NUCLEAR WASTE DISPOSAL

Science and Policy Clash at Yucca Mountain

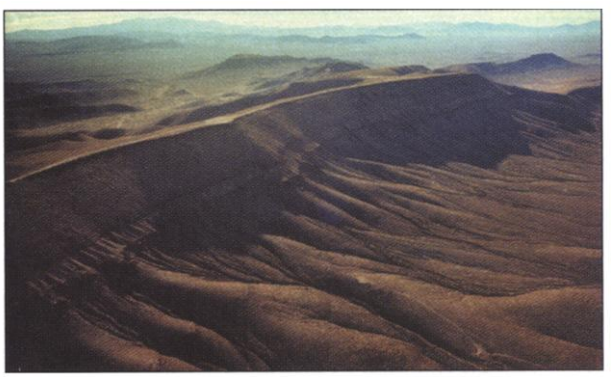
EPA's draft standards for protecting groundwater are drawing fire from scientific groups, including a panel of the National Academy of Sciences

In 1992, Congress tried to ensure that science would have the upper hand in a crucial battle over Yucca Mountain, the proposed repository in Nevada for the nation's highly radioactive wastes from nuclear power plants and national defense activities. It passed a law directing the Environmental Protection Agency (EPA) to come up with public health and safety standards to protect the public from radioactivity that will inevitably leak from Yucca Mountain over the millennia. And it decreed that the standards be "based upon and consistent with the findings and recommendations of the National Academy of Sciences."

EPA unveiled draft standards last summer that it said "emphasize prevention of groundwater pollution" in protecting public health and the environment. But the proposal quickly drew a chorus of objections. Among the dissenters was the academy's own Board on Radioactive Waste Management (BRWM), whose findings and recommendations were supposed to form the basis of EPA's proposed rules. The board has argued that, among other problems, EPA's supporting data were out of date and it was needlessly duplicating the protection of human health by proposing two sets of standards, one covering all possible ways humans could be exposed to radiation and the other focusing on groundwater.

Protecting groundwater separately "may greatly complicate the licensing process and have but a negligible impact on protection of the public," the board observed last fall in its comments on the proposed standards. The board is hoping to persuade EPA to change course when it issues final standards early this summer. "As geologists, we want to see science involved in policy," says David Applegate, who has been following developments as government affairs director at the American Geological Institute in Alexandria, Virginia. In Yucca Mountain, "we're seeing just how complicated that is."

To protect human health, EPA proposed that those living near the repository should not be exposed to more than 150 microsieverts of radiation per year from the repository in any fashion. That "all-pathways" standard drew some flak from groups, including the Nuclear Energy Institute, an industry group; the Department of Energy, which must obtain a license to operate the repository; and the Nuclear Regulatory Commission, which would issue the license in accordance with EPA standards. A higher, 250-microsieverts-per-year standard would be almost as safe and far easier to ensure with confidence, these groups argued. People are exposed to 3000 microsieverts of background radiation every year, from cosmic rays to the radiogenic potassium in bananas.



Wetter than it looks. Groundwater beneath Yucca Mountain worries regulators.

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Perhaps more disturbing for critics is EPA's insistence on a standard to protect the groundwater around Yucca Mountain, separate from the all-pathways standard. EPA proposes an exposure standard of 40 microsieverts per year from groundwater, assuming users of the groundwater ingest 2 liters of groundwater per day. "Groundwater is a valuable resource," says the preamble to the proposed rules, "with many potential uses," such as drinking water, irrigation, stock watering, food preparation, showering, and industrial use. Adds Frank Marcinowski of EPA's Office of Radiation and Indoor Air: "If there's contaminated water migrating off site, then you're imposing the cost of cleaning it on someone else. It's an equity issue—let's prevent the pollution before it happens."

"It was not scientifically logical to add in the groundwater standard," responds John Ahearne, director of Sigma Xi in Research Triangle Park, North Carolina, and current chair of the BRWM. In its comments, the BRWM contends that "if EPA wishes to establish groundwater standards on the basis of science, it must make more cogent scientific arguments to justify the need for this standard." Ahearne doesn't see the justification so far: "You have to ask, Why are you protecting the resource? If it's because of human health, you're back to the first [all-pathways] standard." John Greeves of the National Research Council (NRC) goes further: "We're saying there's no need for a separate groundwater standard. There's no country I know of that has anything but all-pathways standards." In addition, the BRWM told EPA, the all-pathways standard is based on the latest understanding of radiation effects, while the groundwater standard goes back to 40-year-old data.

Although EPA has been regulating groundwater pollution as a matter of course for decades, it has never established a formal radiological standard for untreated groundwater, as the NRC pointed out. The proposed 40 microsieverts per year was set in the 1974 Safe Drinking Water Act for drinking water "at the tap," that is, after treatment of raw water from the ground, rivers, or lakes. But that number has a checkered history, according to William Mills of Olney, Maryland. Mills, as a member of the Public Health Service working for the EPA, helped develop the 40-microsieverts drinking water standard from work he had been doing on the Great Lakes. "We couldn't make even a guesstimate [of risk] to better than a factor of 10," he says. "It was quite arbitrary in many ways."

EPA argues, however, that the standard is "scientifically and technically achievable." Says Marcinowski: "It's been applied at Superfund sites, low-level [radioactive] waste facilities, and WIPP," a site for radioactive transuranic wastes in New Mexico. He adds that EPA is now updating the 40-year-old data underlying the standard so that risks of contracting cancer should fall in the range that EPA traditionally regulates—a 10^{-4} to 10^{-6} risk.

Congress, alarmed at what Senate Energy and Natural Resources Committee chair Frank Murkowski (R–NM) has called EPA's "unrealistic" proposed standards, passed legislation this session that would transfer environmental regulatory responsibility at Yucca Mountain from the EPA to the NRC. But President Clinton has promised to veto it. A lot is at stake in this tussle, in the view of some observers. If EPA sticks to its tough standards, they believe, it could add yet another burden to the already strained authorization process at Yucca Mountain. And if this repository falls through, notes geophysicist Mary Lou Zoback of the U.S. Geological Survey in Menlo Park, California, and the BRWM, "we won't be able to go anywhere else."

–RICHARD A. KERR