

INTEGRATION AND TRANSPORTATION – ARE THEY DIFFERENT?

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ABSTRACT

The U.S. Department of Energy (DOE) is responsible for the world's largest environmental cleanup program. This enormous technical challenge is a national priority. In the last five years, the DOE has made substantial progress in systematically defining the scope, schedules, and life-cycle costs to meet this challenge and creating a step-by-step work plan to tackle it. Accelerating Cleanup: Paths to Closure outlines the Department's evolving and dynamic cleanup program based on site-developed, project-by-project forecasts of the scope, schedule, and costs to complete 353 projects that currently define the cleanup program. The accelerated cleanup would reduce health and environmental risks, make sites available for community reuses, and maintain our compliance with federal and state laws and agreements.

Consistent with this Administration's commitment to work smarter, the DOE Environmental Management (EM) program will continue to seek opportunities to complete our cleanup work as quickly, efficiently, and safely as possible.

Implementing the strategies of Paths to Closure will require sites to achieve major program efficiencies to accomplish the cleanup objectives within today's budget constraints. In doing so, DOE must mobilize and integrate its resources across the complex – people, budgets, facilities, information, technology, etc. A systems approach by DOE managers, Headquarters and Field, must look at broader interests than individualized programs or sites.

The final element of closure is disposal of waste. While disposal options are many, efficiency demands these options be narrowed down to the sensible few. Intersite transfers of nuclear waste and materials are inevitable. In fact, these transfers and ultimate disposition/disposal are the central focus of the Department's interactions with its stakeholders, regulators, and the Congress and tribal nations on closure.

This paper will describe the goals of integration efforts, how systems engineering is being used, and outputs of systems engineering. The waste type disposition maps and site input/output diagrams will also be presented along with the implications for packaging and transportation. Are integration and transportation the same? We'll let the audience decide.

Program Integration

The idea of better integrating the EM Program as a strategy to achieve closure has taken a firm hold on the planning process. Integration goal #1 is program efficiency. DOE sites have many unique challenges for characterization, treatment, storage, and disposal of waste. These sites also have unique processes and treatment methods and could easily handle treatment of wastes from

other sites. The best available technologies can be combined with new methods to optimize the configuration of sites for treatment, storage, and disposal.

The idea of integrating activities across the complex has often been impeded by the “stovepipes” of inflexible programs, site biases, not-invented-here, and a host of attitudes working against common solutions to similar problems. It is indeed possible to eliminate redundant facilities and eliminate under-utilized capacity. The DOE has also achieved major successes in a multitude of waste management activities. Transferring lessons learned from these successes will lead to significant efficiency.

However, some requirements lack demonstrated technology solutions. Innovative technologies will be developed and deployed to optimally fill the gaps. National procurements are also envisioned as a way to efficiently use scarce resources. Several examples include hazardous waste treatment and disposal, and low-level waste disposal. Obviously it makes good sense to use large contracts for an array of hazardous waste services versus every site procuring its own services. Commercial disposal of low level waste, available to multiple sites, makes further good sense.

Systems Engineering

The “key to the mint” in achieving significant program efficiency is through systems engineering. A standardized systems engineering approach is viewed by EM as critical to success. It is a disciplined and structured process for developing and implementing decision alternatives and implementing solutions. Fundamental to the systems engineering approach is defining the problem before creating solutions (surprise!). If one has clearly and accurately defined the problem, one is in a good position to begin defining feasible, effective solutions.

Systems engineering rigorously establishes functions and requirements in developing solutions. What functions must be accomplished (treatment, for example)? What are the acceptance criteria for treated waste at disposal facilities? The analysis of functions and requirements leads to potentially optimal solutions. The next step is to critically analyze the alternatives in trade off studies – also called trade studies. The end result is a solution that delivers the products and services that meet customer requirements. For EM, the big picture systems engineered product is a program baseline. This must be a defensible baseline produced with rigor and discipline.

Integration Tools

The EM integration and systems engineering effort employs some unique tools. These tools include baseline disposition maps, site input/output diagrams, waste and material quantity table information, and functional flow diagrams. The first two are particularly useful in linking the integration effort to transportation needs.

Disposition Maps

Disposition maps show the baseline functional breakdown for a site’s waste and material streams. They are particularly well-suited for complex-wide communication, reporting, and analysis. They point out the current planning assumptions and results of trade-off studies as opportunities for facility use optimization. These disposition maps are available on the internet.

Because of the complexity of these maps, readers are referred to the EM Home Page rather than attaching the maps to this paper.

Because these graphics so clearly point out where intersite waste transfers may be made, they have catalyzed dialogue between sites and with stakeholders. “Isn’t this just transportation?” DOE is asked. Isn’t integration just about where to treat waste and where to dispose of it? Many people look between the “boxes” on the disposition maps and see little trucks or trains with a DOT Class 7 placard on their side, connecting them.

Disposition maps have indeed generated dialogue with stakeholders and DOE is careful to explain what the maps portray. First, they are a work in process. Some decisions have been made and others are pending (often shown as a “To Be Determined” disposition path). A set of maps have been “frozen” in time to present a snapshot of thinking at that point in time. Others are shown as clearly work in progress. Regardless, many view them as a snapshot of what is being transported and to what location.

Input/Output Diagrams

The Input/Output Diagrams are customized for each site and show where waste comes from, what happens to it, and where it goes. They show waste or materials coming to the site for treatment, storage, and disposal. They show what happens to this incoming stream, as well as what happens to the on-site inventories and streams. Finally, they show where the waste and materials go. Again, the image of connecting the boxes with little trucks with a DOT Class 7 placard on their side, persists.

Results and Conclusions

Some interesting things are happening. Transportation, both packaging and logistics, is being taken seriously. Transportation is being looked on as enabling the Paths to Closure Plan. Integration opportunities for transportation are being aggressively pursued, and a formal Transportation Integration Team has been established. The common objectives of integration and transportation are finally coming into synch.

As a final thought, when sites come to closure and waste is dispositioned, did it get integrated or did it get transported?