Compiled by Raissa Rocha

Joe Ayotte

The Word on Wells

The U.S. Geological Survey (USGS) released a report in August revealing that 20% of untreated water samples from wells across the U.S. contain concentrations of trace elements exceeding human health benchmarks. Raissa Rocha, editorial intern for *Water Quality Products*, spoke with Joe Ayotte, USGS hydrologist and lead author of the study, about the report and the occurrence of trace elements in groundwater.

Raissa Rocha: What was the purpose of this study?

Joe Ayotte: The main goal was not necessarily to report on private wells in particular, but more to look at the occurrence of trace elements in various types of groundwater across the U.S. So we looked at trace element concentrations in private wells, public wells, monitoring wells and even in a few other types.

These samples were collected prior to any form of treatment of the water. For public wells, water that is delivered to customers has to meet standards established by the Safe Drinking Water Act. For private wells, it does not have to meet standards necessarily. We don't know whether they treat or don't treat water.

Rocha: Which trace elements were most commonly found to exceed human health benchmarks?

Ayotte: The biggest one, the most commonly occurring trace element we found that exceeded human health benchmarks, was manganese. And then also arsenic and uranium were pretty common.

Rocha: What factors contribute to these trace elements being in the water?

Ayotte: Those trace elements get into groundwater in different ways. It really all comes down to the geochemistry in the water sample and in the aquifer. Often times there are geochemical conditions that make one [element] soluble and [able to] get into the groundwater [that] inhibit the solubility of other [elements] to varying degrees.

An example is manganese, which we tend to see in humid climate areas (the eastern half of the U.S. primarily) and where there is not much dissolved oxygen in the sample water. Basically, either through metabolism of bacteria or water-rock reactions, the oxygen has been consumed in the sample, and those conditions favor manganese mobility. [Manganese] is also consistent with low pH.

Arsenic is similar. It is more mobile under low oxygen conditions, but it is definitely more mobile under high pH than low pH. So you can start to see these competing geochemical effects work differently depending on the trace element. Uranium, by contrast, is less mobile when there is low dissolved oxygen, so we find it mostly where water has plentiful oxygen in it.

These were the kinds of things we were able to, with a large sample, find good information on.

Rocha: Are certain areas of the country at higher risk for well contamination?

Ayotte: In a general sense, yes. Certainly, if you look at the maps in the report. I'll use arsenic and manganese as examples. We tend to see the highest manganese concentrations in the eastern half of the country. And we tend to see arsenic in the western half of the country—not universally, but by and large. Those facts really stem from differences in general geochemistry across the U.S. In the east, conditions are usually different and favor manganese mobility, compared to the west, where we see conditions that favor arsenic mobility.

Rocha: Were there any trends between which trace elements occurred in private, public and monitoring wells?

Ayotte: Yes. Trace elements that exceeded benchmarks occurred in general at similar rates for public and private wells. The ones that occurred most frequently were manganese, arsenic and uranium.

Rocha: How do these recent findings compare with any trends studied in the past?

Ayotte: There are two studies that are most closely related to this in terms of trace elements. One was on public supply well information in the U.S. and one was [on] private supply well information. Those two reports used subsets of the data that we used in this report. We looked at all types of wells in this report, while the two previous reports looked at only public or private wells, and those were not geared so much towards looking at relations to trace element occurrence. They were mostly looking at how many wells exceeded benchmarks. This report revisits those exceedances a little more deeply.

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NSF Intl. Obtains Injunction for Certification Mark Infringement

NSF Intl. successfully enforced its certification mark rights against Parson Adhesives, a Rochester Hills, Mich. company that distributes adhesives for drinking water products worldwide. NSF filed suit in the U.S. District Court for the Eastern District of Michigan and obtained a permanent injunction. Parson Adhesives admitted that it falsely represented some of its products as being NSF certified and willfully infringed the NSF mark.

Portable Water Filter Makes North American Retail Debut

The LifeStraw personal water filter, used since 2005 in harsh conditions in developing countries, is now available to consumers in the U.S. and Canada. The portable filtration tube is ideal for outdoor activities, overseas travel and emergency preparedness.

H2Options Receives NSF Grant

The National Science Foundation awarded a nearly $500,000 grant to a consortium of regional colleges and universities for the H2Options project, which aims to promote water technology education and career opportunities in southeastern Wisconsin.

Ariz. Groundwater Withdrawals Outpacing Recharges

U.S. Geological Survey scientists released a report evaluating groundwater availability and use for all of Arizona's alluvial basins from 1940 to 2007. The report found that groundwater in the basins was depleted by more than 74.5 million acre-ft, or approximately three times the maximum storage of Lake Powell. These alluvial basins account for 95% of the state's groundwater use, with groundwater providing about 43% of the entire state's water supply.

Networking News

The Hydrotech Div. of WaterGroup added Dave Willett to its northeast U.S. sales team.

Verde Environmental Technologies obtained rights to develop products based on patented technology owned by Teikoku Pharma USA Inc.