

# New standards for arsenic and uranium impact water systems in Kansas

**B**y now I believe it is well known to anyone working in the public water supply industry that the Environmental Protection Agency (EPA) has the responsibility of conducting periodic reviews of the drinking water standards. The Agency can leave them as they are, lower the limit, or raise any limit based on their review of new scientific research data. During these reviews, EPA can also add any contaminants they believe pose a threat to the health of the general public. Arsenic and uranium are two of the most recent contaminants that were added to the list and each was given a new maximum contaminant level (MCL). Uranium was included in the final rule for radionuclides which became effective in 2003, three years after the publication date of December 7, 2000. The arsenic rule effective date was January 23, 2006, five years after the rule was published in January 2000 to allow for monitoring.

The MCL for arsenic is 0.010 milligrams per liter (mg/L) or 10 parts per billion (ppb). The rule applies to all community and non-transient, non-community public water systems. While visiting with David Waldo with the Kansas Department of Health and Environment (KDHE), he indicated there are only about three or four systems currently exceeding the arsenic MCL in Kansas.

The current MCL for uranium is 30 µg/L; this rule affects several communities in Kansas. The Kansas Geological Survey issued a news release on September 24, 2008, with the following statement: "In addition to the water systems along the Arkansas River corridor in southwestern Kansas containing high uranium, there are nine Kansas communities and water districts whose water consistently registered above the federal standards. These are Atwood, Clay Center, Gaylord, Morganville, Norton, Oberlin, Lakin, Rooks County Rural Water District No. 1, and a Garden City subdivision."

## What are the health risks?

The EPA's final rule for arsenic addresses the long-term chronic effects of exposure to low concentrations of inorganic arsenic in drinking water. Studies link inorganic arsenic ingestion to a number of health effects including cancer of the skin, bladder, lung, nasal passages, liver, and

prostate. Non-cancerous complications include cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., diabetes) effects.

Exposure to uranium in drinking water may cause toxic effects to the kidney. In 1991, EPA proposed a MCL of 20 µg/L, which was determined to be as close as feasible to the maximum contaminant level goal (MCLG) of zero. Based on human kidney toxicity data collected since that time and on

its estimate of the costs and benefits of regulating uranium in drinking water, EPA determined that the benefits of a uranium MCL of 20 µg/L did not justify the costs. Instead, EPA determined that 30 µg/L is the appropriate MCL, because it maximizes the net benefits (benefits minus costs), while being protective of kidney toxicity and carcinogenicity with an adequate margin of safety.

Treatment options for removal of both arsenic and uranium are very similar. These include ion exchange, lime softening, reverse osmosis (RO), and enhanced coagulation/filtration.

## What are the treatment options?

Treatment options for removal of both arsenic and uranium are very similar. These include ion exchange, lime softening, reverse osmosis (RO), and enhanced coagulation/filtration. Additional treatment options for arsenic removal include activated alumina, oxidation/filtration, and electrodialysis reversal (EDR). None of these are very feasible for very small systems such as the city of Clayton located in northwest Kansas with a population of about 65. Clayton has arsenic in its groundwater and as stated by Mayor Russell Bird, "Funding a treatment plant for a small town like this is out of the question." Russell stated also that the only possible solution to their problem is to locate another well site with water low in arsenic. Actually, I believe the first area to explore for any system out of compliance with either arsenic or uranium is another source of water including the possibility of purchasing water from a nearby source if available. The various treatment options are not only quite expensive to install but also require regular operation and maintenance. Also, each system will have a waste stream with concentrated arsenic or uranium that will need to be disposed of in a manner that will comply with KDHE requirements.

Oberlin is another city in the northwest part of Kansas with water quality issues. Oberlin has a population of about



With a \$4 million water system improvement project being proposed to address the arsenic and uranium drinking water rules, city officials worry that other infrastructure and facilities such as the city's pool that was constructed in 1953 will be neglected.

1,965; it is the county seat of Decatur County, and is located along Highway 36. Some notes of interest about Oberlin include that it was the site of the last Indian raid in Kansas and the city is quite proud of the city's civic center, which has also been made available to KRWA to hold training workshops. Also, there is a sign on Highway 36 denoting this highway as the shortest route between Denver and Indianapolis. In addition, and unfortunately, the city has both arsenic and uranium in the drinking water. Oberlin has the engineering firm of Miller & Associates, Consulting Engineers, P.C., McCook, Nebraska, working with them to address this issue. Project consultant Chris Miller indicated they have considered several treatment options and are currently considering coagulation/filtration and possibly iron removal/absorption. Other options either have too much waste, such as with RO, or have waste handling issues, or as with pressure vessels, could not get adequate contact time. Mayor Joe Stanley expressed the feelings that he and the city council have which are that the city water is not harmful to one's health and no one can show that the water with current levels of arsenic and uranium are harmful. He stated also that the city just cannot afford a \$4 million project. Oberlin however, is currently looking to the U.S. Department of Agriculture, Rural Development for funding assistance. Marcia Lohofeneer, councilwoman, expressed her

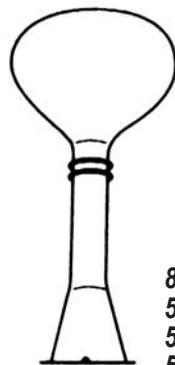
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Oberlin, Kansas is rightfully proud of the "Gateway Civic Center." Many organizations, including KRWA, have used the modern and well-equipped facility.

concerns that a water project of this magnitude will not allow the city to address other infrastructure needs. She is concerned that the city will not be able to deal with the city's aging distribution system, the streets that need resurfacing, and the city swimming pool that needs extensive maintenance.

It is obvious that many systems will find it challenging to comply



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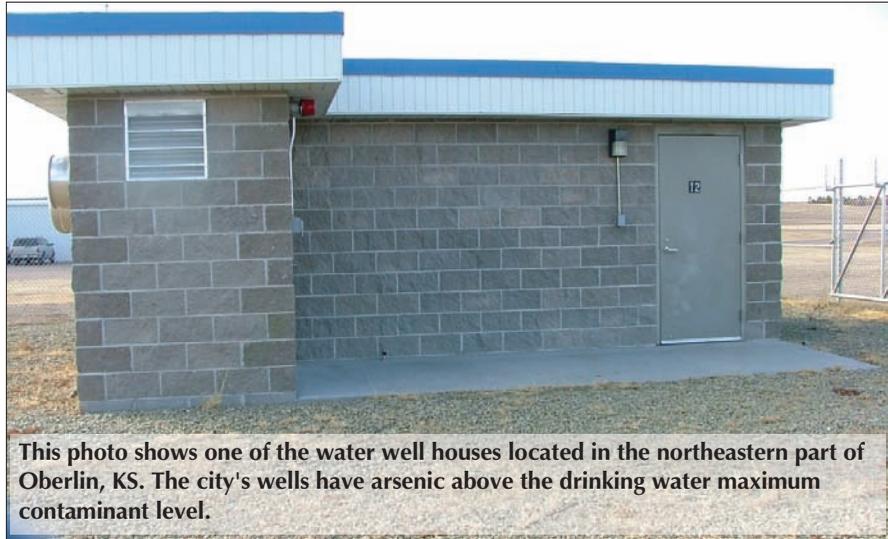
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This photo shows one of the water well houses located in the northeastern part of Oberlin, KS. The city's wells have arsenic above the drinking water maximum contaminant level.

with these standards. With cities as small as Clayton, installing a water treatment system to remove arsenic is financially prohibitive. However, there is no evidence that EPA will relax or change these standards, nor is there evidence that an exemption will be given to small systems. Systems that are not meeting either the arsenic or uranium MCLs should be looking into possible options for bringing their system into compliance. Some of the funding options that are available include the Kansas Public Water

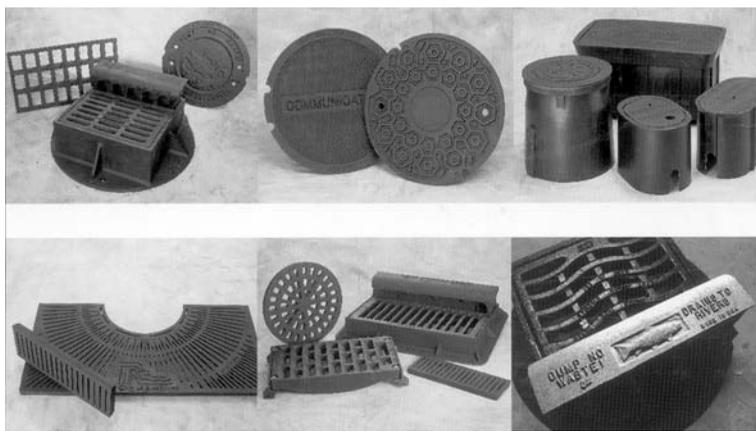
Supply Loan Fund through KDHE, grants and loans through Rural Development, and Community Development Block Grants (CDBG) through the Department of Commerce.

*Bert Zerr is currently a consultant with KRWA. He has been with KRWA for the last 31 1/2 years. Bert held the position as District Engineer with the KDHE in the Salina District Office for 32 years prior to that.*



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