Mill Tailings: A $4-Billion Problem

Litigation and jurisdictional disputes have delayed cleanup by the uranium milling industry of vast mounds of toxic tailings

In November 1978, Congress passed legislation requiring the uranium milling industry to clean up mill tailings produced in refining uranium for use in nuclear fuel. Almost 8 years later, major provisions of the Uranium Mill Tailings Radiation Control Act have yet to be implemented. And, despite the presence of 191 million tons of toxic tailings on the ground, the outlook is bleak for the program becoming operational soon.

Plans for stabilizing tailing piles at 26 sites in seven states have been delayed in part by jurisdictional disputes between the Nuclear Regulatory Commission (NRC) and the Environmental Protection Agency (EPA). But what appears to have been most disruptive is repeated congressional meddling and unresolved litigation brought by industry and environmentalists.

"These tailings are just blowing around New Mexico," complains Melanie Kenderdine, legislative director for Representative Bill Richardson (D–N.M.), whose state has the largest piles of mill tailings—some 84 million tons. Frustrated by the delays, Richardson is pushing a bill to ease the financial burden on the industry in hopes of breaking the gridlock. "The underlying concerns are the potential hazards . . . ," says Kenderdine. "We are not doing anything about them."

Since 1957, when the Atomic Energy Commission (AEC) recognized the problem, mill tailings have been considered hazardous to humans and the environment when not properly controlled. The tailings contain radium, a source of radon gas, and an array of other toxic heavy metals. Radon daughters, particles produced by degrading radon gas, are especially toxic when inhaled.

The tailings problem is extended beyond milling sites by wind and water. In New Mexico, for example, Governor Toney Anaya notes that "Groundwater contamination problems have been documented" in areas outlying each of the state's five milling sites. "Contamination of surface areas," Anaya adds, "continues to spread through wind erosion." The same conditions are found in other states, NRC officials say.

Almost from the start, industry has opposed the law on grounds that the regulations were either too costly or too stringent. Its position has been championed by Senators Alan K. Simpson (R–Wyo.) and Pete V. Domenici (R–N.M.), who have sought to salvage sinking mill-town economies in their states. They have successfully offered amendments on several occasions to delay implementation of agency regulations or to ease compliance standards.

Such legislative actions, says David Berick, director of the Environmental Policy Institute's nuclear wastes project, are a major cause of cleanup delays. The congressional pressure also may be producing less than adequate standards, says Paul Robinson of the Southwest Research and Information Center located in Albuquerque. "Our concern is that EPA's standard for mill tailings incorporate residual risks that are higher than EPA has ever allowed for any other pollutant," says Robinson, who is pressing for Congress' Office of Technology Assessment to examine the standards.

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The cost of cleaning up mill tailings has become increasingly important to the industry, which has facilities in New Mexico, Wyoming, Utah, Texas, Colorado, Washington, and South Dakota. Since the law was enacted in 1978, the industry's financial condition has deteriorated. Only five of the 26 so-called "active" uranium mills are actually operating. Employment has fallen from 22,000 to 2,000 nationwide. The industry that once provided half the free world's uranium will produce less than a quarter of domestic requirements in 1985.

The demise of the United States' milling industry has been driven by excess world production capacity, stockpiles created by domestic overproduction, plus delays and cancellations of new nuclear generating stations. Consequently, executives such as Harry M. Conger, president of Homestake Mining Company, argue that the reclamation costs are prohibitive and inhibit the revival of the industry. But critics charge that these companies have yet to demonstrate that they or their multinational parent corporations cannot afford the expense.

Unlike the coal industry, which must clean up as it mines, uranium millers can delay stabilizing tailings until mills are permanently closed. As a result, cleanup costs have been accumulating since 1978 and are estimated to be at least $2 billion to $4.4 billion. Costs could be lower, depending on whether private industry or DOE performs the cleanup. Congers and other millers represented by the Uranium Producers of America are lobbying for bills—introduced by Richardson in the House, and Domenici and Simpson in the Senate—that would shift the task to DOE. More important, the legislation (H.R. 2234 and S. 1004) would slash industry's financial liability from 100 percent to 15 percent.

Specifically, the milling companies, many of which are owned by major corporations like Texaco, Exxon, and Union Carbide, want to shift 55 percent of the reclamation costs to the electric utility industry and another 30 percent to the federal government. This contrasts sharply with the 100 percent cost factor borne by coal producers, and would represent a second bailout for uranium millers.

In 1978, Congress agreed to shoulder $200 million in costs for cleaning up 75 million tons of tailings generated prior to 1978 largely as a result of government contracts issued by the AEC. Seven years later and with its cleanup just beginning, DOE now estimates actual costs at $700 million to $900 million. But from 1978 on, uranium millers were expected to assume all expenses.

DOE and the electric utility industry oppose the proposed legislation. "The precedent of relieving the owners of commercial facilities involved in . . . processing activities of the site cleanup costs is an undesirable one for the nuclear industry and waste generators in general," said James W. Vaughan, Jr., acting assistant secretary for nuclear energy, recently in testimony before Congress. In addition, the vice chairman of Wisconsin Electric Power Company, Sol Burstein, speaking in behalf of the Edison Electric Institute (EEI), added that utilities already have paid for the cleanup. These expenses, he says, were rolled into nuclear fuel prices.

The economic slump the uranium

millers are experiencing is in part their fault, argues Burstein. Forcing utilities to take delivery of uranium under "take-or-pay" contracts in the face of plant delays and cancellations, EEI officials note, has contributed to surpluses and falling prices. Similarly, the industry's reluctance to renegotiate prices for uranium to be delivered under long-term contract has led utilities to buy cheaper foreign uranium—a major factor in the decline in the domestic industry.

While the prospects for the bailout legislation passing Congress seem slim, it may trigger oversight hearings in the House Energy and Commerce Committee and elsewhere. Indeed, unless greater attention is paid to the problem, Representative Richardson fears cleanup could be delayed into the 21st century. Litigation challenging EPA's authority to set air and water standards, maximum radon emission levels from tailing piles, and ground-water contamination protection contribute to the uncertainty. Now being decided by the U.S. Circuit Court of Appeals for the 10th District (Denver), these issues are likely end up before the Supreme Court.

Even if the litigation ends soon, the mill tailings cleanup could be delayed further by structural weaknesses in the 1978 law. Surety bonds, for example, which are meant to guarantee that funds will be available for stabilizing sites if a mill operator defaults, appear inadequate—totaling about $300 million. Mills also can continue to defer the day of reckoning on cleanup by postponing final retirement dates for facilities.

And, Larry Boggs, senior counsel for the American Mining Congress, complains that too many federal agencies are involved. "The legislation is so poorly drafted as to be unbelievable," says Boggs. "The Congress was asleep." But it is doubtful that Congress will move to overhaul the legislation any time soon. Representative Morris K. Udall (D–Ariz.), chairman of the House Interior Committee, normally might lead such a fight, but staffers say he is waiting for the appeals court to rule. That decision could come by January.

Nevertheless, Congress is showing signs of impatience with the inaction on tailings cleanup. Representative Edward J. Markey (D–Mass.), chairman of the energy conservation and power subcommittee, may probe the cleanup issue in hearings on the uranium industry scheduled for this fall. Comments David Schooler, chief counsel for the subcommittee, "When you see a situation as messed up as this, there is a temptation to write a new law."—**MARK CRAWFORD**

Test Wrecks Reactor, Delights Researchers

On 9 July 1985, a small nuclear reactor in the Idaho desert suffered a loss-of-coolant accident that resulted in a partial core meltdown. The accident, which released highly radioactive fission products into the reactor vessel and associated structures, wrecked parts of the plant. Those operating the facility are delighted.

The "accident," which in some respects mirrored the events at Three Mile Island, was the final test in a series of experiments at the Department of Energy's Loss of Fluid Test Facility (LOFT) at Idaho Falls. Researchers uncovered several fuel elements in the center of the reactor's core for about 30 minutes in an attempt to simulate an accident in which cooling water is lost.

Designed to obtain a better understanding of what will happen in a reactor undergoing a severe nuclear accident, the experiment should provide some crucial information on the types of fission products that are likely to be released. This information, in turn, could play an important role in nuclear regulation because it should help determine whether radionuclides in some types of accidents are likely to be trapped within the plant or be released into the environment.

An especially important element in this respect is iodine. Until recently, it was assumed for regulatory purposes that in a severe accident iodine would be released in its volatile elemental form and would escape in large quantities from the plant. Thanks in part to analyses of what happened at Three Mile Island, however, it is now widely believed that iodine will be converted to cesium iodide, which is soluble and far less volatile than iodine itself. The LOFT test should provide some direct experimental data on this.

It will, however, be several weeks before radioactivity in the crippled LOFT facility declines to levels that will permit researchers to obtain all the samples they need to analyze exactly what happened in the reactor. At this point, all they know is that the fuel cladding ruptured under the intense heat and that radioactive elements were released into the reactor vessel.

Officials of the Organization for Economic Cooperation and Development, which funded and planned the LOFT test, are happy that the uncovered core reached temperatures that should have caused it to melt. According to David Hicks of the U.K. Atomic Energy Authority, there was some concern when the experiment was being planned that the thing would fizzle—that sufficient radionuclides would be released to wreck the reactor but temperatures would not climb sufficiently to simulate a real accident.

—**COLIN NORMAN**

Illinois, Cornell Sign Supercomputer Contracts

Cornell University and the University of Illinois have now signed contracts with the National Science Foundation (NSF) to operate supercomputer centers, without agreeing to restrictions on who can have access to the machines. Officials from the State Department and the Department of Defense had originally wanted the contracts to bar use of the machines by citizens of Soviet bloc countries and China, to guard against use of the supercomputers to run military programs, but the two universities refused to accept any restrictions (*Science*, 12 July, p.148).

The matter is far from settled, however. An interagency committee is developing federal rules on access to supercomputers, and if the Administration eventually comes up with a policy limiting access on the basis of citizenship, NSF would have to go along with it. The Cornell and Illinois contracts would then have to be renegotiated. As one university official noted, that would put the universities in the uncomfortable position of either changing their policies in a way that restricts academic freedom or giving up the contracts.

Two other NSF-funded supercomputer centers, at the University of California at San Diego and Princeton University, signed contracts that commit them to whatever federal policy is finally adopted. However, if restrictions are imposed, there are likely to be serious objections from members of the academic consortia that operate the two centers.—**COLIN NORMAN**