and the 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 provided a short fact sheet for use by the local health department describing the reasons for the advisory. In August 1998, the NJDEP, the NJDHSS and NJDA, in coordination with the USEPA, issued the final fish consumption advisory for the entire length of the Bound Brook including Spring Lake.

In October 1997, EPA collected surface soil samples from 16 residential properties located across the street from the CDE site. The soils were analyzed for PCBs. Approximately 20 surface soil samples were collected from each residential property. PCB levels in surface soils ranged from not detectable to 22 ppm. In addition, on November 17 and 18, 1997, EPA collected indoor dust samples from 12 residential properties located across the street from the CDE site. Samples were collected from carpeted and non-carpeted areas. Between 2 and 4 samples were collected from each house, yielding a total of 37 samples. The dust samples were analyzed for PCBs using EPA method 8080/SW-846. The objective of this analysis was to determine the extent of PCB contamination in residences southwest of the site. PCB levels in indoor dust ranged from not detectable to 205 ppm (or 117 micrograms (ug) total PCBs in sample mass).

Due to the extensive on-site contamination and migration of contaminants, the EPA has issued a Superfund order in 1997, to the property owners (CDE), to conduct the following clean-up actions: 1) restrict access to areas known to be contaminated with PCBs; 2) take necessary actions to limit the movement of contaminants to Bound Brook through surface water runoff; and 3) pave driveways and parking areas within the industrial park.

Previous ATSDR and NJDHSS Activity

The ATSDR and the NJDHSS have completed several health consultations for the CDE site in 1996, 1997, 1998 and 1999, and 2000. The following are summaries of the activities:

Health Consultation of September 1996

The EPA Region II requested that ATSDR review analytical data from a fenced area at the site and determine whether PCBs in the soil were at levels of public health concern. ATSDR completed a health consultation for the site in September 1996 **(Appendix 2)**.

The health consultation reported that a fenced area of 1.5 acres was the location of a truck driving school. The school was reported to have been in operation 8 hours a day, 6 days a week since February 1996. Tractor trailers maneuver in the fenced area, while instructors outside the vehicles guide the drivers through their training. Although the composition of the ground surface within the fenced area varies, it generally consists of a compacted mixture of soil, rock, and crushed brick. When weather conditions are dry, dust is airborne within the fenced area during truck maneuvers; this may result in significant exposure (through inhalation) to dust containing PCBs, and may result in off-site migration of PCBs. The ATSDR concluded the following:

1. PCBs are present in the surface soil at levels of public health concern in the fenced area;

2. PCBs may be migrating off the site during dry conditions when dust is generated during truck maneuvers; and,

3. The extent of PCB contamination in soil in the fenced area has not been adequately defined.

ATSDR recommended the following activities:

1. Immediately stop exposure to PCBs in soil in the fenced area;

2. Prevent off-site migration of PCBs in dust or soil; and,

3. Characterize the extent of contamination in the fenced area.

Health Consultation of October 1996

The EPA Region II requested that the ATSDR review analytical data from the CDE site and determine if contaminants in the soil are at levels of public health concern. ATSDR completed a health consultation for the site in October 1996 **(Appendix 3)**. Based on the limited analytical data collected at the CDE site, the following conclusions were made:

1. The limited sampling (23 sample locations for 25 acres) was inadequate to completely characterize the extent of contamination at the site;

2. Lead concentrations that present a public health concern were not widespread across the site; however, lead in one area was at a level of public health concern;

3. Cadmium was not present in on-site surface soil at levels of public health concern; and,

4. PCBs were present at levels of public health concern in sampled areas at the site. Chronic exposure to PCBs in surface soils presents a public health concern to on-site workers and trespassers.

Recommendations were made to conduct the following activities:

1. Conduct additional sampling to adequately characterize the extent of contamination at the site;

2. Prevent exposure to PCBs in surface soil at levels of public health concern; and,

3. Prevent off-site migration of PCBs in dust or soil.

Health Consultation of May 1997

The EPA Region II requested that the ATSDR comment on the public health threat posed by indoor PCB contamination at the CDE site. ATSDR completed a health consultation for the CDE site in May 1997 **(Appendix 4)**.

The following conclusions were made by ATSDR:

1. The site poses a potential health threat to workers due to the presence of PCBs indoors. Although short-term effects are not likely to occur with 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; and,

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 qualitatively estimating potential human exposures.

Recommendations were made to perform the following activities:

1. Conduct indoor air sampling to determine the potential health threat posed by cadmium and lead contamination. If a building is unoccupied, aggressive sampling should be conducted to simulate activity;

2. If any workers are experiencing health effects, they should be evaluated by a health care provider for PCB exposure; and,

3. This site will be considered for an exposure investigation by the ATSDR Exposure Investigation section.

Health Consultation of March 1997

At the request of the Health Officer of the Borough of South Plainfield, a meeting was held on February 5, 1997, which was attended by representatives of the South Plainfield Health Department (as of June 1998, the Plainfield Health Department has been under contract with the Middlesex County Public Health Department), the NJDHSS, the ATSDR Region II, and the EPA Region II.

During the meeting various exposure pathways and levels of contaminants were discussed. The surface soil sampling events have indicated the presence of PCBs, lead, and cadmium at levels of public health concern at various locations on the CDE site. Based on the results of the June 1996 samplings, which showed high levels of PCBs in the surface soil of the fenced and unpaved area used for a truck driving school, the permit for operating a truck driving school within this area was revoked by the Borough of South Plainfield in October of 1996.

As requested by the Health Officer for South Plainfield, NJDHSS and ATSDR will assist the South Plainfield Health Department by providing public health education materials (primarily in the form of fact sheets) and professional expertise to explain the potential implications of human exposure to PCBs (**Appendix 5**).

The ATSDR recommended that, as soon as practicable, EPA, with the assistance of NJDHSS and ATSDR, should determine and take all necessary and appropriate interim actions which would be required to interrupt the potential exposure pathway caused by dust generation on the dirt/gravel road which traverses the site property.

Health Consultation of July 1997

EPA Region II requested that ATSDR determine the health implications to emergency personnel (such as police officers, fire fighters, and medical personnel) who may come in contact with PCB contamination at the CDE site. ATSDR completed this health consultation in July 1997 (**Appendix 6**) . ATSDR concluded that the site does not pose a health threat to fire fighters, police, medical personnel, or other emergency personnel due to the anticipated short duration of exposure to PCBs. The health consultation recommended that the personnel accessing the site and coming in contact with contaminated areas should perform appropriate decontamination procedures prior to exiting the site.

Health Consultation of September 1997

EPA Region II requested that ATSDR review analytical data of fish samples collected from surface water near the CDE site and determine if PCBs are present in fish at levels of public health concern.

Available information indicated that fish were being caught and eaten from the Bound Brook and New Market Pond (**Appendix 7**) . The ATSDR concluded that PCBs in fish collected in surface water near the CDE site exceed FDA tolerance level of 2.0 ppm PCBs in fish, and are at levels of

public health concern. ATSDR recommended that fish with PCB levels greater than 2 ppm in the edible portion should not be eaten.

Health Consultation of May 1998

The EPA requested that the ATSDR evaluate analytical data from residential properties located across the street from the site and determine if PCBs in indoor dust and surface soils are at levels of public health concern. ATSDR completed a health consultation for the site in May 1998 (**Appendix 8**) . The following conclusions were made by ATSDR:

1. Elevated levels of PCBs were detected in indoor dust and in surface soils at residential properties that may pose a health concern or potential health concern to the residents. The health evaluations for the residential properties are presented in Appendix 8;

2. The nature and extent of off-site migration of PCB-contaminated dust via wind has not been determined; and,

3. The nature and extent of surface soil PCB contamination in this residential community has not been determined.

Recommendations were made to conduct the following activities:

1. Prevent potential exposure to PCBs in surface soil at levels of public health concern. ATSDR believes that an interim measure or permanent solution to the contaminated residential yards and/or indoor dust should be put in place within six months;

2. As additional data become 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 indoor dust and surface soils. ATSDR will assist in the health education at this site through DHAC's Community Involvement Branch;

3. Appropriate cleaning methods should be used in the homes where elevated levels of PCBs were detected in indoor dust. Wet/damp dusting and mopping on floors and hard surfaces with a mineral-based cleaning solution should be used to help clean up PCBs. Carpets should also be shampooed with these products. Prior to cleaning of the home interior surfaces by EPA, the use of a regular vacuum cleaner to remove dust is not recommended unless a HEPA filter is placed on the vacuum cleaner exhaust;

4. As needed, additional dust suppression techniques should be used at the site to prevent off-site migration of contaminated dust;

5. Conduct indoor dust sampling at residential properties where only surface soil sampling was conducted; and,

6. Determine if other residences in the area are contaminated (include soil samples from properties located upwind of the facility).

Health Consultation of October 1999

The EPA Region II Removal Action Branch requested that the ATSDR and the 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) Do the data present a public health hazard?

(2) What does ATSDR/NJDHSS recommend?

The soil and sediment samples were analyzed for total PCBs.The NJDHSS and the ATSDR completed a health consultation for the site in October 1999 **(Appendix 9)**. The following conclusions were made by the NJDHSS and the ATSDR:

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

2. 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.

Recommendations were made to conduct the following activities:

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

2. 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.

Heatlh Consultation of May 2000

The EPA Region II Removal Action Branch requested that the ATSDR and the NJDHSS evaluate the June 1999 surface soil and sediment sampling data from the floodplain of Bound Brook in order to respond to the following questions:

(1) Do the data collected in June of 1999 present a public health hazard?

(2) What does ATSDR/NJDHSS recommend if similar levels of PCBs are detected in residential areas?

The soil and sediment samples were analyzed for total PCBs.The NJDHSS and the ATSDR completed a health consultation for the site in May 2000 **(Appendix 10)**. The following conclusions were made by the NJDHSS and the ATSDR:

1. Based on available data reviewed, for the four areas located in the floodplain of theBound Brook, pose **no apparent public health hazard** to children and adults who utilize these areas for recreational purposes. The ATSDR and the NJDHSS have concluded that surface soils and sediment PCB contamination, in the four areas sampled in June 1999, do not exist at levels of public health concern for the recreational user.

2. Similarly, based on reported concentrations and the exposure assumptions, it-is unlikely that a hypothetical resident would experience adverse health effects as a result of chronic exposure to PCB soil and sediment contamination in the four areas sampled in June 1999. 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 were made to conduct the following activities:

1. 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

B. Site Visit

Several site visits have been made to the Cornell Dubilier Electronics site in recent years by the ATSDR and the NJDHSS. The most recent visit to the site was on March 23, 1998. Steve Miller and Narendra P. Singh of NJDHSS, an EPA representative, and representatives of the owners of the property visited the site.The following observations were made during the visit.

The CDE property, now known as Hamilton Industrial Park, is an actively used industrial property that includes numerous brick buildings. Approximately 15 tenant-occupied commercial businesses employing approximately 200 individuals are currently operating on the property. The area is potentially accessible to trespassers.

A storm and drain sewer discharges into the unnamed tributary to the Bound Brook on the northeastern border of the site, although there did not appear to be a significant current in the drainage channel. The confluence of the unnamed creek and the Bound Brook is approximately 800 meters downstream of the site. The Bound Brook then flows west for approximately 3,000 meters and enters New Market Pond. According to local health officials fish are being caught from both the Bound Brook and the New Market Pond, and the fish advisory is being ignored by a few residents.

A roadway nearly encircles the structures at the site, and the roadway separates the structures from a vacant field. Driveways and parking areas within the industrial park are paved. The southeastern portion of the vacant field is fenced and secured, making trespassing difficult. There is also a fence along a portion of the edge of the site bordering the stream. The remainder of the vacant field contains shrubs, high grass, and other vegetative cover. The ground surface is generally hard and appears to have been compacted. There are trees along Spicer Avenue, and trees line the area between the field and the stream.

C. Demographics, Land Use, and Natural Resource Use

The surrounding area is primarily commercial and industrial in character, lightly mixed with residential properties. Approximately 500 persons reside within a quarter mile of the CDE site. The nearest residential homes are on Spicer Avenue and on the opposite side of Hamilton Boulevard, less than 200 feet from the site. The total number of people estimated to live within 1 mile of the site is 9,900.

A summary of population statistics within 1 mile of the CDE site, calculated using an area-proportion spatial analysis technique, is presented in **Appendix 1**. On the basis of data from January 1994, the nearest municipal drinking water well is located 0.6 miles north and downgradient of the site. The drinking water purveyors serving people within a 4-mile radius of the site use supply wells that are within 4 miles of the site. Groundwater is a significant source of drinking water in this radius. The majority of the residents are served by the Middlesex or Elizabethtown water companies from these supply wells. The supply wells are blended with surface water, mainly from the Raritan River and the Delaware-Raritan Canal, which are reportedly not located in the surface water flow path from the site.

COMMUNITY HEALTH CONCERNS

To gather information on community health concerns, NJDHSS contacted the SPHD and the EPA. The community concerns are related to off-site migration of site contaminants and their effects on residents of neighboring properties, the health risks associated with PCBs, and the community's role

in the decision-making process. The Edison Wetlands Association expressed concern regarding subsistence fishing in the New Market Pond. All of these concerns are addressed in the community health concerns evaluation section.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

This section lists the contaminants of concern for the site. ATSDR and NJDHSS evaluate these contaminants in the subsequent sections of the public health assessment to determine whether exposure to the contaminants is a matter of public health significance. ATSDR and NJDHSS select and discuss these contaminants when the concentration of the contaminant is above health comparison values. These values may include ATSDR's environmental media evaluation guides (EMEGs) and cancer risk evaluation guides (CREGs), New Jersey soil action levels (NJSALs), and New Jersey maximum contaminant levels (NJMCLs). Selected contaminants are further evaluated in subsequent sections of this public health assessment to determine whether exposures to these contaminants are likely to result in harmful health effects in humans. When selected as a contaminant of concern in one medium (such as water, soil, or air), that contaminant is reported for all media. Community health concerns are also evaluated.

In the data that follow in the subsections for on-site and off-site contamination, the listing of a contaminant does not mean that exposure to the contaminant will cause adverse health effects. The list only indicates which contaminants will be evaluated further in this public health assessment.

A. On-Site Contamination

Soil

EPA collected 2 soil samples from each of 23 locations at the site: a surface soil sample (0–3 inches below grade) and a subsurface sample (> 3 inches below grade). This health assessment reviews analytical data from the surface soil samples because human exposure to soil contamination usually results from the surface soil. Twelve soil sampling locations were on the gravel part of the roadway, seven locations were in a vacant field, and four locations were on a footpath that runs north/south on the southeastern edge of the site.

The soil samples were analyzed for PCBs, lead, cadmium, silver, chromium, and mercury. EPA had requested that analytical results for PCBs, cadmium, and lead be evaluated for potential public health threats. Lead was detected in all surface soil samples collected from the roadway, vacant field, and footpath. Lead concentrations in the roadway samples ranged from 29 ppm to 340 ppm, with an average concentration of 167 ppm. With one exception, lead concentrations in the vacant field samples ranged from 66 ppm to 546 ppm, with an average concentration of 279 ppm. The one exception for lead was a location with a concentration of 21,000 ppm. Lead concentrations in the 4 footpath samples were 29 ppm, 105 ppm, 543 ppm, and 1,770 ppm, with an average of 612 ppm. The NJDEP has established a non-residential cleanup level for lead at 600 ppm.

Cadmium was detected in 11 of the 12 roadway samples at concentrations ranging from less than 1 ppm to 19 ppm, with an average concentration of 3 ppm. Cadmium concentrations in the vacant field samples ranged from 1.1 ppm to 152 ppm, with an average concentration of 27.4 ppm. Cadmium was detected in 3 of the 4 footpath samples at concentrations ranging from 1.2 ppm to 51.4 ppm, with the average concentration being 18.9 ppm. The NJDEP non-residential soil cleanup level for cadmium is 100 ppm.

PCBs were detected in all surface soil samples collected from the roadway, vacant field, and footpath. PCB concentrations in the roadway samples ranged from 8 ppm to 340 ppm, with an average concentration of 87.5 ppm. With one exception, PCB concentrations in the vacant field samples ranged from 4.9 ppm to 100 ppm, with an average concentration of 42.4 ppm. The one exception was a vacant field sample that contained PCBs at 3,000 ppm. One footpath sample contained PCBs at a concentration of 1,000, but the other footpath samples had PCB concentrations ranging from 3.6 ppm to 90 ppm, with an average concentration of 36.5 ppm. The NJDEP non-residential soil cleanup level for PCBs is 2 ppm.

In addition, a number of surface soil and subsurface soil samples were collected from the fenced area at the back of the property. Four surface soil samples (0–3 inches or 0–6 inches) were collected and analyzed for PCBs. The PCB Aroclor 1254 was detected at the following concentrations in surface soil samples.

Sampling Point	Concentration of Aroclor 1254 (mg/kg)
0–6 inches	270
0–3 inches	4,700
0–6 inches	98
0–6 inches	51,000

Sampling of Building

On March 21, 1997, the EPA Environmental Response Team supervised the collection of wipe samples for PCB analysis 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" × 3" cotton gauze pad over an area of 100 square centimeters (cm sq).

ATSDR was provided with the 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 and 1260) were present on various interior surfaces. Total PCBs ranged from not detectable to 680 micrograms per 100 cm sq. Approximately one-half of the wipe samples exceeded 10 micrograms per 100 cm sq (combined Aroclors 1254, 1260). The EPA has developed a PCB spill cleanup policy which requires that PCBs be cleaned to a level no higher than 10 micrograms per 100 cm sq for high contact surfaces. Cadmium concentrations ranged from not detectable to 34 micrograms per 100 cm sq. Lead concentrations ranged from not detectable to 780 micrograms per 100 cm sq.

B. Off-Site Contamination

Residential Soil and Dust

In October 1997 the EPA collected approximately 20 surface soil samples from each of 16 residential properties located across the street from the site. In November of that year they also collected between two and four indoor dust samples from 12 of those properties. Both the soil and dust samples were analyzed for the presence of PCBs. Soil samples contained levels of PCBs ranging from not detectable to 22 ppm. PCBs in dust samples ranged from not detectable to 205 ppm (or 117 micrograms total PCBs in sample mass).

Toxicologic evaluations of these data by the ATSDR indicate that three of the residences contained levels of PCBs in surface soil and indoor dust at a level of public health concern. One residence had levels at no public health concern; the remaining 12 were at levels of potential public health concern. Appendix 8 further discusses these evaluations.

Fish Sampling

Fish sampling was conducted by the USEPA, in surface waters adjacent to and near the CDE site, and fish were collected from the following locations:

1. Three areas of the Bound Brook located downstream from the CDE site.
2. Two areas of New Market Pond.
3. The unnamed creek at a location immediately adjacent to the CDE site.
4. The unnamed creek at a reference location 1,000 meters upstream of the CDE site.

Fish filets were analyzed for PCBs. **Table 1** shows the maximum concentrations of PCBs in the fish collected near the site.

Table 1. Maximum concentrations of PCBs detected in fish filets

Location	Concentration (parts per million)
Bound Brook	12.2
New Market Pond	36.0
Adjacent creek	9.8
Reference Location (upstream)	7.8

Note: Fish ranged in total length from 4.1 to 25.6 inches (average: 10.9 inches). Fish ranged in total weight from 0.8 to 35.4 ounces (average: 9.7 ounces). The tolerance level set by the FDA for edible fish is 2 ppm of PCB.

C. Quality Assurance and Quality Control

In preparing this public health assessment, ATSDR and NJDHSS relied on the information provided in the referenced documents and assumed that adequate quality assurance and quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of analyses and conclusions drawn for this health assessment is determined by the completeness and reliability of the referenced information. Environmental samples were analyzed under the guidelines of the EPA-certified laboratory program.

D. Physical and Other Hazards

The CDE site is partially fenced and posted with hazard and "no trespassing" signs; the primary physical hazard to trespassers is the uneven surface of the vacant field.

PATHWAYS ANALYSIS

To determine whether nearby residents or workers at the CDE site are exposed to site-related contaminants, ATSDR and NJDHSS evaluate the environmental and human components that lead to human exposure. This pathways analysis consists of five elements: (1) a source of contamination; (2) transport through an environmental medium; (3) a point of human exposure; (4) route of human exposure; and (5) a receptor (exposed) population. ATSDR and NJDHSS classify exposure pathways into three groups: (1) "completed pathways," that is, those in which exposure has occurred, is occurring, or will occur; (2) "potential pathways," that is, those in which exposure might have occurred, may be occurring, or may yet occur; and (3) "eliminated pathways," that is, those that can be eliminated from further analysis because one of the five elements is missing and will never be present, or in which no contaminants of concern can be identified. A summary of the pathways for the CDE site is discussed in the following section and presented in **Table 2**.

A. Completed Exposure Pathways

Surface Soil Pathway (On-Site Workers and Trespassers)

A limited sampling event was conducted at the CDE site to locate and identify potential sources of contamination. Although insufficient to fully characterize the extent of contamination of the 25-acre site, PCBs, lead and cadmium were detected at levels of public health concern. Because site access is not restricted and there are residences located nearby on Spicer Avenue, it is anticipated that on-site workers (adults), visitors and trespassers from nearby residences (adults and children) may be exposed to PCBs, lead and cadmium found in on-site soils through oral, inhalation, and dermal routes.

Residential Surface Soils and Indoor Dust Pathway (Off-Site)

Elevated levels of PCBs were detected in indoor dust and the surface soils at residential properties that may pose a health concern or potential health concern to the residents. The health evaluations for the residential properties are presented in Appendix 8. The nature and extent of off-site migration of PCB contaminated dust via wind and soil PCB contamination in this residential community has not been determined. It is likely that residents may be exposed to PCBs through ingestion and inhalation of soil and dust, as well as through dermal contact.

Consumption of Fish Pathway (Bound Brook and New Market Pond)

Local health officials report that fishing (and most likely consumption of fish) has occured in the past and is likely occuring at the Bound Brook and the New Market Pond. Based on the available data, ATSDR concluded that PCBs in fish collected in surface water near the CDE site exceed FDA tolerance levels for PCBs in fish, and are at levels of public health concern.

Table 2 presents a summary of the completed human exposure pathways at the CDE site.

Table 2. Completed exposure pathways

EXPOSURE PATHWAY ELEMENTS					
SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	TIME
CDE site	Surface Soil	On-site	Ingestion, inhalation, skin contact	Workers and trespassers	Present
CDE site	Fish	Bound Brook and New Market Pond	Ingestion	Consumers of fish from Bound Brook and New Market Pond	Present
CDE site	Surface soils and dust	Residential properties Located across the street from CDE site	Ingestion, inhalation, skin contact	Residents living in the houses located across the CDE site	Present

PUBLIC HEALTH IMPLICATIONS

A. Toxicological Evaluation

Introduction

In this section, NJDHSS will discuss the health effects in persons exposed to specific contaminants. To evaluate health effects, ATSDR has developed a minimal risk level (MRL) for contaminants

commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which noncancer adverse health effects are unlikely to occur. MRLs are developed for each route of exposure, such as ingestion and inhalation, and for the length of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (greater than 365 days). ATSDR presents these MRLs in Toxicological Profiles, which are chemical-specific profiles that provide information on health effects, environmental transport, human exposure, and regulatory status. In the following discussion, NJDHSS used information from the ATSDR Toxicological Profiles for the contaminants of concern at the site. NJDHSS uses an EPA reference dose (RfD) as a health guideline when an MRL is not available. This section contains discussion of the health effects in persons exposed to PCBs, cadmium, and lead from contaminated soil associated with the CDE site. Significance of the consumption of fish containing elevated levels of PCBs is also discussed, as is the significance of elevated PCB levels detected in the surface wipe samples collected from inside the buildings on the CDE site.

Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with. 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. 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, children may have greater adverse health effects than adults from both individual contaminants or mixtures of contaminants. This situation depends upon the specific chemical being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

The toxicological evaluation of the completed exposure pathway at the site is based upon an adult exposure duration of 40 years for trespassers and 30 years for on-site workers, and a duration of 10 years for children who are trespassers. Estimation of exposure doses for workers were based on the following assumptions: adult body weight of 70 kg; ingestion rate of 100 mg of soil per day; and 5 site visits a week for a period of 11 months per year. To estimate exposure doses of trespassers, the following assumptions were made: adult body weight of 70 kg; ingestion rate of 100 mg of soil per day; 2 site visits a week for a period of 8 months per year. For children, the following assumptions were made: child body weight of 20 kg; ingestion rate of 200 mg of soil per visit; 2 site visits a week for a period of 8 months per year.

PCBs

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.

Workers on the site, visitors and trespassers (adults and children) visiting the CDE site may be exposed to PCBs through ingestion, and to a lesser extent, inhalation and dermal contact with

contaminated surface soil. Exposure doses for PCB and subsequent theoretical lifetime excess cance risk estimates were calculated based upon the average reported concentrations of 87.5 ppm from th roadway and the maximum concentration of 3000 ppm detected from the vacant field.

Based on an immunosuppressive effect seen in monkeys chronically exposed to PCBs, ATSDR ha derived a chronic oral minimal risk level (MRL) for PCBs of 0.00002 mg/kg/day.

At the average concentration of PCBs detected (87.5 mg/kg), the estimated ingestion exposure dos for an adult worker of 3.7×10^{-5} mg/kg/day is slightly above the chronic oral MRL for PCBs. A such concentrations, noncarcinogenic health effects among adults are not generally expected. Th estimated exposure dose for an adult trespasser exposed to the average level of PCBs is 1.25x10 mg/kg/day, which is below the chronic oral MRL for PCBs. At such concentrations, noncarcinogeni health effects among adults are not generally expected. However, for a child trespasser, the estimate exposure doses of 1.57×10^{-4} mg/kg/day would exceed the chronic oral MRL. Exposure doses d not exceed the No Observed Adverse Effect Levels for chronic exposure in humans (for effects othe than cancer) cited in the ATSDR Toxicological Profile for PCB. However, at a soil concentratio of 3,000 ppm PCBs (the maximum concentration detected in any surface soil sample), the dose would exceed the MRL by more than 2 orders of magnitude for child trespassers and adult worker and by more than 1 order of magnitude for an adult trespasser. Additional exposure to PCBs b inhalation of PCB-laden dust and dermal absorption would potentially increase the received dose i both on-site workers and children who trespass. EPA has determined that PCBs are probable huma carcinogens. Carcinogenic risk based upon calculated exposures to the average soil concentratio of PCBs is estimated to be no apparent increased risk to adults, and a low increased risk to childre Carcinogenic risk based upon calculated exposures to the highest levels of PCBs detected i estimated to be a moderate increased risk for adult workers and children who trespass, and a lo increased risk for adult trespassers.

Lead

There is no current MRL or RfD for chronic oral exposure for lead. The NJDEP has established Residential Direct Contact Soil Cleanup Criteria level of 400 ppm lead in soil to protect agains elevated blood lead levels in children. The Centers for Disease Control and Prevention (CDC) ha stated that there is sufficient evidence that adverse health effects occur at blood lead levels at lea as low as 10 micrograms per deciliter in children.

Lead can affect nearly every system in the body, but is particularly harmful to the developing brai and nervous system of fetuses and young children. Low blood lead levels in children are associate with decreased intelligence and impaired neurobehavioral development, decreased stature an growth, and decreased hearing acuity. Lead is considered by EPA to be a probable huma carcinogen. However, there are limited data describing the carcinogenicity of lead in humans. A cancer slope factor for lead has not been established, so lifetime excess cancer risk estimates coul not be calculated.

The limited analytical data indicate that elevated lead levels in surface soil samples are not widespread across the site. One sample location indicated the presence of lead at levels greater than 21,000 ppm. However, the extent of the elevated lead levels in the area around this sample location has not been adequately characterized.

Cadmium

Cadmium was detected in most of the samples at average concentrations ranging from 3 ppm to 27.4 ppm. Exposure to cadmium may occur due to ingestion of contaminated soil or inhalation of cadmium-laden dust. Chronic exposure to low levels of cadmium via ingestion may adversely affect the kidneys and skeletal system. Inhalation of high levels of cadmium in air can damage the lungs, and chronic inhalation of low levels can cause kidney disease. Based on kidney effects in humans chronically exposed to cadmium, ATSDR has derived a chronic oral MRL of 0.0007 mg/kg/day. Using the standard default values described above, an adult ingesting soil containing 27.4 ppm cadmium (maximum average concentration) will receive a dose approximately 1 order of magnitude less than the MRL. A young child who trespasses on the site may receive a dose approximately 4 times less than the MRL. Therefore, adverse health effects are not likely from exposure to cadmium.

Indoor Wipe Sampling

PCB concentrations at this site have been detected as high as 680 micrograms per 100 cm sq on indoor surfaces (on-site buildings). PCBs at similar concentrations at other work places have been shown to raise serum PCB levels. EPA has developed a PCB spill clean-up policy under the Toxic Substances Control Act (TSCA). The TSCA spill policy calls for PCBs to be cleaned to 10 micrograms per 100 cm sq for high contact surfaces. In industrial settings, high contact surfaces are defined as surfaces that are repeatedly touched, often for long periods of time. Manned machinery and control panels are examples of high contact industrial surfaces. Based on assessment of risk posed by PCBs on indoor hard surfaces, the dermal exposure route would be expected to be the route of greatest concern. PCB levels on indoor surfaces of 10 micrograms per 100 cm sq. are associated with an estimated increased cancer risk of 1×10^{-5}. See Appendicies 4 and 8 for further information on the public health implications of PCB's in both on-site buildings and off-site residences, respectively.

Fish Sampling

Fish were collected from three areas of the Bound Brook located downstream from the CDE site; two areas of New Market Pond; the unnamed creek at a location immediately adjacent to the CDE site; and the unnamed creek at a reference location 1,000 meters upgradient of the CDE site. The Food and Drug Administration (FDA) has set tolerances for PCBs in the edible portions of fish at 2 ppm. Tolerances are established at levels that are sufficient for the protection of public health. The tolerance level of 2 ppm PCBs was exceeded in at least one sample of each of the species collected.

PCBs are persistent in the environment and break down slowly. ATSDR concludes that PCBs in fish collected in surface water near the CDE site exceed FDA tolerance levels for PCBs in fish and are at levels of public health concern.

B. Community Health Concerns Evaluation

Residents had expressed concerns regarding potential health effects associated with exposure to site-related contaminants. In August, 1997, the NJDEP, the NJDHSS and the NJDOA, in coordination with the USEPA issued an 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. This action was taken in response to a USEPA investigation of extensive PCB contamination at the CDE site.The USEPA identified levels of PCBs in carp, white suckers and largemouth bass collected from New Market Pond, an impoundment of the Bound Brook, which exceeded the U.S. Food and Drug Administration's 2.0 ppm tolerance level.

The concern by the Edison Wetlands Association that individuals continue to fish at the New Market Pond was investigated with the Piscataway Township Department of Health (PTHD). Local health officials report that, although there is some limited consumption of fish by subsistence anglers, most of the people who fish at the pond release their catch. The PTHD checks New Market Pond weekly to ensure that the fish advisory signs are still posted, and replace missing signs as needed. Advisories are posted in English and Spanish. Local health officials believe that most of the people who continue to consume fish from the pond are not English or Spanish speaking.

C. 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 waste sites. They are more likely 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 importantly, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

NJDHSS and the ATSDR evaluated the likelihood for children living near the CDE site to be exposed to contaminants at levels of public health concern. Children have been taken into account in the development of the public health implications for their exposures to site-related contaminants.

CONCLUSIONS

1. On the basis of the information reviewed, the ATSDR and the NJDHSS have concluded that the CDE site in its present state poses a public health hazard. Supportive findings include PCBs in fish collected in surface water near the site exceed FDA tolerance levels for PCBs; elevated levels of PCBs were detected in indoor dust and the surface soils at residential properties that may pose a health concern or potential health concern to the residents; and, workers and trespassers (adults and children) are likely exposed to PCBs at the site at levels of public health concern.

2. Available data and information do not adequately characterize the extent of contamination at the site. However, based on the available data 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. Wipe samples for lead and cadmium are useful as a qualitative indicator of contamination, but cannot be used to assess human exposures.

RECOMMENDATIONS

Cease/Reduce Exposure

1. Access to contaminated areas of the CDE site should be restricted as much as is practicable, and the area should be posted to warn potential site trespassers of the potential hazards.

2. Optimal dust control measures should be utilized during remediation of the site to prevent off-site migration of PCBs in dust or soil. An interim measure or permanent solution to the contaminated residential yards and/or indoor dust should be put in place as soon as possible.

3. Health education regarding appropriate cleaning methods (e.g., wet/damp dusting and mopping on floors and hard surfaces with a cleaning solution) in the homes where elevated levels of PCBs were detected in indoor dust should be conducted.

4. On-site workers should be advised of the potential health risks so that precautionary measures may be taken (for example, dust control measures).

5. Workers should discuss any health concerns regarding potential exposures with their health care providers. The ATSDR and the NJDHSS can supply appropriate information to health care providers regarding these contaminants and health.

6. Fish from the Bound Brook, the New Market Pond, Spring Lake, and their tributaries should not be consumed, as there is a fish consumption advisory currently in place for these waters.

Site Characterization

1. Additional sampling should be conducted to adequately characterize the extent of contamination at the CDE site and the surrounding community.

2. Indoor air sampling should be conducted to determine the potential health threat posed by cadmium and lead contamination because air sampling data would be more useful in estimating potential human exposures than wipe samples.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the CDE site contains a description of the actions to be taken by the ATSDR and/or the NJDHSS at or in the vicinity of the site subsequent to the completion of this public health assessment (PHA). The purpose of the PHAP is to ensure that this PHA 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 the ATSDR and the NJDHSS to follow up on this plan to ensure that it is implemented. The public health actions to be implemented by the ATSDR and the NJDHSS are as follows.

A. Public Health Actions Undertaken by the ATSDR and the NJDHSS

1. Environmental data have been evaluated within the context of human exposure pathways and relevant public health issues.

2. The NJDEP, the NJDHSS and the NJDOA, in coordination with the EPA, issued a 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. ATSDR provided support to these agencies in the development of the fish advisory. 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.

4. The Piscataway Township Health Department (PTHD) has posted warning signs at the New Market Pond in English and Spanish advising people not to eat fish from the pond. The PTHD also checks the signs weekly, and replaces them as necessary.

B. Public Health Actions Planned by the ATSDR and the NJDHSS

1. This Public Health Assessment document and the Citizen's Guide will be provided to the Middlesex County Public Health Department, Middlesex County, New Jersey.

2. NJDHSS and the ATSDR will assist the Middlesex County Public Health Department by providing public health education materials and professional expertise to explain the potential implications of human exposure to PCBs.

3. The NJDHSS will assist the PTHD in developing signs that are easily understandable by individuals who do not read English or Spanish regarding the consumption of fish from the New Market Pond.

4. The NJDHSS will determine what additional languages are likely to be spoken in Piscataway for the purpose of developing signs in languages other than English and Spanish.

5. As additional data becomes available on the extent and degree of off-site contamination, ATSDR and the NJDHSS will provide health education to residents on ways to reduce their potential exposure to PCBs present in indoor dust and surface soils.

6. 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 PHA.

DOCUMENTS REVIEWED

1. National Priorities List (NPL) Update, Cornell Dubilier Electronics Inc., South Plainfield, NJ, EPA, September 1997.

2. Health Consultation, Cornell Dubilier Electronics Incorporated, South Plainfield, Middlesex County, NJ, CERCLIS NO. NJD981557879, ATSDR, September 9, 1997.

3. Fish Consumption Advisory for Bound Brook, New Market Pond, and Spring Lake, Middlesex County, ATSDR, August 1997.

4. 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.

5. Health Consultation, Cornell Dubilier Electronics Incorporated, South Plainfield, Middlesex County, NJ, CERCLIS NO. NJD981557879, ATSDR, July 31, 1997.

6. Polychlorinated Biphenyls (PCBs) and Cornell Dubilier(Hamilton Industrial Park): Facts for Workers and Area Residents, ATSDR and South Plainfield, New Jersey, Health Department, May 1997.

7. Health Consultation, Cornell Dubilier Electronics Site (20GZ) (a.k.a. Hamilton Industrial Park), South Plainfield, Middlesex County, NJ, ATSDR, May 27, 1997.

8. ATSDR Record of Activity, Cornell Dubilier Electronics Site, South Plainfield, Middlesex County, NJ, ATSDR, March 11, 1997.

9. ATSDR Record of Activity, Cornell Dubilier Electronics, Log # 96-4046, S. Kinsler, September 17, 1996.

10. ATSDR Record of Activity, Cornell Dubilier Electronics Site, South Plainfield, Middlesex County, NJ, ATSDR, October 7, 1996.

11. Removal Site Evaluation for the Cornell Dubilier Electronics Site (A.K.A.: Hamilton Industrial Park), South Plainfield, Middlesex County, New Jersey. O.S.C., Removal Action Branch, Region II, EPA.

12. Toxicological Profile for Lead, Update, US Department of Health and Human Services, Public Health Service, ATSDR, April 1993.

13. Toxicological Profile for Cadmium, Update, US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, April 1993.

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

15. 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.

16. Preventing Lead Poisoning in Young Children, Centers for Disease Control and Prevention, October 1991.

Certification

The Public Health Assessment 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 Public Health Assessment was initiated.

Gregory V. Ulirsch
Technical Project Officer
Superfund Site Assessment Branch (SSAB)
Aivision of Health Assessment and Consultation (DHAC)

The Division of Health Assessment and Consultation, ATSDR, has reviewed this Public Health Assessment and concurs with its findings.

Richard Gillig
Chief, SSAB, DHAC, ATSDR

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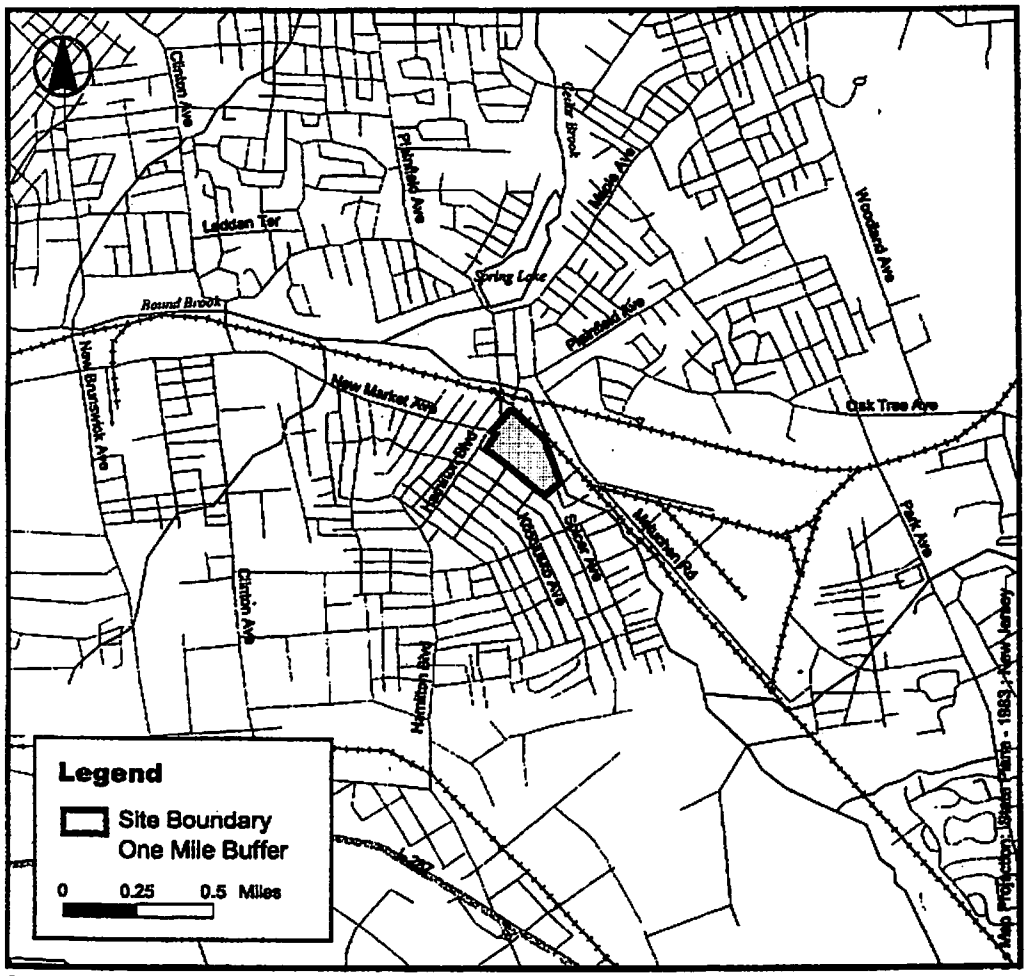
Appendix 1 - Demographic Information

Figure 1 - Demographic Information

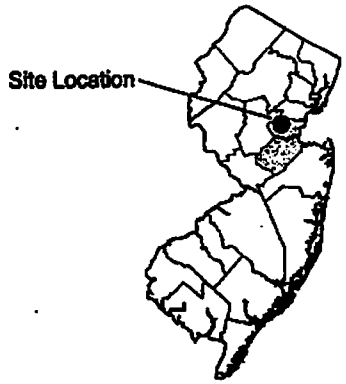
Cornell Dubilier Electronics Inc.

South Plainfield, New Jersey

CERCLIS No. NJD981557879



Base Map Source: 1995 TIGER/Line Files



Middlesex County, New Jersey

Demographic Statistics Within One Mile of Site*	
Total Population	9889
White	8570
Black	586
American Indian, Eskimo, Aleut	20
Asian or Pacific Islander	549
Other Race	164
Hispanic Origin	448
Children Aged 6 and Younger	990
Adults Aged 65 and Older	1090
Females Aged 15 - 44	2362
Total Housing Units	3232

Demographics Statistics Source: 1990 U.S. Census
*Calculated using an area-proportion spatial analysis technique

Appendix 2 - Health Consultation (September 1996)

Name: Cornell-Dubilier Electronics
LOG #: 96-4046

ATSDR Record of Activity

ROUTING:
E. Skowronski
CS FILE

UID #: syk5 Date: 9-17-96 Time: _____ am _ pm _

Site Name: Cornell-Dubilier Electronics City: South Plainfield
Cnty: Middlesex State:NJ

CERCLIS #: _____ Cost Recovery #: 20GZ Region: 2

Site Status: (1) _ NPL x Non-NPL _ RCRA _ Non-Site specific _ Federal
(2) x Emergency Response _ Remedial _ Removal _ Other:

Activities

_ Incoming Call _ Public Meeting _ Health Consult _ Site Visit
_ Outgoing Call _ Other Meeting _ Health Referral _ Info Provided
_ Conference Call x Data Review _ Written Response _ Training
_ Incoming Mail _ Other

Requestor and Affiliation: (1) Nick Magriples
Phone: _____ Address: _____
City: _____ State: __ Zip Code: _____

Contacts and Affiliation

(31) Steve Jones _____ ( ) _____
( ) _____ ( ) _____

1-EPA 2-USCG 3-OTHER FED 4-STATE ENV 5-STATE HLT 6-COUNTY HLT
7-CITY HLTH 8-HOSPITAL 9-LAW ENFORCE 10-FIRE DEPT 11-POISON CTR
12-PRIV CITZ 13-OTHER 14-UNKNOWN 15-DOD 16-DOE
17-NOAA 18-OTHR STATE 19-OTHR CNTY 20-OTHR CITY 21-INTL
22-CITZ GROUP 23-ELECT. OFF 24-PRIV. CO 25-NEWS MEDIA 26-ARMY
27-NAVY 28-AIR FORCE 29-DEF LOG AGCY 30-NRC 31-ATSDR

Program Areas

_ Health Assessment _ Health Studies _ Tox Info-profile
_ Worker Health _ Petition Assessment _ Health Surveilnc
_ Tox Info-Nonprofile _ Admin _ Emergency Response
_ Disease Registry _ Subst-Spec Research _ Other (Technical Assist)
x Health Consultation _ Exposure Registry _ Health Education

Background and Statement of Issues:

The Region 2 U.S. Environmental Protection Agency (EPA) has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) review analytical data from a fenced area at the Cornell-Dubilier Electronics Site in South Plainfield, New Jersey, and determine if polychlorinated biphenyls (PCBs) in soil are at levels of public health concern.

The fenced area, which covers 1.5 acres, is the location of a truck

driving school. The school has reportedly been in operation since February 1996, 8 hours per day, 6 days per week. Tractor trailers maneuver in the fenced area, while instructors outside of the vehicles guide the drivers through their training. An office trailer, parking area, and 2 canopied rest areas with benches are in the fenced area. A barbecue is located near the office trailer.

Although the composition of the ground surface within the fenced area varies, it generally consists of a compacted mixture of soil, rock, and crushed brick. When weather conditions are dry, dust is airborne within the fenced area during truck maneuvers; this may result in significant exposure to PCB containing dust via inhalation, and may result in offsite migration of PCBs.

A number of surface soil and subsurface soil samples were collected from the fenced area and adjacent areas. Four surface soil (0 - 3 inches or 0 - 6 inches) were collected and analyzed for PCBs (exposure to soil contamination usually occurs in the top 3 to 6 inches, so subsurface soil analytical data are not evaluated for potential public health threats). Aroclor 1254 was detected at the following concentrations in surface soil samples.

Sampling Point	Concentration of Aroclor 1254 (mg/kg)
S23 (0 - 6 inches)	270
S25 (0 - 3 inches)	4,700
S24 (0 - 6 inches)	98
S29 (0 - 6 inches)	51,000

Discussion:

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: reproductive, endocrine, immunosuppressive, and carcinogenic effects have been observed in animal studies [1,2].

Based on an immunosuppressive effect seen in monkeys chronically exposed to PCBs, ATSDR has derived a chronic oral Minimal Risk Level (MRL) for PCBs of 2.0E-05 mg/kg/day; an MRL is defined as an estimate of daily human exposure to a dose of a chemical that is likely to be without an appreciable risk of adverse noncancerous effects over a specified duration of exposure.

Using standard default values (70 kg adult ingesting 50 milligrams of soil per day), an adult ingesting soil containing 51,000 ppm PCBs will receive a dose 3 orders of magnitude greater than the MRL. At a soil concentration of 4,700 mg/kg PCBs, the dose would exceed the MRL by 2 orders of magnitude. Additional exposure to PCBs by potential

Name: Cornell-Dubilier Electronics
LOG #: 96-4046

inhalation of dust and dermal absorption would potentially increase the received dose.

Conclusions:

Based on review of the data, ATSDR concludes:

PCBs are present in surface soil in the fenced area at levels of public health concern.

PCBs may be migrating off-site during dry conditions when dust is generated during truck maneuvers.

The extent of PCB contamination in soil in the fenced area has not been adequately defined.

Recommendations:

1. Immediately stop exposure to PCBs in soil in the fenced area.
2. Prevent off-site migration of PCBs in dust or soil.
3. Characterize the extent of contamination in the fenced area.

If further clarification is required, or additional information becomes available, please do not hesitate to contact this office at 404/639-0616.

Steven Kinsler, Ph.D. Date: September 19, 1996

Concurrence: Date: 9-19-96

References

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

2. 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.

cc:
PERIS
Ed Skowronski, Acting Chief, EICB
Steven Kinsler, Toxicologist, CS
Steve Jones, Region 2 ATSDR Regional Representative

Appendix 3 - Health Consultation (October 1996)

Name: Cornell-Dubilier Electronics
LOG #: 97-1004

ATSDR Record of Activity

FEB 4 2 55 PM '97

ROUTING:
~~E. Skowronski~~ EJS
CS FILE

UID #: syk5 Date: 10-7-96 Time: _____ am _ pm _

Site Name: Cornell-Dubilier Electronics City: South Plainfield
Cnty: Middlesex State:NJ

CERCLIS #: _____ Cost Recovery #: 20GZ Region: 2

Site Status: (1) _ NPL x Non-NPL _ RCRA _ Non-Site specific _ Federal
(2) _ Emergency Response _ Remedial _ Removal _ Other:

Activities

_ Incoming Call _ Public Meeting _ Health Consult _ Site Visit
_ Outgoing Call _ Other Meeting _ Health Referral _ Info Provided
_ Conference Call x Data Review _ Written Response _ Training
_ Incoming Mail _ Other

Requestor and Affiliation: (1) Nick Magriples
Phone: _____ Address: _____
City: _____ State:__ Zip Code: _____

Contacts and Affiliation

(31) Steve Jones _____ ( ) _____
(31) Arthur Block _____ ( ) _____

1-EPA 2-USCG 3-OTHER FED 4-STATE ENV 5-STATE HLT 6-COUNTY HLT
7-CITY HLTH 8-HOSPITAL 9-LAW ENFORCE 10-FIRE DEPT 11-POISON CTR
12-PRIV CITZ 13-OTHER 14-UNKNOWN 15-DOD 16-DOE
17-NOAA 18-OTHR STATE 19-OTHR CNTY 20-OTHR CITY 21-INTL
22-CITZ GROUP 23-ELECT. OFF 24-PRIV. CO 25-NEWS MEDIA 26-ARMY
27-NAVY 28-AIR FORCE 29-DEF LOG AGCY 30-NRC 31-ATSDR

Program Areas

_ Health Assessment _ Health Studies _ Tox Info-profile
_ Worker Health _ Petition Assessment _ Health Surveilnc
_ Tox Info-Nonprofile _ Admin _ Emergency Response
_ Disease Registry _ Subst-Spec Research _ Other (Technical Assist)
x Health Consultation _ Exposure Registry _ Health Education

Background and Statement of Issues

The Region 2 U.S. Environmental Protection Agency (EPA) has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) review analytical data from the Cornell-Dubilier Electronics Site in South Plainfield, New Jersey, and determine if contaminants in soil are at levels of public health concern [1].

The Cornell-Dubilier Electronics Site is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey. The approximately 25 acre site is located in an industrial/commercial/residential area and is bordered by commercial businesses and residences on the south, west and north, and on the southeast, east, and northeast by an unnamed tributary to Bound Brook [2]. It is estimated that 540 persons reside within 0.25 miles of the site; the nearest residence is approximately 200 feet from the site [2].

During the 1950s, Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, and tested transformer oils. Discarded electronic components were landfilled onsite and transformer oils contaminated with PCBs were reportedly dumped directly onto site soils. The company vacated the site in the early 1960s [2].

The site is currently known as the Hamilton Industrial Park and is occupied by an estimated 15 commercial businesses. Numerous companies have operated at the site as tenants over the years [2]. A paved driveway is used to enter the park; the pavement ends within 100 yards of entering the park. It has been observed that vehicles entering the industrial park during dry conditions create airborne dust [2]. The driveway leads into a dirt/gravel/stone roadway that nearly encircles the business structures at the site. The roadway separates the structures from a heavily vegetated vacant field. Currently, there are no access restrictions at the site other than a 1.5 acre fenced area in the southeast portion of the vacant field that was formerly used by a truck driving school [2]. Analytical data of contaminants in soil in the fenced area were evaluated in a previous ATSDR Record of Activity (AROA) [3].

On June 27 and 29, 1996, the U.S. EPA Superfund Technical Assessment and Response Team (START) collected 2 soil samples from each of 23 locations at the site; a surface soil (0 - 3 inches) sample and a subsurface (greater than 3 inches) sample were collected from each location.

Twelve soil sampling locations were on the gravel part of the roadway, 7 locations were in the vacant field, 4 locations were on the footpath that runs north/south on the southeastern edge of the site. Because human exposure to contaminants in soil usually occurs in the top 0 to 3 inches of soil, this consultation will review analytical data from the surface soil samples only.

The soil samples were analyzed for Target Compound List Polychlorinated Biphenyls (TCL PCBs) and Target Analyte List (TAL) lead, cadmium, silver, chromium, and mercury [2]. Sample locations were selected to locate and identify potential sources of contamination at the site [2]. The EPA has requested that analytical results for polychlorinated biphenyls (PCBs), lead, and cadmium be evaluated for potential public health threats [1].

Analytical Results

Lead

Lead was detected in all surface soil samples collected from the roadway, vacant field, and footpath. Lead concentrations in the roadway samples ranged from 29 parts-per-million (ppm) to 340 ppm (average concentration = 167 ppm). Lead concentrations in the 5 vacant field samples with detectable levels of lead ranged from 66 ppm to 546 ppm (average concentration = 279 ppm), except for 2 samples (sample plus duplicate) collected at 1 location (S6/S26); lead concentrations in these 2 samples were 21,800 ppm and 22,500 ppm. Lead concentrations in the 4 footpath samples were 29 ppm, 105 ppm, 543 ppm and 1,770 ppm. Exclusive of the 2 samples containing lead at 21,800 ppm and 22,500 ppm lead, only 1 sample of the remaining 21 samples contained lead at a concentration greater than 1,000 ppm (1,770 ppm).

Cadmium

Cadmium was detected in 11 of the 12 roadway samples at concentrations ranging from less than 1.0 ppm to 19.3 (average concentration = 3.0 ppm). Cadmium concentrations in the vacant field samples ranged from 1.1 ppm to 152 ppm (average concentration = 27.4 ppm). Cadmium was detected in 3 of the 4 footpath samples at concentrations ranging from 1.2 ppm to 51.4 ppm (average concentration = 18.9 ppm).

PCBs

PCBs were detected in all surface soil samples collected from the roadway, vacant field, and footpath. PCB concentrations in the roadway samples ranged from 8.0 ppm to 340 ppm (average concentration = 87.5 ppm). PCB concentrations in the vacant field samples ranged from 4.9 ppm to 100 ppm (average concentration = 42.4 ppm), except for one vacant field sample that contained PCBs at 3,000 ppm. PCB concentrations in the footpath samples ranged from 3.6 ppm to 90 ppm (average concentration = 36.5 ppm), except for one footpath sample that contained PCBs at 1,000 ppm.

Discussion

A limited sampling event was conducted at the Cornell-Dubilier site to locate and identify potential sources of contamination. Twenty-three sample locations were selected; this limited sampling is not an adequate characterization of the extent of contamination at the 25 acre site.

Because site access is not restricted and there are residences located nearby, it is anticipated that populations potentially exposed to contamination on-site will include on-site workers (adults) and trespassers from nearby residences (adults and children). It is not anticipated that infants and/or toddlers will frequently or regularly

access the site.

Lead

The Centers for Disease Control and Prevention (CDC) has indicated there is sufficient evidence that adverse health effects occur at blood lead levels at least as low as 10 micrograms per deciliter (ug/dL) in children [4]. Young children and fetuses are especially sensitive to the toxic properties of lead. Factors accounting for this susceptibility include the following: 1) the immaturity of the blood-brain barrier which allows entry of lead into the immature nervous system, 2) hand-to-mouth behavior and pica behavior (ingestion of nonfood items, such as soil) which leads to consumption of lead-contaminated media, 3) enhanced gastrointestinal absorption of lead (affected by the nutritional status of the child), 4) low body weight, and 5) the ready transfer of lead across the placenta to the developing fetus [4]. These factors put children exposed to lead at a much higher risk of developing adverse health effects than adolescents and adults.

Studies indicate that ingestion and inhalation of lead-contaminated media can contribute to elevated blood lead levels [4]. Blood lead levels in young children have been reported to be raised, on average, about 5 ug/dL for every 1,000 milligrams of lead per kilogram of soil or dust, and may increase 3 to 5 times higher than the mean response depending on play habits and mouthing behavior [4]. Blood lead levels of 10 ug/dL and above have been associated with adverse health effects such as developmental and hearing impairment, and reductions in intelligence quotient (IQ) in children [4,5].

The limited analytical data indicate that elevated lead levels in surface soil are not widespread across the site. One sample location (S6/S26) had very elevated levels of lead (greater than 21,000 ppm lead); however, the extent of the elevated lead levels in the area around this sample location has not been adequately characterized.

Cadmium

Cadmium was detected in most of the collected samples at average concentrations ranging from 3.0 ppm to 27.4 ppm. Exposure to cadmium may occur due to ingestion of contaminated soil or inhalation of cadmium-laden dust.

Chronic exposure to low levels of cadmium via ingestion may adversely affect the kidneys and skeletal system [6]. Inhalation of high levels of cadmium in air can damage the lungs, and chronic inhalation of low levels can cause kidney disease [6].

Based on kidney effects in humans chronically exposed to cadmium, ATSDR has derived a chronic oral Minimal Risk Level (MRL) of 7.0E-04 mg/kg/day; an MRL is defined as an estimate of daily human exposure to a dose of a chemical that is likely to be without an appreciable risk of adverse noncancerous effects over a specified duration of exposure.

Using standard default values (70 kg adult ingesting 50 milligrams of soil per day), an adult ingesting soil containing 27.4 ppm cadmium (maximum average concentration) will receive a dose approximately 1 order of magnitude less than the MRL. Assuming that young children (30 kg body weight) may trespass on the site and ingest soil (200 milligrams per day), a child ingesting soil that contains 27.4 ppm cadmium will receive a dose approximately 4 times less than the MRL.

PCBs

Elevated levels of PCBs were detected in surface soil samples collected at the site. Average concentrations of PCBs were 87.5 ppm, 42.4 ppm, and 36.5 ppm in the roadway, vacant field, and footpath surface soil samples, respectively.

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; reproductive, endocrine, immunosuppressive, and carcinogenic effects have been observed in animal studies [7,8]. PCBs have very low potential for producing acute toxic effects [8].

Based on an immunosuppressive effect seen in monkeys chronically exposed to PCBs, ATSDR has derived a chronic oral Minimal Risk Level (MRL) for PCBs of 2.0E-05 mg/kg/day; an MRL is defined as an estimate of daily human exposure to a dose of a chemical that is likely to be without an appreciable risk of adverse noncancerous effects over a specified duration of exposure.

Using standard default values (70 kg adult ingesting 50 milligrams of soil per day), an adult ingesting soil containing 36.5 ppm PCBs (lowest average concentration of the 3 areas sampled) will receive a dose approximately equivalent to the MRL. At a soil concentration of 3,000 ppm PCBs (maximum concentration detected in any surface soil sample), the dose would exceed the MRL by over 2 orders of magnitude.

Assuming that young children (30 kg body weight) may trespass on the site and ingest soil (200 milligrams per day), a child ingesting soil that contains 36.5 ppm PCBs will receive a dose approximately 1 order of magnitude greater than the MRL. At a soil concentration of 3,000 ppm PCBs, the dose would exceed the MRL by over 3 orders of magnitude. Additional exposure to PCBs by inhalation of PCB-laden dust and dermal absorption would potentially increase the received dose in both on-site workers and children that trespass.

Conclusions

Based on the limited analytical data collected at the Cornell-Dubilier Site, ATSDR concludes the following:

The limited sampling (23 sample locations for 25 acres) is not

adequate to completely characterize the extent of contamination at the site.

Lead concentrations that present a public health concern are not widespread across the site; lead concentrations in 1 area (sample location S6/S26) are at levels of public health concern.

The extent of lead contamination in the area of sample location S6/S26 has not been adequately defined.

Cadmium is not present in surface soil on-site at levels of public health concern.

PCBs are present at levels of public health concern in sampled areas at the site; chronic exposure to PCBs in surface soil presents a public health concern to on-site workers and trespassers.

Recommendations

Conduct additional sampling to adequately characterize the extent of contamination at the site.

Prevent exposure to PCBs in surface soil at levels of public health concern.

Prevent off-site migration of PCBs in dust or soil.

If further clarification is required or if additional information becomes available, please do not hesitate to contact this office at 404/639-0616.

Steven Kinsler, Ph.D. Date: October 30, 1996

Concurrence: Kenneth Orloff Date: 10/30/96

References

1. Personal Communication, S. Jones/S. Kinsler, September 23, 1996.

2. Personal Communication Series, S. Jones/S. Kinsler, N. Magriples/S. Kinsler, October 1996.

3. ATSDR Record of Activity (AROA), Cornell-Dubilier Electronics, South Plainfield, New Jersey, Log # 96-4046, S. Kinsler, 9-17-96.

4. Preventing Lead Poisoning in Young Children, A Statement by The Centers for Disease Control - October 1991, U.S. Department of Health and Human Services, Public Health Service.

5. Toxicological Profile for Lead, Update, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, April 1993.

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

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

8. 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.

cc:
PERIS
Ed Skowronski, Acting Chief, EICB
Steven Kinsler, Toxicologist, CS
Steve Jones, Region 2 ATSDR Regional Representative
Arthur Block, Region 2 ATSDR Senior Regional Representative
David Hutchins, TPO

Appendix 4 - Health Consultation (May 1997)

Health Consultation

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

May 27, 1997

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.

Timothy Walker, M.S.
Environmental Health Scientist

Concurred: Kenneth G. Orloff, Ph.D., DABT
Senior Toxicologist

cc:
EICB File (E32)
David Hutchins, TPO (E32)
PERIS (E32)
Mr. Jim Pasqualo
Program Manager
Division of Occupational and
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New Jersey Department of Health
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Trenton, New Jersey 08625-0360

Send to:

Arthur Block
Sr. ATSDR Regional Representative
EPA Region II
290 Broadway, North
18th Floor
New York, NY 10007

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.

Appendix 5 - Health Consultation (March 1997)

ATSDR Record of Activity

UID #: __ Date: 3/11/97 Time: ___ am _ pm _

Site Name: Cornell-Dubilier Electronics (AKA Hamilton Industrial Park)
City: South Plainfield Cnty: Middlesex State: NJ

CERCLIS #: NJ981557879 Cost Recovery #: 20GZ Region: 2

Site Status (1) _ NPL XX Non-NPL _ RCRA _ Non-Site specific _ Federal
(2) _ Emergency Response _ Remedial _ Other

Activities

_ Incoming Call
_ Outgoing Call
_ Conference Call
XX Incoming Mail
_ Public Meeting
XX Other Meeting
XX Data Review
_ Other
XX Health Consult
_ Health Referral
_ Written Response
XX Site Visit
XX Info Provided
_ Training

Requestor and Affiliation: Michael Bonk, Health Officer, South Plainfield Health Departrment

Phone: 908-226-7634 Address: 2480 Plainfield Avenue
City: South Plainfield State: NJ Zip Code: 07080

Contacts and Affiliation

(1) Arthur Block (Region 2) (2) Eric Wilson (Region 2) ( ) _____ ( ) _____

1=ATSDR 2=EPA 3=USCG 4=DOD 5=DOE 6=NOAA 7=Natl Respns Ctr 8=other Fed
9=State Hlth 10=State Env 11=other state 12=County Hlth 13=other county 14=City Hlth 15=other city
16=Hospital 17=Poison Ctr 18=Fire Dept 19=Law Enf 20=Priv Citzn 21=Ctzn Group 22=Elected Off
23=Priv Co. 24=News Media 25=Internatl 26=Other_____ 27=Unknown

Program Areas

_ Health Assessment
_ Petition Assessment
_ Emergency Response
XX Health Consultation
_ Health Studies
_ Health Survellnc
_ Disease Regstry
_ Exposr Regstry
XX Tox Info-profile
XX Tox Info-Nonprofile
_ Subst-Spec Resch
XX Health Education
_ Worker Hlth
_ Admin
_ Other

Narrative Summary:

At the request of the Health Officer of the Borough of South Plainfield, a meeting was held on February 5, 1997 which was attended by representatives of the South Plainfield Health Department (SPHD), the New Jersey Department of Health and Senior Services (NJDHSS), the Agency for Toxic Substances and Disease Registry (ATSDR) Region II, and the U. S. Environmental Protection Agency (EPA) Region II.

Historical Perspective

During the period 1936-1962, Cornell-Dubilier Electronics (CDE) manufactured electrical components, including capacitors, on this 25 acre property which is a potential NPL site. During some portion of that period it has been reported the CDE also tested transformer oils on the property. As a result, it has been alleged that CDE disposed of PCB-containing oil and other hazardous materials directly on the soil on site property. The CDE property, now known as Hamilton Industrial Park, is an actively used industrial property which includes numerous brick buildings and several Quonset huts. Approximately 15 tenant commercial businesses which employ some two hundred individuals currently occupy the property.

Summary of Previous Environmental Characterization

Environmental sampling of the property has been conducted by EPA on several occasions. In June, 1994 surface water (four locations), surface soil (six locations), and sediment (four locations) samples were taken on the property. In April, 1996 four air samples were taken along the perimeter of the fenced area in which a truck driving school operated. In June 1996 additional sampling (forty-eight soil samples and one sediment sample) was conducted in conjunction with pre-remedial site assessment. In July, 1996 eighteen additional soil samples were obtained, including six surface soil samples from within the fenced area, and twelve samples from six test pits dug o the property. These data have been summarized in the EPA Removal Site Evaluation dated January 9, 1997.

Public Health Implications of Site Contaminants

The surface soil sampling events have indicated the presence of polychlorinated biphenyls (PCBs), lead (Pb), and cadmium (Cd) at levels of public health concern at various locations on site property. Based on the results of the June, 1996 sampling event, which showed high PCB levels in the surface soil of the fenced (unpaved) 1.5 acre area, the permit for operating a truck driving school within this area was revoked by the Borough of South Plainfiel in October, 1996. This action was taken in order to interrupt the potential exposure pathway which could result from inhalation of entrained fugitive dust, as concluded in the ATSDR Record of Activity (AROA) Data Review of September 17, 1996.

However, an additional potential public health risk remains at the CDE site due to generation (and possible inhalation) of fugitive dusts by vehicular traffic on the dirt/gravel road which traverses the property. Fugitive dust might be inhaled by workers on the property, or carried off the property by ambient wind. In addition, inhalation/ingestion could also result from dirt/dust carried inside buildings on site property (or possibly carried off-site) on workers' shoes.

Recommendation for Interim Action by EPA to Protect Public Health

It has been agreed by NJDHSS, ATSDR, and EPA that a potential pathway exists for human exposure via inhalation of fugitive dust which contains PCBs. Consequently, it is recommended that, as soon as practicable, EPA, with the assistance of NJDHSS and ATDSDR, determine and take all necessary and appropriate interim actions which would be required to interrupt the potential exposure pathway caused by dust generation on the dirt/gravel road which traverses the site property. Such action will serve to terminate any possible previous exposure to entrained dust by workers on the site and nearby residents, and would facilitate further permanent remedial actions.

Assistance from NJDHSS/ATSDR

As requested by Mr. Bonk, the Health Officer for South Plainfield (see attached letter), NJDHSS/ATSDR will assist the South Plainfield Health Department 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 which might result from exposure to these contaminants; however, in addition, professional expertise would be provided as needed at public availability sessions which might be scheduled by the SPHD. (The attached "fact sheet" on PCBs was provided by NJDHSS for use by ATSDR, the South Plainfield Health Department, and EPA Region 2 for distribution at the public meetings which were held on February 18 and 20, 1997.)

Signature: _____ Date: _____

Encl as

cc: Michael Bonk, Health Officer, South Plainfield Health Department
Eric Wilson, On Scene Coordinator, EPA Region II Remedial Action Branch

Appendix 6 - Health Consultation (July 1997)

Health Consultation

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

JULY 31, 1997

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

HEALTH CONSULTATION

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

Prepared by:

Exposure Investigations and Consultation Branch
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation

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) determine the health implications to emergency personnel (e.g. police, fire, medical) who may come in contact with 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 landfilled on-site, and transformer oils contaminated with PCBs were reportedly dumped onto site soils [1]. The site is currently known as the Hamilton Industrial Park and is occupied by approximately 15 industrial businesses [1].

At the request of EPA Region II, health consultations were conducted by ATSDR in October 1996 and May 1997 addressing outdoor and indoor PCB contamination, respectively, at the site [1,2]. ATSDR concluded that the PCB contamination both in the outdoor soils and the interior surfaces pose a potential long-term health threat to workers and other individuals who would come in frequent contact with the contamination [1,2]. Although EPA has initiated some interim measures to prevent access to contaminated soils, there have been concerns expressed by emergency personnel (fire, police, medical, etc.) who may, in the course of their duties, access the site and come in contact with the PCB contaminated soils. There is also concern for those personnel who may enter the buildings and come in contact with PCB-laden dust on interior surfaces.

Discussion:

PCBs persist in the environment for years and have the ability to collect in human fatty tissue. The PCBs represent a health threat to humans exposed chronically and have been shown to affect the skin and liver [3]. Reproductive, endocrine, immunosuppressive, and carcinogenic effects have been observed in animal studies [3,4].

Exposure to emergency and other personnel entering the site would likely be through inhalation and/or ingestion of PCB-contaminated dust, or absorption of PCBs through the skin. Inhalation of PCBs and its combustion products could also occur in the event of a fire. Contamination may also be carried home on shoes and clothing exposing other members of the family.

Emergency personnel responding to events at the facility would likely be there for only short periods of time on an infrequent basis. It is unlikely that such limited contact with the facility would result in exposures to PCBs that would pose a

health hazard. If a fire occurred at the facility, the heat could volatilize the PCBs. Unprotected personnel could be exposed to PCBs and their thermal degradation products by inhalation or by deposition on uncovered skin. However, fire fighters at the facility would be protected from such exposures by normal protective equipment, including respirators and protective outerwear.

If emergency personnel and others come in contact with contaminated soil or dust, there is a potential for shoes, clothing, and equipment to transport contamination off site. Contamination carried into the home can persist for long periods of time exposing family members. Children are at an increased risk due to more frequent contact to dusty floor surfaces, hand-to-mouth activities, and low relative body weights resulting in greater exposure.

Conclusions:

Based on the available information:

1. The site does not pose a health threat to fire fighters, police, medical personnel, or other emergency personnel due to the anticipated short duration of exposure to PCB contamination.

Recommendations:

1. Ensure that personnel accessing the site and coming in contact with contaminated areas perform appropriate decontamination procedures prior to exiting the site.

Timothy Walker, M.S.
Environmental Health Scientist

Concurred: Kenneth G. Orloff, Ph.D., DABT
Senior Toxicologist

References:

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

2. ATSDR Health Consultation for the Cornell-Dubilier Site, May, 1996.

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

4. 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.

Appendix 7 - Health Consultation (September 1997)

Health Consultation

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

SEPTEMBER 9, 1997

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

HEALTH CONSULTATION

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

Prepared by:

Exposure Investigation and Consultation Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

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) review analytical data of fish samples collected from surface water near the Cornell-Dubilier Electronics (CDE) site and determine if polychlorinated biphenyls (PCBs) are present in fish at levels of public health concern.

The CDE site is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey [1]. The 25 acre site is located in an industrial/commercial/residential area and is bordered by commercial businesses and residences on the south, west, and north, and on the southeast, east, and northeast by an unnamed tributary to Bound Brook [1].

During the 1950s, Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, and tested transformer oils. Discarded electronic components were landfilled onsite and transformer oils contaminated with PCBs were reportedly dumped directly onto site soils [1]. The company vacated the site in the early 1960s.

The site is currently known as the Hamilton Industrial Park and is occupied by an estimated 15 commercial businesses. Numerous companies have operated at the site as tenants over the years [1].

An unnamed creek that borders the site to the southeast, east, and northeast flows into Bound Brook. The confluence of the unnamed creek and 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. Available information indicates that fish are being caught and eaten from Bound Brook and New Market Pond [2].

The EPA has conducted sampling events at the site. In mid-1996, several surface soil samples (0 - 3 inches and 0 - 6 inches) were collected from a 1.5 acre fenced area at the site and analyzed for PCBs; PCBs were detected at a maximum concentration of 51,000 parts-per-million [3].

In mid-1996, the EPA collected surface soil samples (0 - 3 inches) from 23 locations at the site [1]. Samples were analyzed for PCBs; PCBs were detected at concentrations ranging from 3.6 to 3,000 ppm [1].

A fish sampling event was conducted in surface waters adjacent to and near the CDE site. Fish were collected from the following locations:

Three areas of Bound Brook located downstream from the CDE site

Two areas of New Market Pond

The unnamed creek at a location immediately adjacent to the CDE site

The unnamed creek at a reference location 1,000 meters upgradient of the CDE site [4].

Fish filets were analyzed for PCBs. PCBs were detected at maximum concentrations indicated in Table 1 [4].

Table 1. Maximum Concentrations of PCBs Detected in Fish Filets

Location	Concentration (ppm)
Bound Brook	12.2
New Market Pond	36.0
Adjacent, CDE	9.8
Reference Location	7.8

Note: Fish ranged in total length from 4.1 to 25.6 inches (average = 10.9 inches). Fish ranged in total weight from 0.8 to 35.4 ounces (average = 9.7 ounces)

Discussion

PCBs are persistent in the environment and break down slowly. In water, PCBs partition significantly from water to aquatic organisms, such as fish [5]. The bioconcentration factors (BCF) of various PCBs in aquatic animals vary from 26,000 to 660,000; BCF is defined as the ratio of the concentration of a contaminant in aquatic organisms to the concentration of the contaminant in the surrounding water. Evidence also indicates that PCBs biomagnify within the food chain [5].

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 [5,6] PCBs have very low potential for producing acute toxic effects [6].

Consumption of fish that contain elevated levels of PCBs can result in exposures at levels of public health concern. The Food

and Drug Administration (FDA) has set tolerances for PCBs in the edible portions of fish at 2 ppm [7]. Tolerances are established at levels that are sufficient for the protection of public health [8]. The tolerance level of 2 ppm PCBs was exceeded in at least one sample of each of the species collected [4].

Conclusions

Based on the available data, ATSDR concludes that PCBs in fish collected in surface water near the Cornell-Dubilier Electronics Site in South Plainfield, New Jersey exceed FDA tolerance levels for PCBs in fish and are at levels of public health concern.

Recommendations

Fish that contain greater than 2 ppm PCBs in the edible portion of the fish should not be eaten.

If further clarification is required or if additional information becomes available, please do not hesitate to contact this office at 404/639-0616.

Steven Kinsler, Ph.D.
Senior Toxicologist

References

1. ATSDR Record of Activity, Cornell-Dubilier Electronics, Log # 97-1004, S. Kinsler, October 30, 1996.

2. Personal Communication, S. Kinsler, ATSDR; E. Wilson, EPA; July 31, 1997.

3. ATSDR Record of Activity, Cornell-Dubilier Electronics, Log # 96-4046, S. Kinsler, September 19, 1996.

4. Bound Brook Sampling and Edible Fish Tissue Data Report, Cornell-Dubilier Electronics Site, South Plainfield, New Jersey, Prepared By: Environmental Response Team Center, Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, July 1997.

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

6. 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.

7. Code of Federal Regulations, Title 21, Volume 2, Chapter 1, Part 109, Section 109.30--Tolerances for polychlorinated biphenyls (PCBs), April 1, 1996.

8. Code of Federal Regulations, Title 21, Volume 2, Chapter 1, Part 109, Section 109.4--Establishment of tolerances, regulatory limits, and action levels. April 1, 1996.

Appendix 8 - Health Consultation (May 1998)

Health Consultation

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

MAY 26, 1998

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

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

Prepared by:

Exposure Investigation and Consultation Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

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) evaluate analytical data from residential properties located across the street from the Cornell-Dubilier Electronic Inc. site in South Plainfield, New Jersey, and determine if polychlorinated biphenyls (PCBs) in indoor dust and surface soils are at levels of public health concern [1]. Exposure Investigation and Consultation Branch (EICB) has completed several verbal health consultations regarding on-site PCB contamination and made public health recommendations that have included sampling of residential homes near the site [2,3].

The Cornell-Dubilier Electronics Site is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey. The 25 acre site is bordered by commercial businesses and residences on the south, west and north, and on the southeast, east, and northeast by an unnamed tributary to Bound Brook [2]. It is estimated that 540 persons reside within 0.25 miles of the site; the nearest residence is approximately 200 feet from the site [2].

During the 1950s, Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, and tested transformer oils. Discarded electronic components were landfilled onsite and transformer oils contaminated with PCBs were reportedly dumped directly onto site soils. The company vacated the site in the early 1960s [2].

The site is currently known as the Hamilton Industrial Park and is occupied by an estimated 15 commercial businesses. Numerous companies have operated at the site as tenants over the years [2]. A paved driveway is used to enter the park; the pavement ends within 100 yards of entering the park. It has been observed that vehicles entering the industrial park during dry conditions create airborne dust [2]. The driveway leads into what was formally a dirt, gravel, and stone roadway that nearly encircles the business structures at the site. The roadway separates the structures from a heavily vegetated vacant field, and was paved by EPA in September 1997 as part of the site stabilization process to mitigate migration of contaminated dust.

On March 24, 1998, ATSDR and EPA Region II held a conference call to discuss indoor dust and surface soil data collected from 16 residential properties and analyzed for PCBs.

The residential properties sampled by EPA were selected using information obtained from air modeling. The indoor dust and surface soil sampling was conducted to evaluate health impacts to area residents from PCB contamination .

In October 1997, EPA Region II collected surface soil samples from 16 residential properties [4]. The soils were analyzed for PCBs. Approximately 20 surface soil samples were collected from each residential property. PCB levels in surface soils ranged from none detected to 22 parts per million (ppm).

In November 1997, EPA Region II collected indoor dust samples from 12 residential properties [5]. The indoor dust samples were analyzed for PCBs. Approximately two to four indoor dust samples were collected from each residential property. PCB levels in indoor dust ranged from none detected to 205 ppm (or 117 micrograms (ug) total PCBs in sample mass).

Discussion

Because the properties sampled were residential, it is anticipated that populations potentially exposed to contamination will include children and adults.

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; reproductive, endocrine, immunosuppressive, and carcinogenic effects have been observed in animal studies [6]. PCBs have very low potential for producing acute toxic effects [6].

An immunosuppressant effect was observed in a study of monkeys chronically exposed to 0.005 mg/kg/day of PCBs. On the basis of this study of monkeys, ATSDR has derived a chronic oral Minimal Risk Level (MRL) for PCBs of 2.0E-05 mg/kg/day. An MRL is defined as an estimate of daily human exposure to a dose of a chemical that is likely to be without an appreciable risk of adverse noncancerous effects over a specified duration of exposure [6]. Screening level exposure-dose calculations indicate that children in some houses may exceed the MRL.

Since screening analysis identified potential for health concern, soil and dust PCBs concentrations were evaluated using averaged daily doses estimated for both child and adult residential exposure scenarios and both cancer and non-cancer dose response relationships for PCBs. The exposure dose equation and parameter assumptions used for soil assessment followed that found in EPA RAGS. Exposure equations used for indoor dust assessment were based on ongoing methods development by a combined ATSDR/EPA/CDC workgroup on residential dust pathway analysis. Evaluations of health concerns were made on a house-by-house basis using estimated excess individual cancer risk, a margin of exposure analysis relative to the identified LOAEL for immunosuppression, and qualitative consideration of uncertainty based on site specific data.

Conclusions

Based on the indoor dust and surface soil analytical data for the residential properties located across the street from the Cornell-Dubilier site, the one point and time sampling event for both indoor dust and surface soils, the unknown location of an elevated level of PCBs on a specific residential property (e.g., the one 22 ppm elevated PCB level may be located next to a child's play area or near the entryway into the home), and the uncertainty of the future indoor dust levels (how the indoor dust levels would be impacted by surface soil contamination is uncertain), ATSDR concludes the following:

1. Elevated levels of PCBs were detected in indoor dust and the surface soils at residential properties that may pose a health concern or potential health concern to the residents. The health evaluations for the residential properties are presented in the following
table:

Table 1: Health Categories for Residential Properties:

Residential Property Designations	Health Categories	Follow up activities needed for residents with elevated levels of PCBs in indoor dust and/or surface soils
1. E	Health concern (a)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils
2. D	Health concern (a)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils
3. C	Health concern (a)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils
4. G	*Potential health concern (b)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils resample indoor dust to ensure that future indoor dust levels are not elevated (surface soil contamination may be tracked into homes)
5. O	Potential health concern (b)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils resample indoor dust to ensure that future indoor dust levels are not elevated (surface soil contamination may be tracked into homes)

6. J	Potential health concern (b)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils resample indoor dust to ensure that future indoor dust levels are not elevated (surface soil contamination may be tracked into homes)
7. B	Potential health concern (b)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils resample indoor dust to ensure that future indoor dust levels are not elevated (surface soil contamination may be tracked into homes)
8. A	Potential health concern (b)	health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils resample indoor dust to ensure that future indoor dust levels are not elevated surface soils at this property did not represent a health concern; however, PCBs were detected in the indoor dust.
9. I	Potential health concern (b)	reduce/stop potential exposure to indoor dust and surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils resample indoor dust to ensure that future indoor dust levels are not elevated (surface soil contamination may be tracked into homes)
10. M	Potential health concern (d)	reduce/stop potential exposure to surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils indoor dust not a health concern; however, surface soil contamination may contribute to future indoor dust contamination
11. F	Potential health concern (d)	reduce/stop potential exposure to surface soils contaminated with PCBs health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils indoor dust not a health concern; however, surface soil contamination may contribute to future indoor dust contamination
12. L	No health concern (e)	no action at this time

13. H.	Potential health concern (c)	sample indoor dust health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils
14. K.	Potential health concern (c)	sample indoor dust health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils
15. N	Potential health concern (c)	sample indoor dust health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils
16. P	Potential health concern (c)	sample indoor dust health education on ways to reduce/stop potential exposure to indoor dust and/or surface soils

(a) Health concern - take action to reduce/stop exposures to PCBs
* Potential health concern- data needed, prudent to take action at this time to reduce exposures:
(b) resample indoor dust to ensure that future indoor dust levels are not elevated (surface soil) contamination may be tracked into homes)
(c) indoor dust sampling should be conducted to better assess the health concern at these residential properties
(d) surface soils are elevated and may pose a future health concern for indoor dust contamination
(e) No health concern- no action needed at this time

2. The nature and extent of off-site migration of PCB contaminated dust via wind has not been determined.

3. The nature and extent of surface soil PCB contamination in this residential community has not been determined.

Recommendations

1. Prevent potential exposure to PCBs in surface soil at levels of public health concern. ATSDR believes that an interim measure or permanent solution to the contaminated residential yards and/or indoor dust should be put in place within six months.

2. 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 polychlorinated biphenyls (PCBs) present in indoor dust and surface soils. ATSDR will assist in the health education at this site through the Division of Health Assessment and Consultation's Community Involvement Branch.

3. Different cleaning methods should be used in the homes where elevated levels of PCBs were detected in indoor dust by wet/damp dusting and mopping on floors and hard surfaces with a cleaning solution such as Lestoil or Mr.Clean. These products are mineral-oil-based cleaners that help to clean up the PCBs. Carpets should also be shampooed with these products. Prior to cleaning of the home interior surfaces by EPA, the use of a regular vacuum cleaner to remove dust is NOT recommended unless a HEPA (high efficiency particulate adsorption) filter is placed on the vacuum cleaner exhaust.

4. As needed, additional dust suppression techniques should be used at the site to prevent off-site migration of contaminated dust.

5. Conduct indoor dust sampling at residential properties where only surface soil sampling was conducted.

6. Determine if other residences in the area are contaminated (include soil samples from properties located upwind of the facility).

If further clarification is required or when additional information becomes available, please contact this office at 404/639-0616.

Tammie McRae, M.S. Date: 5-17-98

Concurrence: Date: 5/20/98

References

1. VonGunten, Brian. ATSDR Record of Activity Region 2. Cornell-Dubilier Electronics Inc. Request from EPA Region II for a health consultation for the Cornell-Dubilier Electronics site. March 11, 1998.

2. Kinsler, Steven. ATSDR/Exposure Investigation and Consultation Branch Record of Activity, Cornell-Dubilier Electronics, South Plainfield, New Jersey. Log No. 97-1004. October 7, 1997.

3. Walker, Timothy. ATSDR/ Health Consultation, Cornell-Dubilier Electronics (aka Hamilton Industrial Park), South Plainfield, New Jersey. May 27, 1997.

4. Cornell-Dubilier Electronics Sampling Trip Report (Surface Soil Sampling). DCN#: START-02-F-01454. TDD#: 02-97-02-0015. PCS#: 2076. Sampling Date: October 27,28,29 and 30, 1997.

5. Final Report, Vacuum Dust Sampling, Cornell Dubilier Electronics, South Plainfield, New Jersey. U.S. EPA Work Assignment No.: 2-262. Weston Work Order No.: 03347-142-001-2262-01. U.S. EPA Contract No.: 68-C4-0022. February 1998.

6. Toxicological Profile for Polychlorinated Biphenyls (PCBs) Update. U.S. Department of Health and Human Services. Agency for Toxic Substances and Disease Registry. September 1997.

7. PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures. National Center for Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency. EPA/600/P-96/001F. September 1996.

Appendix 9- Health Consultation (October 1999)

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

Evaluation of Bound Brook Area Sediments and Surface Soils

CORNELL DUBILIER ELECTRONICS INCORPORATED

SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD981557879

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:

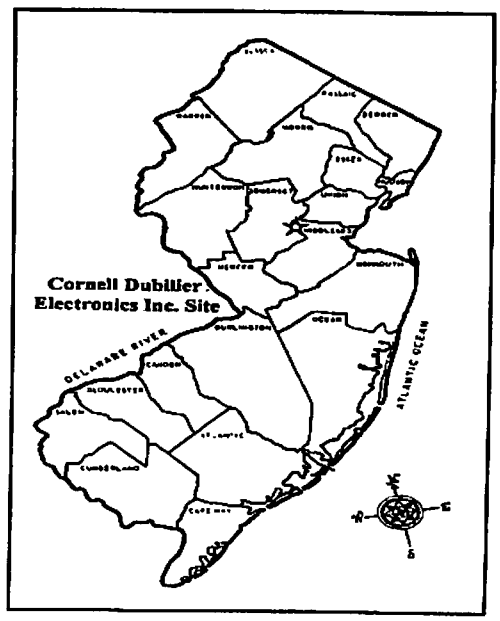
(1) Does the data present a public health hazard?

(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, ATSDR

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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.

Appendix 10- Health Consultation (May 2000)

Health Consultation

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

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

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

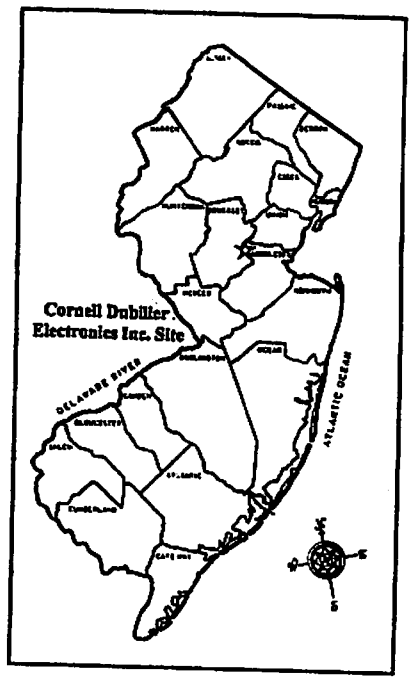
BACKGROUND AND STATEMENT OF ISSUES

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.[1] 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.[2] 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.[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.[2]

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 $2x10^{-5}$ 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 [4,5]. 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 fo 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.

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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.

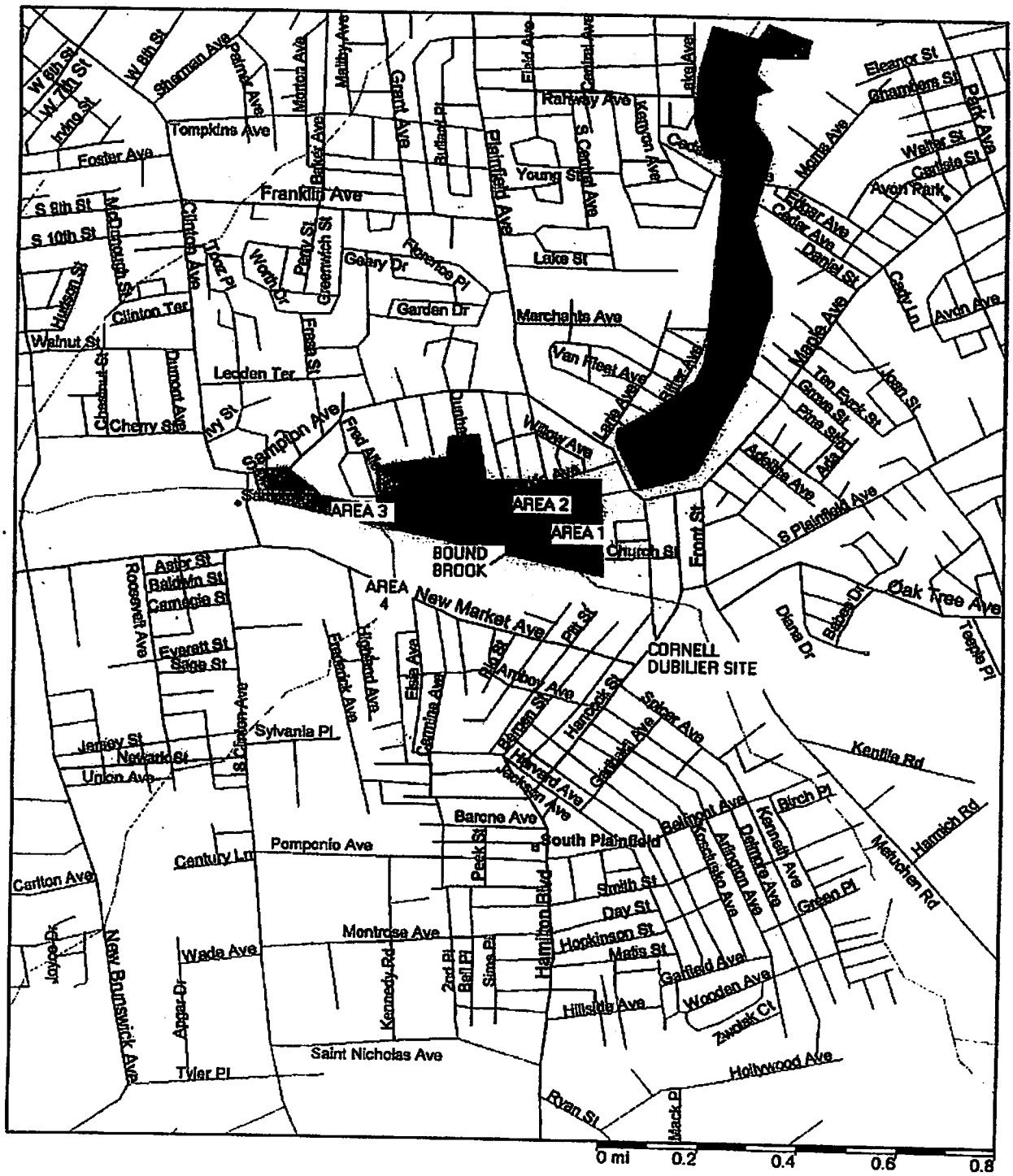

Figure 1. General Site Location; Cornell Dubilier Electronics Incorporated (CDE) Site.

Appendix 11- ATSDR Glossary

ATSDR Plain Language Glossary of Environmental Health Terms

Absorption: How a chemical enters a person's blood after the chemical has been swallowed, has come into contact with the skin, or has been breathed in.

Acute Exposure: Contact with a chemical that happens once or only for a limited period of time. ATSDR defines acute exposures as those that might last up to 14 days.

Additive Effect: A response to a chemical mixture, or combination of substances, that might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

Adverse Health Effect: A change in body function or the structures of cells that can lead to disease or health problems.

Antagonistic Effect: A response to a mixture of chemicals or combination of substances that is less than might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

ATSDR: The Agency for Toxic Substances and Disease Registry. ATSDR is a federal health agency in Atlanta, Georgia that deals with hazardous substance and waste site issues. ATSDR gives people information about harmful chemicals in their environment and tells people how to protect themselves from coming into contact with chemicals.

Background Level: An average or expected amount of a chemical in a specific environment. Or, amounts of chemicals that occur naturally in a specific environment.

Biota: Used in public health, things that humans would eat – including animals, fish and plants.

CAP: See Community Assistance Panel.

Cancer: A group of diseases which occur when cells in the body become abnormal and grow, or multiply, out of control

Carcinogen: Any substance shown to cause tumors or cancer in experimental studies.

CERCLA: See Comprehensive Environmental Response, Compensation, and Liability Act.

Chronic Exposure: A contact with a substance or chemical that happens over a long period of time. ATSDR considers exposures of more than one year to be *chronic*.

Completed Exposure Pathway: See **Exposure Pathway.**

Community Assistance Panel (CAP): A group of people from the community and health and environmental agencies who work together on issues and problems at hazardous waste sites.

Comparison Value: (CVs) Concentrations or the amount of substances in air, water, food, and soil that are unlikely, upon exposure, to cause adverse health effects. Comparison values are used by health assessors to select which substances and environmental media (air, water, food and soil) need additional evaluation while health concerns or effects are investigated.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): **CERCLA** was put into place in 1980. It is also known as **Superfund**. This act concerns releases of hazardous substances into the environment, and the cleanup of these substances and hazardous waste sites. ATSDR was created by this act and is responsible for looking into the health issues related to hazardous waste sites.

Concern: A belief or worry that chemicals in the environment might cause harm to people.

Concentration: How much or the amount of a substance present in a certain amount of soil, water, air, or food.

Contaminant: See **Environmental Contaminant.**

Delayed Health Effect: A disease or injury that happens as a result of exposures that may have occurred far in the past.

Dermal Contact: A chemical getting onto your skin. (see **Route of Exposure**).

Dose: The amount of a substance to which a person may be exposed, usually on a daily basis. Dose is often explained as "amount of substance(s) per body weight per day".

Dose / Response: The relationship between the amount of exposure (dose) and the change in body function or health that result.

Duration: The amount of time (days, months, years) that a person is exposed to a chemical.

Environmental Contaminant: A substance (chemical) that gets into a system (person, animal, or the environment) in amounts higher than that found in **Background Level**, or what would be expected.

Environmental Media: Usually refers to the air, water, and soil in which chemcials of interest are found. Sometimes refers to the plants and animals that are eaten by humans. **Environmental Media** is the second part of an **Exposure Pathway.**

U.S. Environmental Protection Agency (EPA): The federal agency that develops and enforces environmental laws to protect the environment and the public's health.

Epidemiology: The study of the different factors that determine how often, in how many people, and in which people will disease occur.

Exposure: Coming into contact with a chemical substance.(For the three ways people can come in contact with substances, see **Route of Exposure.**)

Exposure Assessment: The process of finding the ways people come in contact with chemicals, how often and how long they come in contact with chemicals, and the amounts of chemicals with which they come in contact.

Exposure Pathway: A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or get exposed to) the chemical.

ATSDR defines an exposure pathway as having 5 parts:

1. Source of Contamination,
2. Environmental Media and Transport Mechanism,
3. Point of Exposure,
4. Route of Exposure, and
5. Receptor Population.

When all 5 parts of an exposure pathway are present, it is called a **Completed Exposure Pathway**. Each of these 5 terms is defined in this Glossary.

Frequency: How often a person is exposed to a chemical over time; for example, every day, once a week, twice a month.

Hazardous Waste: Substances that have been released or thrown away into the environment and, under certain conditions, could be harmful to people who come into contact with them.

Health Effect: ATSDR deals only with **Adverse Health Effects** (see definition in this Glossary).

Indeterminate Public Health Hazard: The category is used in Public Health Assessment documents for sites where important information is lacking (missing or has not yet been gathered) about site-related chemical exposures.

Ingestion: Swallowing something, as in eating or drinking. It is a way a chemical can enter your body (See **Route of Exposure**).

Inhalation: Breathing. It is a way a chemical can enter your body (See **Route of Exposure**).

LOAEL: Lowest Observed Adverse Effect Level. The lowest dose of a chemical in a study, or group of studies, that has caused harmful health effects in people or animals.

Malignancy: See **Cancer**.

MRL: Minimal Risk Level. An estimate of daily human exposure – by a specified route and length of time -- to a dose of chemical that is likely to be without a measurable risk of adverse, noncancerous effects. An MRL should not be used as a predictor of adverse health effects.

NPL: The National Priorities List. (Which is part of **Superfund**.) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site needs to be cleaned up or is being looked at to see if people can be exposed to chemicals from the site.

NOAEL: No Observed Adverse Effect Level. The highest dose of a chemical in a study, or group of studies, that did not cause harmful health effects in people or animals.

No Apparent Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals may have occurred in the past or is still occurring but the exposures are not at levels expected to cause adverse health effects.

No Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where there is evidence of an absence of exposure to site-related chemicals.

PHA: Public Health Assessment. A report or document that looks at chemicals at a hazardous waste site and tells if people could be harmed from coming into contact with those chemicals. The PHA also tells if possible further public health actions are needed.

Plume: A line or column of air or water containing chemicals moving from the source to areas further away. A plume can be a column or clouds of smoke from a chimney or contaminated underground water sources or contaminated surface water (such as lakes, ponds and streams).

Point of Exposure: The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For examples:
the area of a playground that has contaminated dirt, a contaminated spring used for drinking water, the location where fruits or vegetables are grown in contaminated soil, or the backyard area where someone might breathe contaminated air.

Population: A group of people living in a certain area; or the number of people in a certain area.

PRP: Potentially Responsible Party. A company, government or person that is responsible for causing the pollution at a hazardous waste site. PRP's are expected to help pay for the clean up of a site.

Public Health Assessment(s): See PHA.

Public Health

Hazard: The category is used in PHAs for sites that have certain physical features or evidence of chronic, site-related chemical exposure that could result in adverse health effects.

Public Health Hazard Criteria: PHA categories given to a site which tell whether people could be harmed by conditions present at the site. Each are defined in the Glossary. The categories are:

1. Urgent Public Health Hazard
2. Public Health Hazard
3. Indeterminate Public Health Hazard
4. No Apparent Public Health Hazard
5. No Public Health Hazard

Receptor Population: People who live or work in the path of one or more chemicals, and who could come into contact with them (See **Exposure Pathway**).

Reference Dose (RfD): An estimate, with safety factors (see **safety factor**) built in, of the daily, life-time exposure of human populations to a possible hazard that is <u>not</u> likely to cause harm to the person.

Route of Exposure: The way a chemical can get into a person's body. There are three exposure routes:
- breathing (also called inhalation),
- eating or drinking (also called ingestion), and
- or getting something on the skin (also called dermal contact).

Safety Factor: Also called **Uncertainty Factor**. When scientists don't have enough information to decide if an exposure will cause harm to people, they use "safety factors" and formulas in place of the information that is not known. These factors and formulas can help determine the amount of a chemical that is <u>not</u> likely to cause harm to people.

SARA: The Superfund Amendments and Reauthorization Act in 1986 amended CERCLA and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from chemical exposures at hazardous waste sites.

Sample Size: The number of people that are needed for a health study.

Sample: A small number of people chosen from a larger population (See **Population**).

Source (of Contamination): The place where a chemical comes from, such as a landfill, pond, creek, incinerator, tank, or drum. Contaminant source is the first part of an **Exposure Pathway**.

Special Populations: People who may be more sensitive to chemical exposures because of certain factors such as age, a disease they already have, occupation, sex, or certain behaviors (like cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Statistics: A branch of the math process of collecting, looking at, and summarizing data or information.

Superfund Site: See **NPL**.

Survey: A way to collect information or data from a group of people (**population**). Surveys can be done by phone, mail, or in person. ATSDR cannot do surveys of more than nine people without approval from the U.S. Department of Health and Human Services.

Synergistic effect: A health effect from an exposure to more than one chemical, where one of the chemicals worsens the effect of another chemical. The combined effect of the chemicals acting together are greater than the effects of the chemicals acting by themselves.

Toxic: Harmful. Any substance or chemical can be toxic at a certain dose (amount). The dose is what determines the potential harm of a chemical and whether it would cause someone to get sick.

Toxicology: The study of the harmful effects of chemicals on humans or animals.

Tumor: Abnormal growth of tissue or cells that have formed a lump or mass.

Uncertainty Factor: See **Safety Factor**.

Urgent Public Health Hazard: This category is used in ATSDR's Public Health Assessment documents for sites that have certain physical features or evidence of short-term (less than 1 year), site-related chemical exposure that could result in adverse health effects and require quick intervention to stop people from being exposed.