



Information Sheet

Air Monitoring at Barrie Park

June 2003

This information sheet is one in a series created to inform the community about the environmental clean up underway at Barrie Park, the site of a former Manufactured Gas Plant.

Overview...

- The air within Barrie Park and the surrounding neighborhood is monitored on a continuous basis by both the utilities and the Village.
- Monitoring results are compared to action levels or standards and, if warranted, air emission controls are put in place.
- Air action levels set for the site have been reviewed by the Illinois EPA, and are health-protective.
- On-going air monitoring indicates that emissions from the site are meeting the air standard.

Background

Barrie Park was once the site of a plant where coal was processed into gas for heating, cooking, and lighting. Such plants were scattered across the northeast and Midwest, and were called manufactured gas plants, or MGPs. Although operations ceased at the Barrie Park MGP around 1928, byproducts of the process in concentrations that exceed environmental standards have been found in the park soil below the ground surface. The Village and park district negotiated the clean-up parameters with Commonwealth Edison Co. and Nicor Gas Inc., which, as successors to the company that operated the former Barrie Park MGP, are now responsible for the clean up. The clean up consists of excavating soil and transporting it off the site for further treatment and ultimate disposal.

What air emissions are produced during the clean up? How is it monitored?

When excavating contaminated soil from the park, it is reasonable to expect that some of the chemicals within the soil will be transferred to the air in a gaseous form (called “volatilization”) or transferred to the air in dust

particles. The amount of contamination that gets into the air as gas and dust depends on how much contamination is present in the ground and how much needs to be removed.

To measure the amount of volatilization occurring and dust being generated, and to ensure that the community is not at risk, the project team monitors and analyzes the air around the Barrie Park work site throughout the duration of the cleanup. Monitoring data is then compared to air standards, which have been developed for the site, and have been reviewed and approved by the Illinois EPA (see the text box, *All About the Air Standard or “PAAQS”*).

Are the air standards for Barrie Park health-protective?

For the Barrie Park site, the chemical having the lowest PAAQS is benzene. The PAAQS for benzene is lower than the lowest value of all the available standards from the Occupational Safety and Health Administration (OSHA), the American Conference of Governmental Industrial Hygienists (ACGIH), the National Institute for Occupational Safety and Health (NIOSH) and the U.S. EPA.

The PAAQS for benzene, along with other OSHA, ACGIH, NIOSH, and USEPA standards for benzene, are shown in **Table 1**. This table shows that the PAAQS for benzene is very close to the background level for benzene in the local area as measured at Rehm Park, is well below occupational exposure limits and is much lower than a level identified as immediately dangerous to life and health. Therefore, managing the site activities to ensure that the PAAQS is met at the end of the project is very health protective for all residents.

Explain how air monitoring is done.



Air monitoring is a process where the air at the site is sampled and analyzed to ensure that it does not jeopardize the health and safety of the workers or surrounding community. The monitoring instruments used are capable of identifying and measuring gases and dusts. The monitors record the

levels of these gases and dusts at the site's perimeter and along the rail corridor to the north of the site. The Village reviews the data to ensure that levels are not harmful to human health. If elevated levels are detected, the Village and cleanup contractor focus on controlling the sources of the air emissions.

What types of monitoring are conducted?

For remediation of the park itself, two types of air monitoring are used – continuous time-integrated monitoring and real-time air monitoring (see text box, **All about Air Monitoring**). These techniques are used to monitor air in the vicinity of Barrie Park as follows:

1. Continuous time-integrated air monitoring at the site perimeter;
2. Real-time air monitoring at the site perimeter (by both the utilities and the Village),
3. Real-time air monitoring at the excavation site(s).

Air monitoring also is a component of any necessary soil remediation on residential properties. The type(s) of air monitoring for residential properties will be outlined in the individual Remedial Action Plans prepared for each residential property undergoing clean up. Each residential Remedial Action Plan will need to be submitted to the Illinois EPA for approval prior to any clean up activities.

Where are the air monitoring stations located?

Air monitoring consists of 10 continuous, time-integrated monitoring stations. Six stations are positioned around site, just inside the security fence. Four additional stations are located along the rail line between Ridgeland Avenue and Austin Boulevard. In addition, a background air monitoring station is located in Rehm Park, ½ mile west of the Site.

Real-time air monitoring also is conducted around the site perimeter and downwind of the excavation sites.

Who conducts the air monitoring?

The utilities' contractor performs the majority of the air monitoring within the site. In addition, the Village has a separate contractor to conduct continuous oversight of the utilities' air monitoring activities. The Village contractor also continuously monitors air quality outside the work area and on, or near, residences that may be downwind of the site.

What do the results mean?



The results of real-time air monitoring are compared to action levels, which are limits for short-term exposure. Readings that are near or exceed the action level for any monitored chemical will prompt the use of control measures to reduce its concentration. Control measures could include covering excavation areas, foaming work areas, redirecting work to other portions of the site until engineering controls can be effectively installed or temporarily halting work if needed, the control measures can be implemented immediately by the clean-up contractor.

The results of the time-integrated sampling are evaluated for each 24-hour sampling event. A project running-average air concentration for each chemical is determined for each monitoring station. These averages are then compared to the Project Ambient Air Quality Standards (PAAQS).

Does the air standard (or PAAQS) have to be met every day?

No, the PAAQS or air standards do not have to be met every day. The PAAQS are essentially daily targets that the clean up contractors try to achieve. It is acceptable to exceed the standards in a given day, as long as the long-term goals are not exceeded. (Refer to the **All About the Air Standard or PAAQS** text box).

Do you need a structure to control emissions?

No. The most contaminated soil in the park is being excavated under a tent-like structure. This is because this area of the park contains the largest amount of MGP wastes, and thus is the most contaminated. The tent structure contains the emissions from the excavation of this heavily contaminated area. Once this heavily contaminated soil has been excavated, the tent will be removed, and lesser-contaminated soil will be removed from areas of the site outside of where the tent once stood.

How will emissions be controlled using other measures, aside from a tent structure?

Because less contamination is expected in the streets and utility corridors based on data from soil samples collected around the perimeter of the site, the tent is not needed to control emissions during excavation in these areas. Emission controls that may be appropriate for these areas include spraying foam on the excavation surface or using a tarp to surround the excavation area. If additional emission controls are needed, there is a contingency plan that would allow for the use of a smaller structure to cover these areas during excavation

ALL ABOUT AIR MONITORING...

Two types of air monitoring are being conducted at the Barrie Park site:

Real-time air monitoring: Real-time air monitoring includes monitoring with hand-held, direct-reading units. These instruments are easily portable, and allow the user to collect a sample from several places in a short sample period. The results of this sampling are used to evaluate short-term exposure, and are used in providing immediate information to the cleanup contractor, who can modify site activities or implement controls to reduce emissions, as needed.

Continuous time-integrated air monitoring: Time-integrated sampling is accomplished using air-monitoring instruments designed to continuously sample large volumes of air over extended periods of time. This sampling is intended to document air concentrations over each 24-hour period for comparison to long-term exposure limits (the PAAQS). The sample data are collected at “fixed” locations around the site, and are sent to a laboratory for analysis. The results are typically available within 1 to 2 weeks after being sent to the laboratory.

Will residential remediation air emissions require that removal of soil take place under a tent?

Based on the results of the residential soil sampling conducted to date, **no** MGP wastes or benzene have been detected on the residential properties, with the exception of one property. The residential properties do not have the same characteristics as the park or streets. As a result, it is not expected that a tent-like enclosure will be needed there.

Benzene was detected in the front yard of only one property in the vicinity of the park. Benzene was not detected in the back yard of this property or in either adjacent property. In this one case, emission controls may be needed during cleanup activities, but it is still too early to tell. For the remainder of the residential properties, emissions are unlikely to be an issue during remediation activities.

Where can I find air data results?

The utilities’ contractor prepares and issues a daily air quality report, as well as a weekly summary report on the air monitoring. The reports are reviewed by the Village and park district, a posted on the project web site, www.barriepark.org.

What if I have a concern or question about the air quality near my home?

Please call the Village Department of Public Health at 708.358.5480, or, after hours, call the Barrie Park Site Community Hotline at 708.445.8876. In response, the Village will direct its consultant to respond to complaints from residents concerning odor, dust or other suspected emissions. As necessary, the Village’s consultant may also conduct testing to evaluate whether or not chemicals are present above the health-protective standards.

**Table 1: Comparison Levels For Benzene Exposure
Compared to the Air Standards for Benzene Set at Barrie Park**

Level (in ppb)	Basis
500,000	The federal agency OSHA or Occupational Safety and Health Administration limit that indicates a situation “immediately dangerous to life and health”
5,000	The OSHA short-term exposure limit for a period of 15-minutes (calculated by a time-weighted average)
2,500	The ACGIH (American Conference of Governmental Industrial Hygienists) short-term exposure limit for a period of 15-minutes (also calculated by a time-weighted average)
1,000	The OSHA permissible exposure limit for an 8-hour period (calculated by a time-weighted average)
500	The ACGIH exposure limit for an 8-hour workday, 40-hour workweek period (calculated by a time weighted average)
100	The NIOSH (National Institute for Occupational Safety and Health) exposure limit for a 10-hour workday, 40-hour workweek period (calculated by a time-weighted average)
1.85	USEPA, Reference Concentration
1.1	Average outdoor air concentration in 5 Midwestern states
2.2	Average indoor air concentration in 5 Midwestern states
0.82	Barrie Park PAAQS (Air Standard)
0.46	Barrie Park Background at Rehm Park

All About the Air Standard (or PAAQS) at Barrie Park

Project ambient air quality standards or PAAQS have been established for the Barrie Park site to protect public health, and to determine when air emissions controls are necessary. The Illinois EPA reviewed the PAAQS to ensure that they are protective of public health. The health-based PAAQS have been set to be protective of a young child resident who is assumed to reside at the fence line of Barrie Park for 24 hours per day and 7 days per week (in other words, a child who would never leave the residence).

How are the PAAQS developed and how are they used?

In very simple terms, to develop the PAAQS, the total amount of benzene that a young child could be exposed to is calculated. That total amount is then averaged over the period that the cleanup will take, which gives an allowable concentration of benzene in air (the PAAQS). Next, the average concentration of benzene *measured* in air at the site over the period of cleanup (also called the project running average) is compared to the PAAQS.

As the cleanup period gets longer, the allowable benzene average air concentration gets lower because there is a fixed amount of benzene that is averaged over the period of the cleanup. This is best shown by an example. If the total allowable benzene concentration was 100 ppm, and the cleanup was to take 5 days, the allowable project running average concentration at the end of the 5 days would be $100 / 5$ or 20 ppm. However, if the remediation was to take 10 days, the allowable project running average concentration at the end of the 10 days would be $100 / 10$ or 10 ppm. Similarly, if the remediation was to take 100 days, the allowable project running average concentration at the end of the 100 days would be $100 / 100 = 1$ ppm. As you can see, as the cleanup period increases, the PAAQS for benzene gets lower and lower.

So, how does the cleanup duration affect the PAAQS for Barrie Park?

For the Barrie Park project, the PAAQS for benzene has been calculated for several different cleanup times (ranging from 6 months up to several years). Comparing the PAAQS for benzene with the project running average air concentration of benzene (that takes into account the emissions of benzene from the project to date) shows us that the project needs to be completed in winter 2003. As shown on Table 1, the PAAQS for the Barrie Park project (which is based on an 18-month project duration) is very low, and in fact is very close to background concentrations for the Oak Park area, as well as for the U.S. in general. Therefore, it is very important to closely monitor the project running average air concentration of benzene and compare it to the target PAAQS for the end of the project. If it looks like the project running average air concentration of benzene is too high to be able to meet the PAAQS, the project emissions controls need to be closely examined to determine what other control measures are needed.

What if the project running average air concentration gets too high?

This is what happened in the spring of 2002 when the project had to be shut down – the concern was that the project running average air concentration of benzene would not be able to meet the PAAQS at the completion of the cleanup. After the shut-down, the Utilities, the Village, and the Park District worked together to develop a revised project plan that would accomplish the scope of work and would still meet the PAAQS at the end of the project. That is why the new and larger tent-like structure was brought on to the site – it provides aggressive emissions controls and provides enough room within the tent for the contractors to work efficiently and effectively at removing the contamination.

When the project is shutdown, how does that affect the PAAQS?

The period when the project was shut down is referred to as the "hiatus." During the hiatus, there were no emissions of benzene from the site, because the excavation work was not being completed. Because there were no benzene emissions, this period is not added to the total duration of the cleanup, and thus, the PAAQS is not affected.

FOR MORE INFORMATION ABOUT BARRIE PARK AIR MONITORING...

- For questions or to speak with the Village's environmental consultants, contact the Village's Health Department at 708.358.5480
- View on-going air data results at www.barriepark.org
- Review Reports from the Illinois Department of Public Health, visit the document repositories at Village Hall Health Department (123 Madison) or the Park District of Oak Park (218 Madison)