

**Kansas Department of Health and Environment  
Division of Environment**

**ARSENIC RULE  
REGULATORY IMPACT STATEMENT**

Pursuant to K.S.A.77-416

**PROPOSED NEW REGULATIONS**

K.A.R. 28-15a-2;  
K.A.R. 28-15a-6;  
K.A.R. 28-15a-11;  
K.A.R. 28-15a-23 through K.A.R. 28-15a-24;  
K.A.R. 28-15a-60;  
K.A.R. 28-15a-62;  
K.A.R. 28-15a-154.

May 12, 2004

## **Executive Summary of Proposed New Regulations Necessary to Implement the Arsenic Rule under the Safe Drinking Water Act**

### **Legal Authority**

The Safe Drinking Water Act (SDWA - P.L.104-182), title XIV of the Public Health Service Act (P.L. 93-523), is the key federal law for protecting public water system customers from harmful contaminants. First enacted in 1974 and substantively amended in 1986 and 1996, the SDWA is administered through regulatory programs that establish standards and treatment requirements for drinking water, control underground injection of wastes that might contaminate water supplies, and protect groundwater. The Environmental Protection Agency (EPA) is the federal agency responsible for administering the provisions of the SDWA.

The 1974 law established the current federal-state arrangement in which states may be delegated primary implementation and enforcement authority for the drinking water program. The Public Water Supply Supervision (PWSS) program and the Drinking Water State Revolving Fund (DWSRF) loan program are the basic federal programs for regulating and financing SDWA requirements to the nation's public water systems through state, tribal, and territorial governments. Kansas Statutes Annotated (K.S.A.) 65-171m states in part: "The secretary of health and environment shall adopt rules and regulations for the implementation of this act... The standards established under this section shall be at least as stringent as the national primary drinking water regulations adopted under public law..."

### **Background**

Arsenic is a naturally occurring element, is widely distributed in air, water, and soil, and is present in trace amounts in all living organisms, including food sources. Higher levels of arsenic are frequently found more often in groundwater than in surface water. Arsenic occurs in two main forms, inorganic (the most toxic) and organic (fairly inert but quickly convertible to inorganic forms).

Arsenic can be contributed to water sources from metals, dyes, soaps, drugs, glass, semi-conductors, wood preservatives and paints, as well as from natural contacts with geologic sources, and by geomorphic releases caused by volcanic eruption, forest fires, erosion, mining, and agricultural activities. It has been linked to increased rates of skin, lung, kidney, bladder, and other organ cancers in humans. It is suspected to affect the nervous and circulatory systems and is associated with diabetes, heart disease, and many other adverse health effects. Ironically, some evidence exists that small amounts of arsenic in a normal diet (micro-nutrient) may be beneficial to health. In spite of the general acknowledgment that arsenic is intrinsically unhealthy at some basic level, there has been little scientific or policy consensus on exactly what that level is.

Prior to the most recent revisions, the federal drinking water standard for arsenic was established in 1942 by the U.S. Public Health Service at 50 ppb (parts per billion, or micrograms per liter ( $\mu\text{g/L}$ ); also expressed as 0.05 mg/L). EPA adopted the same standard for arsenic in 1975 when it issued the first interim drinking water regulations under the SDWA. When Congress amended the SDWA in 1986, it converted all of the then remaining interim standards into National Primary Drinking Water Regulations, and included arsenic on a list of 83 contaminants for which EPA was required to issue new standards by 1989. EPA conducted extensive but inconclusive studies of arsenic risk assessment issues, and subsequently did not meet the 1989 deadline for establishing a new standard.

Under the SDWA amendments of 1996, Congress again directed EPA to propose a new drinking water standard for arsenic by January 1, 2000, and to promulgate a final standard by January 1, 2001. And again, after an additional, extensive amount of review and analysis, on June 22, 2000 EPA proposed to revise the arsenic standard from 50  $\mu\text{g/L}$  to 5  $\mu\text{g/L}$ , applicable only to community water systems (CWSs), and requested comments on alternative standards of 3  $\mu\text{g/L}$ , 10  $\mu\text{g/L}$ , and 20  $\mu\text{g/L}$ . In the final version of the rule which was published on January 22, 2001, EPA established the standard at 10  $\mu\text{g/L}$  applicable to all CWSs and all non-transient non-community water systems (NTNCWSs). While EPA established a non-enforceable Maximum Contaminant Level Goal (MCLG) of "0"  $\mu\text{g/L}$  (as it has for all carcinogens), EPA's decision to set an enforceable standard higher than the limit at which technology can feasibly remove a contaminant (found to be 3  $\mu\text{g/L}$  for arsenic) was based on the consideration of costs required to afford the projected benefits in the forms of health risk reductions.

On March 25, 2003, EPA issued a "Minor Clarification" to the final arsenic rule which is effective on April 24, 2003. This clarification re-expresses the previously adopted arsenic MCL standard of "0.01 mg/L" (10  $\mu\text{g/L}$ ) as "0.010 mg/L" for the purpose resolving a technical "rounding" issue with respect to the interpretation of mathematically significant figures.

EPA projects that 5.5% of water systems, which serve about 11 million people, are likely to exceed the new standard of 0.010 mg/L. At this revised level, it is anticipated that the new rule requirements will particularly impact small water systems supplied by groundwater from wells. (Almost all of the approximate 3400 systems which will be required to conduct treatment processes to meet the revised MCL standard serve 10,000 people or less. Therefore, EPA has provided extension provisions (in some cases up to a possible 14 years for systems serving 3,300 persons or less).

The final Arsenic Rule applies to all CWSs and NTNCWSs. It establishes a MCLG and a revised maximum contaminant level (MCL) for arsenic, requires monitoring for new systems and new drinking water sources, and clarifies the procedures for determining compliance with the MCLs for inorganic chemicals, synthetic organic chemicals, and volatile organic chemicals. It prescribes treatment techniques for the removal of arsenic.

Federal law now requires that all applicable water systems comply with these drinking water standards regardless of state or tribal law. Concurrent amendments to Kansas Administrative Regulations, however, are necessary to maintain compliance with the provisions of the SDWA regarding state primacy

for administrative and enforcement authority and related state eligibility for federal PWSS program grants and DWSRF program loan capitalization grants.

The new proposed regulations recommended as K.A.R. 28-15a-2, K.A.R. 28-15a-6, K.A.R. 28-15a-11, K.A.R. 28-15a-23 through K.A.R. 28-15a-24, K.A.R. 28-15a-60, K.A.R. 28-15a-62, and K.A.R. 28-15a-154 are no more stringent than federal law requires for these purposes. KDHE is not required to adopt, and is not proposing to adopt, the MCLG for arsenic which has been established by EPA. Under some requirements, KDHE proposes to implement special provisions permitted by EPA to allow more flexibility and reduced monitoring activities to the public water suppliers under these rules.

As codified under 40 C.F.R. 141, recent federal revisions summarized as the Arsenic Rule which now require concurrent amendments to Kansas Administrative Regulations are summarized in their constituent articles, as follows:

### **Arsenic Rule**

#### **Part 141 - National Primary Drinking Water Regulations**

##### **Subpart A - General**

- § 141.2 Definitions.
- § 141.6 Effective dates.

##### **Subpart B - Maximum Contaminant Levels**

- § 141.11 Maximum contaminant levels for inorganic chemicals.

##### **Subpart C - Monitoring and Analytical Requirements**

- § 141.23 Inorganic chemical sampling and analytical requirements.
- § 141.24 Organic chemicals other than total trihalomethanes, sampling and analytical methods.

##### **Subpart F - Maximum Contaminant Level Goals and Maximum Residual Disinfectant Level Goals**

- § 141.51 Maximum contaminant level goals for inorganic contaminants.

##### **Subpart G - National Revised Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels**

- § 141.60 Effective dates.
- § 141.62 Maximum contaminant levels for inorganic contaminants.

**Subpart O - Consumer Confidence Reports**

§ 141.154 Required additional health information.

\* Appendix A to Subpart O of Part 141 - Regulated Contaminants

**Subpart Q - Public Notification of Drinking Water Violations**

\* Appendix A to Subpart Q of Part 141 - NPDWR Violations and Other Situations  
Requiring Public Notice

\* Appendix B to Subpart Q of Part 141 - Standard Health Effects Language for Public  
Notification

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(K.A.R. 28-15a-51 is proposed to be reserved.)

## **Environmental Benefit Statement**

### **1. Need for proposed amendments and environmental benefit likely to accrue.**

#### **a. Need**

All of the changes are needed to retain approval of KDHE's PWSS program and DWSRF loan program by EPA. The SDWA requires state programs to meet federal primacy requirements for administering and enforcing the SDWA, or they must forfeit their PWSS program grants (approximately \$1.1 million to Kansas in FY2004) and DWSRF program loan capitalization grants (approximately \$9.5 million to Kansas in FY2004).

The federal requirements established in the Arsenic Rule apply to all CWSs and NTNCWSs. Although all of these systems will be required to monitor for arsenic contamination, it is estimated that 17 small systems in Kansas may need to provide water treatment to achieve compliance with the new requirements. A list of these systems is attached to this statement.

#### **b. Environmental benefit**

Studies considered by EPA have indicated that exposure to various levels of arsenic over both short and long periods of time is associated with increased rates of skin, lung, kidney, bladder, and other organ cancers in humans. It is suspected to affect the nervous and circulatory systems and is associated diabetes, heart disease, and many other adverse health effects. Adoption of the proposed regulations is expected to provide an increased level of environmental awareness and health protection to the general public through the improved safety of drinking water supplies.

It is possible that the enhanced level of awareness and monitoring which will be occurring by water systems across the state may reveal new or additional information about areas of arsenic deposits / contamination.

No other direct benefits to the extended environment are anticipated.

### **2. When applicable, a summary of the research or data indicating the level of risk to the public health or the environment being removed or controlled by the proposed regulations or amendments.**

Under a cooperative agreement between EPA and the National Academy of Sciences, the National Research Council studied EPA's proposed arsenic standards and current health effects research. Literature reviews and data analysis evaluations were performed on an extensive number of prior toxicological studies on arsenic effects. The most significant information was obtained from research conducted in the 1980s and 1990s in Taiwan (Chen et al., 1998 and 1992; Wu et al., 1989) and Utah (Lewis et al., 1999). Overall, the

National Research Council concluded that EPA's arsenic MCL needed to be reduced, but did not specify an amount. EPA's final adopted MCL of 10 µg/L was based on analytical measurement feasibility, treatment feasibility, health risk reduction and cost analysis, and risk management decision making.

In summary, EPA estimates that the implementation of the Arsenic Rule will result in avoidance of 16 to 26 non-fatal bladder and lung cancers per year, avoidance of 21 to 30 fatal bladder and lung cancers per year, and numerous other cancer and non-cancer health benefits that were non-quantifiable (i.e. reductions in cardiovascular, pulmonary, immunological, neurological, and endocrine effects). EPA believes that, collectively, the studies justify the costs in relation to the savings in risk. (EPA believes it is appropriate and prudent to err on the side of public health protection when there are indications that exposure to a contaminant may present risks to public health, rather than take no action until risks are unequivocally proven.)

**3. If specific contaminants are to be controlled by the proposed regulation or amendment, a description indicating the level at which the contaminants are considered harmful according to current available research.**

EPA has set a non-regulatory, non-enforceable limit, or "goal", for arsenic as a drinking water contaminant to establish the level at which no adverse health effects are anticipated or are known to occur - MCLGs - which are separate and distinct from the regulatory limits on MCLs. MCLs represent enforceable limits for the maximum feasible levels at which current treatment methodology can reduce contaminants in drinking water and which are justified by the costs in relation to the health protection benefit afforded.

EPA has set the MCLG for arsenic at "0" in view of the fact that a safe threshold level is unable to be specified about the mode of physiological action for arsenic. EPA believes the most scientifically valid approach, given the lack of critical data, is to use the linear approach (cumulative impacts) to assessing the mode of action.

### **Economic Impact Statement**

#### **1. Are the proposed regulations or amendments mandated by federal law as a requirement for participating in or implementing a federally subsidized or assisted program?**

Yes. Federal law now requires that all CWSs and NTNCWSs must comply with these drinking water standards regardless of state or tribal law. The new proposed regulations recommended as K.A.R. 28-15a-2, K.A.R. 28-15a-6, K.A.R. 28-15a-11, K.A.R. 28-15a-23 through K.A.R. 28-15a-24, K.A.R. 28-15a-60, K.A.R. 28-15a-62, and K.A.R. 28-15a-154 are necessary to maintain compliance with the provisions of the SDWA regarding state primacy for administrative and enforcement authority and related state eligibility for federal PWSS program grants and DWSRF program loan capitalization grants.

#### **2. Do the proposed regulations or amendments exceed the requirements of applicable federal law?**

No. The concurrent amendments and proposals recommended are no more stringent than federal law requires for these purposes. Further, KDHE is not required to adopt, and is not proposing to adopt, any of the MCLGs which have been established by EPA. Under some requirements, KDHE proposes to implement special provisions permitted by EPA to allow more flexibility and reduced monitoring activities to the public water suppliers effected by these rules.

#### **3. Description of costs to agencies, to the general public, and to persons who are effected by, or subject to, the regulations.**

The core components of KDHE's PWSS program have already been developed and maintained for many years. However, KDHE must continually conform its regulations with EPA's regulations to maintain primacy under SDWA. The regulations will only be minimally revised as it regards the required amendments for the Arsenic Rule. There will be minimal costs to the agency and to the general public associated with the amendments which will be significantly offset by EPA grants to KDHE for the PWSS program and the DWSRF loan program.

##### **a. Capital and annual costs of compliance with the proposed regulations or amendments and the persons who will bear those costs.**

The primary costs associated with these proposed regulations will be borne by the PWSs (both publically and privately owned) who are required to conduct the required sampling, analysis, and monitoring, and in those cases where standards are exceeded, to provide treatment for the removal of arsenic contaminants to achieve the standards. As with KDHE, the core components of compliance with the SDWA for the majority of these subject public water systems have already been developed and

maintained for many years. These activities will, however, require additional time, labor, and/or financial resources by these entities to generate, maintain, retain, disclose, and/or provide information to the regulating party as well as developing and maintaining additional technological infrastructure.

EPA estimates that, assuming a 7% cost of capital in 1999 dollars over a 20 year amortization period, the total annualized cost in the United States for implementing the Arsenic Rule is \$205.7 million for the approximate 74,000 systems which will be regulated. (EPA estimates that only about 3,433 of these systems will need treatment). This includes:

- treatment upgrade costs to utilities of \$200.6 million.
- start-up and monitoring costs to utilities of \$3.8 million.
- start-up and monitoring costs to states of \$1.2 million.

It is expected that the cost of implementing these proposed regulations will ultimately be passed through to the public water supply customers. For the households from systems that are expected to install treatment, EPA estimates that:

- households of systems which serve less than 100 will incur an increase of \$27.23 per month.
- households of systems which serve 1001 - 3300 will incur an increase of \$4.85 per month.
- households of systems which serve 10,001 - 50,000 will incur an increase of \$2.69 per month.

In Kansas, there are about 1.03 million households, and a resident population of approximately 2.5 million people, which will be affected by these regulations in some way, 913 CWSs and 64 NTNCWSs will be technically subject to these monitoring requirements. However, recent data suggests that only about 17 of these Kansas water systems (representing about 16,792 persons or about 6,918 households) will not comply with the new arsenic standard. A list of these systems is attached to this statement.

“Average” or “typical” system costs for compliance can be masked by several factors. With ever-changing and more complex drinking water regulations, some water systems will make improvements to address more than one new rule or regulation at once. In some cases, water systems are also replacing infrastructure which has deteriorated and is in need of repair. Other systems may find it more cost effective to discontinue treatment operations and opt to purchase treated water from nearby existing public water supply systems.

Options for compliance include discontinuing use of a source which exceeds the standard and construction of a new well if necessary. If suitable quality water can be obtained, purchase of water from an adjacent water system, blending of sources, or installation of treatment are also alternatives which can help to achieve compliance with standards. Treatment technologies for arsenic removal include coagulation / filtration, activated alumina, reverse osmosis, lime softening, ion exchange, nano-filtration, electro-dialysis reversal, green sand filtration, and other processes. The actual costs of compliance won't be known until communities evaluate their options, and the costs associated with these treatment process upgrades are

expected to be extremely variable depending on the current system size and age, and on the present system process configuration. KDHE expects installation of treatment will be selected as a last resort, as it will be the most expensive option.

Examples of cost estimates associated with treatment options as experienced in Kansas range from \$170,000 to \$2.8 million as follows:

- Jackson County Rural Water District (RWD) No. 3, located in north east Kansas, constructed a new well at a depth of 78 feet with an iron and manganese removal facility through pressurized filtration at a cost of \$500,000.
- The city of Wetmore also constructed a pressurized filtration facility for a cost of \$325,000.
- The city of Stockton provided iron and manganese removal with softening at a construction cost of \$2.8 million.
- Saline County RWD No. 4, located in north central Kansas, constructed two new wells at depths of 71 feet deep with a well house and disinfection building at a cost of \$170,730 or \$85,365 per well.
- The city of Long Island, located in north west Kansas, constructed two new wells at depths of 161 feet for an estimated cost \$140,000 or \$70,000 per well.
- The city of Liberal, located in south west Kansas, constructed a new well at a depth of 586 feet at a cost \$308,700 for one well.
- Woodson County RWD No. 1 discontinued using their source of water and constructed a 10 mile transmission line to connect with and purchase water from the city of Yates Center at a cost of \$942,431.

The following tables summarize cost estimates for monitoring requirements expected to be experienced by CWSs and NTNCWSs in Kansas which are subject to the Arsenic Rule. These costs have been estimated by multiplying the total number of samples required for the two source water classifications by the current KDHE lab price of analysis for each of the sampling frequencies required.

**Arsenic Monitoring Requirements and Costs**  
 (Per POE by Water Source Type)

Applies to all sizes of CWS & NTNCWS (659 Systems) Monitoring is Required at Every Point of Entry to the Distribution System (POE)				
Monitoring Period	Frequency	Cost Per Sample	Factor	Cost Per Year Per POE
<b>Initial Monitoring</b> <sup>1</sup> One Sample Per POE				
Ground Water	1 Sample (2005 - 2007)	\$8.00	X 1 Sample/POE	<b>\$8.00</b>
Surface Water	1 Sample (2006)	\$8.00	X 1 Sample/POE	<b>\$8.00</b>
<b>Reduced Monitoring</b> Initial Monitoring < MCL <sup>2</sup>				
Ground Water	1/ POE / 3 yrs.	\$8.00	/ 3yrs.	<b>\$2.66</b>
Surface Water	1/ POE / Year	\$8.00	X 1 Sample/POE	<b>\$8.00</b>
<b>Increased Monitoring</b> Sampling Point > MCL <sup>3</sup>				
Ground Water	4/ POE / quarter	\$8.00	X 4 quarters/yr.	<b>\$32.00</b>
Surface Water	4/ POE / quarter	\$8.00	X 4 quarters/yr.	<b>\$32.00</b>

<sup>1</sup> One sample after the effective date of the MCL (January 23, 2006). Surface water systems must take annual samples / groundwater systems must take one sample between 2005 and 2007.

<sup>2</sup> Surface water systems must collect annual samples. Groundwater systems must collect one sample every three years.

<sup>3</sup> A system with a sampling point result above the MCL must collect quarterly samples at that sampling point, until the system is reliably and consistently below the MCL.

These costs have been projected as applicable to the Kansas CWSs and NTNCWSs which have been classified according to their previous monitoring histories and will be subject to reduced or increased monitoring frequencies under the Arsenic Rule, as follows:

Monitoring Period	No. of Systems and POEs	Cost Per Sample	Total Cost	Average Cost Per System
<b>Initial Monitoring</b> One Sample Per POE				
Ground Water	659 Systems & 1,047 POEs	\$8.00	\$8,376.00	\$12.71
Surface Water				
<b>Reduced Monitoring</b> Initial Monitoring < MCL				
Ground Water	539 Systems & 899 POEs	\$2.66	\$2,391.34	\$4.43
Surface Water	101 Systems & 119 POEs	\$8.00	\$952.00	\$9.42
<b>Increased Monitoring</b> Sampling Point > MCL				
Ground Water	18 Systems & 28 POEs	\$32.00	\$896.00	\$49.77
Surface Water	N/A	N/A	N/A	N/A

These costs will be incurred by the public water suppliers and their customers even if Kansas does not adopt the proposed regulations because EPA will still be enforcing the Arsenic Rule. Some systems may wish to consider other cost / compliance alternatives to investing in new or upgraded facilities such as purchasing water from other sources or consolidating with other systems.

**b. Initial and annual costs of implementing and enforcing the proposed regulations or amendments, including the estimated amount of paperwork, and the state agencies, other governmental agencies or other persons who will bear the costs.**

KDHE has adopted a new analysis fee schedule for its laboratory in anticipation of the various increased costs to the agency of implementing new rules under the SDWA. Other costs to KDHE associated with these proposed regulations are estimated to be approximately \$24,000. This includes the increased demand for staff time and office resources to implement, assist, monitor, and enforce the new requirements for public water suppliers, as well as complying with EPA’s reporting / record keeping requirements for KDHE. These costs are covered by EPA through the PWSS program grant.

No other state agencies, governmental agencies, persons, or entities are anticipated to incur or bear any of the costs associated with these proposed regulations.

**c. Costs which would likely accrue if the proposed regulations or amendments are not adopted, the persons who will bear the costs and those who will be effected by the failure to adopt the regulations.**

The SDWA requires state programs to meet federal primacy requirements for administration and enforcement authority in order to qualify for the PWSS program grants and DWSRF program loan capitalization grants. Failure to amend these regulations would result in KDHE losing approximately \$1.1 million to Kansas program grants in FY2004 and DWSRF program loan capitalization grants of approximately \$9.5 million to Kansas in FY2004. This would in turn negatively impact the public water suppliers and their customers who would not be eligible for state financial assistance but must still comply with EPA requirements.

EPA estimates the quantifiable benefits (using “what if” or consideration of costs avoided) from implementing the Arsenic Rule to be \$139 million to \$197 million per year in avoided medical costs and associated ancillary impacts such as lost wages. Other potential benefits not monetized for the final rule include customer peace of mind from drinking water that has been treated for arsenic and reduced costs for contaminants that may be co-treated with arsenic.

**d. A detailed statement of the data and methodology used in estimating the costs used in the statement.**

The data and methodology used in preparing this regulatory impact statement were primarily obtained from EPA references, documents, and publications on the Arsenic Rule as published in the *Federal Register* on January 22, 2001. Where supportable, some general inferences were made to relate national level data to the State of Kansas and KDHE. Representative cost figures for Kansas systems were also obtained from the KDHE DWSRF loan program data.

**e. Description of any less costly or less intrusive methods that were considered by the agency and why such methods were rejected in favor of the proposed regulation.**

There are no less intrusive or less costly methods that were available for consideration by KDHE to achieve the purposes of the proposed amendments.

**f. Consultation with the League of Kansas Municipalities, Kansas Association of Counties, and Kansas Association of School Boards.**

KDHE anticipates that the proposed amendments will have a direct and substantial fiscal impact on the constituency of the League of Kansas Municipalities. There may be a very minimal direct impact to a small constituency of the Kansas Association of School Boards. No direct impact is anticipated on the constituency of the Kansas Association of Counties. A copy of this regulatory impact statement was sent to each of these organizations on May 12, 2004.

## **Attachment A**

Kansas Public Water Suppliers which will likely not meet the new arsenic standard of 0.010 mg/L:

City of Alma  
City of Argonia  
City of Atwood  
City of Buhler  
City of Canton  
City of Clayton  
City of Englewood  
City of Hill City  
City of Lacrosse  
City of Lincoln  
City of Ness City  
City of Oberlin  
City of Scott City  
City of Timken  
Countryside Christian School  
Geary County Rural Water District No. 4  
Norton County Rural Water District No.1