

# Health Consultation

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Soil Gas Infiltration in Area 4 and Area 7

SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION  
(a/k/a SOUTHEAST ROCKFORD GROUND WATER CONTAMINATION)

ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

EPA FACILITY ID: ILD981000417

SEPTEMBER 30, 2004

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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ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

EPA FACILITY ID: ILD98100417

Prepared by:

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

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## **Purpose**

The U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (Illinois EPA) requested that the Illinois Department of Public Health (IDPH) evaluate the latest indoor air sampling data for the Southeast Rockford Groundwater Contamination site. In response, IDPH evaluated basement air samples from 11 homes in source areas 4 and 7 (Attachment 2) of the Southeast Rockford site to determine whether volatile organic compounds (VOCs), possibly migrating by soil gas from contaminated shallow groundwater, could pose a public health hazard to residents in the homes.

## **Background and Statement of Issues**

### ***Site History and Location***

The Southeast Rockford Groundwater Contamination site is approximately 0.7 square miles on the southern edge of Rockford, Illinois (Attachment 1). Beneath the area is a large plume of groundwater contaminated with chlorinated VOCs (chemicals that contain carbon and chlorine and evaporate readily under certain conditions). Groundwater testing first began in 1981, when the Rockford Water Utility discovered low levels of VOCs in four municipal wells. In 1982, additional contamination was discovered and remedied by removing the wells from service. From 1984 through 1989, IDPH sampled private wells throughout the site area and discovered that more than 300 private wells were contaminated. Some wells had total VOC levels exceeding 1,000 micrograms per liter (ATSDR, 2001).

Illinois EPA and USEPA investigated this area in several phases. During the first phase, soil and groundwater were sampled to determine the extent of the contamination. To establish whether the contaminated plume had gone into areas not associated with the city water supply, 24 residential wells were tested. During this investigation, eight possible sources of the contamination were identified, as were high levels of VOCs in soil gas and groundwater.

Since the investigation, virtually all area homes have connected to the Rockford municipal supply system. This has greatly decreased the number of residents who could be exposed to contaminated groundwater. Six homeowners in the current plume area have decided against connecting to the municipal water system.

An Illinois EPA contractor (Camp, Dresser and McKee) used a groundwater model to help determine which homes could be affected if the plume migrated to another area. A 70-year period was used. Four homeowners in the buffer zone predicted by this 70-year model have decided against connecting to the municipal water supply (ATSDR, 2001).

### ***Previous Health Evaluations***

In 1992, IDPH wrote an interim preliminary public health assessment for the site that was released by the Agency for Toxic Substances and Disease Registry (ATSDR). IDPH classified the site as a public health hazard. IDPH recommended that public water be provided to homes with contaminated wells and the wells be sealed according to state regulations (ATSDR, 1992).

On December 31, 2001, ATSDR released a public health assessment prepared by IDPH for the Southeast Rockford Groundwater Contamination site. On the basis of available information, IDPH concluded that the site may pose a public health hazard for the residents who have not

connected to public water. Indoor air sampled by IDPH in 1992 and 1993 did not show that the migration of VOCs via soil gas was a public health hazard (ATSDR, 2001).

IDPH recommended that local authorities attempt to convince the remaining unconnected residents to use public water. IDPH also recommended that Illinois EPA sample indoor air again to ensure that conditions had not changed since the early 1990s (ATSDR, 2001).

In addition, ATSDR planned to continue to follow-up with the Southeast Rockford residents who were added to the National Trichloroethylene Subregistry in June 1990. The follow-up is to obtain more information about the possible health effects of trichloroethylene exposure and will continue until 2010 (ATSDR, 2001).

### ***2003 Indoor Air Sampling***

In 2003, Illinois EPA sampled soil gas in source areas 4 and 7 because those regions are the closest to potential sources of VOCs affecting groundwater (Attachment 2). The results of these samples showed VOCs at elevated levels in soil gas in certain areas. Illinois EPA concluded that the movement of VOCs in soil gas varied and depended on the type of subsurface soil. Illinois EPA also concluded that indoor air sampling would best indicate actual human exposure to VOCs in the soil gas.

Illinois EPA focused the 2003 indoor air sampling plan on source areas 4 and 7. Homes in source areas 9 and 10 are farther from these source areas, and the contaminated groundwater is moving away from those homes. Therefore, if contamination was not found in homes closer to potential sources no reason would exist to test farther out.

Vapors in the indoor air samples collected in 1992 and 1993 from these areas were not found at levels that would pose a public health hazard (ATSDR, 2001). The 2003 indoor testing was done to determine whether VOCs were migrating from contaminated groundwater to residential basements under current conditions.

On August 5 and 6, 2003, contractors for Illinois EPA collected one basement indoor air sample in each of 11 homes in source areas 4 and 7. The 24-hour air samples were obtained in accordance with the recommended guidelines for testing for VOCs (Illinois EPA, 2003). The homes were not ventilated for 24 hours before sampling or during sampling, products containing VOCs were removed from the home before sampling, and any item found that would interfere with the testing was removed during the pre-sampling inspection.

On September 25, 2003, IDPH received the laboratory results of the indoor air sampling. IDPH conducted an exposure assessment and toxicological evaluation of the data and mailed letters on October 15, 2003, to residents of the homes sampled. These letters provided a health-based interpretation of the sampling data. Letters were provided in both English and Spanish.

### ***Illinois EPA Remediation Efforts***

Illinois EPA and USEPA have selected low-temperature thermal desorption and leachate containment and collection as the remedy for the source of environmental contamination in Source Area 4. Construction of this remedy is planned for 2005 (Illinois EPA, 2004).

For Source Area 7, Illinois EPA and USEPA have proposed soil vapor extraction and air sparging (air is pumped into the ground to aid in the removal of VOCs) for contaminated soil and multiphase extraction and containment for leachate contamination (Illinois EPA, 2001). The selection of a remedy for Source Area 7 is yet to be determined.

Once implemented, these remedies should reduce VOC contamination at the various sources and ultimately reduce contamination in the groundwater and soil gas that can lead to exposure.

## Discussion

### *Chemicals of Interest*

IDPH compared the results of each environmental sample with the appropriate comparison values used to select chemicals for further evaluation for carcinogenic and noncarcinogenic health effects. Chemicals found at levels greater than comparison values or those for which no comparison values exist were selected for further evaluation (Attachment 3).

The chemicals of interest in the residential air samples are VOCs, including 1,2-dichloroethane, trichloroethylene, and tetrachloroethylene (Table 1).

**Table 1. Chemicals of Interest in Basement Air Sampling—August 5–6, 2003**

<b>Volatile Organic Chemicals</b>	<b>Maximum Levels Detected in a Basement Sample (in ppb)</b>	<b>Comparison Value and Source (in ppb)</b>	<b>Number of Homes Exceeding the Comparison Value (n = 11)</b>
1,2-dichloroethane	1.9	0.04 (CREG)	4
tetrachloroethylene	0.48	0.12 (USEPA)	7
trichloroethylene	0.68	0.0041 (USEPA)	6

ppb: parts per billion; CREG-cancer risk evaluation guide (based on 1 E-6 increased risk); USEPA screening level (based on 1 in 1,000,000 increased risk)

### *Exposure Analysis*

Exposure to a chemical at a level exceeding a comparison value does not necessarily mean that adverse health effects will result. The potential for exposed persons to experience adverse health effects depends on the amount of each chemical to which a person is exposed, the length of time during which a person is exposed, the health condition of the exposed person, and the route of exposure.

A chemical can cause an adverse effect only if people contact it at a sufficient level. That requires a source of exposure, an environmental transport medium, a point of exposure, a route of exposure, and an exposed population. An exposure pathway is complete if all of the components are present and people were exposed, are being exposed, or will be exposed. If parts of a pathway are absent, data are insufficient to determine whether a pathway is complete, or exposure may occur at some time (past, present, future), then a potential exposure pathway exists. If part of an exposure pathway is not present and will never exist, the pathway is incomplete and can be eliminated from further consideration.

Some residents reported using their basements as a TV room or game room. Others indicated using the basement mainly for laundry and storage and spending little time in the basement.

None of the residents reported having bedroom in their basement. IDPH assumed that adults and children living in a sampled home would spend a maximum of 6 hours per day in the basement for 15 years of their lifetime.

The home with the highest level of trichloroethylene also had a well pit in this basement that had not been properly sealed. In the letter to the resident and owner of this home, IDPH recommended that the well pit in the basement be sealed in such a way to reduce VOCs from entering the home. Illinois EPA reports that the well pit has now been sealed properly (Illinois EPA, 2004).

On the basis of the exposure scenario described above, none of the chemicals detected would pose a risk for non-cancer health effects. No apparent increased risk for cancer would be expected on the basis of the above scenario.

For homes where multiple VOCs were present, IDPH added the relative concentrations of the chemicals, and no apparent increased risk for cancer would be expected on the basis of the exposure scenario described above.

### **Child Health Considerations**

Children can have higher risks for adverse health effects from exposures to some contaminants than can adults. IDPH evaluated exposures to children using daily exposures of six hours in the basement of a sampled home over a 15 year period. Based on this exposure scenario, no apparent increased risk for cancer and no non-cancer health effects are expected from exposures to the levels of VOCs detected in these homes.

### **Conclusions**

On the basis of the basement air samples collected, IDPH concludes that exposure to VOCs in residential homes sampled in Southeast Rockford, Illinois, poses **no apparent public health hazard**. Illinois EPA and USEPA are proceeding with remedies for source areas that should reduce the potential for future exposure to VOCs.

### **Public Health Action Plan**

IDPH recommended that the home with the open well pit in the basement seal the pit to reduce VOCs entering the home. Illinois EPA reports that the well pit has now been properly sealed (Illinois EPA, 2004).

In October 2003, IDPH sent letters to the residents in the homes sampled by Illinois EPA. The letters provided a health-based interpretation of the sampling data. Letters were provided in both English and Spanish.

Until 2010, ATSDR will continue to follow the Southeast Rockford residents who were added to the National Trichloroethylene Subregistry in June 1990 to obtain more knowledge about the possible health effects of trichloroethylene exposure.



**Preparer of Report**

Ken Runkle

Environmental Toxicologist

Illinois Department of Public Health

**References**

1. Agency for Toxic Substances and Disease Registry. Interim guidance for the public health assessment of benzene. Atlanta: U.S. Department of Health & Human Services. 2000.
2. Agency for Toxic Substances and Disease Registry. Interim preliminary public health assessment for Southeast Rockford. Atlanta: U.S. Department of Health & Human Services. 1992.
3. Agency for Toxic Substances and Disease Registry. Public health assessment for Southeast Rockford. Atlanta: U.S. Department of Health & Human Services. 2001.
4. Illinois Environmental Protection Agency. Source area 7 feasibility study and proposed plan; Southeast Rockford groundwater contamination Superfund project. Springfield, Illinois. June 2001.
5. Illinois Environmental Protection Agency. Southeast Rockford groundwater contamination Superfund project update. Springfield, Illinois. March 2003.
6. Illinois Environmental Protection Agency. Southeast Rockford groundwater contamination Superfund project area 4 update. Springfield, Illinois. March 2004.

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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 Southeast Rockford Groundwater Contamination health consultation. It was prepared in accordance with approved methodology and procedures existing at the time.

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Allen Robison  
Technical Project Officer  
Superfund and Program Assessment Branch  
Division of Health Assessment and Consultation

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

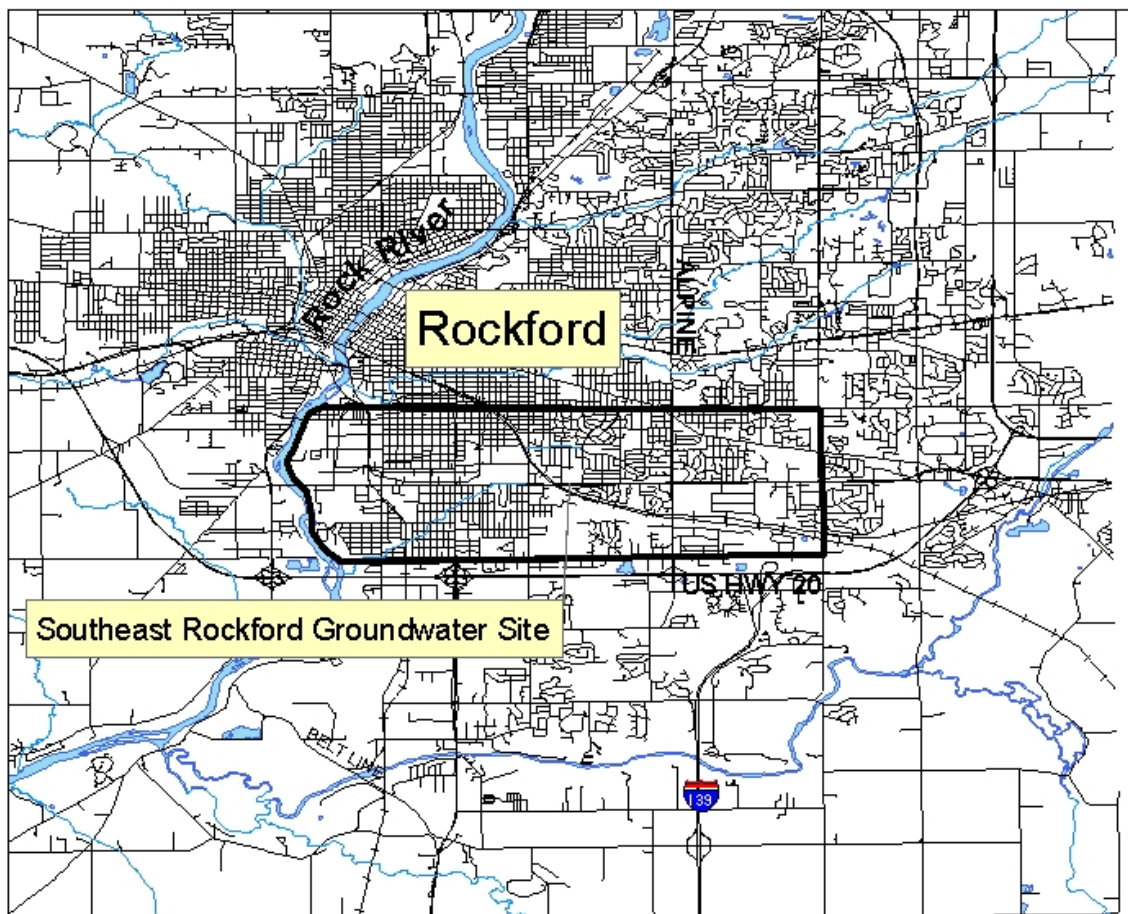
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Bobbi Erlwein  
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Superfund and Program Assessment Branch  
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ATSDR

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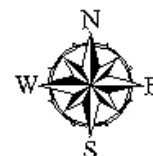
# Approximate Location of Southeast Rockford Groundwater Site

Attachment 1



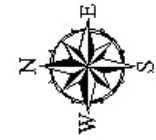
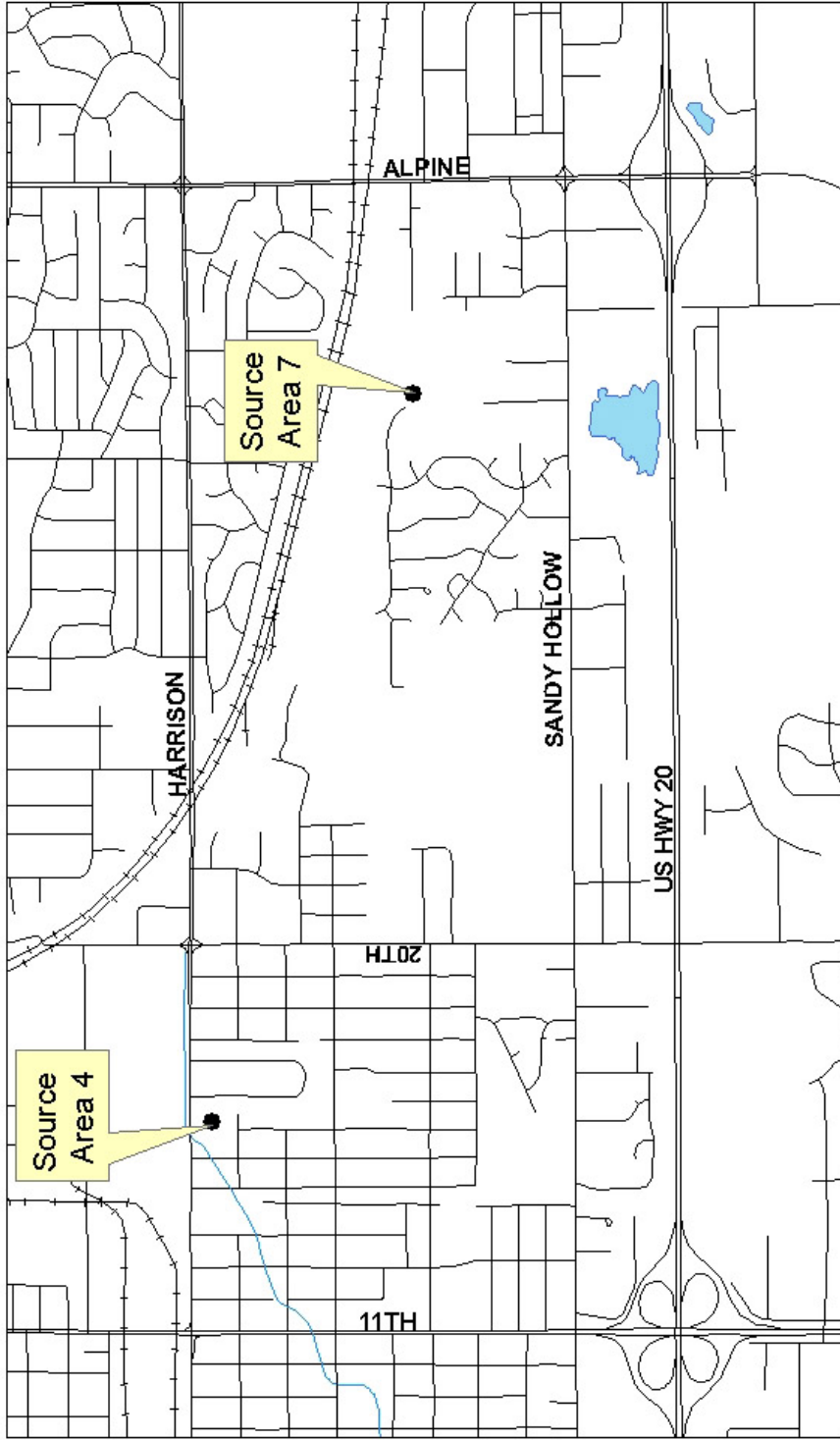
## Legend

- Roads
- + Rails
- Surface Water



Source: Illinois Department of Public Health GIS

### Approximate Locations of Source Areas 4 and 7



#### Legend

- Roads
- +— Rails
- Surface Water

**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.