# The New Environmental Cleanup Mission of the U. S. Department of Energy—A New Challenge in Transportation Innovation

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## INTRODUCTION

Thank you. First, I want to thank our hosts and organizers for arranging such an excellent conference. The number of participating nations and the volume and range of the papers to be presented and published is ample evidence of the importance of PATRAM in the exchange of knowledge about the transportation and packaging of radioactive materials.

I am grateful for the opportunity to be able to discuss some of the DOE programs which are so important to the DOE mission under the new conditions which exist in the world today. I especially want to highlight the importance and need for transportation systems technological developments for this mission.

## DOE MISSION

Three years ago, the U.S. Department of Energy made a thirty-year commitment to clean up all of its facilities and to comply with applicable environmental laws and regulations.

The Department's Environmental Restoration and Waste Management program is leading this effort to clean up the U.S. Nuclear Weapons Complex. This program has taken on increasing relative importance as the production and testing of nuclear weapons has been scaled back. Beginning in 1989 with a budget of $1.3 billion and about 250 employees, the Office of Environmental Restoration and Waste Management has expanded in three years to about 1,500 employees and a budget of about $5.6 billion—about 25 percent of DOE's budget.

EM is divided into three major programs:

- Waste Management which is responsible for treatment, storage, and disposal of wastes at *active* DOE sites, and for bringing active and standby facilities at these sites into compliance with local, State, and Federal regulations. These activities account for about 56 percent of our budget.

- Environmental Restoration which is responsible for remedial actions at *inactive*, contaminated DOE sites and for decontaminating and decommissioning nuclear weapons and related materials and facilities. These activities account for 32 percent of our budget.

- Technology Development which is responsible for developing and accelerating the use of new technologies to manage the waste and clean up the sites—about 6 percent of our budget.

This organization faces a formidable task. We have close to 4,000 sites contaminated with radioactive or hazardous waste, soil, groundwater, or structures. We have 1.4 million drums of buried or stored waste some of which is inadequately contained or stored. We have 5,000 properties in the vicinity of 24 inactive uranium ore processing sites. And we have thousands of facilities awaiting D&D which means we need to deactivate, decommission, decontaminate, and dismantle thousands of DOE buildings.

The problem is enormous, but the Department is serious about meeting its 30-year commitment.

## NEED FOR GREATER KNOWLEDGE

To do this job will require billions of dollars and the work of thousands of dedicated men and women. It is important to realize that we are at the beginning of a long and complex process: much is unknown about the conditions of the sites and waste, the treatments which will be required, and the steps which need to be taken to insure safe disposal of waste and solutions to the environmental problems challenging us.

Indeed, when we think about the most pressing needs we face today, what stands out is the need for much greater knowledge:

- knowledge about contaminated groundwater and soils;

- knowledge about improperly stored waste;

- knowledge about how to put facilities in a "safe holding pattern" while solutions are being developed; and

- knowledge about the solutions themselves; solutions which work and can be implemented at a reasonable cost and in a reasonable time frame.

Knowledge is the key to understanding what we have, what our options are, and selecting a path which will allow us to reach our goals effectively and efficiently.

A few examples will serve to illustrate the point.

*Example*: we have identified more than 700 waste streams requiring treatment prior to disposal. Of these 700 waste streams, 28 have no technologies available for treatment.

*Example*: many radioactive wastes generated during the past 45 years are now known to contain hazardous constituents along with the radioactivity. Treatment technologies which can meet approved regulatory standards have not been developed for many of these "mixed" wastes.

*Example*: waste streams in the past were often discharged directly to the environment in ponds, aquifers, or in deep injection wells below aquifers. We do not fully understand the extent to which these containments might migrate beyond the fences of DOE sites and what to do about it if they do.

*Example*: our experience with identifying suitable sites for permanent disposal of high level and transuranic waste has proved to be exceedingly difficult both technically and institutionally. The first drum of waste has yet to be emplaced in the Waste Isolation Pilot Plant in Carlsbad, New Mexico after years of technical analysis, environmental and safety evaluations, and extensive public review.

In the area of transportation and packaging, the agenda for this conference is a catalogue of some of the ongoing work which will contribute importantly to the knowledge base of our future programs. To mention just a few: work on the burnup credit, radiation protection, transportable storage casks, risk assessment, ductile cast iron, and brittle fracture methodology show great promise in giving us new technical options for meeting our transportation and packaging needs in the years ahead.

## IMPORTANCE OF TRANSPORTATION

The heart of DOE's transportation problem is that contaminated materials present on many sites will have to be moved prior to treatment, storage, and disposal. For example:

- While it is true that some of the contaminated soils will be treated *in situ*, many will have to excavated and relocated.

- High level waste at Hanford, Idaho, Savannah River, and West Valley will ultimately require permanent disposal in a geologic repository—at some other location.

- Transuranic wastes are stored at many DOE sites but most are slated for disposal at WIPP in Carlsbad, New Mexico.

- Commercial spent fuel is stored at more than a hundred reactor sites and will have to be transported to a geologic repository for permanent disposal.

Transportation, therefore, is a vital link in our overall Environmental Restoration and Waste Management program. Even where the bulk of contaminated materials will remain on site, transportation has a key role to play in the movement of samples for evaluation and analysis prior to treatment and disposal.

## AN INNOVATIVE TRANSPORTATION PROPOSAL

Today, I would like to focus on just one area which I think serves to illustrate the kind of contribution transportation R&D can make in the context of our overall program and the changing conditions in the world today.

The U.S. Nuclear Weapons Complex is essentially a vast industrial empire of large power plants and factories for unique material production and fabrication, chemical separation processes, large chemical tank farms, and electronic assembly. Like most such industrial operations, these facilities have generated vast quantities of waste—much of it hazardous, some of it radioactive.

But the waste which has already been generated represents only half—*or less*—of the problem which we face. As the Cold War comes to a close, and this industrial empire is scaled back, the Department will need to deactivate, decontaminate, decommission, and dismantle a massive number of facilities no longer in use. As the Complex is consolidated and we bring old facilities to safe shutdown, we will be generating huge new quantities of all kinds of waste: hazardous, mixed, high-level, low-level, and transuranic.

It is completely unrealistic to assume that these facilities can be broken down into small pieces, put into 55 gallon drums, and shipped off for storage. We need to develop technologies which allow us to recycle or reuse large portions of these facilities. Needless to say, we simultaneously need to develop standards and specifications for the reuse of recycled scrap metal and materials.

Let me illustrate this point with a specific example. At K-25, the uranium enrichment plant at Oak Ridge, we have 222,000 tons of ferrous metals, 20,000 tons of nickel, 30,000 tons of copper and aluminum, and 480,000 cubic feet of concrete. We need to reuse these materials to build our future facilities for storage, treatment and disposal including containers of all kinds, future road networks, and the facilities themselves. Recycling offers a major opportunity to cut costs while cleaning up our sites.

In the transportation area, one of the more innovative proposals we have seen is to use EM scrap metal for the fabrication of multipurpose casks for commercial spent fuel. EM has an estimated 4 million tons of contaminated scrap steel that must be properly disposed of as a result of site restoration activities. The idea is to melt the contaminated scrap metal in a dedicated foundry, cast chill blocks and transport to a commercial foundry where the metal will be used to make casks for interim storage of commercial spent fuel. With the addition of a certified transport sleeve, the cask could be used for transportation to the repository. Potentially, the cask could also be used as a primary engineered barrier for disposal at the repository.

This proposal is technically feasible and represents an extension of a FY 93 Integrated Demonstration Project. We estimate that roughly half a million tons of contaminated scrap metal would be consumed if such a proposal were fully implemented. The savings to the DOE Civilian Radioactive Waste Management Program could be in the

billions and would facilitate DOE's goal to begin taking title to commercial spent fuel by 1998. The proposal has strong backing from private industry. We have formed a small task group to evaluate the proposal.

Regardless of the outcome of this particular idea, I think it illustrates the kind of thinking we will need to see a lot more of:

- near-term solutions to meeting our commitment to solve national waste issues;
- a demonstrated commitment to working with private industry;
- accomplishing our goals at significant savings to the taxpayer.

## INTERNATIONAL COOPERATION

The kind of problems we are grappling with are not unique to nuclear weapons production or to the Department of Energy. They are not unique to the United States. Much of the contamination we have is typical of industrial processes that occur worldwide. It is therefore only logical that we share our solutions and work together. International conferences and symposia like PATRAM are one approach to accomplishing this goal. Joint projects with other nations on R&D for our mutual benefit is another. We have several such projects underway with other nations and many are in the initial exploration stage. Joint technical workshops and personnel exchanges represent additional methods of working together. All of these activities need to be pursued vigorously. It simply doesn't make sense to go it alone.

## CONCLUSION

In conclusion, I would like to reiterate our commitment to developing and applying new technologies to solving our shared technical and environmental problems. I have no doubt that transportation R&D will be in the forefront of that effort.

Thank you for your attention and my very best wishes for a successful conference.