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

ATSDR Record of Activity

FEB 4 2 55 PM '97

ROUTING:
~~E. Skowronski~~
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 Survellnc
_ 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.

[signature] Date: October 30, 1996
Steven Kinsler, Ph.D.

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
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