

Health Consultation

BRIDGEPORT HOMES/31ST ST. GAS DISTRIBUTION CENTER

CHICAGO, COOK COUNTY, ILLINOIS

JUNE 13, 2006

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.

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HEALTH CONSULTATION

BRIDGEPORT HOMES/31ST ST. GAS DISTRIBUTION CENTER

CHICAGO, COOK COUNTY, ILLINOIS

Prepared By:

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

Purpose

The Illinois Environmental Protection Agency (Illinois EPA) asked the Illinois Department of Public Health (IDPH) to perform a health consultation of the 31st St. Gas Distribution Center in Chicago, Illinois to determine if contaminated soil or vapor intrusion poses a public health hazard for residents living in the area.

Background and Statement of Issues

The 31st St. Gas Distribution Center (Figure 1) is bounded on the north by 31st Street, on the west by Lituania Avenue, on the south by 32nd Street, and on the east by an alley. The site stored and distributed gas manufactured from coal. In 1874, the Chicago Gas Light and Coke Company built a one million cubic foot gas holder on the site, and in 1884, they built a two million cubic foot gas holder on the site. In 1897, the Chicago Gas Light and Coke Company consolidated with Peoples Gas. In 1934, Peoples Gas disconnected the gas holders, and in 1936, they dismantled the facility. In 1941, they sold the property to the Chicago Housing Authority (CHA). In the 1940s, the CHA built 15 two-story brick buildings and a one-story community building on the site (Burns & McDonnell 2000).

The ground is covered with asphalt, concrete, and buildings, with small areas of grass around each building. A playground north of the community building is covered with wood chips (Burns & McDonnell 2000).

Demographics

As of July 2004, 71 of the units in the on-site Bridgeport Homes CHA complex were occupied (Irwin 2004). People in the area are served by the Chicago municipal water supply, which draws water from Lake Michigan.

Land use within a 1,000-foot radius of the site includes residential and commercial properties. Past and present commercial facilities within one block of the site include gas stations, oil change stations, a laundry, a printing shop, a photography shop, a paint shop, an automobile repair facility, and an automobile transmission repair facility (Burns & McDonnell 2000).

Community Concerns

On July 15, 2004, IEPA held a public meeting for residents of the Bridgeport Homes CHA complex. People from 19 of the 71 occupied units attended, and residents of 11 units agreed to permit air testing of their units. IEPA also contacted the residents of the other units (Irwin 2004). Ultimately, only five people permitted air testing of their units, suggesting low concern among the residents, although distrust of governmental agencies or poor communication may have been involved. IDPH is not aware of any specific health concerns among the residents.

Discussion

Chemicals of Interest

IDPH compared the maximum level of each contaminant detected during environmental sampling with appropriate screening comparison values. Chemicals that exceeded comparison values were selected for further evaluation. The listing of a chemical of interest does not necessarily mean it will cause adverse health effects if exposure does occur. A detailed discussion of each of the comparison values is found in Attachment 1.

IDPH used the comparison values to screen for contaminants that warranted further evaluation. These comparison values do not represent thresholds of toxicity. Although some of these chemicals may exist at levels greater than comparison values, the contaminants can affect only someone exposed to sufficient doses. The amount of the contaminant, the duration and route of exposure, and the health status of exposed individuals are important factors in determining the potential for adverse health effects.

Air

Between July 28 and September 26, 2004, Burns and McDonnell Engineering, a contractor for Peoples Energy, collected air samples from the first and second floors of five occupied and 11 unoccupied units in the Bridgeport Homes CHA complex. The samples were analyzed for benzene, toluene, ethylbenzene, xylenes, and naphthalene. In the occupied units, no elevated levels of chemicals were found. Two unoccupied units had elevated naphthalene levels (Table 1).

Between July 28 and September 26, 2004, Burns and McDonnell Engineering collected 30 outdoor air samples at the site. The concentrations of toluene, ethylbenzene, xylenes, and naphthalene did not exceed normal background levels for the outdoor air of cities. For benzene, only one sample, at 0.14 milligrams per cubic meter (mg/m^3), was elevated. However, the maximum benzene concentration was less than the acute Environmental Media Evaluation Guide (EMEG) of $0.16 \text{ mg}/\text{m}^3$. The acute EMEG is the most appropriate comparison value for an isolated occurrence.

Soil

Between December 15, 1999 and January 5, 2000, and between February 14 and 18, 2000, Burns & McDonnell collected surface soil samples (0 to 3 inches in depth) from the site that were analyzed for inorganic chemicals, volatile organic compounds (VOCs), and semi-volatile organic compounds. None of the inorganic chemicals or volatile organic compounds exceeded soil comparison values. Table 2 shows the semi-volatile organic compounds that either exceeded their comparison value or had no comparison value.

Exposure Pathways

A hazardous chemical can affect people only if they contact it through an exposure pathway at a sufficient level to cause an adverse health effect. This requires:

- A source of exposure,
- An environmental transport medium,
- An exposure point,
- A route of exposure, and
- A receptor population.

A pathway is complete if all its components are present and exposure of people occurred in the past, is occurring, or will occur in the future. If (1) parts of a pathway are absent, (2) data are insufficient to decide whether it is complete, or (3) exposure may occur at some time (past, present, future), then it is a potential pathway. If a part of a pathway is not present and will never exist, the pathway is incomplete and can be eliminated from further consideration.

Air

VOCs in soil gas could infiltrate into buildings on the site. People inside the buildings then could inhale the chemicals. However, with the exception of naphthalene the indoor air samples did not contain elevated levels of VOCs.

Air sampling found elevated naphthalene levels in two unoccupied units (Table 1). Construction materials, including paints, were stored in Unit A, and may have been the source of the naphthalene. Recent renovations in Unit B may have been the source of its naphthalene. Furthermore, in Units A and B, naphthalene levels were higher on the second floor than on the first floor. If the naphthalene had originated from contaminated soil, its airborne level should have been greater on the first floor than on the second floor. Therefore, the elevated naphthalene levels in Units A and B are likely not site-related. Because both units are unoccupied, exposure is not occurring and this is currently an incomplete exposure pathway.

VOCs in soil gas also could enter the outside air, where they could be inhaled. However, outdoor air and surface soil samples did not contain elevated levels of VOCs.

IDPH sent letters to residents who participated in the air sampling to provide a health-based interpretation of the results.

Soil

People may be exposed to contaminants in surface soil by inhalation (dust), incidental ingestion, or skin contact. Exposure is more likely in areas of bare soil. Vegetation or pavement minimizes

exposure to contaminated soil. Most of the site is covered with buildings, pavement, or grass, which would minimize exposure.

USEPA (1993, cited in ATSDR 1995) has established relative potency factors for the carcinogenic polycyclic aromatic hydrocarbons (PAHs). Using these relative potency factors, incidental ingestion of on-site soil with the highest PAH concentration would result in no increased risk of cancer in a 10 kg child or 70 kg adult exposed to this soil for 50 weeks per year, for 70 years. Furthermore, most of the site is covered with buildings, pavement, or grass, which would minimize exposure. Consequently, IDPH does not expect any adverse health effects from exposure to PAHs in on-site soil.

Although a potential exposure pathway exists, children and adults would not be expected to experience any adverse health effects from limited contact with the soil.

Child Health Considerations

IDPH recognizes that children are especially sensitive to some contaminants. Given the same contaminant concentrations, children likely receive greater exposure than adults. This is because children play in soil, wash hands less frequently than adults, and commonly exhibit hand-mouth behavior. Children also have a smaller body size, meaning that they receive a greater dose from the same amount of absorbed contaminant.

At this site, children would not be expected to experience any adverse health effects from exposure to soil contaminated with PAHs.

Conclusions

The site currently poses no apparent public health hazard. Currently, no one is being exposed to contaminants at levels that could cause adverse health effects.

Recommendations

IDPH will interpret the results of any further air sampling of on-site residences.

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Table 1. Concentrations of naphthalene in the air of two unoccupied units.

Location	Concentration (mg/m³)	Comparison Value	Source of Comparison Value	Background Indoor Air (mg/ m³)
Unit A, 1 st floor	0.20	0.0037	EMEG	0.00086-0.032
Unit A, 2 nd floor	0.24	0.0037	EMEG	0.00086-0.032
Unit B, 1 st floor	0.0099	0.0037	EMEG	0.00086-0.032
Unit B, 2 nd floor	0.036	0.0037	EMEG	0.00086-0.032

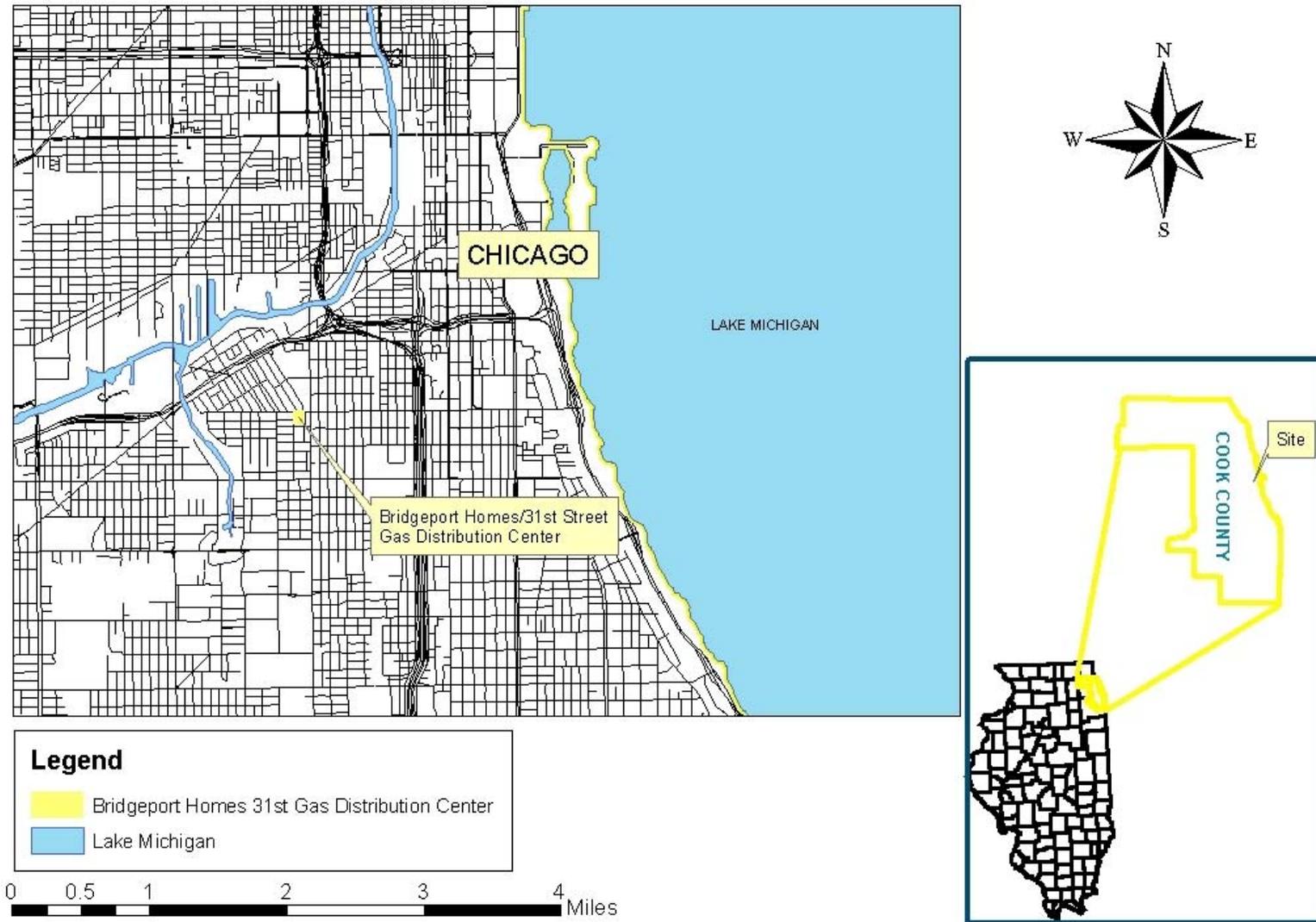
Table 2. Concentrations of semi-volatile organic compounds in surface soil (Burns & McDonnell 2000).

Chemical	Concentration (ppm)	Comparison Value (ppm)	Source of Comparison Value
Acenaphthylene	ND-7.79	--	--
Benzo(a)anthracene	ND-45	--	--
Benzo(b)fluoranthene	ND-33.8	--	--
Benzo(k)fluoranthene	ND-26.9	--	--
Benzo(a)pyrene	ND-36	0.1	CREG
Benzo(g,h,i)perylene	ND-15	--	--
Chrysene	ND-46.9	--	--
Dibenzo(a,h)anthracene	ND-5.11	--	--
Indeno(1,2,3-c,d)pyrene	ND-17.8	1,000	EMEG
Naphthalene	ND-8.3	1,000	EMEG
Phenanthrene	ND-83	--	--

ND = Not detected

-- = No comparison value

Figure 1. Bridgeport Homes/ 31st Street Gas Distribution Site Location Map



Comparison Values Used In Screening Contaminants for Further Evaluation

Comparison values (CVs) are the calculated levels of a chemical in air, water, food, or soil that is unlikely to cause adverse health effects in exposed people. CVs are used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

There are three different types of comparison values, environmental media evaluation guides (EMEGs), reference dose media evaluation guides (RMEGs), and cancer risk evaluation guides (CREGs). These values are used to screen chemicals and determine those that need to be evaluated further.

Environmental media evaluation guides (EMEGs) are derived from minimal risk levels presented in ATSDR Toxicological Profiles. Standard exposure assumptions for children and adults (body weights; ingestion rates for water, soil and air; and frequency and duration of exposure) are used. Individual EMEGs do not consider cancer, chemical interactions or multiple routes of exposure. They do help to identify specific chemicals needing further evaluation.

Reference dose media evaluation guides (RMEGs) are derived from the oral RfDs developed by USEPA using standard exposure assumptions for children and adults (body weights; ingestion rates for water, soil and air; and frequency/duration of exposure). Like EMEGs, RMEGs do not consider carcinogenic effects, chemical interactions, or multiple exposures.

Cancer risk evaluation guides (CREGs) represent levels of environmental chemicals that may pose a 1×10^{-6} (one in a million) excess cancer risk. They are derived using cancer slope factors published by USEPA.

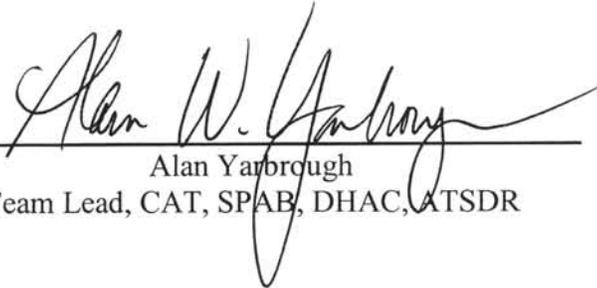
Certification

This Bridgeport Homes/31st Street Gas Distribution Center Public Health Consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.



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The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.



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