

# Arsenic

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The debate over whether to tighten the drinking water standard for arsenic highlighted a key problem with federal drinking water regulation: the inappropriateness of the federal government's setting local priorities. At any 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 case of arsenic demonstrates, the Safe Drinking Water Act (SDWA) 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 Earth's crust. It exists in organic and

inorganic forms, but the U.S. 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 principal danger to public health. But the EPA Science Advisory Board (SAB) 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.<sup>1</sup>

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1. SAB, *Arsenic Proposed Drinking Water Regulation: A Science Advisory Board Review of Certain Elements of the Proposal*, EPA-SAB-DWC-01-001 (Washington, DC: EPA, December 2000), 10–11.

## 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 the EPA will allow in tap water. Between 1975 and 2002, the EPA used an MCL of 50 parts per billion for arsenic, which meant that it allowed no more than 50 parts per billion of arsenic per liter of tap water. This standard was set as an “interim standard” after the passage of the 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. The amendments 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 five parts per billion.<sup>2</sup> Because EPA proposed the rule 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 that extended the deadline for six additional months.

But in the waning days of the Clinton administration, the EPA published a final standard of 10 parts per billion in the *Federal Register*.<sup>3</sup> The standard would have been effective starting March 23, 2001, although water systems would have had until 2006 to comply. Senator Pete

Domenici (R-NM) 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 2001, 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.<sup>4</sup> The delay of the rule proved controversial, as the Democratic National Committee and environmental activists suggested that the delay would threaten public health. The administration completed its review and issued the Clinton standard in the fall of 2001.

## Welfare Losses

The debate on arsenic largely focused on the public health consequences of arsenic in drinking water, but it failed to consider the public health impacts of the rule itself. According to a U.S. Congressional Budget Office study, federal drinking water regulations can impose “welfare losses”—a phrase that highlights the possibility of shortsighted federal standards reducing the overall public welfare.<sup>5</sup>

With the arsenic rule, the welfare losses will likely be high, because the costs 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

2. *Federal Register* 65, no. 121 (June 22, 2000): 38888–983.

3. *Federal Register* 66, no. 14 (January 22, 2001): 6976–7066.

4. *Federal Register* 66, no. 78 (April 23, 2001): 20580–84.

5. U.S. Congressional Budget Office, *Federalism and Environmental Protection: Case Studies for Drinking Water and Ground-Level Ozone* (Washington, DC: U.S. Congressional Budget Office, November 1997).

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 water.<sup>6</sup> The statistics on how much the law will cost reveal that welfare losses are likely to be high:

- According to the EPA, per household costs of this rule alone could add \$326 annually to water bills in systems that serve fewer than 100 connections and up to \$162 in systems that serve between 100 and 100,000 residents. Even residents in larger systems that serve up to a million residents might see water bills increase by \$20 per year.<sup>7</sup>
- According to conservative EPA estimates, the total annual costs of the rule could range from \$180 million to \$205 million.<sup>8</sup> 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 cost of \$5 billion.<sup>9</sup> Independent researchers have found that the costs would exceed benefits by \$600 million annually.<sup>10</sup>

6. Ibid., 38.

7. *Federal Register* 65, no. 14 (January 22, 2001): 7011.

8. *Federal Register* 65, no. 14 (January 22, 2001): 7010.

9. “Environmental Group Asks Court to Force OMB to Issue Arsenic Proposal,” *Daily Environment Report* no. 92 (May 11, 2000): A1.

10. 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, 2000).

## Problems with the Underlying Science

Because tightening the standard would force people to make serious sacrifices, one might assume that, before issuing its rule, the EPA had clear evidence indicating that the current standard is not safe. Yet even after the Bush administration reviewed the science, it is still far from clear that the rule would provide any benefit. According to the National Research Council, “No human studies of sufficient statistical power 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 no cancer effects.”<sup>11</sup>

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. The EPA based its risk assessment on studies of Taiwanese populations in 42 villages who were exposed to relatively high levels of arsenic. From these studies, the EPA has extrapolated risks of low-level arsenic exposures in drinking water to the U.S. population. But the SAB and the National Research Council have pointed out serious flaws. Among them are the following:

- Although 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.<sup>12</sup>

11. National Research Council, *Arsenic in Drinking Water* (Washington, DC: National Academies Press, 1999), 7, [http://www.nap.edu/catalog.php?record\\_id=6444](http://www.nap.edu/catalog.php?record_id=6444).

12. SAB, *Review of the Draft Criteria Document on Inorganic Arsenic*, EPA-SAB-DWC-94-004 (Washington, DC: U.S. EPA, November 1993).

- The 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.<sup>13</sup>
- Similarly, the SAB noted that the EPA did not adequately consider studies of U.S. populations in Utah exposed over decades to levels of up to 200 parts per billion—20 times the Clinton standard—that failed to find bladder cancers.<sup>14</sup>
- The SAB concluded that the EPA approach likely biases “U.S. risk estimates toward overestimates. ... The magnitude of this bias is likely to be large.”<sup>15</sup>
- However, the agency fails to consider loss of life because of the burdens placed on the public from the standard. Considering such factors, a study by the American Enterprise Institute and the Brookings Institution estimates that the rule could lead to a net loss of 10 lives per year.<sup>17</sup>
- The SAB notes that any substantial benefits of tightening the arsenic standard would occur in communities that have arsenic levels approaching the current 50 parts per billion 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 of meeting the standard. In fact, such costs may lead to a net reduction in public health.<sup>18</sup>

### Benefits or Net Public Health Loss?

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

- According to EPA estimates, a standard set at 10 parts per billion will eliminate 23 to 33 cancer deaths each year (lung and bladder cancers combined).<sup>16</sup> The agency speculates that there would be other benefits, but it cannot quantify them because it lacks solid evidence for such claims.

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13. SAB, *Arsenic Proposed Drinking Water Regulation*, 26, 30–31. The SAB notes substantial deficiencies in selenium, methyl donors, zinc, and other substances as key confounding factors.

14. *Ibid.*, 30.

15. *Ibid.*

16. *Federal Register* 65, no. 14 (January 22, 2001): 7011. The EPA estimates that benefits will come to \$140 to \$198 per year and \$6.1 million per life saved.

### Arsenic Rule Implementation

After the EPA finalized the arsenic rule in late 2001, Congress directed it to review its affordability standards, develop policies to address “undue economic hardships” on small communities, and report to Congress on these issues in March 2002.<sup>19</sup> In March 2002, the

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17. Jason Burnett and Robert W. Hahn, *EPA’s Arsenic Rule: The Benefits of the Standard Do Not Justify the Costs* (Washington, DC: American Enterprise Institute-Brookings Joint Center for Regulatory Studies, 2001).

18. SAB, *Arsenic Proposed Drinking Water Regulation*, 37–39.

19. 107th Congress, House of Representatives, *Making Appropriations for the Departments of Veterans Affairs and Housing and Urban Development, and for Sundry Independent Agencies, Boards, Commissions, Corporations, and Offices for the Fiscal Year Ending September 30, 2002, and for Other Purposes*, Conference Report 107-272, November 2001, 175, [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=107\\_cong\\_reports&docid=f:hr272.107.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=107_cong_reports&docid=f:hr272.107.pdf).

EPA produced its report, but the report simply offered calculations showing how the EPA arrived at its affordability standards.<sup>20</sup>

The EPA then requested that the SAB and the National Drinking Water Advisory Council review the affordability issue. The SAB released a report suggesting that the EPA find a better device than median income to decide affordability—one that better reflected the finances of lower-income households. It also recommended that the EPA consider lowering the percentage of income that it believed acceptable as an annual expense for a drinking water regulation from 2.5 percent to a significantly lower, more reasonable level.<sup>21</sup> The council recommended that the EPA reduce acceptable drinking water costs to 1 percent of the median income.<sup>22</sup>

The EPA has not implemented any such suggestions. It has continued to reject variance and exemption requests on the basis of its misguided affordability criteria.<sup>23</sup> As a result, Representative Butch Otter (R-ID) and eight cosponsors introduced H.R. 4717 in 2004 and H.R. 1315 in 2005, which would allow small, nonprofit public water systems (serving 10,000 homes or fewer) to exempt themselves from the drinking water rules related to naturally occurring substances such as arsenic and radon. The goal was to help alleviate excessive burdens and allow

communities to allocate resources according to their greatest needs. However, no legislation has passed to address affordability issues.

In March 2006, EPA proposed more reasonable affordability criteria, but these will not apply to existing regulations, such as arsenic, but instead to future rules.<sup>24</sup> EPA has yet to finalize this proposal.<sup>25</sup>

### Legal Challenge

There have been attempts to challenge the rule in the courts. Most interesting was the attempt to cast the SDWA as unconstitutional. In 2003, the state of Nebraska challenged the arsenic rule as a violation of the Commerce Clause, which limits Congress to regulation only in cases involving interstate commerce.<sup>26</sup> The state essentially argued that because most drinking water systems do not cross state lines, the entire SDWA was unconstitutional because Congress has no authority to regulate intrastate commerce. The court held that the EPA showed that there is enough interstate commerce of drinking water to justify regulation. However, it left open the possibility that individual systems involved exclusively in intrastate activity might be able to successfully challenge the rule.

### Key Expert

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20. EPA, *Report to Congress: Small Systems Arsenic Implementation Issues* (Washington, DC: EPA, March 2002).

21. SAB, *Affordability for Small Drinking Water Systems*, (Washington, DC: EPA, December 2002), 4.

22. National Drinking Water Advisory Council, *Recommendation of the National Drinking Water Advisory Council to the EPA on Its National Small Systems Affordability Criteria* (Washington, DC: EPA, July 2003), 87, [http://www.epa.gov/safewater/ndwac/pdfs/report\\_ndwac\\_affordabilitywg\\_final\\_08-08-03.pdf](http://www.epa.gov/safewater/ndwac/pdfs/report_ndwac_affordabilitywg_final_08-08-03.pdf).

23. Personal conversation with Mike Keegan of the National Rural Water Association on July 27, 2004.

24. *Federal Register* 71, no. 41, (March 4, 2006): 10671-10685.

25. For more information see EPA's website <http://epa.gov/OGWDW/smallsys/affordability.html>.

26. *State of Nebraska et al. v. Environmental Protection Agency*, 331 F.3d 995, 998 (DC Cir., 2003).

### Recommended Readings

Burnett, Jason, and Robert W. Hahn. 2001. *EPA's Arsenic Rule: The Benefits of the Standard Do Not Justify the Costs*. Washington, DC: American Enterprise Institute–Brookings Joint Center for Regulatory Studies.

Dudley, Susan. 2001. *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, <http://www.mercatus.org>.

Logomasini, Angela. 2001. “Arsenic and Old Politics.” *OnPoint* 80, Competitive Enterprise Institute, Washington, DC, <http://www.cei.org/gencon/004,02034.cfm>.

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