

Health Consultation

FORMER DUREN INDUSTRIAL DRIVE DRUM STORAGE FACILITY

ADAMSVILLE, MCNAIRY COUNTY, TENNESSEE

SEPTEMBER 13, 2002

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

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Division of Health Assessment and Consultation

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Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation 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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HEALTH CONSULTATION

FORMER DUREN INDUSTRIAL DRIVE DRUM STORAGE FACILITY

ADAMSVILLE, MCNAIRY COUNTY, TENNESSEE

Prepared by:

Tennessee Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

In May 2002, the Jackson Environmental Assistance Center (J-EAC) of the Tennessee Department of Environment and Conservation (TDEC) received a call from Mr. Tony Sweat of Adamsville, McNairy County, Tennessee 38310. Mr. Sweat asked if his family was being or had been exposed to hazardous chemicals. They learned that hazardous materials had been stored in the 134 Duren Industrial Drive building their family used as a home and business. The Sweat family, two adults and four children, ages 5, 10, 12 and 12, have lived within the building since April 2001.

A 1996 TDEC field screening listed the Former Duren Industrial Drive Drum Storage Facility, formerly 150 Lagoon Street, as holding some 300 drums of unspecified hazardous waste. The report has not been located, but Ron Sells, J-EAC Superfund (TDSF), remembers that some drums were leaking and some contents were odorous. In June 1996, the property was repossessed by Farmers Merchants Bank of Adamsville from Jim McDonough, now deceased. At some point the drums were removed. The Sweat's purchased the property in April 2001.

During a May 7, 2002, visit to the residence, TDSF J-EAC staff talked with the home owners, toured the property, and collected a few test samples. One composite soil sample was collected from a small garden near the front entrance to the home. Analysis of the sample indicated the presence of polycyclic aromatic hydrocarbons (PAHs) (Table 1). A photo ionization detector measured no volatile pollutants within the residence; this kind of detector will not detect semi-volatile organic compounds, such as PAHs.

On July 8, 2002, representatives from J-EAC held a conference call with Bonnie Bashor and David Borowski, Environmental Health Studies and Services (EHSS), Tennessee Department of Health (TDH), concerning the Adamsville residence. Since eight PAHs were present in soils above EPA Region IX preliminary remediation goals (PRG) and/or TDEC guidance levels (Table 1) and there were no indoor samples taken, it was determined that a Health Consultation should be conducted.

On July 16, 2002, Ron Sells and Shanda Hunt of TDSF escorted Bonnie Bashor and David Borowski from the TDH through the property at the invitation of the owners. The property, just north of US Highway 64, includes a 6,000 ft² concrete block building, truck loading ramp, gravel and pavement parking lot and another business adjoining the Sweat residence/antique shop on the property's north side (Figures 1 & 2). The building is divided into 2 roughly equal portions for use a residence and antique shop.

Three indoor dust samples were collected for semi-volatile organic compound analysis. Samples were derived from an air conditioning filter that had been in use over the previous 3 weeks, the vacuum cleaner contents from the Sweat's vacuum cleaner, and a sample of dust collected with a new vacuum cleaner bag using Ms. Bashor's vacuum cleaner. Samples were delivered to the Tennessee State Laboratory for analysis. Mr. and Mrs. Sweat were provided a PAH fact sheet.

On August 8, 2002, TDSF personnel returned to collect 6 samples of surface soil between 0-3 inches depth as directed by Ms. Bashor. The results were unavailable as of this release.

On August 12, 2002, TDSF J-EAC and TDH EHSS had a conference call to discuss the lab results from the July 16 sampling. The results indicated no detectable level of PAHs inside the residence. The sampling yielded levels of polychlorinated biphenyls (PCBs), specifically Archlor 1260; phthalates; acetophenone; benzaldehyde; and long chain organic acids (Table 2).

TDH EHSS contacted Joe Little, a toxicologist from ATSDR, to discuss the potential threat to human health from the new indoor data.

Bonnie Bashor, TDH, put Dr. Gigi Davis, the Sweat's physician, in contact with Dr. Donna Seeger, Clinical Toxicologist at Vanderbilt University Medical Center, for questions regarding symptoms of PAH or PCB exposure.

Mr. Tony and Mrs. Dana Sweat filed a lawsuit against Farmers Merchants Bank of Adamsville in August 2002. The suit claims the building was sold without disclosure of the waste storage.

The Sweats moved their residence in August 2002, although they still operate their antique business from the Duren Industrial Drive building.

DISCUSSION

Contaminants in Surface Soil

The initial cause of concern at the Former Duren Industrial Drive Drum Storage Facility was from PAHs found in surface soil around the loading dock (Table 1 & Figure 2). Several PAHs were measured at levels above guidance provided by EPA Region IX or TDEC Superfund.

Polycyclic Aromatic Hydrocarbons, commonly called PAHs, is a generic term for a group chemicals derived following the incomplete combustion of organic materials such as coal, oil, gas, wood, garbage, tobacco or meat. PAHs usually are found as complex mixtures of chemicals rather than just as individual chemicals. PAHs occur naturally or can be manufactured. More than 100 types of PAHs are known to exist throughout the environment, including in air, water and soil.

Several of the PAHs, including benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno [1,2,3-c,d]pyrene, have caused tumors in laboratory animals through inhalation, ingestion, and long-term dermal exposure. Studies of people show that some individuals exposed by breathing or skin contact for long periods to mixtures that contain PAHs and other compounds can also develop cancer. A well-known example of this was the scrotal cancer in boys who cleaned chimneys in 18th and 19th century England.

Human exposure to PAHs is generally through drinking water and ingesting food, soil or dust contaminated with PAHs. PAHs can be taken up by plants (ATSDR 1995). The Sweat's used a portion of their front yard as a vegetable garden. They consumed small amounts of garden produce; as of July 2002 all gardening activities were stopped.

Contaminants of Indoor Air

Results of analysis of the dust collected via the air conditioner filter, the Sweat's vacuum cleaner waste, and the dust taken with Ms. Bashor's vacuum cleaner showed that all samples contained the PCB Aroclor 1260. Without air flow or particle size information, it is impossible to turn these values into ambient indoor air contaminant concentrations. Even with this obstacle, the measured PCB values are a cause of concern.

PCBs are a group of synthetic organic chemicals; no natural PCB is known to exist. PCBs enter the environment as mixtures of chlorinated biphenyl components. PCBs are either oily liquids or solids; some can volatilize and exist as vapor in the air. PCBs have no known odor or taste.

PCBs do not burn easily and are good insulators, because of these properties PCBs were widely used as coolants and lubricants in electrical components such as transformers and capacitors. PCB mixtures are commonly referred to by industrial trade names such as Aroclor 1260, which was discovered in this investigation. The production of PCBs was stopped in the United States in August 1977 due to evidence that PCBs accumulate in the environment and may cause adverse human health effects (ATSDR 2000).

PCBs are understood to be a long-term chronic hazard. Evidence of cancer in rats and liver damage in humans exposed to PCBs over many years has been reported. PCBs are not known to cause birth defects. PCBs are not thought to be a risk in short duration, acute exposure situations. In cases of exposure to high concentrations of PCBs, skin irritations like acne and rash were reported (ATSDR 2000).

Four types of phthalates were identified in the indoor air samples. Phthalates are widely used to make hard plastics soft and flexible. Phthalates are used in the production of many household products, including carpets, food wrapping, furniture upholstery, toys, PVC pipes, rain coats, intravenous tubing, cosmetics and plastic bags. Phthalates can adsorb to dust particles. Phthalates break down quickly within the body and the metabolites are usually excreted in 24-48 hours (ATSDR 1995, 1999, 2000).

There is no evidence of adverse health effects in humans attributed to exposure to di-ethylhexyl phthalate, but animal data mostly in rodents, show that the main targets for toxicity are the liver and testes, and that it also induces fetotoxicity and teratogenicity (ATSDR 2000).

The primary toxic effects of di-n-butylphthalate is developmental or reproductive alterations. No data are available for developmental or reproductive effects in humans (ATSDR 2001).

The liver may be the only target organ of diethyl phthalate exposure. Very mild hepatic effects are observed only after administration of extremely high doses (ATSDR 1995).

As phthalates are ubiquitous in the environment and no background levels are known, it is not possible to determine if the phthalate levels observed were normal or from contamination.

ATSDR Child Health Initiative

In 1996, ATSDR launched an initiative to place a special agency-wide emphasis on environmental hazards to children's health and to emphasize child health in all agency programs and activities. The initiative was begun because of the special vulnerabilities children have when exposed to hazardous substances (ATSDR 1997, 1998).

Children are at greater risk than adults from certain kinds of exposure to hazardous substances at sites with environmental contamination. Children engage in activities such as playing outdoors and in hand-to-mouth behaviors that increase their exposure to hazardous substances. Children are shorter than adults, which means they breathe dust, soil, and vapors close to the ground. Their lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. The developing body systems of children can sustain permanent damage if toxic exposures are high enough during critical growth stages.

CONCLUSIONS

1. PAHs are present in soil outdoors at elevated levels
2. PCBs are present inside the residence and business at elevated level.
3. Completed exposure pathways exist for:
 - a. PAHs through inhalation, incidental ingestion, and dermal exposure
 - b. PCBs through inhalation and incidental ingestion
4. An indeterminate health hazard existed for past residents of 134 Duren Industrial Drive.
5. An indeterminate health hazard exists for the general public who shop in the building.

RECOMMENDATIONS

1. Measure indoor air PCB concentration.
2. Time spent at the site should be limited to minimize possible exposures.
3. The site should undergo cleanup prior to full-time business use.
4. Determine if the phthalates detected are higher than normal background levels.

PUBLIC HEALTH ACTION PLAN

Actions Completed

1. The Sweat family has moved into a different residence.
2. Garden produce is not being eaten and no further gardening is taking place.
3. Sweat family physician has been invited to contact the TDH with questions or concerns.
4. TDH sent an explanatory letter with PAH and PCB fact sheets to the Sweat family.

Actions Planned

1. TDSF recommended that air sampling be conducted and a core sample from the stained concrete floor be collected. Since TDSF would have to contract the core sample out, it was suggested that the Sweat's attorney arrange to have the core sample collected by their contractor. TDSF has made arrangements to get the necessary air monitoring equipment from the TDEC Division of Air Pollution Control, but the equipment will not be available until late September 2002. TDSF will suggest that the Sweat's attorney also make arrangements to sample air quality.
2. TDH will be available to review future data or provide additional consultation.

REFERENCES

Agency for Toxic Substances and Disease Registry. Healthy Children - Toxic Environments. Report of the Child Health Workgroup presented to the Board of Scientific Counselors. April 1997.

Agency for Toxic Substances and Disease Registry. Promoting Children's Health, Progress Report of the Child Health Workgroup, Board of Scientific Counselors. 1998-1999.

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Figure 1

Aerial Photo

Former Duren Industrial Drive Drum Storage Facility
Adamsville, McNairy County, Tennessee



(Photo Credit: Spragins, Barnett, Cobb & Butler, PLC)

Figure 2

July 16, 2002 Photo of Building and Truck Dock
Former Duren Industrial Drive Drum Storage Facility
Adamsville, McNairy County, Tennessee



(Photo Credit: David Borowski, TDH)

Table 1

Soil Data - May 7, 2002
Former Duren Industrial Drive Drum Storage Facility
Adamsville, McNairy County, Tennessee

Chemical	EPA Region IX PRGs (ppb)	TDEC-DSF Guidelines (ppb)	Highest Concentration (ppb)
2-butanone (MEK)	7,300,000	5,000	8
acenaphthylene		2,300,000	6,750
acetone	1,600,000		64
acetophenone	490	500	350
anthracene	22,000,000		2,390
benzo[a,h]anthracene	62	200	4,080
benzo[a]anthracene	620	1,900	11,600
benzo[a]pyrene	62	200	29,800
benzo[b]fluoranthene	620	1,300	5,300
benzo[g,h,i]perylene		2,300,000	12,400
benzo[k]fluoranthene	6,200	18,000	10,900
bis [2-ethyl hexyl] phthalate	35,000	100,000	9,130
butyl benzyl phthalate	12,000		1,250
caprolactum	31,000,000	5,000	1,390
chrysene	620	190,000	12,300
di-n-Butyl phthalate			76
diethyl phthalate	49,000,000	5,000	105
dimethyl phthalate	100,000,000	5,000	89
fluoranthene	2,300,000	5,000	10,700
fluorene	2,600,000	2,600,000	270
indeno[1,2,3,c,d]pyrene	620	1,300	14,500
phenanthrene		2,300,000	2,040
pyrene	2,300,000	2,300,000	14,000

* Values in bold typeface are above guidelines. *

Table 2
Indoor Air Data - July 16, 2002
 Former Duren Industrial Drive Drum Storage Facility
 Adamsville, McNairy County, Tennessee

Chemical	Sweat Vacuum (ppb)	Bashor Vacuum Bag (ppb)	Sweat AC Filter (ppb)	Remarks
Butyl Benzyl Phthalate	81,000	540,200	132,000	
Di(2-Ethylhexyl) Phthalate	420,000	578,500	462,000	
Di-n-Buytl Phthalate	15,500	Not Detected	Not Detected	
Diethyl Phthalate	7,600	282,000	288,000	
PCB Aroclor 1260	6,610	12,700	25,100	
Acetophenone	1,220	Not Detected	4,540	
Long Chain Organic Acids	Detected	Detected	Detected	Unable to specifically identify

CERTIFICATION

This Former Duren Industrial Drive Drum Storage Facility Health Consultation was prepared by the Tennessee Department of Health 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 begun.

Alan W. Yarbrough

Technical Project Officer, SPS, SSAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Lisa C. Hayes

for Chief, State Program Section, SSAB, DHAC, ATSDR

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