TOXICOLOGY

Science Only One Part Of Arsenic Standards

When the Bush Administration decided last week to withdraw new standards that require lower arsenic levels in U.S. drinking water, it brandished scientific uncertainty as a shield against environmental protesters.

Ruled out. EPA's Christine Todd Whitman cited scientific "uncertainties" in dropping new standards for arsenic in drinking water.

But the reality is that setting safe levels of very small amounts of toxicants such as arsenic is not a question that science alone can answer. It's a judgment call, and that means a role for politics.

Rocks and soils are the main source of inorganic arsenic in groundwater, although mining and other humanmade sources also contribute. People who drink water from tainted sources can eventually develop bladder and other cancers. In 1999, a National Research Council (NRC) reviewed the evidence on arsenic and concluded that the current acceptable level of 50 parts per billion (ppb) should be lowered "as promptly as possible." Although the NRC did not recommend a specific level, on 22 January the outgoing Clinton Administration issued a final rule that would have dropped the safe level to 10 ppb.

Western officials and industry objected, estimating that they would need to spend billions of dollars on treatment equipment to meet the new standard. On 20 March, EPA Administrator Christine Todd Whitman sided with them, saying that she agreed with the NRC but that the Clinton plan was based on "unclear" science. "An independent review … will help clear up the uncertainties," she added.

But scientists say the evidence won't become clear anytime soon. The lack of a good animal model, until recently, has forced scientists to rely on human evidence—in particular, studies of cancer in Taiwanese villagers exposed to arsenic from wells from the 1920s to 1960s. But those arsenic levels were relatively high—200 ppb or more. To estimate risks at levels below 50 ppb, experts have used a linear relationship to extrapolate the data. But if there is a level of exposure below which arsenic-laced water is harmless, that statistical technique could overestimate the risk. "The lower you go, the greater the uncertainty is," says Robert Goyer, a retired pathologist who chaired the NRC panel. As a result, Goyer says, setting a standard "depends on a subjective judgment" that must also weigh costs.

As the EPA takes another look, one new study may bolster the 10 ppb standard. In the 1 March issue of the *American Journal of Epidemiology*, a Taiwanese research team examined cases of urinary tract cancer in villagers exposed to arsenic levels as low as 10 to 50 ppb. The study, the first of its kind, found that cancer risk rose with arsenic levels even at these low exposures. "On the face of it, I think [the new study] might be quite important," says Kenneth Brown, a statistician and consultant in Chapel Hill, North Carolina.

–JOCELYN KAISER

PEER REVIEW

NSF Scores Low on Using Own Criteria

Scientists seem to have no trouble giving their opinions on the scientific merit of a grant proposal. But ask them to rate its potential social impact, and they tend to clam up. And that poses a problem for the National Science Foundation (NSF).

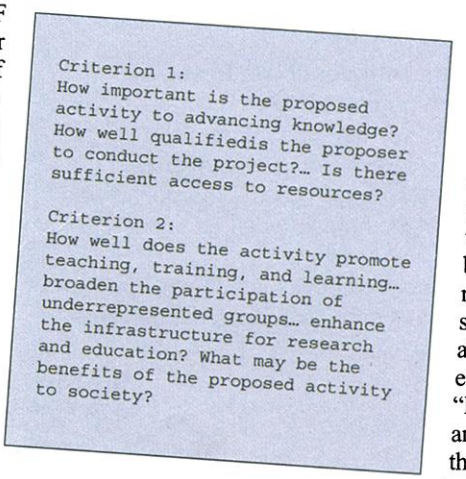
Three years ago, NSF changed the criteria for rating the quality of grant proposals it receives. Instead of asking reviewers to judge them on four factors—the research's merit, its relevance, the investigator's ability to do the work, and the work's impact on the scientific enterprise—NSF asked for ratings on just two: scientific quality and social impact. The change was intended to give social impact —defined to include issues such as education and training, diversity, and addressing of national priorities—a more prominent role in assessments. But a new report from a panel of management experts says that most reviewers don't even bother to rate proposals on their potential social impact, and it chides NSF for not doing more to get scientists on board.

Why does it matter? If NSF doesn't convince legislators that the peer review system provides fair, comprehensive reviews, Congress has suggested it may try to apply its own remedy.

NSF made the changes partly to address complaints from federal legislators that the grants process is an "old boys network" biased against first-time applicants and less prestigious institutions. Indeed, barely a week after the new criteria were promulgated, a Senate spending panel asked NSF to hire the National Academy of Public Administration (NAPA) to study the impact of the new criteria "on the types of research the agency supports." Although NSF thought the suggestion premature, it agreed to a limited review. But when the Senate repeated its request the following year, NSF contracted with NAPA for a $250,000 study.

That report, delivered last month, concludes that the reviewers are mostly ignoring social impact. Some 73% "disregard criterion 2 [social relevance] altogether or simply merge it into scientific merit," it notes, while others "parrot the language without making any actual evaluation on the basis of it." Most reviewers, it says, "use criterion 1 [scientific merit] as a cutoff and then apply criterion 2 to evaluate any remaining proposals." The report says NSF bears some of the blame. It notes that the agency gave reviewers broad discretion on how to apply each criterion, a decision that "essentially gives reviewers license to not apply [the social impact criterion] at all."

"We're not achieving our goal," admits Nate Pitts, head of NSF's Office of Integrative Activities, which collects data on NSF's peer review process. Some members of the National Science Board, NSF's oversight body, seem to agree. At the board's meeting last month, they asked some sharp questions about the office's latest annual report. "How many proposals are sent back because they don't address criterion 2?" asked mathematician Pam Fergu-



Keeping score. NSF wants reviewers to pay more attention to the second criterion.

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