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## MEMORANDUM

To: Local Health Departments, Administrators and Directors of  
Environmental Health  
  
Regional Engineers/Supervisors

From: Jerry Dalsin, P.G.  
Division of Environmental Health

Date: February 25, 2009

Subject: Guidance Document for Arsenic in Private Wells

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### **Background:**

This serves as a guidance document for the Department and local health departments, regarding the issuance of water well construction permits in areas where naturally occurring arsenic (not caused by pollution) exceeds the maximum contaminant level (mcl) of 10 parts per billion (ppb) established by the Safe Drinking Water Act, and for providing public information to owners of both new and existing water wells, concerning arsenic in groundwater and danger it poses to public health. It was developed since arsenic in private water systems is not regulated as it is in all other types of potable water systems, e.g., community, and non-community. Some local health departments may have requirements in their ordinances that may differ from this document. The intent is not to preclude those requirements.

### **Occurrence of Arsenic in Illinois Groundwater:**

Arsenic occurs naturally throughout Illinois in deep bedrock materials, and in shallow glacial materials, covering the northern two-thirds of the state. In some areas of the state, elevated levels of arsenic can be found in groundwater, occurring most frequently in sand and gravel aquifers of glacial origin.

### **Previous Studies on the Occurrence of Arsenic in Groundwater and its Health Effects:**

Studies pertaining to the occurrence of arsenic in Illinois groundwater are available through the Illinois State Water Survey and the U.S. Geological Survey. They include maps, depicting areas where arsenic concentrations are close to the mcl of 10 ppb or exceed it. Publications on arsenic in drinking water, including its health effects, are available through the Department, and the US Department of Health and Human Services.

Illinois State Water Survey, Illinois Department of Public Health, and Illinois Environmental Protection Agency, 2002, *Arsenic in Illinois Groundwater*

<http://www.isws.illinois.edu/gws/arsenic/ilsources.asp>

Kelly, W.R., and Wilson, S.D., 2005, *Arsenic in Groundwater in Central Illinois*, Illinois State Water Survey

<http://www.isws.illinois.edu/pubs/pubdetail.asp?CallNumber=ISWS+IEM+2005%2D02>

Kelly, W.R., and Wilson, S.D., 2003, *Shallow Groundwater Sampling in Kane County*, Illinois State Water Survey

<http://www.isws.illinois.edu/pubdoc/IEM/ISWSIEM2005-01.pdf>

Warner, K.L., Martin, A., Jr., and Arnold, T.L., 2003, *Arsenic in Illinois Groundwater Community Supplies*, U.S. Geological Survey

<http://il.water.usgs.gov/pubsearch/reports.cgi/keyword?keyword=Arsenic&sortby=date&page=1>

### *Health Effects Associated with Arsenic*

Illinois Department of Public Health, 2008, *Arsenic in Groundwater*

<http://www.idph.state.il.us/envhealth/factsheets/arsenicwater.htm>

US Department of Health and Human Services, Agency for Toxic Substances & Disease Registry, 2007, *Arsenic in Private Drinking-Water Wells*

<http://www.atsdr.cdc.gov/arsenic/index.html>

### **Issuing Permits to Construct Water Wells in Areas Susceptible to Excessive Arsenic Concentrations:**

When a water well driller intends to utilize water from an aquifer known to have arsenic concentrations exceeding 5 parts ppb, provide a notice to the owner and driller, informing them of the potential for excessive arsenic concentration, making recommendations for testing the water, and providing treatment, if necessary. **An example of a notice to well owners and water well contractors, regarding arsenic in groundwater, is included on the last page of this document.** It is also intended for owners of existing wells. Since the cost for arsenic testing is relatively small, when in doubt, test the water.

### **Laboratories Certified to Test Water Samples for Arsenic:**

Laboratories performing tests on water samples are accredited through the Illinois Environmental Protection Agency, Division of Laboratories. A list of laboratories accredited for chemical analysis of water is included on their website at <http://www.epa.state.il.us/labs/pdf/chem.pdf>. A shorter three page version list is also available through the Division of Environmental Health. Just make sure arsenic is listed under the laboratory that will be performing the test.

### **Reducing the Potential for Arsenic through Aquifer Selection and Well Construction Procedures:**

In some areas where arsenic is found to be excessive, it may be possible to construct a well in a different aquifer known to have no arsenic problem, or where the contamination has been identified in a specific portion of an aquifer, it can be excluded from that aquifer by drilling techniques. In many situations, this involves excluding the aquifer by casing deeper and utilizing another aquifer. However, it would still be necessary to recommend sampling the water to ensure the successful exclusion.

The Illinois Water Well Construction Code, Section 920.40, specifies well construction liner installation and grouting procedures for excluding aquifers known to have excessive arsenic concentrations. "Water bearing formations shall be excluded by installing casing or a liner and properly sealing when such formations contain undesirable water. When a contaminated aquifer is to be excluded, the liner must be grouted in place, in accordance with Section 920.90 h), from 10 feet below the bottom of the

contaminated formation to at least 10 feet above the top of the contaminated formation. When multiple water-bearing formations of different static water levels are penetrated in the construction of a water well and the lower water-bearing formation has sufficient yield for the water well, the upper water bearing formations shall be excluded by installing casing or a liner and properly sealing to prevent the dewatering of the upper water-bearing formations.”

On the basis of existing well logs, local health departments can provide well owners and drillers with the depths of nearby wells and sampling results, or they can refer them directly to the web sites where this information is available. Water well records are available through the Illinois State Water Survey at <http://www.sws.uiuc.edu/data/gwdb/> and the Illinois State Geological Survey at <http://www.isgs.illinois.edu/maps-data-pub/wfdb/wfdb.shtml>. With this data available to them, water well contractors then can plan their construction methods that will isolate the high arsenic aquifer and insure that it is excluded.

Jerry Dalsin, Program Manager  
Private Water Program  
Division of Environmental Health

cc: Water Well Licensing Board  
IAGP

# **NOTICE TO WATER WELL OWNERS REGARDING ARSENIC IN GROUNDWATER**

Groundwater in your area is known to contain arsenic in concentrations exceeding the maximum contaminant level of 10 parts per billion (ppb). It usually occurs naturally, mostly in unconsolidated sand gravel formations, rather than from contamination.

Some studies have shown that drinking water containing elevated levels of arsenic can cause the following health effects: thickening and discoloration of the skin, sometimes leading to skin cancer; digestive problems such as stomach pain, nausea, vomiting, and diarrhea; and numbness in hands and feet.

Many of these health effects are often seen with other common illnesses, so detecting arsenic poisoning can be difficult. If you or your family members are concerned about health problems you believe to be related to arsenic in your water, you should consult your physician.

It is recommended that your well water be tested for arsenic concentration. A list of laboratories certified to test water for arsenic is available on the Illinois Environmental Protection Agency web site at <http://www.epa.state.il.us/labs/pdf/chem.pdf>, or if you are not able to access their web site, contact your local health department. The laboratory cost for performing this test is quite nominal. If the level of arsenic is 5 ppb or more, consider further testing to determine if the level of concentration changes over time.

If arsenic in your well water meets or exceeds the maximum contaminant level, you can reduce your exposure to it by using bottled water for drinking and cooking, treating the well water, constructing a new well (does not work in some situations), or connecting to a public water supply. Methods for water treatment include reverse osmosis, home distillation, deionization, and activated alumina media filter.

For additional information on water treatment, contact the Water Quality Association at 630-505-0160, and the National Sanitation Foundation, 313-769-8010.

For further information, contact your local health department or the Illinois Department of Public Health at 217-782-5830 or TTY (for hearing impaired use only) 800-547-0466.