

# Rethinking on weapons clean-up

**Science can make a critical contribution to the massive US effort to clean up sites once devoted to manufacturing nuclear armaments — but only if the Department of Energy is effectively reformed.**

THE clean-up of the nuclear weapons production complex in the United States presents a daunting array of technical challenges, which science will play an important role in meeting. Hazel O'Leary's energy department has made some progress toward injecting technical and administrative cohesion into the vast programme. If, as expected, O'Leary leaves at the end of the year, the acceleration of this process will be the top priority of her successor.

The litany of problems surrounding the \$6-billion-a-year programme began at its outset, in 1989, with the failure properly to integrate science and technology into its core. As a result, the programme has lacked technical direction. Tens of thousands of people are engaged in the work, which is supposed to lead to the environmental remediation of a chain of huge former weapons production plants across the United States. But experts have fiercely criticized the Department of Energy (DoE)'s management of the programme, claiming that many of its approaches are expensive and technically misguided (see pages 375–379).

So what must be done to reform it? The department — at the insistence of the Congress — has taken one step in the right direction this year, establishing a \$50-million-a-year programme of basic research directed at the clean-up technologies of the future. The Environmental Management Science Program will fund chemists, biologists and others to pursue more efficient ways of disposing of high-level waste, and various biological and chemical means of erecting underground 'barriers' to block the dispersal of toxins and radionuclides.

The first round of grants has been split evenly between scientists at universities and at the DoE's own laboratories. The typical grant for the latter is \$1 million — three times the size of the typical university grant, reflecting the high overheads associated with work in the laboratories. If the department is to get value for the taxpayers' money, it must either reduce overhead costs at its laboratories, or direct more of the money at the universities.

The time is also ripe for an extensive revision of the objectives of the programme, based on a scientific assessment of the risks posed by different hazards on the sites. When the clean-up problem was first exposed to the public, its natural response was to demand simultaneous remediation action on all fronts. It is becoming clear that this approach is technically and fiscally unsustainable: the problems must be prioritized on the basis of risk.

Such revisions will have to be agreed with local state governments and the Environmental Protection Agency. In the past, an energy department in search of a quiet life has reached agreements with those parties which it is now unable to implement. In renegotiating the agreements, the department must be much firmer than it has been, resisting the temptation to promise actions that its own scientists and engineers do not support.

O'Leary's strongest legacy has been her 'openness initiatives', which have helped to make the public (and local environmental activists, in particular) more inclined to believe the department. Her successor must take advantage of this legacy to win consent for patient and technically sound approaches to clean-up. The introduction of performance-based contracts at key sites such as Hanford provides additional grounds for optimism.

But the department remains vastly bureaucratic, with large and powerful local offices vying with its headquarters in Washington,

DC, for control of the programme. And many in Congress continue, perversely, to measure the success of the programme by the number of jobs it retains on the sites. In the resultant dog-fight for resources, the investments that the programme most needs tend to suffer. John Myers (Republican, Indiana), chair of the energy appropriations subcommittee in the House of Representatives, is to be congratulated on breaking this cycle to make funding available for the new science programme.

Doubts remain, however, about the ability of the Department of Energy as now constituted to reform the clean-up programme. Last year, a report by a panel chaired by the industrialist Bob Galvin was highly critical, calling for a research programme worth \$200 million initially, rising to \$400 million a year, to find new approaches to clean-up. Galvin also recommended the promotion of the assistant secretary for environmental management to the rank of under secretary.

Neither recommendation has been implemented. Instead, the former assistant secretary, Tom Grumbly, after coming closer than any of his predecessors to getting to grips with the problems, was promoted this summer. A new assistant secretary, Alvin Alm, has arrived, with his own vision of maximizing clean-up over the next ten years. Laudable as this goal may be, it highlights the impersistence of stop-go management which has been the bane not just of the clean-up programme but of the entire department.

Republicans in Congress continue to call for the abolition of the DoE. They have already scaled back its energy supply mission and say the weapons programme should go to the Department of Defense and the laboratories to the National Science Foundation. But the abolitionists never mention clean-up, which is as expensive as, and more problematic than, the other three missions put together. Next month, the Republicans are defending six marginal congressional districts downriver from the former plutonium production facility at Hanford. Voters there should be told now if the party is really intent on handing over the worst environmental site in the country to the secretive hands of the Department of Defense.

Senator Pete Domenici (Republican, New Mexico), the department's best Republican friend, has floated the concept of a change in the department's status as the best means of strengthening its component parts. If DoE became an agency, like the National Aeronautical and Space Administration (NASA), the argument goes, it could find direction under a strong and politically independent administrator. This approach has much to commend it.

In a wholly rational world, the clean-up programme might cost about one-tenth of its current budget — the irrationalities stemming from politicians' need to preserve constituents' jobs, excessive bureaucracy and the wish of US citizens to see the problems tackled rather than mothballed. But with appropriate reforms and prioritization, money can be redeployed to boost research, as Galvin rightly recommended. Early in the next century, technology for clean-up will drastically improve, and public demand for it will recede, subject to accurate assessment of the risks posed by residual radioactive waste. At some point, expectations and capabilities are likely to coincide. Science has a pivotal role to play in helping the government to reach that point as quickly and as cheaply as possible. □