

cleanup standards to uses other than residential or agricultural, and decisions about nuclear waste storage. "These changes have been talked about for a long time," said one veteran DOE staffer commenting on the plan. "But Alm is really serious. He has pushed the Ten-Year Plan, and he is not backing down. Things are happening, and it is obvious in money, people, and programs. He is pushing hard."

Initial investment in basic science

With a strategy in place for reducing costs in the short term, the Environmental Management Science Program aims to tap basic research to generate new knowledge that will lead to less costly, more innovative cleanup technologies in the future, according to Alm. Right now, as part of the Ten-Year Plan to expedite remediation, EM has a program to find ways to take advantage of cleanup technologies that are currently at the demonstration stage. EM also anticipates that applied research based on existing scientific knowledge will continue to generate new technologies to improve cleanup strategies over the next five to 10 years.

But Alm also recognizes that the basic scientific knowledge for tackling many of EM's responsibilities is lacking. The EM Science Program is looking for the breakthroughs to solve those problems, he said. Such problems are found at all levels of EM's cleanup task, from handling high-level nuclear waste to analyzing the composition of some of the thousands of hazardous mixtures at the sites.

Frank Parker, an engineer at Vanderbilt University, Nashville, who chairs Alm's new science advisory panel, said the task of fostering breakthrough research is more art than science. "The best prescription we have is to get the best people, give them the toughest problems, provide little interference, and ensure stable funding." Parker's panel took over from a National Research Council committee that had been advising Alm on the program.

But the 1997 EM Science Program budget indicates that stable funding may prove difficult within a restricted DOE budget. Last year, in the first year of the program, DOE promised to fund 138 three-year projects for a total of \$112 million (7). But only \$47 million was funded in 1996. The remaining \$65 million must come from future EM Science Program budgets. In fact, \$23 million of the 1997 funds has already been committed to funding 1996 projects, leaving just \$20 million for new research.

In an Oct. 8 letter to Carol Henry, who manages the program within EM, the National Research Council committee described this commitment as "a significant challenge to the future viability of the program." More money is desirable, said Henry, but constraints on the total DOE budget are the limiting factor for science program funds. In addition, she said, the \$20 million in new funds should be seen as part of a total cumulative program funding of \$132 million, a substantial research program.

Overall, recent developments indicate that EM is headed in the right direction, but questions remain about how far it will be able to travel down this road. Innovative technologies are expensive to implement in an era of static or diminished funding. Some community groups fear that the Ten-Year Plan is an attempt to cut and run instead of a bold commitment to ac-

Rocky Flats: From mistrust to cleanup model

The recent agreement on the cleanup of the Rocky Flats Environmental Technology Site near Denver is an indication of how much improvement has been made in EM operations and management, according to Rocky Flats spokesperson Patrick Etchart. The site has a legacy of mistrust dating back to 1989, when it was raided by EPA and the FBI following charges of criminal violations of environmental laws. A "temporary" shutdown that followed the raid lasted until 1993.

A former nuclear weapons facility, the 6550-acre site began operation in 1952. The site holds the biggest stockpile of weapons-grade plutonium in the United States (more than 14 tons), as well as numerous contaminated buildings, facilities, and surface hot spots. Today, Rocky Flats is a National Priority List site under Superfund. The Rocky Flats cleanup budget peaked at more than \$700 million in 1994. The budget for 1995 was \$573 million.

Stabilizing the nuclear materials and placing them in safe storage is the top priority. Activities currently under way include draining tanks and pipes containing plutonium-bearing solutions, venting waste drums and tanks that have dangerous buildups of hydrogen gas, and repackaging metal parts and raw materials. There is also soil and groundwater contamination at the site, and plutonium contamination has been found off-site.

Rocky Flats was already analyzing the consequences of various accelerated cleanup scenarios and so had a head start on the Ten-Year Plan process. The Rocky Flats plan assumes that a new vault will be built for interim plutonium storage and that much of the nuclear waste will be shipped off site.

There is strong community support to safely store the radioactive materials, build a new plutonium storage vault, and decommission the site buildings. But other strategies are more controversial. In August, the regulatory agencies agreed to set interim soil cleanup levels based on a dose of 15 millirems per year to a person on site. Acknowledging community concerns, the regulators have agreed to review these action levels each year. —R. R.

tion. The plan is still largely a list of proposals, and it is too soon to judge its success. As one state regulator said, "To succeed, the plan must quickly show some concrete results. By the end of 1997 we should know whether it's real or rhetoric."

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