

Health Consultation

STATE OF ILLINOIS

MOUNT GREENWOOD #2
ST. LOUIS AVENUE AND 117TH STREET
CHICAGO AND MERRIONETTE PARK, COOK COUNTY, ILLINOIS

FEBRUARY 23, 2005

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: 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.

You May Contact ATSDR TOLL FREE at
1-888-42ATSDR

or

Visit our Home Page at: <http://www.atsdr.cdc.gov>

HEALTH CONSULTATION

STATE OF ILLINOIS

MOUNT GREENWOOD #2
ST. LOUIS AVENUE AND 117TH STREET
CHICAGO AND MERRIONETTE PARK, COOK COUNTY, ILLINOIS

Prepared by:

Illinois Department of Public Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

Purpose

In June 2004, the Illinois Department of Public Health (IDPH) received a data package from the Illinois Environmental Protection Agency (Illinois EPA) for the Mount Greenwood #2 site in Merrionette Park, Illinois. Illinois EPA asked IDPH to provide a health-based interpretation of environmental samples it collected in response to requests made by the U.S. Environmental Protection Agency (USEPA) and the local community for an investigation of the property. The soil samples were analyzed for metals, volatile organic chemicals, semi-volatile organic chemicals, pesticides, and polychlorinated biphenyls to determine whether the site currently poses a public health hazard.

Background and Statement of Issues

Site Description

The Mount Greenwood #2 site is in Worth Township, Cook County, Illinois (Attachment 1). The site area is about 11.6 acres, including a 1-acre portion being developed as residential property. This 1-acre portion of the site is in the City of Chicago. The remaining 10.6 acres are owned by K-Five, a road construction company, in Merrionette Park. K-Five uses the property for the storage of construction equipment, building materials for road construction activities, and for cleanup and repair of heavy equipment used in the road construction process (Illinois EPA 2004).

The site is bounded by South Central Park Avenue on the west, commercial property to the south, a trailer park to the east, and a residential area to the north. A chain-link fence topped with barbed wire restricts access along the western portion of the K-Five property. The eastern portion of the site is wooded land that is not fenced. The trailer park on the east backs up to these woods. An unnamed drainage way flows from north to south through the wooded area and carries surface water runoff from the residential area north of the site and from the trailer park east of the site (Illinois EPA 2004).

Site History

At some time between 1938 and 1950, the property owned by K-Five was used as a sand quarry. Quarry activities lowered the area by about 20 feet, and at one time water ponded and children fished in this area (Illinois EPA 2004). Since then, K-Five filled the quarry area with rock, gravel, brick, and asphalt from various road projects. Today, the area is flat and almost entirely covered with asphalt.

Most of the homes north of the site were built in the 1950s, with the exception of three new homes built on the 1-acre residential portion of the site. Residential construction began here in August 2003, and landscaping was completed in August 2004. At the beginning of the new residential construction, an 8-foot-diameter concrete storm-sewer pipe, abandoned and non-functional since the early 1970s, was removed from the property. Gravel was brought in to fill the excavation and to provide a stable base for the residential construction (Illinois EPA 2004). Homes in the area are connected to a public water supply.

Because the 1-acre portion of the site had been vacant for decades, and the new construction was excavating an old storm sewer line, area residents became concerned about the environmental integrity of the property. Area residents alleged that three dogs died from playing in the excavated soil and also reported various adverse human health effects associated with the excavation, including skin rashes, liver cancer, and blood infections (Southtown 2004).

April 2004 Illinois EPA Investigation

In April 2004, in response to these citizen concerns and at the request of USEPA, Illinois EPA conducted an environmental investigation of the site, which included –

- surface soil and subsurface soil screening for metals using X-Ray Fluorescence (XRF) technology
- sampling of subsurface soil using a Geoprobe
- sampling of sediments in surface water drainage ways

Soil samples were collected from the 1-acre residential parcel and from the former sand quarry and wooded areas near residences. The laboratory analyzed the samples for metals, volatile organic chemicals, semi-volatile organic chemicals, pesticides, and polychlorinated biphenyls (Illinois EPA, 2004).

IDPH staff reviewed the data from this investigation, provided Illinois EPA with a verbal opinion of the results, and recommended additional surface soil sampling in the 1-acre residential parcel.

July 2004 Illinois EPA Surface Soil Sampling

On July 20, 2004, Illinois EPA staff conducted surface soil sampling for metals, volatile organic chemicals, semi-volatile organic chemicals, pesticides, and polychlorinated biphenyls at six locations on the 1-acre residential parcel (Illinois EPA, 2004b). IDPH received these results in August 2004, and provided Illinois EPA with a verbal opinion of the results.

Site Visit and Community Meeting

On August 5, 2004, IDPH staff visited the site and confirmed the site description above. The 1-acre residential parcel was level, north of the 117th Street corridor, and grown up in weeds from the corridor to the K-Five property.

On August 17, 2004, the local alderperson hosted a public meeting at which IDPH and Illinois EPA staff presented information to residents who live near the Mt. Greenwood site. Most residents were glad to learn that the sampling data of the current conditions of the property do not present a public health hazard. A few residents voiced their desire that Illinois EPA had been present to sample the soil from the storm sewer excavation that they allege caused adverse health effects. Unfortunately, it is not possible to reconstruct these past exposures. IDPH staff offered to speak to the physicians of the affected residents, but this offer was declined.

Discussion

Chemicals of Interest

IDPH compared the results of each soil sample and XRF screening value with the appropriate comparison values used to select chemicals for further evaluation for carcinogenic and non-carcinogenic health effects (Attachment 2). Chemicals found at levels greater than comparison values or those for which no comparison value exists were selected for further evaluation.

Table 1 shows the chemicals of interest at the site that exceeded comparison values and the depths at which they were detected at these levels. No chemicals of interest were found in the sediment samples.

Exposure Evaluation

An environmental exposure pathway consists of: 1) a source of contamination, 2) environmental media and transport mechanisms, 3) a point of exposure, 4) an exposure route, and 5) a receptor population. If all five of these elements are identified, then a complete exposure pathway exists. When one or more of these elements is missing, a potential exposure pathway exists; that is, exposure to a contaminant may have occurred in the past, may be occurring at present, or may occur in the future.

Although several chemicals of interest were detected, only arsenic and polycyclic aromatic hydrocarbons (PAHs) were detected at levels greater than comparison values in surface soil. All other chemicals of interest were detected at several feet below the surface, and no one would be exposed to this material except during any future excavation activities.

Benzo(a)pyrene (BaP) is one of the most potent PAHs and probably one of the most studied. Little is known about many of the other PAHs. USEPA has developed toxicity equivalency factors (TEFs) for many of the PAHs on the basis of their toxicity relative to BaP. These TEFs can be used to estimate the potential for adverse human health effects from exposure to mixtures of PAHs. IDPH converted the PAH results to BaP equivalents for evaluation of potential cancer risk.

Surface Soil

IDPH assumed that residents could be exposed to arsenic and PAHs in the surface soil 10 months per year. IDPH assumed that adults weighing 70 kilograms (kg) would ingest 100 milligrams of soil per day, and children weighing 10 kg would ingest 200 milligrams of soil per day.

ATSDR establishes minimal risk levels (MRLs), which are doses in humans below which no non-cancerous adverse health effects would be expected. Exceeding an MRL does not mean that adverse health effects will occur. Prudent public health practice requires public health officials to look closely at studies used to derive MRLs to determine whether any adverse effects could occur.

On the basis of the exposure scenarios described above, the estimated daily dose of arsenic for adults was 0.00002 milligrams per kilogram day (mg/kg-day). The estimated daily dose of arsenic for children was 0.0003 mg/kg-day. Because these estimated doses do not exceed the MRL for arsenic, exposure to arsenic in residential surface soil would not be expected to cause non-cancerous adverse health effects. No MRL exists for BaP or PAHs.

Arsenic is a known human carcinogen, but based on the exposure scenarios described above, exposure to the highest level of arsenic detected in surface soil poses no apparent increased risk of cancer.

The estimated daily dose of BaP equivalents for adults was 0.000004 mg/kg-day. The estimated daily dose of BaP equivalents for children was 0.00006 mg/kg-day. BaP is a probable human carcinogen, but on the basis of the exposure scenarios described above, exposure to the highest level of BaP detected in surface soil poses no apparent increased risk of cancer.

Child Health Considerations

IDPH recognizes that children are especially sensitive to some contaminants. For that reason, IDPH considered children when evaluating exposures to chemicals in surface soil at the Mount Greenwood #2 site. Children are the most sensitive population considered in this health consultation. No non-cancer adverse health effects would be expected for children exposed to the levels of arsenic and PAHs in the soil, and persons exposed to the levels of arsenic and PAHs detected in the soil over their lifetime would have no apparent increased risk of developing cancer.

Conclusions

On the basis of the data reviewed, IDPH concludes that the level of exposure to chemicals detected at the Mount Greenwood #2 site does not present a short-term or long-term public health hazard. Therefore, IDPH concludes that the site poses no apparent public health hazard.

Recommendations

IDPH recommends that the K-Five portion of the site (1) remain a commercial-industrial property and (2) not be developed as residential property without appropriate investigation and remedial actions. According to Illinois EPA, K-Five remains a viable company and has no plans to modify the use of its property.

Public Health Action Plan

No further public health actions are necessary.

Author

Ken Runkle
Environmental Toxicologist
Illinois Department of Public Health

References

Agency for Toxic Substances and Disease Registry. Toxicological profile for arsenic. Atlanta: U.S. Department of Health and Human Services; 2000. (Sep)

Agency for Toxic Substances and Disease Registry. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta: US Department of Health and Human Services; 1995. (Aug)

Dobberstein J. Illinois Environmental Protection Agency: Dirt just fine on south side. The Daily Southtown. 2004 June 16.

Illinois Environmental Protection Agency. Pre-CERCLIS Screening Report and Environmental Data for Mount Greenwood #2. 2004. (May)

Table 1. Chemicals of Interest in Soil at Mount Greenwood #2 Site, Chicago and Merrionette Park, Cook County, Illinois; 2004 (in milligrams per kilogram).

Chemical	Level Detected	Depth of Sample	Location of Sample	Comparison Value	Source
Arsenic	19	0 to 3 inches	residential area	0.5	CREG
	21.4	6 feet	residential area		
	261	6 feet	K-Five storage area		
Benzo(a)pyrene (equivalents)	3.6	0 to 3 inches	residential area	0.1	CREG
	16	10 feet	residential area		
	118.8	7 to 8 feet	K-Five wooded area		
Chromium	2,379	9 feet	K-Five quarry area	200 (for Cr-VI)	RMEG (child)
	1,110	11 feet	K-Five quarry area		
	1,340	13 feet	K-Five quarry area		
Lead	2,829	5 feet	K-Five storage area	1,000	IDPH
Nickel	13,888	9 feet	K-Five quarry area	1,000	RMEG (child)

CREG – cancer risk evaluation guide

RMEG – reference dose media evaluation guide

IDPH – Illinois Department of Public Health Lead Poisoning Prevention Code

Benzo(a)pyrene equivalents – the concentrations of polycyclic aromatic hydrocarbons were converted to benzo(a)pyrene equivalents for toxicological evaluation purposes according to a procedure devised by the U.S. Environmental Protection Agency (ATSDR 1995)

Comparison Values Used in Screening Contaminants for Further Evaluation

Environmental media evaluation guides (EMEGs) are developed for chemicals on the basis of their toxicity, frequency of occurrence at National Priorities List (NPL) sites, and potential for human exposure. They are derived to protect the most sensitive populations and are not action levels, but rather comparison values. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Reference dose media evaluation guides (RMEGs) are another type of comparison value derived to protect the most sensitive populations. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Cancer risk evaluation guides (CREGs) are estimated contaminant concentrations that are based on a probability of 1 excess cancer in 1 million persons exposed to a chemical over a lifetime. These are also very conservative values designed to protect sensitive members of the population.

Cancer Slope Factors Used and Lifetime Cancer Risks Calculated for this Health Consultation

Arsenic and polycyclic aromatic hydrocarbons (PAHs) were the carcinogens that exceeded comparison values at Mt. Greenwood. The cancer risk estimations are based on the doses found on pages 3 and 4 of this health consultation. Additional modifying factors of 20/70 years for child lifetime risk and 30/70 years for adult lifetime risk were used to calculate the cancer risk.

Age	Dose (milligrams per kilogram-day)	Potency Factor (milligrams per kilogram-day) ⁻¹	Modifying Factor (years)	Cancer Risk
Arsenic				
Adult	0.00002	1.5	30/70	1.3 x 10 ⁻⁵
Child	0.0003	1.5	20/70	1.3 x 10 ⁻⁴
Benzo(a)pyrene Equivalents				
Adult	0.000004	7.3	30/70	1.3 x 10 ⁻⁵
Child	0.00006	7.3	20/70	1.3 x 10 ⁻⁴