

**Kansas Department of Health And Environment  
Division of Environment**

**RADIONUCLIDES RULE  
REGULATORY IMPACT STATEMENT**

Pursuant to K.S.A. 77-416

**PROPOSED NEW REGULATIONS**  
K.A.R. 28-15a-25 through K.A.R. 28-15a-26;  
K.A.R. 28-15a-66.

May 12, 2004

## **Executive Summary of Proposed Regulations Necessary to Implement the Radionuclides 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**

In 1976, responding to the directives of Congress and the passage of the SDWA, EPA adopted National Primary Drinking Water Regulations (NPDWRs) to establish maximum contaminant levels (MCLs) for the most problem radionuclides in drinking water supplies and to establish minimum monitoring requirements for the same radionuclides in the most effected public water supplies (PWSs).

In 1991, EPA proposed revisions to the NPDWRs which were intended to further implement provisions of the SDWA regarding the establishment of MCLs for some additional radionuclides and the adoption of Maximum Contaminant Level Goals (MCLGs) for all regulated radionuclides, and to make the monitoring requirements for radionuclides more consistent with the monitoring requirements for other contaminants.

On December 7, 2000, EPA finalized and established revisions to the NPDWRs which modify the requirements regarding radionuclides for all size categories of all community water systems (CWSs). These requirements are now classified as the "Radionuclides Rule" The purpose of the rule is to improve public health protection, and to reduce the risk of cancer and other adverse health effects, by reducing exposure to radionuclides in drinking water.

The Radionuclides Rule adds uranium as a regulated contaminant for the first time at an MCL of 30 micrograms per liter ( $\mu\text{g/L}$ ), and adopts MCLGs of “Zero” for all regulated radionuclides. It also increases the frequency and location of testing for all previously regulated radionuclides and indicators, e.g. combined radium-226/-228, gross alpha particle radioactivity, and beta particle and photon radioactivity, by requiring that all entry points to a distribution system be monitored rather than just a “representative point” being monitored. In some cases, the Radionuclides Rule allows for decreases in the total amount of monitoring required to be conducted by the CWSs over time based on a showing of acceptable quality.

Federal law now requires that all CWSs 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-25 through K.A.R. 28-15a-26, and K.A.R. 28-15a-66 are no more stringent than federal law requires for these purposes. KDHE is not required to adopt, and is not proposing to adopt, any of the MCLGs which have been established by EPA.

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

### **Radionuclides Rule**

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

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

§ 141.15 Maximum contaminant levels for radium-226, radium-228, and gross alpha particle radioactivity in community water systems.

§ 141.16 Maximum contaminant levels for beta particle and photon radioactivity from man-made radionuclides in community water systems.

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

§ 141.25 Analytical methods for radioactivity.

§ 141.26 Monitoring frequency and compliance requirements for radionuclides in community water systems.

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

§ 141.55 Maximum contaminant level goals for radionuclides.

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

§ 141.66 Maximum contaminant levels for radionuclides.

**Subpart O** - Consumer Confidence Reports

\* 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

The new proposed regulations recommended as K.A.R. 28-15a-25 through K.A.R. 28-15a-26, and K.A.R. 28-15a-66 will effectively adopt the federal language of these appurtenant National Primary Drinking Water regulations by reference.

(K.A.R. 28-15a-15 through K.A.R. 28-15a-16, and K.A.R. 28-15a-55 are 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 Radionuclides Rule apply to all CWSs (approximately 53,156 in the United States). All CWSs conducting primary treatment operations in Kansas (approximately 604) will be required to perform monitoring for regulated radionuclides, but few systems in our state will exceed any standards and be required to conduct additional water treatment processes. Adopting these proposed regulations will afford many public water suppliers increased flexibility and reduced monitoring activities from the current requirements.

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

Approximately 18 existing water systems in Kansas (Attachment A) exceeding the proposed radiological standards should realize improved drinking water quality from the adoption and enforcement of these regulations. New water systems which prospectively develop in areas of high radiological activity are also likely to benefit.

### **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.**

In promulgating the Radionuclides Rule, EPA estimated that the new uranium MCL of 30 µg/L would provide additional protection to 620,000 people in the United States and decrease the incidence of cancers and kidney problems. An estimated 0.8 cancer deaths are estimated to be avoided annually in the nation due to the MCL, resulting in estimated monetary benefits of \$3 million per year. (EPA could not quantify the economic benefits from reduced kidney damage.) Reducing the presence of uranium will also remove other contaminants, providing additional, unquantified benefits to CWS customers.

EPA also estimated the changes in monitoring requirements for radium-226/-228 will reduce radium exposure to 420,000 people in the United States and reduce the incidence of cancer. An estimated 0.4

cancer deaths are expected to be avoided annually in the nation due to the monitoring requirements, resulting in estimated monetary benefits of \$2 million per year.

**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 each of the subject contaminants to establish the levels 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 most feasible levels at which current treatment methodology can reduce radiological contaminants in drinking water at practical and justifiable costs. EPA regards the presence of any levels of radionuclides in drinking water to be harmful, and subsequently, has adopted MCLGs of “Zero” for all radionuclide contaminants. KDHE is not required to adopt, and is not proposing to adopt, these MCLGs as part of its primacy authority to regulate radionuclides.

EPA considers an MCL of 20 µg/L to be the most feasible level at which current treatment methodology can reduce uranium contamination in drinking water. Based on cost / benefit analysis of the best available technology (BAT), however, EPA determined that an MCL of 20 µg/L was not justified in the degree of health protection afforded by the cost, and discretionarily established that 30 µg/L was the justifiable limit of health protection which could be effectuated at current BATs and costs. Based on similar, additional research and analysis, EPA determined that the present MCLs for beta particle and photon radioactivity would not be increased (remain unchanged) in the current regulatory revisions.

**MCLs AND MCLGs for Regulated Radionuclides**

| <b>Regulated Radionuclide</b> | <b>MCL</b>  | <b>MCLG</b> |
|-------------------------------|-------------|-------------|
| Beta/photon emitters          | 4 mrem/year | Zero        |
| Gross alpha particle          | 15 pCi/L    | Zero        |
| Combined radium-226/228       | 5 pCi/L     | Zero        |
| Uranium                       | 30 µg/L     | Zero        |

### **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 comply with these drinking water standards regardless of state or tribal law. The new proposed regulations recommended as K.A.R. 28-15a-25 through K.A.R. 28-15a-26, and K.A.R. 28-15a-66 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. 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 community water suppliers under 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 upgrade its regulations to conform with EPA's regulations to maintain primacy under the SDWA. The regulations will only be minimally revised as it regards the required amendments for the Radionuclides Rule. There will be 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 CWSs (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 radionuclide 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.

Nationally, approximately 53,156 CWSs are subject to the provisions of the Radionuclides Rule, however, EPA estimates that less than 1000 will have to install treatment. EPA also estimates that 98% of the systems that will need to take action to come into compliance with the uranium or combined radium MCLs serve less than 10,000 people - therefore, most of the capital costs of complying with the rule will be borne by small water systems.

EPA estimates that these regulations will nationally result in total annual compliance costs of \$81 million for monitoring by all CWSs and treatment upgrades by 795 systems expected to be in violation. This estimate includes:

- \$25 million as system mitigation costs resulting from violations exposed by the new radium-226/-228 monitoring requirements.
- \$51 million as system mitigation costs resulting from violations exposed by the new uranium MCLs.
- \$4.9 million as monitoring and reporting costs incurred by CWSs.
- \$0.6 million as new implementation costs to the states.

In Kansas, there are about 604 CWSs performing primary treatment operations on source water which ultimately serve approximately 84% of the state's population (about 322 additional CWSs distribute purchased treated water from these 604 systems which will be monitoring source water for radionuclides - they will be sharing in the costs of implementing the Radionuclides Rule). Due to the very low and infrequent occurrence of radiological problems in the source water supplies of our state, it is estimated that only about 18 of the 926 CWSs in Kansas may exceed the new MCLs based on prior analysis and monitoring histories. The approximate 18 systems (list attached to this statement) which will likely require additional treatment facilities for radionuclides are small systems (population range of 50 to 3396), therefore some Kansas households in CWSs which must upgrade treatment facilities may experience increases in utility costs.

“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 radionuclide removal include enhanced coagulation / filtration, ion exchange / activated alumina, reverse osmosis, lime softening, and green sand filtration. 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. The cost / compliance alternatives to investing in new or upgraded facilities for these few CWSs may be to develop new water sources, to purchase water from other sources, or to consolidate with other systems. 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 groundwater 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 groundwater wells at depths of 161 feet for a cost \$400,000 or \$200,000 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 of monitoring requirements expected to be experienced by CWSs in Kansas which are subject to the Radionuclides Rule. These costs have been estimated by multiplying the total number of samples required for various classifications of CWSs by the current KDHE lab price of analysis for each of the radiological constituents required to be monitored.

**Radionuclide Rule Monitoring Requirements and Costs**  
(per POE by Radiological Constituent)

| Applies to all sizes of Community Water Systems (604 Systems) |   |                  |                 |  |                       |
|---|---|------------------|-----------------|--|-----------------------|
| Monitoring Period   | Parameters (Cost)   | Frequency        | Cost Per Sample | Factor   | Cost Per Year Per POE |
| <b>Initial Monitoring<sup>1</sup></b>                         |   |                  |                 |  |                       |
| 4 consecutive quarters  | Gross Alpha (\$35),<br>Total Radium<br>{Ra-226 (\$50) & Ra-228 (\$50)},<br>Gross Uranium (\$70) | 1/ POE / quarter | \$205.00        | 4 quarters will be composited and analyzed as one sample | <b>\$205.00</b>       |
| <b>Reduced Monitoring</b>                                     |   |                  |                 |  |                       |
| Below Detection Limit (DL)                                    | Gross Alpha (\$35),<br>Total Radium<br>{Ra-226 (\$50) & Ra-228 (\$50)},<br>Gross Uranium (\$70) | 1/ POE / 9 yrs.  | \$205.00        | / 9 yrs.   | <b>\$22.77</b>        |
| ≥ DL but ≤ 50% of MCL   |   | 1/ POE / 6 yrs.  | \$205.00        | / 6 yrs.   | <b>\$34.17</b>        |
| >50% of MCL but ≤ of MCL                                      |   | 1/ POE / 3 yrs.  | \$205.00        | / 3 yrs.   | <b>\$68.33</b>        |
| <b>Increased Monitoring</b>                                   |   |                  |                 |  |                       |
| Result > MCL  | Gross Alpha (\$35)  | 1/ POE / quarter | \$35.00         | X 4 quarters/yr.   | <b>\$140.00</b>       |
| Result > MCL  | Total Radium<br>{Ra-226 (\$50), Ra-228 (\$50)}  | 1/ POE / quarter | \$100.00        | X 4 quarters/yr.   | <b>\$400.00</b>       |
| Result > MCL  | Gross Uranium (\$70)  | 1/ POE / quarter | \$70.00         | X 4 quarters/yr.   | <b>\$280.00</b>       |

<sup>1</sup>Data Collected between June 2000 and December 8, 2003 may be grandfathered to satisfy the initial monitoring requirements

These costs have been projected as applicable to the Kansas CWSs which are known to have had prior histories of elevated radiological constituents and will be subject to increased monitoring under the Radionuclides Rule, as follows:

**Radionuclide Rule Monitoring Requirements and Costs**  
(Total CWS costs to communities by radiological constituent)

| Monitoring Period           | Approximate Number of Systems Affected in Kansas | Average Annual Cost Per System                                   | Total Annual Cost for All Systems (954 POEs X \$205) |
|-----------------------------|--|--|--|
| <b>Initial Monitoring</b>   |  |  |  |
| 4 consecutive quarters      | <b>604</b>                                       | <b>\$323</b>   | <b>\$195,570</b>                                     |
| <b>Reduced Monitoring</b>   |  |  |  |
| Below Detection Limit (DL)  | Unknown Until Initial Monitoring is Completed    |  |  |
| ≥ DL but ≤ 50% of MCL       | Unknown Until Initial Monitoring is Completed    |  |  |
| > 50% of MCL but ≤ of MCL   | Unknown Until Initial Monitoring is Completed    |  |  |
| <b>Increased Monitoring</b> |  |  |  |
| Gross Alpha                 | 1  | <b>\$140.00</b>  | <b>\$700.00</b>                                      |
| Total Radium                | 12   | <b>\$400.00</b>  | <b>\$4,800.00</b>                                    |
| Uranium                     | 6  | <b>\$280.00</b>  | <b>\$1,680.00</b>                                    |
|                             |  | <b>Average Cost Per Year for Systems on Increased Monitoring</b> | <b>\$359.00</b>                                      |

It is expected the cost of implementing these proposed regulations will ultimately be passed through to the CWS customers. These costs will be incurred by the CWSs and their customers even if Kansas does not adopt the proposed regulations because EPA will still be enforcing the Radionuclides Rule.

EPA expects that, overall, these costs will be offset by the savings to CWSs in long-term compliance expenses due to reduced monitoring frequency for systems with low contaminant levels. The national cancer risk reduction benefits for the new uranium standard are estimated to be \$3 million annually; the national cancer risk reduction benefits for the new combined radium-226/-228 standard are estimated to be \$1.7 million annually. EPA was not able to quantify reductions in uranium kidney toxicity. EPA cites numerous other financial benefits which cannot be quantified such as savings from reductions of excessive calcium and manganese carbonate scaling in distribution systems, water heaters, and boilers, and reductions in soap and detergent use which will result from the technologies used to remove uranium and radium.

**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 or entities who will bear the costs.**

KDHE has recently expended approximately \$30,000 for new radiological laboratory equipment and monitoring preparations to meet the Radionuclide Rule requirements. KDHE has also adopted a new laboratory analysis fee schedule for KDHE's laboratory in anticipation of these increased costs to the agency.

Other costs associated with these proposed regulations are estimated to be approximately \$10,200. This includes the increased demand for staff and office resources to implement, assist, and monitor the new requirements for public water suppliers, as well as complying with EPA's reporting and record keeping requirements for KDHE. These costs are reimbursed by EPA through the PWSS program.

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 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 CWSs and their customers who would not be eligible for state financial assistance but must still comply with the EPA requirements under the Radionuclides Rule.

**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 statements on the final Radionuclides Rule as published in the *Federal Register* on December 7, 2000. 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 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. A direct impact is expected on a very minimal fraction of the constituency of the Kansas Association of School Boards. No direct impact is anticipated on the constituencies 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 Community Water Suppliers which will not likely meet the new radiological MCLs:

Cherokee County Rural Water District No. 3 - Total Combined Radium  
Cherokee County Rural Water District No. 4 - Total Combined Radium  
City of Arcadia - Total Combined Radium  
City of Burdett - Total Combined Radium  
City of Columbus - Radium 226, Total Combined Radium  
City of Coolidge - Radium 226, Total Combined Radium  
City of Frontenac - Total Combined Radium  
City of Hill City - Uranium  
City of Pawnee Rock - Radium 226, Total Combined Radium  
City of Rush Center - Uranium  
City of Timken - Uranium  
City of Wallace - Uranium  
Cloud County Rural Water District No. 1 - Radium 226, Total Combined Radium  
Crawford County Rural Water District No. 1c - Total Combined Radium  
Crawford County Rural Water District No. 3 - Total Combined Radium  
Crawford County Rural Water District No. 5 - Radium 226, Total Combined Radium  
West Hills Subdivision (Reno County) - Uranium  
Westside Mobile Home Park (Finney County) - Uranium