

Health Consultation

BELVIDERE MUNICIPAL LANDFILL #1

BELVIDERE, BOONE COUNTY, ILLINOIS

EPA FACILITY ID: ILD980497663

SEPTEMBER 30, 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

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BELVIDERE, BOONE COUNTY, ILLINOIS

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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 1995, the Agency for Toxic Substances and Disease Registry (ATSDR) released a public health assessment prepared by the Illinois Department of Public Health (IDPH) for the Belvidere Municipal Landfill #1 located in Belvidere, Illinois. Since then, the U. S. Environmental Protection Agency (USEPA) has released three 5-year review reports, the first in 1995 and the most recent in 2005.

The purpose of this health consultation is to update the current status of the site and evaluate new environmental data collected since the release of the 1995 public health assessment (PHA).

Background and Statement of Issues

Site Description and History

The Belvidere Municipal #1 Landfill is a National Priorities List (NPL) site located on the western side of Belvidere in Boone County, Illinois [1]. The inactive landfill occupies approximately 19 acres of a 139 acre area owned by the Boone County Conservation District (BCCD) and is bordered by the Kishwaukee River to the west, Spencer Park to the south, a gravel pit to the north, and Appleton Road to the east (Attachment 1) [1].

The Belvidere Landfill was owned and operated as a municipal landfill by the City of Belvidere from 1939 until 1965 [1]. The city purchased a 10-acre tract of land from an area family in 1939. Waste disposal took place on this original parcel until 1954 when an additional acre was purchased for the landfill [1]. Although the city purchased approximately 128 additional acres between the years of 1957 and 1968, waste disposal activities were conducted on only 11 acres [1]. From 1965 until 1973, the city retained ownership while private contractors operated the landfill [1]. During this period of operation, the landfill was used for the disposal of industrial wastes, sludge from the city sewage treatment plant, paint/oil sludge, unknown liquid wastes, and other unknown sludges [1]. The landfill was officially closed and covered in 1973 with sandy soil excavated from an on-site borrow pit and soil remaining from highway construction [1]. In 1979, a cover of up to 3 feet of silt and sandy loam was placed on the landfill because the previous cover did not satisfy regulatory requirements. The new cover was vegetated with active prairie plants to help reduce erosion, and an earthen berm was constructed on top of the side slopes to reduce erosion [1].

The site was placed on the NPL in December 1982 [1]. A Remedial Investigation (RI) was performed beginning in December 1985 and continued through December 1986. In 1986, 100 drums (containing liquids and/or sludges located west of the site) were removed and disposed of at a permitted hazardous waste landfill [1]. The final RI report was issued in March 1988, and the Record of Decision (ROD) was signed on June 29, 1988 [1]. The ROD offered a final site remedy that would contain on-site wastes and contaminated soils and extract and treat groundwater [1]. The major components of the selected remedy included:

1. flood control measures,
2. deed restrictions,

3. security fencing,
4. environmental monitoring (soil, groundwater, surface water, sediments, and aquatic biota),
5. soil remediation
6. landfill capping, and
7. groundwater extraction and treatment [1].

In August 1990, construction of a chain-linked security fence around the landfill area was completed and in October 1990, excavation of approximately 1 foot of contaminated soil was completed from within the limits of the former disposal area. These measures minimized potential hazards as identified previously by ATSDR. The excavated soil was deposited on the landfill as part of a leveling layer and was covered by an additional 2 feet of leveling material in the construction of the cap [1]. The former drum disposal area was backfilled with topsoil, regraded, and revegetated [1]. In April 1989, a Consent Decree was completed between USEPA, Illinois EPA, and the potentially responsible parties (PRPs). On-site construction began in June 1990, and the remedial action was certified complete on May 29, 1992 [8]. The settling parties have conducted the operation and maintenance and provided quarterly reports as required by the plan [8]. The City of Belvidere, one of the settling parties, took responsibility for operating the remedy [7].

Past Health Evaluations

On August 9, 1995, ATSDR released a public health assessment prepared by IDPH for the Belvidere Municipal Landfill #1. IDPH concluded that the site “poses no apparent public health hazard” [1]. Estimates of past and present exposures from site-related contaminants were determined to be unlikely to cause adverse health effects [1].

The main hazard on the site was soil contaminated with polychlorinated biphenyls (PCBs) [1]. Exposure to site-related contamination was determined to have been limited in the past and in most cases eliminated through remedial activities [1]. Low-level contamination existed in on-site sediments and soil, but exposure was limited and levels were not expected to cause adverse health effects [1]. There also was no exposure to site-related chemicals in groundwater at the time [1]. The river and two ponds next to the site also were sampled for surface water, sediment, and fish and biota contamination; all were less than levels that would cause adverse health effects [1].

Several private wells in the area contained elevated levels of nitrites; however, the landfill was not believed to be the source of contamination because the wells were upgradient of the site [1]. IDPH recommended that monitoring of the site continue with

- annual sampling of on-site monitoring wells,
- annual sampling of residential wells within a 1-mile radius of the site to monitor levels of nitrites; and
- annual inspections of the landfill to ensure the cap has not been compromised [1].

Since the 1995 PHA, the City of Belvidere has taken many steps to remediate the site [8]. The city has moved the fence line so that the fencing encloses the landfill. Deed restrictions have

been established, prohibiting construction of a private well within the corporate limits of the City [3]. The landfill site, along with all BCCD property, is within the city limits of Belvidere [3]. The plume barrier groundwater extraction and treatment system has been shut down since the trial shutdown began in 1995. The final landfill cap as constructed is compliant with the Resource Conservation and Recovery Act (RCRA) [8]. Monitoring well sampling is conducted every July by the City of Belvidere.

USEPA Site Evaluation

In September 2000, USEPA staff inspected the Belvidere Municipal Landfill #1, and issued the second 5-year review for the site [8]. The review concluded,

“The USEPA finds that the selected remedy, as constructed and maintained, continues to be protective of human health and the environment and compliant with Applicable or Relevant and Appropriate Requirements. The fence restricts ready access to the site, the cover prevents direct contact with waste material, and the barrier groundwater extraction system prevents contaminated groundwater from migrating to the Kishwaukee River.” [8]

USEPA recommended that:

- the current shut-down configuration of the extraction system continue on an indefinite basis, depending on the results of future monitoring;
- the monitoring frequency be reduced to semi-annual;
- the City provide documentation verifying that groundwater use on land downgradient of the site is prohibited;
- the City provide a copy of the procedures used to maintain the groundwater extraction system when it is in standby mode; and
- the City conduct a Natural Attenuation Study using indicator parameters proposed by Illinois EPA [8].

The third 5-year review was completed September 19, 2005 [6]. The 5-year review found that the immediate threats at the site have been addressed and the site is protective of human health and the environment.

Site Visits

In November 2004, Illinois EPA visited the site. At that time, Illinois EPA staff found the area to be in good condition. A 6-foot chain link fence with angled brackets on the top surrounded the entire site. The fence enclosed the wells and buildings that would be considered in waste or immediately adjacent to waste. In the past, the fence had been damaged by deer, but the site was secure and limited access to trespassers. There were numerous signs along the fence indicating the site is closed to the public and the landfill could pose a threat to human health due to hazardous materials. BCCD does not allow swimming or boating anywhere on their property. The landfill cap was well vegetated with grass and showed no signs of erosion, exposed waste or poor maintenance.

In December 2005, IDPH, at the request of the BCCD, visited the site and sampled two private wells on the BCCD property. One sample was drawn from the Administrative Building and the second sample was drawn from a hand-pump well located in Spencer Park.

Discussion

Chemicals of Interest

IDPH compared the results of each environmental sample with the appropriate ATSDR health-based comparison values used to select chemicals for further evaluation for carcinogenic and non-carcinogenic health effects. Chemicals found at levels greater than the comparison values or those for which no comparison values exist were selected for further evaluation. A description of each comparison value used in this health consultation can be found in Attachment 2.

The settling parties have been in charge of sampling the 10 monitoring wells located in and around the Belvidere Municipal Landfill #1. The monitoring wells consist of seven shallow wells, two deep wells, and a bedrock monitoring well [4]. The most recent sampling data were received and reviewed by IDPH in September 2004. Only one monitoring well (MW-X5) had chemicals at levels that exceeded health-based comparison values (Table 1).

The chemicals of interest for this site are benzene, toluene, ethylbenzene, and xylenes (BTEX).

BCCD Property Well Sampling

The two BCCD property well samples were analyzed for volatile organic compounds (VOCs). Samples drawn from the Administrative Building showed no detection of VOCs. A sample drawn from a hand-pump well located in Spencer Park showed a level greater than the drinking water standard for tetrachloroethene (PCE). Trichloroethene (TCE) was detected, but the level was less than the drinking water standard. The level of PCE found in the hand-pump was 9.15 ppb and TCE was 1.65 ppb. PCE and TCE both have a maximum contaminant level (MCL) of 5 ppb.

Based on the results, IDPH sent a letter to the BCCD, stating that they may want to reconsider the use of this well for drinking water. IDPH shared these results with USEPA and Illinois EPA. The PCE and TCE detected are not believed to be a result of the landfill.

Exposure Evaluation

The main hazard in the past was soil contaminated with polychlorinated biphenyls (PCBs) in an old drum storage area [1]. Past exposure to site-related contaminants was limited and future exposure to contaminated soil was eliminated during the remedial activities. All soil containing more than 50 parts per million of PCBs was removed. Soil that was less than this level was consolidated under the landfill cap [8].

The site is now being monitored annually for VOCs in groundwater. Sampling that has occurred since 1995 has shown elevated levels of benzene, toluene, ethylbenzene, and xylenes in some

wells. However, monitoring well MW-7 showed benzene contamination above the MCL in March 2001, but the last two sampling events there have been no detects [9]. Also, MW-X3, a down-gradient well, has had benzene levels fluctuating above the 5 ppb MCL, but the last two sampling events have shown concentrations below the MCL [9]. These levels of BTEX were found only in monitoring wells and no one is drinking this water.

During the 1995 trial shutdown of the barrier extraction system, VOCs were only reported in four shallow monitoring wells [5]. This pattern of detections indicates that the VOC plume is limited to the shallow part of the groundwater flow system, which is close to the landfill [5]. It appears that natural attenuation is eliminating the VOCs before they reach the barrier extraction system and the Kishwaukee River [5]. No one uses the groundwater between the landfill and the Kishwaukee River, and the property between the landfill and the river belongs to the BCCD [5]. The city of Belvidere prohibits the construction of private wells within the corporate limits of the city and the site is within the city limits [3].

In a report completed by Golder Associates in 2002, it was determined that the amount of VOCs coming from the landfill has decreased and that levels of VOCs in downgradient wells have decreased since the groundwater extraction system was shut down. Golder Associates determined that the existing remedial measures of monitoring and institutional controls are protective of human health and the environment [4].

Community Health Concerns

At this time, there are no reported community health concerns. Past community health concerns were addressed in the PHA released in 1995. Area residents were concerned that private wells in the area might become contaminated. Off-site private well sampling did not reveal site-related contamination [1].

Community members also were concerned about the safety of eating fish from the ponds in Spencer Park and the Kishwaukee River. The concentrations of PCBs and pesticides that were detected in the fish samples were less than FDA action levels [1].

The BCCD was concerned about two wells located on the BCCD property. IDPH staff sampled these wells and recommended that the BCCD reconsider the hand-pump well as a source of drinking water.

Child Health Considerations

IDPH has determined that under the current conditions of the site, children near the site are not exposed to groundwater contamination.

Conclusions

IDPH concludes that this site currently poses no apparent public health hazard since there is no indication of exposure to site-related contaminants. Future exposure to contaminants in groundwater is unlikely because the city prohibits the installation of private wells within the corporate limits of the city. Past contamination found in private residential wells was not believed to be a result of the Belvidere Municipal Landfill #1.

Recommendations

IDPH recommends that:

- The city continue monitoring the groundwater quality as recommended by USEPA.
- The city inspect the landfill cap on a regular basis to ensure the cap has not been compromised.
- The city continue to limit site access through the maintenance of the fence surrounding the site, by posting signs warning of potential threats to human health; and restricting swimming and fishing in the ponds located on BCCD property.

Public Health Action Plan

IDPH sent a letter to the BCCD office and recommended that they reconsider the use of the hand-pump well as a source of drinking water

IDPH will continue to monitor site activities and evaluate any future sampling data that is collected.

Preparer of Report

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References

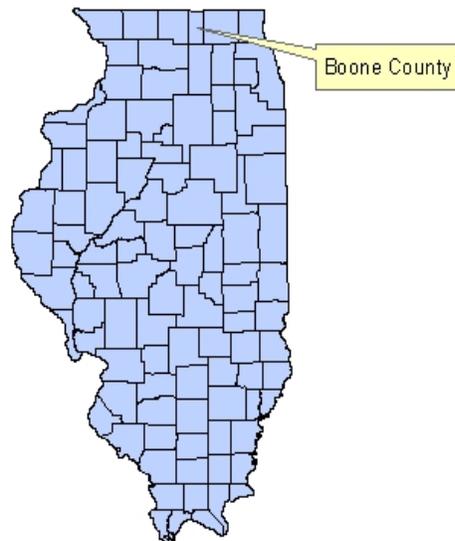
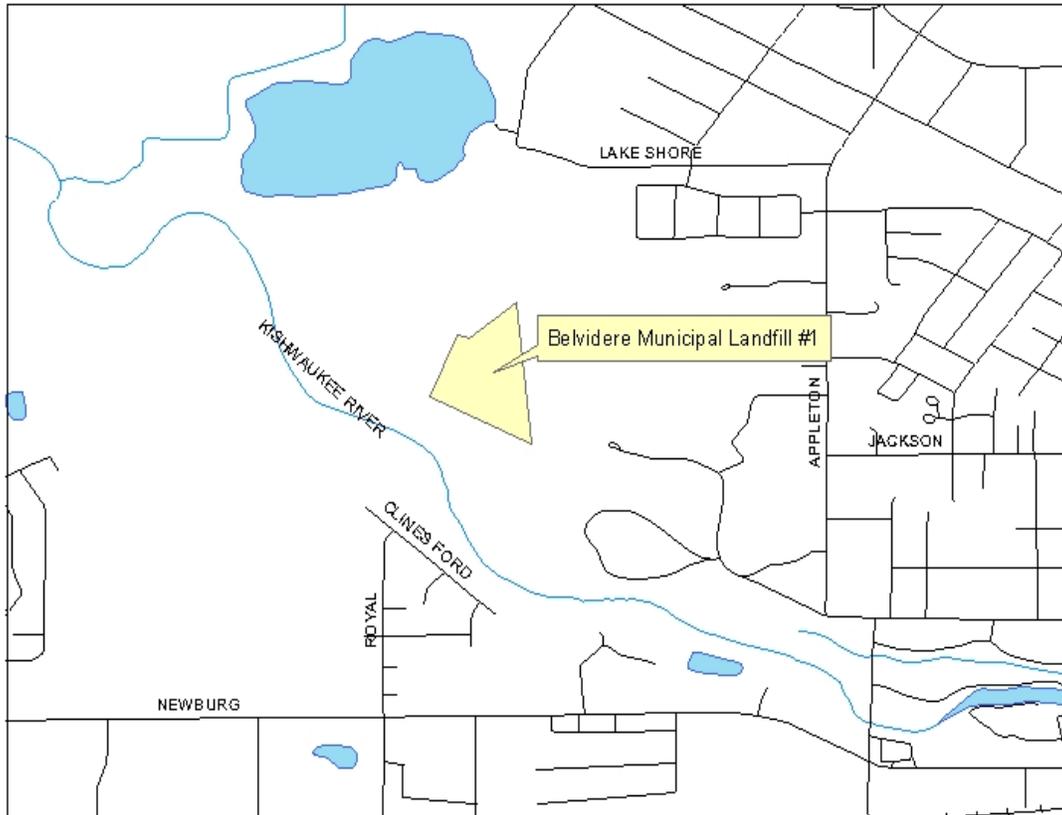
1. Agency of Toxic Substances and Disease Registry. Health Assessment for Belvidere Municipal Landfill No.1, Belvidere, Boone County, Illinois. Atlanta: US Department of Health and Human Services, 1995.
2. City of Belvidere, Department of Public Works. Belvidere Municipal Landfill #1, Operation and Maintenance, Annual Inspectors Report. Belvidere, Illinois. 2004 July.
3. City of Belvidere, Department of Public Works. Letter to Mr. Rick Lanham from Craig Lawler concerning deed restrictions for Boone County Conservation District. Naperville, Illinois. November 30, 2000.
4. Golder Associates Inc. Report on Groundwater Contaminant Trend Analysis and Natural Attenuation Evaluation Report, City of Belvidere, City of Belvidere, Municipal Landfill No. 1, Belvidere, Illinois. St. Charles, MO. 2002 July.
5. Golder Construction Services, Inc. Recommendations For Long-Term Operation and Maintenance of Remedial Action, Belvidere Municipal No.1 Landfill. Naperville, Illinois. 1997 August.
6. US Environmental Protection Agency, Region 5. Letter to Mr. Rick Lanham from Howard Caine concerning the 2005 Five Year Review. Chicago, Illinois. August 24, 2004.
7. US Environmental Protection Agency. NPL Fact Sheet for Illinois: Belvidere Municipal Landfill No. 1, EPA ID# ILD98497663. USEPA, Region 5, Chicago, Illinois. 2004 December. Available at:
<http://www.epa.gov/region5superfund/npl/illinois/ILD980497663.htm> Last accessed 2004 December 23.
8. US Environmental Protection Agency. Second Five Year Report for Belvidere Municipal Landfill #1, Belvidere, Illinois. USEPA, Region 5, Chicago, Illinois. 2000 September.
9. US Environmental Protection Agency. Third Five Year Report for Belvidere Municipal Landfill #1, Belvidere, Illinois. USEPA, Region 5, Chicago, Illinois 2005 September.

Table 1. July 2004 groundwater monitoring well (MW-X5) results exceeding health-based comparison values (in parts per billion) [2].

Chemical	Result	Comparison Value	Source
benzene	539	5	MCL
toluene	589	1,000	MCL
ethylbenzene	7,860	700	MCL
xylenes	19,400	10,000	MCL

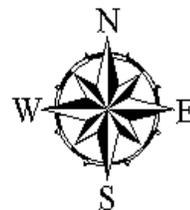
MCL = Maximum Contaminant Level

Approximate Location of Belvidere Municipal Landfill #1



Legend

- +— Rails
- Roads
- Surface Water



Source: Illinois Department of Public Health, May 2005

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.

Maximum Contaminant Levels (MCLs) have been established by USEPA for U.S. public water supplies to reduce the chances of adverse health effects occurring from exposure to contaminated drinking water. MCLs are enforceable limits that public water supplies must meet. These standards are well below levels at which health effects have been observed and take into account the financial feasibility of achieving specified contaminant levels.

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 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 Belvidere Municipal Landfill 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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