

UC SANTA BARBARA

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## **Nuclear Waste Dumps Need Better Stewardship, Says Expert**

(Seattle, Wash.) -- Recent studies show that we have a "weapons-grade Catch-22" when it comes to managing the nation's existing problems of nuclear contamination, according to environmental studies expert William R. Freudenburg.

Freudenburg, a professor of environmental studies and sociology at the University of California, Santa Barbara, will chair a session on the challenges of long-term nuclear waste management at the annual meeting of the American Association for the Advancement of Science (AAAS) in Seattle on Monday, February 16, from 1-4 p.m.

"The best evidence we have tells us that 'institutional management systems' cannot be counted on to protect public safety and the environment at these sites, and that the phrase may even be a contradiction in terms," he said. "At the same time, however, the remaining contamination problems are so severe that we have no alternative but to depend on such systems until we can think of something more sensible to do."

The problem has received recent national attention due to a court case attempting to prevent the creation of a nuclear dump at Yucca Mountain in Nevada, 90 miles from Las Vegas. According to government plans, waste will be shipped to Nevada from more than 100 sites across the U.S. The government says that the waste will be hazardous for 10,000 years, although others maintain that it will remain radioactive for 300,000 years.

Freudenburg has studied the problems of nuclear waste extensively and has contributed to various Department of Energy and National Academy of Sciences committees on this topic for more than 20 years. He said the AAAS panel is meant to "invite our fellow members of the scientific community to join us in thinking about some important problems that aren't going to go away."

"Although we are not spending money on this now, as a nation, we really should be," he said. "Either we deal with it seriously now, or our children will have to deal with it expensively in the future."

Freudenburg explained that there are approximately 140 sites where nuclear weapons production took place. "Over 100 of these sites are so contaminated that we don't know how to clean them up," he said. "We have no choice but to rely on fallible human institutions to manage them."

The February AAAS meetings are taking place not far from one of these sites -- the Hanford nuclear reservation, near Richland, Wash.

"At Hanford, there are a whole bunch of tanks that are leaking," said Freudenburg. "At first it was suggested that the tanks be double-walled. Then it was decided to put them into bigger concrete tanks that can weigh hundreds of tons. If you produce something that's full of a nuclear and toxic stew that weighs hundreds of tons, if it starts to leak 50 years from now, do you dig it up, or what do you do? It might make more sense to expect the leaks, to come up with a multiple barrier system, and to try to deal in advance with the kinds of things that are likely to go wrong in the future."

He emphasized two main points. One, that society must count on institutions, but he said that we really cannot. Second, Freudenburg said that the nation really needs to expect that things will go wrong, and to figure out ways to simplify the work 30 years from now. He suggested the possibility of putting improved sensors in burial vaults, so that in the future it will be easier to find out where something is leaking and why.

"We need to try to find the consequences of nuclear waste leakage before it gets into the groundwater, at which point it has spread and might even be affecting thousands of people," he said.

For example, he said that if you have a nuclear waste burial site that cannot maintain its integrity if tree roots grow through a "cap" on the surface, and if the site is in a region where open ground tends to be covered by trees, then failure is virtually guaranteed. "We need to plan for failure, to expect that things will go wrong, and to ask what kinds of things are likely to go wrong," he said.

He pointed out that problems are especially likely for places our society is not proud of, but that even pride "may not provide much of a guarantee."

As an example, he explained that one of the greatest scientific breakthroughs in history, the first controlled nuclear reaction by Enrico Fermi and his team of scientists, happened in a squash court under the seats of Stagg field at the University of Chicago. Yet the original squash court has long since been torn down, and the area that is called Stagg field today is several blocks away from the historic location.

"Even today, although the breakthrough itself is well recorded in the annals of history and science, there is not so much as a sign or even a bronze plaque that marks the site itself," said Freudenburg. "Instead, the site might better be seen today as a monument to the difficulties we face in maintaining long-term institutional management at sites that need to manage nuclear and hazardous materials. The difficulties are daunting even at the sites that ought to fill us with pride; for sites that inspire less favorable reactions, the track record is even worse."

He continued, "Under the circumstances, unless we are willing to be actively irresponsible, we appear to be badly in need of another breakthrough -- one that may need to be nearly of the magnitude of Fermi's, and ultimately requiring an effort that will be nearly as intensive."

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