# Health Consultation

# DuPage County Landfill

# CERCLIS No. ILD980606305

# Warrenville, DuPage County, Illinois

Prepared by:

Illinois Department of Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

## Purpose

The Agency for Toxic Substances and Disease Registry (ATSDR) requested that the Illinois Department of Public Health (IDPH) update site-related activities for the DuPage County Landfill since the release of the public health assessment (IDPH 1997). This health consultation responds to that request.

## Background and Statement of Issues

The DuPage County Landfill is a 40-acre landfill in the Blackwell Forest Preserve (Figure 1). The landfill is northeast of Warrenville, Illinois. The landfill hill is about 150 feet tall, and people use it for snow tubing in the winter. People use trails in the forest preserve for biking, cross-country skiing, horseback riding, running, and walking. People use Silver Lake in the forest preserve for fishing and boating (no motors). The forest preserve also has a campground.

On April 30, 1992, ATSDR released an interim preliminary health assessment for the DuPage County Landfill (IDPH 1992). On May 1, 1997, ATSDR released a public health assessment for the site (IDPH 1997). At that time, IDPH concluded that the site posed no apparent public health hazard because no one was being exposed to contaminants at levels expected to cause adverse health effects. IDPH further concluded that, although the site could pose a future health threat from exposure to contaminated groundwater, no evidence existed of an advancing contaminant plume. Recommendations from the 1997 PHA are shown in Attachment 1.

From August 1997 through August 1998, the DuPage County Forest Preserve District (FPD) completed the following remedial actions (USEPA 2003b):

- Repaired landfill cap in four areas to ensure at least 2 feet of low-permeability clay.
- Repaired the landfill cover in one location to eliminate water from pooling on the landfill.
- Finished construction of the leachate collection system.
- Finished construction of the landfill gas venting system.

On February 25, 1998, the U.S. Environmental Protection Agency (USEPA) conditionally approved a FPD operation and maintenance plan for the site (USEPA 2003b). On September 30, 1998, USEPA issued a Record of Decision for the site, which included several remedial actions (USEPA 1998):

- Institutional controls in the form of land use and groundwater use restrictions.
- Long-term cap inspection and maintenance, including erosion and storm water control.
- Long-term operation and maintenance of the landfill leachate collection system, with possible augmentation.
- Long-term operation and maintenance of the passive landfill gas collection system, with possible augmentation to active gas collection and on-site thermal treatment (flare).
- Continued off-site treatment and disposal of landfill leachate.

- Monitored natural attenuation of groundwater.
- Long-term monitoring of groundwater, landfill gas, and leachate.

In February 1999, the FPD submitted an updated operation and maintenance plan for the site. The FPD implemented that plan, which included operation and maintenance of the landfill cover, leachate collection system, and landfill gas collection system (USEPA 2003b).

On April 9, 1999, USEPA issued a Unilateral Administrative Order to the FPD that required the FPD to conduct the remedial actions specified in the Record of Decision (USEPA 2003a, USEPA 2003b). On June 3, 1999, the FPD certified that the required deed restrictions had been enacted. These deed restrictions (USEPA 2003b) included

- prohibiting any activity that might interfere with remediation of the site,
- prohibiting the use of site groundwater,
- limiting the use of the site to approved recreational uses,
- prohibiting tampering with the contaminant containment or monitoring systems,
- prohibiting activities that might damage the vegetative cover of the landfill, and
- prohibiting ignition sources on the landfill.

In August 2000, 28 landfill gas vents were abandoned or reconfigured so that all landfill gas exits through one vent, at the top of the landfill. Twelve gas vents now discharge through the one vent (USEPA 2003b).

The leachate collection system drains into a collection tank. Periodically, leachate is removed from the tank and taken to an approved off-site disposal facility. From the startup of the leachate collection system in November 1997 through June 2003, about 2,938,600 gallons of leachate were removed from the landfill (USEPA 2003b).

On July 16, 2003, USEPA inspection of the site found the landfill cover, vegetation, and all fences in good condition. In their 5-year review of the site, USEPA (2003b) concluded that the remedial design protected of human health and the environment, provided that the present operation and maintenance practices, and institutional controls continue. USEPA expects at least 20 years of long-term monitoring, operation, and maintenance at the site (USEPA 2003a, USEPA 2003b). In its 5-year review of the site, USEPA (2003b) recommended the following:

- USEPA should work with the Illinois Environmental Protection Agency (Illinois EPA) and the FPD to finalize the Landfill Gas Trigger Level Report. This report will establish flammable gas levels at which additional actions will be needed to ensure that the management of landfill gas emissions remains protective.

- USEPA will work with Illinois EPA to identify any remaining concerns at the site and move forward toward proposing delisting the site from the NPL. September 30, 2004 is the target date.

## Demographics

Table 1 shows the demographic profile of people living within 1 mile of this site (U.S. Census 2000). In 2000, a total of 6,199 people lived within a 1-mile radius of the landfill (Table 1).

## Community Concerns

On February 13, 2003, USEPA used a local newspaper to request public comments regarding the site. No citizens submitted any comments; the only comments received were from the FPD, which supported its activities as protective of human health and the environment (USEPA 2003b).

# Discussion

## Chemicals of Interest

To select chemicals for further evaluation for both carcinogenic and noncarcinogenic health effects, IDPH compared the maximum level of each chemical detected during environmental sampling with appropriate screening comparison values. Chemicals that exceeded comparison values were selected for further evaluation. A detailed discussion of each of the comparison values is found in Attachment 2.

IDPH used the comparison values to screen for chemicals 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 chemicals can affect only someone exposed to sufficient doses. The amount of the chemical, the duration and route of exposure, and the health status of exposed people are important factors in determining the potential for adverse health effects.

### *Air*

From September 15, 1998 through April 3, 2002, the concentration of methane in landfill gas from the main vent ranged from 55% to 69%, with an average of 60% (Table 2). On April 11, 2003, the concentration of methane from the main vent was 52%.

### *Groundwater*

Since leachate extraction began in November 1997, on-site groundwater monitoring has found a steady reduction in contaminant levels (USEPA 2003b). In September 2002, no chemical in groundwater exceeded any health-based comparison value.

Exposure Pathways

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

- a source of exposure,
- an environmental transport medium,
- a route of exposure, and
- an exposed population (point of exposure).

A pathway is complete if all its components are present and exposure of people has occurred, is occurring, or will occur. If (1) parts of a pathway are absent, (2) data are insufficient to determine 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***

Organic matter in a landfill decomposes to produce, among other things, methane gas, which is flammable at 5%-15% in air. Peak gas production usually occurs 5-7 years after waste disposal. Usually, most of the methane generation by landfills occurs in the first 20 years after waste disposal. However, methane generation can last 50 years or more (ATSDR 2001). Methane is commonly used as "natural gas" for cooking, heating, and other purposes by homes and industry.

No buildings are on or near the landfill where landfill gas could accumulate. Institutional controls prohibit construction of buildings on the landfill. An 8-ft tall fence surrounds the hilltop gas vent, and the fence is at least 4 feet from the vent. The FPD hired Montgomery Watson Harza to model landfill gas concentrations around the hilltop vent, using a worst-case scenario (calm air). For a person outside the fence around the hilltop vent, they concluded that landfill gas would be diluted sufficiently to pose no flammability risk or risk for adverse health effects (USEPA 2003b). Therefore, present exposure to landfill gas is negligible. Given the existing institutional controls and continuing operation and maintenance of the landfill cover and gas collection system, future exposure to landfill gas also should be negligible.

***Groundwater***

Infiltrating precipitation can dissolve contaminants and become leachate. Groundwater also can flow through wastes and become contaminated. The improved landfill cap has decreased the infiltration of precipitation and decreased leachate production. The cap and leachate collection system have reduced the levels of chemicals in on-site groundwater below levels that would be expected to cause adverse health effects. Continued maintenance of the landfill cap and continued leachate extraction should prevent further groundwater contamination. Institutional

controls prohibit use of on-site groundwater. Therefore, human exposure should not occur to contaminants in on-site or off-site groundwater.

### Child Health Considerations

IDPH recognizes that children are especially sensitive to some contaminants. At this site, exposure to contaminants is not occurring at levels that would be expected to cause adverse health effects. Given the existing institutional controls and continuing operation and maintenance of the landfill cover and landfill gas collection system, future exposure should continue to be negligible. Therefore, IDPH does not expect any adverse health effects among children visiting the site.

## Conclusions

Currently, the DuPage County Landfill poses no apparent public health hazard because no one is being exposed to chemicals at levels that would be expected to cause adverse health effects. Institutional controls prohibit construction on the landfill, which could compromise the cap, allowing greater infiltration of precipitation, leachate production, and groundwater contamination. Institutional controls also prohibit construction of buildings on the site, where landfill gas could accumulate. Therefore, IDPH does not expect any adverse health effects for park visitors or employees.

## Recommendations

IDPH recommends the following:

- FPD continue operation and maintenance of the landfill cap, landfill gas extraction system, and leachate collection system.
- FPD continue monitoring groundwater around the site.

These recommendations will be followed as part of the Record of Decision for the site.

**Author**

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## References

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**CERTIFICATION**

The Illinois Department of Public Health, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), prepared this DuPage County Landfill health consultation. It was prepared in accordance with approved methodology and procedures existing at the time.

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

for Bobbi Erlwein
Team Leader, Cooperative Agreement Team
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ATSDR

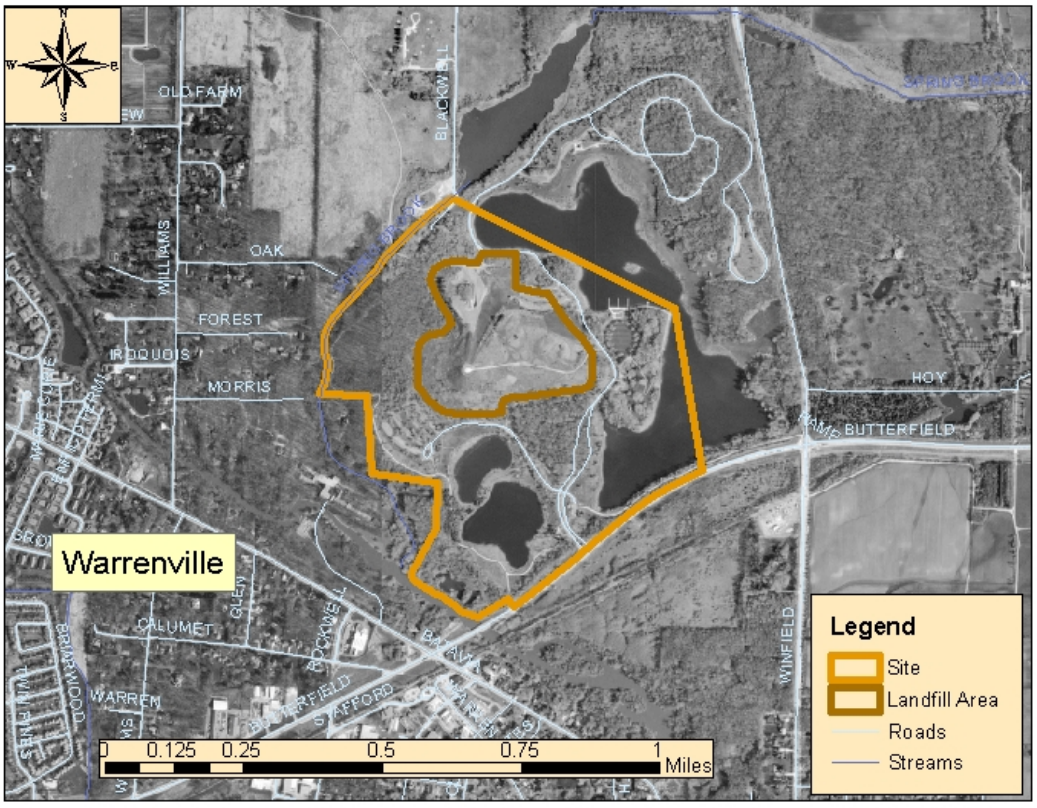
**Table 1. Demographic profile of people within 1 mile of the DuPage County Landfill (U.S. Census 2000).**

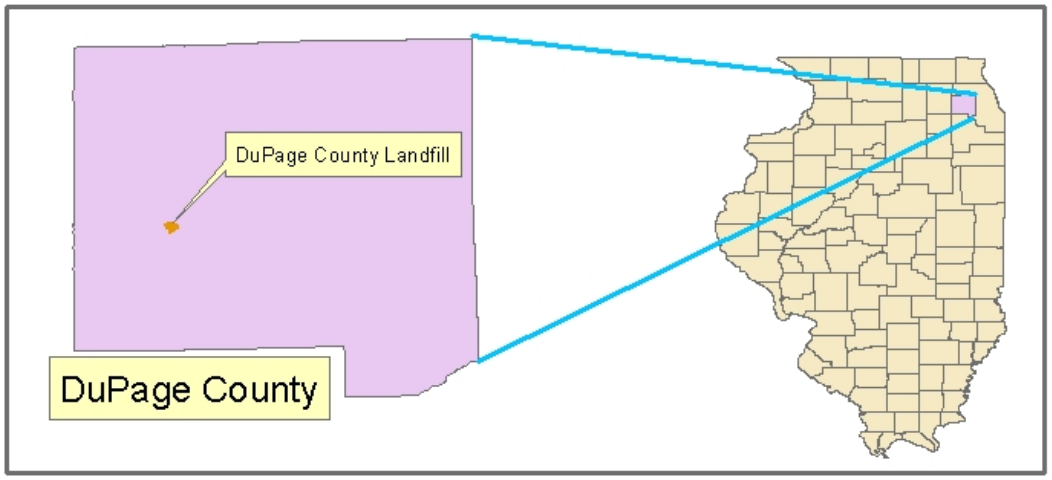
| Category | Number | Percent |
|---|---|---|
| Total Population | 6,199 | |
| **Race** | | |
| White | 5,501 | 89 |
| Black | 145 | 2 |
| Native American | 26 | 0.4 |
| Asian | 200 | 3 |
| Hawaiian/Pacific Islander | 4 | 0.06 |
| Other | 250 | 4 |
| Multiple | 73 | 1 |
| Hispanic | 696 | 11 |
| **Sex Distribution** | | |
| Male | 3,035 | 49 |
| Female | 3,164 | 51 |
| **Age Distribution** | | |
| < 5 years | 427 | 7 |
| 5-17 years | 1,267 | 20 |
| 18-21 years | 282 | 5 |
| 22-29 years | 652 | 11 |
| 30-39 years | 1,017 | 16 |
| 40-49 years | 1,159 | 19 |
| 50-64 years | 980 | 16 |
| ≥ 65 years | 415 | 7 |

**Table 2.** Concentrations of methane in landfill gas from the main vent (USEPA 2003b).

| Date | Methane Concentration (%) |
|---|---|
| 9/15/98 | 55 |
| 9/23/98 | 57 |
| 10/27/98 | 57 |
| 10/28/98 | 57 |
| 11/24/98 | 57 |
| 11/25/98 | 56 |
| 3/24/99 | 58 |
| 3/31/99 | 58 |
| 8/13/99 | 65 |
| 8/18/99 | 65 |
| 1/4/00 | 69 |
| 1/14/00 | 63 |
| 6/19/00 | 64 |
| 6/28/00 | 59 |
| 10/16/00 | 64 |
| 1/4/01 | 60 |
| 4/2/01 | 59 |
| 6/29/01 | 62 |
| 10/4/01 | 62 |
| 12/12/01 | 60 |
| 4/3/02 | 57 |
| 4/11/03 | 52 |

# Figure 1 - DuPage County Landfill Site Location Map




IDPH, 2004

Attachment 1

## Recommendations from the May 1, 1997 Public Health Assessment

1. Conduct periodic monitoring of down gradient private wells to ensure that no exposure is occurring to hazardous substances at levels of public health concern.

2. Continue periodic monitoring of all monitoring wells (including the intervening monitoring wells {located more than 200 yards from the landfill}) to detect possible changes in contaminants, their concentrations, and off-site migration.

3. Perform regular cap maintenance to repair damage from erosion. This will minimize leachate production and, hence, the risk of contamination of down gradient private or municipal wells.

4. Provide institutional controls to prevent construction on the landfill, which could compromise the cap, increasing leachate production and the risk of pollutants reaching down gradient private or municipal wells. In addition, chemicals in landfill gas may penetrate into any future buildings constructed on the landfill.

5. Prevent children and women of childbearing age from drinking the water from the private well with high lead concentrations. The lead levels in this well should be monitored or the source remediated.

6. Investigate the geology and hydrogeology around the landfill site to examine the likelihood of contamination of down gradient private and municipal wells.

7. Add several up gradient deep monitoring wells to adequately characterize the background levels of chemicals in groundwater.

**Attachment 2**

## 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.