

## **Health Consultation**

### **Review of Air Data At and Near the Barrie Park Former Manufactured Gas Plant Site at South Lombard and Garfield Avenues Oak 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**

The Oak Park Health Department and residents living near Barrie Park asked the Illinois Department of Public Health (IDPH) to review air data from past and current sampling at and near Barrie Park. This health consultation evaluates the potential for adverse human health effects if people are exposed to contaminants in the air at or near the Barrie Park site.

## **Background and Statement of Issues**

### **Site History**

Barrie Park is an outdoor recreational area in Oak Park, Cook County, Illinois. A residential neighborhood borders the 3.5-acre park on three sides (Attachment 1). The Eisenhower Expressway (I-290) borders the northern section of the site. Before 1930, the park was the site of a manufactured gas plant, which left the soil contaminated by chemicals. The Village of Oak Park purchased the property in 1959 and transferred it to the Park District of Oak Park in 1965. The site was leveled, regraded, seeded, and converted to a recreational park.

In August 1993, a contractor for Commonwealth Edison conducted ambient air sampling at and near Barrie Park. The samples were analyzed for benzene, ethylbenzene, toluene, xylenes, naphthalene, and 2-methylnaphthalene. Only traces of toluene and xylenes were found (Table 1). The park was used for sledding, ball games, and other activities until the park district closed it in December 1998 (1).

Since then, Commonwealth Edison has sampled and removed contamination at the park as part of a voluntary cleanup with Illinois Environmental Protection Agency (Illinois EPA) oversight. Excavation begun in 2001 has included the removal of contaminated soil and below ground structures and placement of large containment domes to reduce air emissions. Perimeter ambient air samples are taken daily as part of the remediation process (2).

The project ambient air quality standard (PAAQS) for benzene was set at 2.66 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), or about 0.8 parts per billion (ppb). The PAAQS for naphthalene was set at  $1.35 \mu\text{g}/\text{m}^3$  (about 0.25 ppb). During remediation efforts, average emission rates at the perimeter of the site were to remain below the PAAQS. The PAAQS were based on exposure of a 33 pound child at the site fence line for 24 hours per day, 7 days per week, for 18 months (2).

Because perimeter ambient air monitoring indicated levels of benzene and naphthalene above the PAAQS in early 2002, remediation work was discontinued (Table 2). All open excavations were covered with a temporary clay cap (3). A larger containment dome was erected and remedial activities resumed in February 2003. Remediation efforts were scheduled to continue until the fall of 2003, and park restoration is scheduled to continue into the summer of 2004.

## **Past Health Evaluations**

In April 1999, the IDPH Division of Epidemiologic Studies released a report, "Incidence of Cancer in Zip Code 60304 of Oak Park, Illinois." According to the report, the differences in observed and expected cancer cases for 1986 to 1996 were not statistically significant (4).

On September 2, 1999, the Agency for Toxic Substances and Disease Registry (ATSDR) released a health consultation prepared by IDPH that evaluated surface soil at the park. On the basis of the data reviewed, IDPH concluded that exposure to the surface soil at the park did not pose a public health hazard. IDPH recommended additional off-site surface soil sampling (5).

On February 22, 2000, ATSDR released a health consultation prepared by IDPH that evaluated residential and parkway surface soil near Barrie Park. From the data reviewed, IDPH concluded that there was not a public health hazard for exposure to surface soil in residential yards, Barrie Center, the Barrie Center Tot Lot, and the parkways (6).

## **Discussion**

IDPH compared the results of each air sample with the appropriate screening comparison values. Comparison values are used to select contaminants for further evaluation for carcinogenic and noncarcinogenic health effects. Chemicals found at levels greater than comparison values or those for which no comparison value exists were selected for further evaluation. A brief explanation of each comparison value used is found in Attachment 2.

### **1993 Ambient Air Sampling**

IDPH reviewed and evaluated the air sampling data collected in 1993; no chemicals of interest were found. These are the only sampling data available for the ambient conditions at and near the park before the park was closed.

### **2001-2003 Perimeter Sampling**

IDPH reviewed and evaluated the perimeter air sampling data collected since the beginning of excavation activities in 2001. Data for benzene, ethylbenzene, toluene, xylenes, and naphthalene were available. During this period, only benzene and naphthalene exceeded comparison values. Area residents could be exposed to these chemicals in the air they breathe.

#### ***Benzene***

After excavation began, the highest level of benzene detected in perimeter samples was 39  $\mu\text{g}/\text{m}^3$  (12 ppb) on February 19, 2002. Although this maximum level exceeded the ATSDR guidance value of 10 ppb for chronic exposure (7), it did not exceed the acute comparison value of 50 ppb. Levels of benzene at the perimeter of the site exceeded 10 ppb on only 3 days in February 2002. No adverse effects would have been expected from acute exposure.

The perimeter average for benzene for the entire period of remediation to date is at or near the PAAQS of 2.66  $\mu\text{g}/\text{m}^3$  (0.8 ppb). This is less than the ATSDR guidance value for chronic exposure, so long-term adverse health effects would not be expected. Also, no increased risk of cancer would be expected from exposure to the level of benzene at the perimeter of the remediation area. As distance from the fence line increases, the levels of benzene should decrease because of dilution in air. Therefore, no increased risk of cancer would be expected from exposure to benzene for nearby residents.

### *Naphthalene*

After excavation began, the highest level of naphthalene detected in the perimeter samples was 14.9  $\mu\text{g}/\text{m}^3$  (2.8 ppb) on February 8, 2002. The comparison value for chronic exposure was exceeded only on February 8 and 12, 2002. No short-term adverse health effects would be expected from exposure to the maximum detected levels in February 2002. The perimeter average for naphthalene for the entire period of remediation to date is less than the PAAQS of 1.35  $\mu\text{g}/\text{m}^3$  (0.25 ppb). No long-term adverse effects would be expected from chronic exposure.

## **Community Health Concerns**

IDPH presented health information and answered questions at the Barrie Park Citizens Advisory Committee Meeting in Oak Park, May 22, 2003. Residents were concerned about exposure to benzene in the air. IDPH staff gave a verbal presentation of the data evaluation presented in this health consultation.

## **Child Health Considerations**

In communities faced with exposure to environmental contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health.

IDPH evaluated exposures using these child health considerations and determined that no adverse health effects would be expected for children exposed to the levels of chemicals detected in ambient air at or near Barrie Park.

## **Conclusions**

The available data indicate that no apparent public health hazard exists for persons exposed to ambient air at or near Barrie Park. Exposure to the elevated levels of chemicals is not expected to cause adverse health effects.

## **Recommendations and Public Health Actions**

IDPH recommends that perimeter air monitoring continue until excavation and remediation work at Barrie Park are completed. The monitoring will continue under Illinois EPA oversight. The IDPH Division of Epidemiologic Studies will re-evaluate the cancer incidence data for the area.

## **Preparer of Report**

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## **References**

1. Green LC. Evaluation of the contribution of residues from a former manufactured gas plant to the quality of air at Barrie Park in Oak Park, Illinois. Cambridge, MA: Cambridge Environmental; 1993 Sep.
2. The RETEC Group, Inc. Work plan for calculating project ambient air quality standard for benzene. Barrie Park MGP site, Oak Park, Illinois. 2003 Apr 15.
3. Conestoga-Rovers & Associates. Midterm hiatus plan for the Barrie Park MGP site, Oak Park, Illinois. 2003 Apr.
4. Illinois Department of Public Health. Incidence of cancer in zip code 60304 of Oak Park (Cook County), Illinois, 1986–1996. Division of Epidemiologic Studies. Springfield: Illinois Department of Public Health; 1999 Apr.
5. Agency for Toxic Substances and Disease Registry. Health consultation for Barrie Park former manufactured gas plant site. Atlanta: US Department of Health and Human Services; 1999 Sep 3.
6. Agency for Toxic Substances and Disease Registry. Health consultation for residential and parkway soil near Barrie Park former manufactured gas plant site. Atlanta: US Department of Health and Human Services; 2000 Feb 22.

7. Agency for Toxic Substances and Disease Registry. Interim guidance for benzene. Atlanta: US Department of Health and Human Services; 1999 Mar 1.

**Table 1. Air Sampling Results—Barrie Park, Oak Park, Illinois, August 16, 1993.**

<b>Chemical</b>	<b>Maximum Level in Barrie Park (in ppb)</b>	<b>Maximum Level in Barrie Park Neighborhood (in ppb)</b>	<b>Comparison Value (in ppb)</b>
Benzene	< 1	< 1	10 (ATSDR)
Toluene	4.5	5.2	80 (C-EMEG)
Xylenes	2.0	2.6	100 (C-EMEG)
Ethylbenzene	< 1	< 1	1,000 (I-EMEG)
Naphthalene	< 1	< 1	2 (C-EMEG)
2-Methylnaphthalene	< 1	< 1	NA

ppb - parts per billion

ATSDR - March 1999 interim guidance for benzene

C-EMEG - chronic environmental media evaluation guide

I-EMEG - intermediate environmental media evaluation guide

NA - none available

**Table 2. Chemicals of interest in 2001 to 2003 Perimeter Air Sample Data for Barrie Park, Oak Park, Illinois.**

<b>Chemical</b>	<b>Maximum Level Detected (in ppb)</b>	<b>Acute Comparison Values (in ppb)</b>	<b>Chronic Comparison Values (in ppb)</b>
Benzene	12	50 (A-EMEG)	10 (ATSDR)
Naphthalene	2.8	NA	2 (C-EMEG)

ppb - parts per billion

A-EMEG - acute environmental media evaluation guide

ATSDR - March 1999 interim guidance for benzene

C-EMEG - chronic environmental media evaluation guide

NA - none available

### **Certification**

The Illinois Department of Public Health prepared this Barrie Park health consultation 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.

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

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# Location of Barrie Park



Source: IDPH GIS

## 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 are 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.

The three types of comparison values are 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 identify those that need to be evaluated further.

Environmental media evaluation guides (EMEGs) are derived from minimal risk levels presented in ATSDR Toxicological Profiles. The guides use standard exposure assumptions for children and adults (body weights; ingestion rates for water, soil, and air; and frequency and duration of exposure). 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 (RfD) media evaluation guides (RMEGs) are derived from the oral RfDs developed by the U.S. Environmental Protection Agency (EPA). Those use 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  $1 \times 10^{-6}$  (one in a million) excess cancer risk. They are derived using cancer slope factors published by EPA.

The ATSDR Interim Guidance for benzene is based on 1) the primary end point of interest for benzene is leukemia; 2) there is a threshold for acute myelocytic leukemia; and 3) these levels reflect public health prudence. If no maximum values exceed 10 ppb, the exposure is no apparent public health hazard.