SAFE DRINKING WATER ACT

OVERVIEW

Since passage of the Safe Drinking Water Act (SDWA) in 1974, localities struggle to meet federal mandates that do not make sense in all drinking water systems. The Environmental Protection Agency (EPA) has based many of its rules on weak science, leading to needlessly onerous federal standards. As a result, localities are forced to spend limited resources on misguided federal priorities. Small systems are particularly hard hit, paying for standards that provide no verifiable benefits, while diverting resources from legitimate needs (i.e., infrastructure upgrades and repairs, expansion of the water supply system). Unfortunately, 1996 SDWA amendments to the law failed to fix these fundamental flaws. Congress should focus on ways to give states and localities more power in setting priorities. After all, each locality has a better grasp on its particular needs and can better express preferences on how the community wants to expend limited resources.

Statutory Scheme

The SDWA regulates about 200,000 existing public and private "public water systems." These include systems that provide piped drinking water during 60 or more days a year to at least 25 individuals or to at least 15 service connections.[1] Of note, approximately 15 million Americans draw water from unregulated "nonpublic water systems," such as private wells.[2]

EPA regulates more than 80 drinking water "contaminants," potentially found in the water of public water systems. For each regulated contaminant, EPA usually specifies a "maximum contaminant level goal" (MCLG), which represents the level of a contaminant that EPA would ideally want to allow in drinking water. EPA uses the MCLG as a guide in setting the enforceable standard, the maximum contaminant level (MCL). The MCL represents the amount of that contaminant that systems may legally allow in tap water. For example, EPA will only allow systems to provide drinking water that contains no more than 0.005 milligrams of benzene per liter of water. When EPA determines that it is technically or economically infeasible to monitor for a contaminant, it is directed by Congress to promulgate mandatory "treatment techniques," such as mandatory installation of filtration devices.

[1] U.S. Congressional Budget Office, *Federalism and Environmental Protection: Case Studies for Drinking Water and Ground-Level Ozone* (Washington D.C.: CBO, 1997), 17, http://www.cbo.gov/showdoc.cfm? index=250&sequence=0&from=1.
[2] U.S. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey: First Report to Congress*, EPA 816-R-01-004 (Washington, D.C.: U.S. EPA, 2001), 15, http://www.epa.gov/safewater/needs.html.

History

Many fear that returning drinking water regulatory authority to the states will create more waterborne-related illnesses. However, history shows that states and localities were doing a commendable job long before federal involvement. Local government and private industry created the drinking water supply system that we have today,[3] and the federal government did not get involved until well after the infrastructure and treatment technology had produced enormous health benefits.[4] Long before the adoption of the Safe Drinking Water Act in 1974, localities and private industry made much progress.

- Localities and the private sector had developed and employed sand and carbon filtration, advanced water purification technologies (such as coagulation, rapid filtration, and chlorination), and copper sulfate additives (to improve taste and odor).

- Waterborne-related deaths in the United States dropped from 75 to 100 per 100,000 people to fewer than 0.1 deaths per 100,000 annually in 1950, a result of local governments and industry having introduced chlorination in the 1880s.[5]

In the late 1960s and early 1970s, political pressure began to mount for the passage of enforceable federal standards. The federal government and others issued a number of studies indicating that drinking water quality was less than perfect. While Washington was debating the issue in 1973, an American Water Works Association (AWWA)-sponsored Gallup public opinion poll indicated that 70 percent of those polled were happy with the quality of their drinking water.[6] Some contend that public apathy began to change after groups like the League of Women Voters, Ralph Nader groups, and even the AWWA worked to raise public "awareness," i.e., fears.[7] Despite the hype that led up to the passage of the Act in 1974, it appears that drinking water was not necessarily any worse than it had been in the past. EPA and the Centers for Disease Control and Prevention (CDC) data indicate that, overall, waterborne illnesses had most likely remained level since 1920.[8] And in some categories, serious waterborne outbreaks declined, such as outbreaks of typhoid fever.

In recent history, the largest and most serious outbreaks (Milwaukee in 1993 and Las Vegas in 1994) arose within larger systems that regularly meet standards, indicating that federal regulation is inadequate in predicting and preventing new challenges. Unfortunately, such events occur unexpectedly. But history indicates that drinking water suppliers have always been better than federal regulators at dealing with, and eventually solving, such problems.

Welfare Costs of Uniform Federal Standards

Giving states and localities greater authority in setting drinking water standards would allow them to spend their limited resources in a way that maximizes public health and well-being. Indeed, the variety of circumstances facing the 200,000 public water systems around the nation vary tremen-

[3] Michael J. LaNier, "Historical Development of Municipal Water Systems in the United States, 1876-1976," *Journal of the American Water Works Association* (April 1976): 173-80.
[4] Ibid., 173-180.
[5] Ibid., 177.
[6] "Water Quality and Public Opinion," *Journal of the American Water Works Association* (August 1973): 514.
[7] Peter N. Kyros, "Legislative History of the Safe Drinking Water Act," *Journal of the American Water Works Association* (October 1974): 567.
[8] Gunther F. Craun, "Waterborne Disease Outbreaks in the United States of America: Causes and Prevention," *World Health Statistics Quarterly* 45, no. 2/3 (1992): 192-95.

dously. The Congressional Budget Office (CBO) notes that a system that allows localities flexibility would reduce costs.[9] Currently, overall, the financial resources involved are considerable.

- According to CBO, the overall annual cost to comply with the Safe Drinking Water Act ranges from $1.4 billion to more than $4 billion.[10]

- In addition, the EPA estimates additional funds necessary to upgrade infrastructure to meet drinking water needs, both for basic infrastructure and to meet regulatory costs. According to the agency, water supply systems will need a total of $150.9 billion over the next 20 years for infrastructure upgrades.[11]

Is Your Drinking Water Giving You Cancer?

Most EPA drinking water standards of various man-made chemicals are designed to prevent cancer. But are cancer risks really significant, and can EPA actually eliminate them?[12] Consider some facts:

- Using very conservative estimates, EPA estimated in *Unfinished Business* that drinking water contamination causes between 400 and 1,000 cancer cases annually.[13] However, it is important to note that EPA numbers are largely based on cancer risks as determined by rodent studies, which themselves may be seriously flawed.

- Using EPA's estimates, which likely overstate the risks, scientist Michael Gough converted EPA cancer estimates into actual cancer deaths, since not all cancers result in death, and came out with 240-591 possible annual drinking water deaths.[14]

- Using the Food and Drug Administration's process for assessing risks, Gough found that annual cancer deaths due to drinking water contamination range somewhere between 56 and 407 a year.[15] These estimates indicate that cancer risks from drinking water are extremely small and difficult to address via regulation.

- In their landmark study on cancer, scientists Richard Doll and Richard Peto noted, "with the possible exception of asbestos in a few water supplies, we know of no established human carcinogen that is ever present in sufficient quantities in large U.S. water supplies to account for any material percentage of the total risk of cancer."[16]

[9] Congressional Budget Office, *Federalism and Environmental Protection*, 18.
[10] Ibid., 17.
[11] U.S. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey*, 15, http://www.epa.gov/safewater/needs.html.
[12] See also "Chemical Risk" in *The Environmental Source*.
[13] U.S. Environmental Protection Agency, *Unfinished Business: A Comparative Assessment of Environmental Problems*, *Overview Report* (U.S. EPA February 1987), 30.
[14] Michael Gough, "How Much Cancer Can EPA Regulate Anyway?" *Risk Analysis* 10, no. 1 (1990), 5.
[15] Ibid.
[16] Richard Doll and Richard Peto, "The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today," *Journal of the National Cancer Institute* 66, no. 6 (June 1981): 1249.

- EPA notes that $31.2 billion of the 20-year costs can be "directly attributable" to regulatory mandates.[17] Of that amount, water systems need $21.9 billion immediately to meet existing standards, and they will need an additional $14.6 billion to cover costs of recently promulgated regulations.[18]

- For existing regulations, the cost per household is about $20 a year, but for systems serving 25 to 100 people, the cost is about $145 a year.[19] These costs could multiply many times over as new regulations come on line.

The Worst Is Yet to Come

Many of the contaminants regulated in the past — most of which focused on industrial chemicals that accidentally entered water supplies — did not appear in most water supplies. Hence, although these contaminants carry with them expensive monitoring mandates, they did not all trigger the need to invest in expensive infrastructure. But several upcoming regulations are on the horizon that will soon demand astronomical investments. Many of these rules address "naturally occurring" contaminants,[20] which are more prevalent in drinking water systems nationwide and will require very expensive efforts to eliminate them. To add insult to injury, localities may reap no benefits from these rules as the EPA science underlying them is seriously lacking. Three such cases are detailed in the following briefs: the disinfection by-product rule, the radon rule, and the arsenic rule.

Legislative Solutions

The best solution would be to return full authority in standard setting to the states, to allow them to work with localities to meet their specific needs. However, should the federal government remain involved, there also are ways to help empower localities within a federal framework. Congress should engage in greater congressional review of safe drinking water rules to ensure that EPA has indeed employed the "best available science" as demanded under the law. If large questions remain over science, and standards are likely to impose considerable costs, Congress should preempt the overly stringent standard. Congress also could amend the drinking water law to grant states discretion on how they regulate the "naturally occurring" contaminants, such as radon and arsenic.

— Angela Logomasini

[17] U.S. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey*.

[18] Ibid. These estimates cover the disinfection by-products phase I rule, the radon rule, the arsenic rule, and others.

[19] U.S. General Accounting Office, *Safe Drinking Water Act: Progress and Future Challenges in Implementing the 1996 Amendments,* GAO.RCED-99-31 (Washington, D.C.: U.S. GAO, January 1999), 7.

[20] These contaminants are largely by-products of nature, such as radon, which is radiation that results from the decomposition of radium and uranium present in soil and rock.

ARSENIC

The debate over whether to tighten the drinking water standard for arsenic highlights a key problem with federal drinking water regulation: the inappropriateness of the federal government's setting local priorities. At any point in time, local governments and utilities can monitor and control any contaminant they choose, and they know better where to devote their scarce resources. Nonetheless, as the arsenic debate demonstrates, the Safe Drinking Water Act allows federal regulators to impose priorities even when they promise a net loss to public health and well-being.

Background

Arsenic is an element that is a natural part of the earth's crust. It exists in organic and inorganic forms, but the Environmental Protection Agency (EPA) regulations focus on inorganic arsenic because it is more prevalent in drinking water. Traditionally, many critics have contended that inorganic arsenic was the principle danger to public health. But the EPA Science Advisory Board (SAB) recently pointed out that the research is actually far less clear. Recent research indicates that at least some forms of organic arsenic are carcinogenic, and some may be more toxic than inorganic forms.[1]

Legislative History

The drinking water standard for most regulated substances is specified as a "maximum contaminant level," or MCL. The MCL sets the maximum amount of a substance that EPA will allow in tap water. Since 1975 EPA has employed a 50 parts per billion (ppb) MCL for arsenic, which means it allows no more than 50 ppb of arsenic per liter of tap water. This standard was set as an "interim standard" after the passage of the Safe Drinking Water Act (SDWA). The 1986 revisions to the law mandated that the agency set a final standard by 1989.

After the agency missed the legislative deadline and a court-ordered deadline, amendments to the SDWA in 1996 extended the deadlines for the rule. It required the agency to propose a standard by January 2000 and to finalize the rule by January 2001. In June 2000 — five months later than legislatively mandated — the agency proposed a new standard of 5 ppb.[2] Because the proposed rule came late, lawmakers, water providers, and local officials expressed concern that there was not enough time to consider fully the proposed rule and its implications. Congress responded by including language in a fiscal year 2000 appropriations bill, which extended the deadline for six additional months.

But in the waning days of the Clinton administration, EPA published a final standard of 10 ppb in the *Federal Register*.[3] The standard would have been effective starting this past March 23, 2001 although water systems would have had until 2006 to comply. Senator Pete Domenici (R-N.M.) responded by introducing S. 223, which would void the new rule. In March 2001, the Bush administration announced that it would delay the effective date of the standard for 60 days to review the rule and the underlying science. In April, the administration issued a notice announcing that it would delay the final rule until 2002, after further scientific review and a cost analysis were complete.[4]

[1] EPA Science Advisory Board, *Arsenic Proposed Drinking Water Regulation: A Science Advisory Board Review of Certain Elements of the Proposal,* EPA-SAB-DWC-01-001 (Washington, D.C.: U.S. EPA, December 2000), 10-11, http://www.epa.gov/science1/dwc0101.pdf.
[2] *Federal Register* 65, no. 121 (22 June 2000): 38,888-38,983.
[3] *Federal Register* 66, no. 14 (22 January 2001): 6,976-7,066.
[4] *Federal Register* 66, no. 78 (23 April 2001): 20,580-20,584.

Welfare Losses

To date, the debate has focused on the public health consequences of arsenic in drinking water. According to a Congressional Budget Office (CBO) study, federal drinking water regulations can impose "welfare losses" — a term that highlights the fact that shortsighted federal standards can reduce the overall public welfare.[5]

With the arsenic rule, the welfare losses likely would be high because the rule would fall disproportionately on low-income rural Americans, mainly in the Southwest. In fact, the SAB highlights these very points, noting that an overly expensive arsenic rule "might force tradeoffs that do not maximize the gains to public health." For example, "allocation of income to arsenic might preclude addressing nutritional factors" because the standard could make it difficult for low-income families to put food on the table. In addition, the SAB noted that high treatment costs could lead communities to disconnect systems and access water from potentially more dangerous sources, such as from poorly designed wells or untreated surface waters.[6] The statistics on how much the law will cost further reveal that welfare losses are likely to be high:

- According to EPA, per-household costs of this rule alone could add $326 annually to water bills in systems with fewer than 100 connections and up to $162 in systems serving between 100 and 100,000 residents. Even residents within larger systems serving up to a million residents might see water bills increase by $20 per year.[7]

- Some communities will suffer even more severe impacts. For example, Maryland's Calvert County may see its per-household water bills increase by $70 per month just to meet the arsenic standard — a steep price for many people living on modest incomes.[8]

- According to conservative EPA estimates, total annual costs of the rule could range from $180 million to $205 million.[9] Water suppliers and independent academic experts estimate the costs would be far higher — $604 million over and above any estimated benefits each year, with an initial investment of $5 billion.[10] Independent researchers have found that the costs would exceed benefits by $600 million annually.[11]

Problems With the Underlying Science

Because tightening the standard would force people to make serious sacrifices, one might assume that, before issuing its rule, EPA had clear science indicating that the current standard is not safe. Yet the science is not only far from clear, it has not revealed any risks at the current level. According to the National Research Council (NRC), "No human studies of sufficient statistical power

[5] U.S. Congressional Budget Office, *Federalism and Environmental Protection: Case Studies for Drinking Water and Ground-Level Ozone* (Washington, D.C.: CBO, November 1997).
[6] Ibid., 38.
[7] *Federal Register* 65, no. 14 (22 January 2001): 7,011.
[8] See http://www.ruralwater.org/arsenicreality.
[9] *Federal Register* 65, no. 14 (22 January 2001): 7,010.
[10] "Environmental Group Asks Court to Force OMB to Issue Arsenic Proposal," *Daily Environment Report*, no. 92 (11 May 2000): A1.
[11] Robert S. Raucher, *Public Interest Comment on the U.S. Environmental Protection Agency's Proposed National Primary Drinking Water Regulations: Arsenic Rule* (Arlington, Va.: Mercatus Center, 19 September 2000).

or scope have examined whether consumption of arsenic in drinking water at the current MCL [the standard before the Clinton administration acted] results in the incidence of cancer or noncancer effects."[12]

Most of what scientists do know relates to a few studies that reveal one thing: relatively high-level exposure to arsenic for long periods of time can cause cancer and other ailments. EPA based its risk assessment of arsenic on studies of Taiwanese populations in 42 villages that were exposed to relatively high levels of arsenic. From these studies, EPA has extrapolated risks of low-level arsenic exposures in drinking water to the U.S. population. But the SAB and the NRC have pointed out serious flaws. Among them:

- While the Taiwanese studies found an association between high exposures and cancer, these data do not necessarily support any link between low-level exposures and cancer in the United States.[13]

- EPA failed to consider poor nutrition among the Taiwanese, which very likely exaggerates agency risk estimates. Dietary deficiencies, arsenic ingestion from other food sources, and heavy smoking may increase the toxicity of arsenic as well as the incidence of lung and bladder cancers.[14]

- Similarly, the SAB noted that the agency did not adequately consider studies of U.S. populations in Utah exposed over decades to levels of up to 200 ppb — 20 times the Clinton standard — that failed to find bladder cancers.[15]

- The SAB concluded that the EPA approach likely biases "U.S. risk estimates towards overestimates. … The magnitude of this bias is likely to be large."[16]

Benefits or Net Public Health Loss?

Ironically, even if EPA's risk assessment were at all accurate, the benefits of its rule are so small that its costs likely would lead to a net reduction in public health and quality of life.

- According to agency estimates, a 10 ppb standard would eliminate 23-33 cancer deaths each year (lung and bladder cancers combined).[17] The agency speculates other benefits, but it cannot quantify them because it lacks solid evidence for such claims.

- However, the agency fails to consider loss of life due to the burdens placed on the public from the standard. Considering such factors, an American Enterprise Institute-Brookings Institution study estimates that the rule could lead to *a net loss* of 10 lives per year.[18]

[12] National Research Council, *Arsenic in Drinking Water* (Washington, D.C.: National Academy of Sciences, 1999), 7, 299. Read online at: http://www.nap.edu/catalog/6444.html.
[13] SAB, *Review of the Draft Criteria Document on Inorganic Arsenic,* EPA-SAB-DWC-94-004 (Washington, D.C.: U.S. EPA, 8 November 1993).
[14] SAB, *Arsenic Proposed Drinking Water Regulation*, 26, 30-31; SAB notes substantial deficiencies in selenium, methyl donors, zinc, and other substances as key confounding factors.
[15] Ibid., 30.
[16] Ibid., 30.
[17] *Federal Register* 65, no. 14 (22 January 2001): 7011; The EPA estimates benefits will come to $140 to $198 per year, and it estimates $6.1 million per life saved.
[18] Jason Burnett and Robert W. Hahn, *EPA's Arsenic Rule: The Benefits of the Standard Do Not Justify the Costs* (Washington, D.C.: AEI-Bookings Joint Center for Regulatory Studies, 2001), Regulatory Analysis 01-02.

- The SAB notes that any substantial benefits of tightening the arsenic standard would occur in communities that have arsenic levels approaching the current 50 ppb standard — mostly rural southwestern areas of the country. However, the SAB report highlights the fact that any benefits may be overridden by the costs to these communities in meeting the standard. In fact, such costs may lead to a net reduction in public health.[19]

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Recommended Readings

Burnett, Jason and Robert W. Hahn. *EPA's Arsenic Rule: The Benefits of the Standard Do Not Justify the Costs*. Washington, D.C.: AEI-Bookings Joint Center for Regulatory Studies, 2001. Regulatory Analysis 01-02.

Dudley, Susan. *Public Interest Comment on the U.S. Environmental Protection Agency Proposed National Primary Drinking Water Regulations: Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring*. Arlington Va.: Mercatus Center, 7 May 2001, http://www.mercatus.org.

Logomasini, Angela. "Arsenic and Old Politics." *CEI On Point.* Washington, D.C.: Competitive Enterprise Institute, 16 May 2001, http://www.cei.org/OnPointReader.asp?ID=1475. (This brief is a condensed version of this paper.)

Raucher, Robert S. *Public Interest Comment on the U.S. Environmental Protection Agency's Proposed National Primary Drinking Water Regulations: Arsenic Rule.* Arlington, Va.: Mercatus Center, 19 September 2000.

[19] SAB, *Arsenic Proposed Drinking Water Regulation*, 37-39.

DISINFECTION BY-PRODUCTS

For many years, the Environmental Protection Agency (EPA) has attempted to develop standards to regulate disinfection by-products, a group of microbial contaminants that result when public water officials purify water with chlorine. EPA is working on congressionally mandated deadlines to issue a series of rules to regulate these contaminants. According to General Accounting Office (GAO) numbers, the first of two stages of these rules will cost $700 million a year.[1] Because the science used to justify the rule is very weak, it is likely that the public will pay billions in exchange for little or no benefit, and they may suffer adverse health impacts because the rule causes reduced use of chlorination to keep water supplies clean.

Regulatory Status

EPA proposed a rule in 1994,[2] but Congress extended the deadline until November 1998. EPA issued Stage 1 of the rule on schedule, and the law requires the EPA to finalize the Stage 2 rule by May 2002. For each regulated contaminant under the Safe Drinking Water Act (SDWA), EPA usually specifies a "maximum contaminant level goal" (MCLG) which represents the level of a contaminant that EPA would ideally want to allow in drinking water. EPA uses the MCLG as a guide in setting the enforceable standard, the maximum contaminant level (MCL). The MCL represents the amount of that contaminant that systems may legally allow in tap water. In 1998, controversy emerged when the EPA issued its first set of standards for disinfection by-products. EPA set a zero MCLG and a 0.08 MCL for a group of disinfection by-products called "total trihalomethanes," of which chloroform is one of four.[3] A federal court reversed the MCLG for chloroform.

The Science

After the passage of the 1996 SDWA amendments, EPA set up an advisory committee on the rule and co-sponsored a study with the International Life Sciences Institute Expert Panel. Consisting of 10 experts from government and industry, this panel concluded that cancer related to chloroform "is expected to involve a dose response relationship, which is nonlinear and probably exhibits an exposure threshold."[4] That means that the best science indicates that under a given level, chloroform poses zero risk, which would enable the agency to set a less stringent standard than if the substance posed a risk at any level (as is assumed under the "linear risk model").[5]

Based on those findings, EPA released a notice in the *Federal Register* (called a Notice of Data Availability or NODA) stating that EPA was considering revisions to the 1994 rule because it "concluded that a nonlinear approach is more appropriate for extrapolating low dose cancer risk rather than the low dose linear approach."[6] EPA then requested comments. Setting a goal above zero would have been the first time the agency set a MCLG[7] above zero for a substance it considered

[1] U.S. General Accounting Office, *Safe Drinking Water Act: Progress and Future Challenges in Implementing the 1996 Amendments*, GAO.RCED-99-31, 6 (Washington D.C.: U.S. GAO, January 1999).
[2] *Federal Register* 59, no. 145 (29 July 1994): 38,668-38,829.
[3] Under this standard, water providers must ensure that tap water contains no more than 0.08 mg/L of the combined concentration of these substances.
[4] *Federal Register* 63, no. 61 (31 March 1998): 15,685.
[5] For more information on threshold models versus linear models, see "Chemical Risk" in *The Environmental Source*.
[6] *Federal Register* 63, no. 61 (31 March 1998): 15685. The regulations for chloroform would not be affected by a zero Maximum Contaminant Level Goal (MCLG) because the enforceable Maximum Contaminant Level (MCL) would not have changed. Also, the standard does not simply regulate chloroform. It regulates the level of "total trihalomethanes" of which chloroform is one of four contaminants.
[7] An MCLG or Maximum Contaminant Level Goal, which is a nonenforceble standard that is used as a guide for setting the enforceable standard called the Maximum Contaminant Level or MCL. For more details, see the "The Safe Drinking Water Act" overview in *The Environmental Source.*

carcinogenic, and that would have enabled the agency to ease the stringency of standard.

Nine months later, EPA caved in to political pressures and reversed its position. It set a zero MCLG for chloroform in the final rule.[8] EPA had failed to use the "best available science," which the 1996 law demands it observe, and a federal court subsequently vacated the MCLG (but not the final MCL), calling the MCLG "arbitrary and capricious."[9] EPA subsequently removed the zero goal.[10] While EPA has not promulgated a new MCLG, the enforceable MCL it set remains in effect.

EPA's flip-flop is difficult to explain on scientific grounds. The final regulations and the NODA are full of disclaimers, noting that there is little hard evidence that disinfectant byproducts are even carcinogenic.

- In the final rule, EPA notes: "a causal relationship between exposure to chlorinated surface water and cancer has not yet been demonstrated. However, several studies have suggested a weak association in various subgroups ... these studies found a weak association for bladder cancer, although findings were not consistent within and among studies."[11]

- In the NODA, the EPA noted that studies it used for the 1994 rule[12] generally showed weak statistical significance and were not always consistent among the studies. For example, some reviewers believe that two studies showed statistically significant effects only for male smokers, while two other studies showed higher effects for nonsmokers. One study showed a significant association with exposure to chlorinated surface water but not for chlorinated ground water, while others showed the opposite result."[13]

- Setting such standards without a shred of scientific consensus or any verified alternative to chlorination is very risky. Disinfection by-product regulations could curtail the use of disinfectants that are vitally important to protect consumers against microbial contamination, a cause of approximately 50,000 deaths daily worldwide.[14]

- Underscoring that concern, EPA's own Science Advisory Board (SAB) reported in 1993 that EPA lacked the hard data necessary to justify passing a disinfection by-product regulation. The SAB warned: "A key concern is the possibility that chlorination … may be replaced by processes with poorly understood health impacts, both chemically and microbiologically."[15]

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[8] *Federal Register* 63, no. 241 (16 December 1998): 69,390-69,476.
[9] *Chlorine Chemistry Council v. Environmental Protection Agency*, nos. 98-1627, 99-1023, and 99-1056 (D.C. Cir. 31 March 2000).
[10] *Federal Register* 65, no. 104 (30 May 2000): 34,404-34,405.
[11] *Federal Register* 63, no. 241 (16 December 1998): 69,407.
[12] *Federal Register* 63, no. 61 (31 March 1998): 15,679-15,680.
[13] *Federal Register* 63, no. 241 (16 December 1998): 69,408.
[14] "As Control Efforts Reach Turning Point, Water Suppliers Press Congress to Boost Disinfection By-Product Research," *Water Policy Report*, 12 May 1993, 30.
[15] U.S. Environmental Protection Agency, Science Advisory Board, *Drinking Water Committee Commentary on Negotiated Regulation for Disinfection By-products*, EPA-SAB-DWC-COM-94-002 (Washington, D.C.: U.S. EPA, 8 November 1993), 3.

RADON

The Environmental Protection Agency (EPA) has been working to promulgate a drinking water rule on radon for more than a decade. As with many other rules, the debate focuses on whether the agency has the science to prove the rule is necessary to protect public health, given its very high costs, particularly to rural America. Costs to small communities may force them to make huge sacrifices. For example, public officials in Tustin, Calif. noted in a Price Waterhouse Survey that the proposed 1991 rule (which is what EPA reproposed in 1999) would cost them $4 million in capital costs and $30,000 in annual operating costs. Such costs would destroy that community, which only serves 180 homes.[1] The only solution for such communities might be to discontinue drinking water service, which can lead to residents potentially turning to dangerous sources such as untreated surface waters.

Regulatory and Legislative History

The drinking water standard for most regulated substances is specified as a "maximum contaminant level" or MCL. The MCL sets the maximum amount of a substance that EPA will allow in tap water. Currently, EPA regulations include a 4,000 picocuries per liter (pCi\L) MCL for radon. In 1991, EPA proposed changing the MCL to 300 pCi\L, based on its 1991 findings of an agency report on radon.[2] Because of controversies regarding EPA science and the potential costs of the rule, Congress placed a hold on EPA promulgation of the rule until it passed its 1996 Safe Drinking Water Act (SDWA) reauthorization. But rather than reining in EPA and preventing it from setting a ridiculously stringent standard, the 1996 SDWA amendments required EPA to issue a final rule within four years after reviewing the findings of a government-funded National Academy of Sciences (NAS) risk assessment on radon. An affiliate of the NAS — the National Research Council (NRC) — produced a report in 1998.[3] The EPA proposed a rule in 1999, again proposing a 300 pCi\L MCL. However, under 1996 SDWA amendments, the EPA rule would allow localities and states to meet a less stringent standard if they employed programs to regulate radon in indoor air.

Aggregate Costs

- EPA estimates that the radon rule will cost $407.6 million per year.[4]
- EPA claims it will yield $362 million in benefits or $5.8 million per theoretical life saved and $538,000 per theoretical nonfatal cancer prevented.[5]

Science

Early on, EPA's own Science Advisory Board (SAB) expressed serious concern regarding EPA claims about radon.

[1] Price Waterhouse, *Impact of Unfunded Mandates on U.S. Cities, A 314 City Survey* (Washington, D.C.: U.S. Conference of Mayors, 26 October 1993), D-7.
[2] U.S. Environmental Protection Agency, *Report to Congress on Radon in Drinking Water: Multimedia Risk and Cost Assessment of Radon* (Washington, D.C.: U.S. EPA, 1994).
[3] National Research Council, *Risk Assessment for Radon* (Washington, D.C.: National Academy Press, 1998), http://www.nap.edu/books/0309062926/html/index.html.
[4] Figures represent 1997 dollars; *Federal Register* 64, no. 211 (2 November 1999): 59,269.
[5] *Federal Register* 64, no. 211 (2 November 1999): 59,269.

- Back in 1993, EPA science adviser William Raub warned the agency that it was relying on "inconclusive epidemiological findings as to whether radon (either ingested or inhaled) actually presents an appreciable risk within the typical American household if none of the occupants smokes tobacco products."[6]

- The agency, however, essentially ignored Raub's admonition and issued a draft report on radon (which EPA ultimately adopted as the final report with few changes), sticking by its radon alarmism.

- The SAB criticized the EPA's draft report findings, emphasizing again that "there is no direct epidemiological or laboratory evidence of cancer being caused by ingestion of radon in drinking water ... it is not possible to exclude the possibility of zero risks for ingested radon."[7]

- The chairman of the SAB review committee overseeing the EPA radon report, Roger McClellan, after reviewing the scientific literature, concluded that a MCL of 3,000 pCi\L — 10 times less stringent than the proposed EPA standard — would prove sufficient to protect public health.[8]

In 1998, the NRC issued the congressionally mandated risk assessment, which EPA and others hailed as a new definitive finding on radon. But the NRC assessment is not based on new information. The report uses the same data that raised questions in the past among the SAB members and others.[9]

- The data show elevated cancer levels among miners who *smoked heavily* and were exposed to *very high* levels of radon *as well as nitrogen oxides and mineral dusts* in mines. The relevance of these studies to low-level residential exposures is unknown.

- Neither the NRC nor EPA has been able to establish that low-level radiation in homes causes cancer in nonsmokers or even in smokers. Accordingly, the NRC risk assessment indicates that the risks from ingestion could be zero, "depending on the validity of the linear non-threshold dose response hypothesis."[10]

- Despite these very serious weaknesses with their data, the NRC claimed that radon in drinking water might cause as many as 180 deaths.[11]

- Based on the NRC estimates, EPA claims that its 1999 proposal would save 62 lives.[12]

The EPA and the NRC report ignore the fact that radon may not only be safe under a given exposure level, low-level exposures might even be beneficial. Some studies indicate that our bodies may create defense mechanisms against chemicals when we are exposed at low doses. So, rather than causing cancer, low-dose exposures may help us fight off cancer and other illnesses. Scientist Jay Lehr discusses such effects in a recent commentary addressing radiation exposure. Lehr notes:

[6] Richard Stone, "EPA Analysis of Radon in Water is Hard to Swallow," *Science* 261 (17 September 1993): 1514.
[7] Ibid.
[8] Ibid.
[9] J.H. Lubin et al., *Radon and Lung Cancer Risk: A Joint Analysis of 11 Underground Miners Studies,* no. 94-3644 (Bethesda Md.: National Institutes of Health, 1994); National Research Council, *Health Risks of Radon and Other Deposited Alpha-Emitters (BEIR IV)* (Washington, D.C.: National Academy Press, 1988); National Research Council, *Health Effects of Exposures to Radon (BEIR VI)*, (Washington, D.C.: National Academy Press, 1999).
[10] National Research Council, *Risk Assessment of Radon in Drinking Water* (Washington, D.C.: National Academy Press, 1998).
[11] Ibid.
[12] *Federal Register* 64, no. 211, (2 November 1999): 59,269.

- Studies have found instances where people exposed to low levels of radiation actually experienced less incidence of leukemia than the general population, while highly exposed individuals experienced elevated rates of leukemia.[13]

- Another study found that increasing levels of low-level radon exposure are linked to *decreasing* cancer rates.[14]

- Nonetheless, even using its dubious science to exaggerate risks, the EPA's rule still promises more costs than benefits (EPA estimates annual costs at $407.6 million and benefits at $362 million).[15]

Having failed the cost-benefit test, EPA justified its rule based on a provision of the 1996 Safe Drinking Water Act that was an attempt to make the new law flexible and "multimedia" oriented. It allows public water systems to meet a less stringent standard — which they call the "alternative maximum contaminant level" (AMCL) — if the state, locality, or public water system sets up a multimedia mitigation program (MMM). States must gain EPA approval of a MMM by outlining measures they will take to control radon in indoor air. If a state does not submit a plan, then localities and/or public water systems may propose plans to EPA. Accordingly, in 1999, EPA proposed a radon rule that includes a MCL of 300 pCi/L, an AMCL of 4,000 pCi/L, and a set of requirements for MMMs. EPA estimated that if states chose the MMM route, the regulation would only cost $80 million.[16]

However, rather than being more flexible, this provision of the 1996 law gives the EPA an excuse to enter into an entirely new area of government regulation: control over levels of radon in indoor air. In fact, language in EPA's rule indicates that it set the MCL high to promote MMMs, not because the MCL was necessary to protect public health. The agency explained that it needed the higher MCL because "the equal or greater reduction required to be achieved through the AMCL/MMM option would be diminished as the MCL approaches the AMCL of 4000 pCi/L and that fewer states and CWS [community water systems] would select this option. Further, the AMCL/MMM would be eliminated entirely if the MCL were set at the AMCL."[17] In other words, EPA was setting a needlessly high standard so that it could regulate indoor air quality.

Moreover, this approach may not be any less expensive. In fact, attempts to control indoor radon in the past have been expensive and have produced mixed results. Poorly designed or installed mitigation technology can increase radon levels, and successful technology has cost thousands of dollars per home in the past. In addition, state-led programs implemented during the 1980s have proven costly. A New Jersey program during the 1980s proved disastrous, permanently displacing residents from their homes after the government removed soil from under the houses. The New Jersey government then spent years and millions of dollars trying to dispose of the soil as political debates raged disposal sites.[18]

— Angela Logomasini

[13] Jay Lehr, Ph.D., "Good News About Radon: The Linear Nonthreshold Model Is Wrong," May 1996, available at: http:www.junkscience.com/news/lehr.html. Dr. Lehr cites the following studies: T.D. Luckey, "Radiation Hormesis," CRC Press, Boca Raton, Fla., 1991; T. Sugahara, L.A. Sagan, and T. Aoyama, "Low Dose Irradiation and Biological Defense Mechanisms, Amsterdam," Exerpta Medica, 1992; and E.J. Calabrese, "Biological Effects of Low-Level Exposures to Chemicals and Radiation," CRC Lewis Publishers, Boca Raton, Fla., 1994.

[14] B.L. Cohen, "Test of the Linear-no Threshold Theory of Radiation Carcinogenesis for Inhaled Radon Decay Products," *Health Physics* 68 no. 2 (1995): 157-74.

[15] *Federal Register* 64, no. 211 (2 November 1999): 59,269.

[16] Ibid.

[17] *Federal Register* 64, no 211 (2 November 1999): 59,270.

[18] For more information on disasterous radon policies, see: Leonard A. Cole, *Element of Risk: The Politics of Radon* (New York: Oxford University Press, 1993).

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Recommended Readings

Cole, Leonard A. *Element of Risk: The Politics of Radon*. New York: Oxford University Press, 1993.

Stone, Richard. "EPA Analysis of Radon in Water is Hard to Swallow." *Science* 261. 17 September 1993: 1514.

RURAL DRINKING WATER

Rural communities face heavy burdens under uniform federal drinking water standards that force them to make considerable sacrifices. The executive director of the Maine Rural Water Association provides some examples: "Tiny Hebron Water Company, with all of its 26 customers must spend $350,000 to meet this rule [the Surface Water Treatment Rule (SWTR)]. Milo Water District's 700 customers have spent $7.3 million to meet the SDWA [Safe Drinking Water Act] and SWTR requirements. This cost puts the viability of the town in jeopardy. There is a tax lien on one out of ten homes. We are rapidly approaching a time when people on fixed incomes can expect to pay 10 percent of their income for just water and sewer."[1]

Controlling costs is critically important because standards can produce net negative benefits. A Congressional Budget Office (CBO) study notes that uniform federal standards translate into what CBO calls "welfare costs" — which basically means that a regulation costs more than the benefits it returns. The reason for using the word "welfare" is to remind us that those financial losses translate into reductions in quality of life. As the law is now written, EPA considers costs to large systems when conducting cost-benefit analyses, but because of the economies of scale, the costs to households in small systems are far higher than those of the large systems on which the standards are based. Heavy burdens on rural communities have not disappeared under the 1996 law:

- According to the General Accounting Office, the current annual existing compliance cost (not the total water bill, *just compliance*) of systems serving 100 to 250 people is $145 a year and that number is expected to multiply as new rules come online.[2]

- A representative from the National Rural Water Association noted to Congress that the cost to some households to receive water service is as high as $50 per month,[3] which is not affordable for many rural Americans who are living on fixed incomes.

- Systems must spend thousands of dollars every year to test water for the presence of contaminants that pose very little risk or that are very rare. Yet many systems might find it more logical to test for those contaminants less often and use those funds instead to address pressing needs.

- A 1994 National Rural Water Association survey found that monitoring regulations would prevent 80 percent of small communities from devoting resources to hook up more families; provide routine maintenance and systems improvements; engage in pollution prevention activities; pay for additional training for systems operators; and make improvements in water treatment as well as operation and maintenance activities.[4]

Regulatory Relief or Mirage?

For systems that cannot afford to meet standards, the SDWA includes provisions to allow EPA to grant variances (allow the systems to address the issue in another way) and exemptions. These

[1] Statement of Steve Levy, Executive Director of the Maine Rural Water Association, on Behalf of the National Rural Water Association, Before the Subcommittee on Health and the Environment, Commerce Committee, U.S. House of Representatives, 31 January 1996.
[2] General Accounting Office, *Safe Drinking Water: Progress and Future Challenges in Implementing the 1996 Amendments* (Washington, D.C.: GAO, January 1999), 7.
[3] Statement of Steve Levy on Behalf of the National Rural Water Association before the Subcommittee on Fisheries, Wildlife and Drinking Water of the Senate Environment and Public Works Committee, 3 March 1999.
[4] Statement of Dan Keil on Behalf of the National Rural Water Association Before the Environment and Public Works Committee, U.S. Senate, 19 October 1995.

provisions are supposed to provide some regulatory relief to small systems. Because of the bureaucracy associated with these provisions, they are rarely used, making them essentially useless:

- CBO notes that between 1990 and 1994, EPA issued zero variances and only 15 exemptions. "Given that approximately 200,000 public water systems are subject to federal regulations (of which over 85 percent are small), that is a strikingly small number," noted GAO.[5]

- Little has changed since the passage of the 1996 amendments. In its latest compliance report, EPA stated that "in 1998, few public water systems were operating under a variance or exemption, and only 8 new variances or exemptions were granted."[6]

Legislative Bias Against Rural America

In addition to the high costs of uniform standards to existing systems, the law has several provisions that actually prevent many communities from gaining access to piped water. Allegedly, these provisions are designed to help systems come on line, but instead they erect high hurdles.

- One of these provisions specifies that states may only use federal drinking water loans to assist "public water systems," denying states the flexibility to assist communities with nonpiped water supplies.[7]

- Another provision holds that the federal government will reduce federal funding to states that help communities develop new systems if those systems can't immediately meet all 80 plus SDWA standards.[8] While lauded as a "capacity development policy," one public official revealed its real purpose in testimony to Congress. He praised the program for producing "five state programs to prevent the formation of new non-viable water systems."[9] Thirty-six similar programs were "on track," he noted. This provision is essentially equivalent to telling the poor that if they can't afford caviar they should starve.

If Congress does anything in the near future on drinking water, it should be to find means to provide regulatory relief to rural Americans. Among the reforms might be a proposal to grant states *full authority* (without any EPA approval) to issue variances and exemptions and decide on how they expend revolving loan funds. In addition, Congress should engage in vigorous congressional review of all upcoming standards to prevent the agency from passing new regulations that are not supported by strong science. The costs of misguided rules, particularly to rural communities, can reduce quality of life and public health.

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[5] CBO, *Federalism and Environmental Protection*, 20.
[6] U.S. EPA, Office of Enforcement and Compliance Assurance, *Providing Safe Drinking Water in America: 1998 National Public Water Systems Compliance Report* (Washington, D.C.: U.S. EPA, 2000).
[7] 42 U.S.C. § 300j-12(a)(2).
[8] 42 U.S.C. § 300g-9(a), 300j-12(a)(1)(G).
[9] Testimony of Gerry C. Biberstine on Implementation of the SDWA of 1996 Before the Committee on the Environment and Public Works, Prepared by the Association of State Drinking Water Administrators, U.S. Senate, 1 March 1999.