

# **Proposed Radon in Drinking Water Rule**

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The U.S. Environmental Protection Agency (EPA) is proposing new regulations to protect people from exposure to radon. The proposed regulations will provide States flexibility in how to limit the public's exposure to radon by focusing their efforts on the greatest public health risks from radon - those in indoor air - while also reducing the highest risks from radon in drinking water. The framework for this proposal is set out in the Safe Drinking Water Act as amended in 1996, which provides for a multimedia approach to address the public health risks from radon in drinking water and radon in indoor air from soil. The Safe Drinking Water Act directs the EPA to propose and finalize a maximum contaminant level (MCL) for radon in drinking water, but also to make available an alternative approach: a higher alternative maximum contaminant level (AMCL) accompanied by a multimedia mitigation (MMM) program to address radon risks in indoor air. This framework reflects the unique characteristics of radon: in most cases, radon released to indoor air from soil under homes and buildings is the main source of exposure and radon released from tap water is a much smaller source of radon in indoor air. It is more cost-effective to reduce risk from radon exposure from indoor air, than from drinking water. EPA strongly encourages States to take full advantage of the flexibility and risk reduction opportunities in the MMM program.

### WHAT ARE THE PUBLIC HEALTH CONCERNS?

Radon is a naturally-occurring radioactive gas that emits ionizing radiation. National and international scientific organizations have concluded that radon causes lung cancer in humans. Most of the radon in indoor air comes from the breakdown of uranium in soil beneath homes. Breathing radon from the indoor air in homes is the primary public health risk from radon, contributing to about 20,000 lung cancer deaths each year in the United States, according to a 1999 landmark report by the National Academy of Sciences (NAS) on radon in indoor air. The U.S. Surgeon General has warned that radon in indoor air is the second leading cause of lung cancer. EPA and the U.S. Surgeon General recommend testing all homes and apartments located below the third floor for radon in indoor air. If you smoke and your home has high indoor radon levels, your risk of lung cancer is especially high.

Radon from tap water is a smaller source of radon in indoor air. Only about 1-2 percent of radon in indoor air comes from drinking water. However breathing radon released to air from household water uses increases the risk of lung cancer over the course of your lifetime. Ingestion of drinking water containing radon also presents a risk of internal organ cancers, primarily stomach cancer. This risk is smaller than the risk of developing lung cancer from radon released to air from tap water. Based on a second 1999 NAS report on radon in drinking water, EPA estimates that radon in drinking water causes about 168 cancer deaths per year, 89 percent from lung cancer caused by breathing in radon released from water, and 11 percent from stomach cancer caused by drinking radon-containing water.

## WHO MUST COMPLY WITH THE PROPOSED RULE?

The proposed radon in drinking water rule applies to all community water systems (CWSs) that use ground water or mixed ground and surface water (e.g., systems serving homes, apartments, and trailer parks). The proposed rule would not apply to CWSs that use solely surface water, nor to non-transient non-community public water supplies and transient public water supplies (e.g., systems serving schools, office buildings, campgrounds, restaurants, and highway reststops).

## WHAT DOES THE RULE PROPOSE TO REQUIRE?

The rule proposes a maximum contaminant level goal (MCLG), a maximum contaminant level (MCL), an alternative maximum contaminant level (AMCL), and requirements for multimedia mitigation (MMM) program plans to address radon in indoor air. The proposal also includes monitoring, reporting, public notification and consumer confidence report requirements, proposed best available technologies and analytical methods.

### Maximum Contaminant Level Goal (MCLG), Maximum Contaminant Level (MCL), and Alternative Maximum Contaminant Level (AMCL)

The proposed MCLG for radon in drinking water is zero. This is a non-enforceable goal.

The proposed regulation provides two options for the maximum level of radon that is allowable in community water supplies. The proposed MCL is 300 picoCuries per liter (pCi/L) and the proposed AMCL is 4,000 pCi/L. The drinking water standard that would apply for a system depends on whether or not the State or CWS develops a MMM program. The regulatory expectation of CWSs serving 10,000 persons or less is that they meet the 4,000 pCi/L AMCL and be associated with an approved MMM program plan – either developed by the State or by the CWS.

The enforceable MCL or AMCL would apply under the following circumstances:

#### **Small CWSs: Proposed regulatory expectation for systems that serve 10,000 or fewer people**

<i>Does State develop MMM program?</i>	<i>Does CWS develop local MMM program?</i>	<i>CWS Complies with:</i>
yes	not needed	AMCL: 4000 pCi/L*
no	yes**	AMCL: 4000 pCi/L

\* Small systems may elect to comply with the MCL of 300 pCi/L

\*\* Small systems may elect to comply with the MCL of 300 pCi/L, instead of developing a local MMM program.

#### **Large CWSs: Proposed compliance options for systems that serve more than 10,000 people**

<i>Does State develop MMM program?</i>	<i>Does CWS develop local MMM program?</i>	<i>CWS Complies with:</i>
yes	not needed	AMCL: 4000 pCi/L*
no	yes	AMCL: 4000 pCi/L
no	no	MCL: 300 pCi/L

\* Large systems may elect to comply with the MCL of 300 pCi/L

### Monitoring Requirements

CWSs must monitor for radon in drinking water according to the requirements described in the table below and report their results to the State. If the State determines that the radon level in a CWS is below 300 pCi/L, the system only needs to continue meeting monitoring requirements and is not covered by the requirements regarding MMM programs.

Type	Frequency	Condition
Initial	Four consecutive quarters of monitoring for one year.	At each entry point to the distribution system which is representative of each well after treatment and/or storage
Routine	One sample per year	If running average from four consecutive quarterly samples is less than MCL/AMCL, and at the discretion of State.
Reduced	One sample every three years	If average from four consecutive quarterly samples is less than $\frac{1}{2}$ the MCL/AMCL, no samples exceed the MCL/AMCL, and State determines the system is "reliably and consistently below MCL/AMCL."
Increased	Four consecutive quarters of monitoring	If the MCL/AMCL for radon is exceeded in a single sample, when monitoring annually. Can return to one sample per year if meet routine monitoring conditions, listed above.
	One sample per year	If the radon level is less than MCL/AMCL but above $\frac{1}{2}$ MCL/AMCL in a single sample, when monitoring once every three years. Can return to one sample per three years if average from four consecutive annual samples is less than $\frac{1}{2}$ the MCL/AMCL.
Waivers	One sample per 9 years	Based on previous analytical results, geological characteristics of source water aquifer and if a State determines that radon levels in drinking water are reliably and consistently below the MCL/AMCL. All analytical results must be below $\frac{1}{2}$ the MCL/AMCL.

### Multimedia Mitigation (MMM) Program Plan Criteria

EPA has identified four criteria that State MMM program plans are required to meet to be approved by EPA. The MMM program is modeled on the National Indoor Radon Program implemented by EPA, States, and others to address radon in indoor air. The program has been successful in achieving indoor radon risk reduction through a variety of program strategies, which form the basis for EPA's proposed MMM program plan criteria.

The MMM program is intended to provide a more cost-effective alternative to achieve radon risk reduction, by allowing States (or CWSs) to address radon in indoor air from the soil source, while reducing the highest levels of radon in drinking water. It is EPA's expectation that most States will adopt State-wide MMM programs as the more cost-effective approach. Most of the States currently have indoor radon programs that are addressing radon risk from soil, and can be used as the foundation for developing MMM programs approved by EPA under the SDWA. EPA expects that State indoor radon programs will implement MMM programs under agreements with the State drinking water programs. MMM program plans developed by Indian tribes will be reviewed by EPA, according to these same criteria. In non-MMM States, CWSs may develop local MMM program plans meeting these criteria (in a manner appropriate to their

size and institutional capabilities), to be approved by the State.

Under the proposed requirements, an MMM program plan to address radon in indoor air must address four criteria:

1. Public involvement in development of the MMM program plan.
2. Quantitative goals for existing homes fixed and new homes built radon-resistant.
3. Strategies for achieving the goals.
4. Plan to track and report results.

#### *Best Available Technology (BAT) for Radon in Drinking Water Removal*

High-performance aeration is the proposed BAT for all systems. High Performance Aeration is defined as the group of aeration technologies that are capable of being designed for high radon removal efficiencies (up to 99.9% Removal), i.e., Packed Tower Aeration, Multi-Stage Bubble Aeration and other suitable diffused bubble aeration technologies, Shallow Tray and other suitable Tray Aeration technologies, and any other aeration technologies that are capable of similar high performance. In addition to listing BAT, which is based on technology evaluations for large systems, the SDWA directs EPA to list "Small Systems Compliance Technologies" (SSCTs): affordable and technically feasible technologies based upon technology evaluations for small systems. EPA is proposing that high performance aeration, granular activated carbon (GAC), and point-of-entry GAC be listed as SSCTs. Issues relevant to safe operation procedures and safe and legal disposal of spent GAC material are addressed in the preamble to the proposed radon rule. They will also be addressed in a guidance manual for small systems, to be issued in support of the final rule.

#### *Analytical Methods*

EPA proposes Liquid Scintillation Counting (Standard Method 7500-Rn) and de-emanation ("Lucas Cell") as the approved methods. The Liquid Scintillation Counting method designated "D 5072 - 92" by the American Society for Testing and Materials (ASTM) is proposed as an alternate method.

#### *Community Water System Public Notification and Consumer Confidence Report Requirements*

The proposed rule adds violation of the radon rule to the list of violations requiring public notice under the May 13, 1999, proposed public notification rule. Public notices must be distributed within 30 days after the violation of the MCL or AMCL is known (Tier 2 public notice). For violations of the MMM program plan, public notices must be distributed within a year of violation (Tier 3 public notice). In addition, the proposed rule adds special requirements to the consumer confidence report that are intended to encourage public participation in development of the MMM program plan. Specific language is provided.

#### *State Primacy, Record Keeping, and Reporting Requirements*

The proposed rule requires States to adopt several regulatory requirements, including public notification requirements and MCL/AMCL for radon. In addition, States and eligible Indian tribes will be required to adopt several special primacy requirements for the radon rule if they adopt the AMCL/MMM option. If the State adopts the MCL, the State would be required to review and approve CWS MMM program plans. The proposed rule includes additional reporting requirements for MMM program plans. The proposed rule also requires States to keep specific records in accordance with existing regulations.

## WHAT ARE THE PROPOSED COMPLIANCE DEADLINES?

EPA proposes to require that CWSs begin their initial monitoring requirements (one year of quarterly monitoring) for radon by 3 years after publication of the final rule in the *Federal Register*. However, CWSs in States that submit a letter to the Administrator committing to develop an MMM program plan, in accordance with the statute (due 90 days after publication of final regulation in *Federal Register*), are required to begin one year of quarterly monitoring 4.5 years after publication of the final rule. If monitoring data collected after proposal of the rule are consistent with the requirements specified in the regulation, then the State may allow the systems to use those data to satisfy the monitoring requirements for the initial compliance period. Systems opting to conduct early monitoring will not be considered in violation of the MCL/AMCL until after the end of the initial monitoring period applicable to their State (i.e., 4 years after publication of the final rule; 5.5 years after publication of final rule if State submits letter of commitment to MMM). In a non-MMM State, CWSs would need to notify the State of its intention to develop and submit a local MMM program plan to the State by 4 years after the final rule is published and implement a local program by 5.5 years after the final rule. EPA plans to publish the final rule by August, 2000.

Activity	Compliance Deadline*	
	State submits commitment letter on MMM to EPA – 90 days after final rule (State MMM/AMCL)	State does not submit 90-day commitment letter on MMM Program (system MMM/AMCL, or MCL)
States submit primacy applications and notify CWSs of decision on MMM/AMCL	August, 2002 (include MMM program plan in primacy application)	August, 2002
Rule Effective (systems begin initial monitoring)	February, 2005	August, 2003
States implement MMM	February, 2005	Not applicable
Systems complete initial monitoring	February, 2006	August, 2004
Systems notify State of intent to submit local MMM program plans	Not applicable	August, 2004
Systems submit local MMM plan to State for approval	Not applicable	August, 2005
Systems implement local MMM programs	Not applicable	February, 2006

\*Proposed compliance date if final rule published August, 2000.

## WHAT ARE THE COSTS OF THE PROPOSED RULE?

Under this proposal, States, CWSs, and the public will have flexibility in how to limit the public's exposure to radon. The AMCL/MMM approach is the more cost-effective way to reduce the risks from radon exposure. States will be able to set goals that focus on the more significant risk of radon in indoor air, and to reduce the highest risks in drinking water which will protect public health. EPA estimates the costs to States and community water systems of the more cost-effective approach, i.e., reducing radon in indoor air while implementing the 4000 pCi/L drinking water standard, to be approximately \$80 million a year. Treating drinking water from ground water sources to 300 pCi/L, would cost States and systems about \$407.6 million a year.

## HOW CAN I COMMENT ON THE PROPOSED RULE?

EPA is soliciting public comment on the proposed radon in drinking water rule. EPA must receive comments, in writing, by 60 days after the publication date of the proposed rule in the *Federal Register*. For specific instructions, see the *Federal Register* notice's "Addresses" section. A copy of the *Federal Register* notice of the proposed regulation can be obtained by contacting the Safe Drinking Water Hotline at (800) 426-4791. It is also posted on EPA's drinking water web site at <http://www.epa.gov/safewater>.

## HOW CAN I GET ADDITIONAL INFORMATION?

For general information on radon in drinking water, contact the Safe Drinking Water Hotline, at (800) 426-4791, or visit EPA's web site on radon in drinking water at <http://www.epa.gov/safewater/radon.html>. The Safe Drinking Water Hotline is open Monday through Friday, excluding Federal holidays, from 9:00 a.m. to 5:30 p.m. Eastern Time.

For more information on radon in indoor air, contact the National Safety Council's Environmental Health Center's hotline at (800) SOS-RADON. Or visit EPA's web site on radon in indoor air at <http://www.epa.gov/iaq/radon/>.

For technical inquiries regarding the proposed regulations, contact Sylvia Malm, Office of Ground Water and Drinking Water, U.S. Environmental Protection Agency (mailcode 4607), 401 M Street, SW, Washington DC, 20460. Phone: (202) 260-0417. E-mail: [malm.sylvia@epa.gov](mailto:malm.sylvia@epa.gov). For inquiries regarding the proposed multimedia mitigation program, contact Anita Schmidt, Office of Radiation and Indoor Air, U.S. Environmental Protection Agency, (mailcode 6609J), 401 M Street, S.W, Washington, DC, 20460. Phone: (202) 564-9452. E-mail: [schmidt.anita@epa.gov](mailto:schmidt.anita@epa.gov).