

Information Management and Collection for U. S. DOE's Packaging and Transportation Needs in the '90's *

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INTRODUCTION

The Transportation Assessment and Integration (TRAIN) Project (US DOE 1992) was established to provide a systematic approach to identify the problems and needs that will affect the capability of the United States Department of Energy (US DOE) to provide itself with cost-effective, efficient, and coordinated transportation services during the 1990s. Eight issue areas were identified to be included in the TRAIN Project, with one principal investigator assigned to each. The eight areas are as follows:

- 1) Packaging and Transportation Needs (PATN) in the 1990s; 2) Institutional and Outreach Programs; 3) Regulatory Impacts on Transportation Management; 4) Traffic and Packaging Operations; 5) Research and Development Requirements; 6) Training Support; 7) Emergency Preparedness Requirements; and 8) US DOE-EM 561 Roles and Responsibilities.

This paper focuses on the results of the PATN activity of TRAIN. The objective of PATN is to prepare the US DOE, in general, and US DOE-EM 561 (Environmental Restoration and Waste Management (EM), Office of Technology Development, Transportation) in particular, to respond to the transportation needs of program elements in the Department. One of the first tasks in evaluating these needs was to formulate the potential for transportation of radioactive materials in the next decade.

The US DOE is responsible for a relatively small fraction of the national shipments of radioactive material. Nevertheless, the assessment of its packaging and transportation needs presents a problem of wide scope. Large quantities of material are shipped each year throughout the US DOE establishment as a result of its work in the various field offices, national laboratories, and contractor facilities which carry out its programs.

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OBJECTIVE OF PATN TASK

The objective of the PATN component of TRAIN was to survey ongoing and planned US DOE programs. Needs for packaging and transportation services over the next decade were identified. Those needs which are critical will be targeted for resolution by US DOE-EM 561 through its own efforts or together with national laboratories and contractors.

SUMMARY OF ACTIVITIES

The following activities were undertaken as a first phase of the investigation:

- Workshops involving participants from all eight TRAIN issue areas
- Review of major US DOE transportation data bases for information on projected shipments
- Assessment of waste management data bases for information relevant to packaging
- Survey of program planning documents for projects potentially in need of packaging development
- Development of a network of program and site contacts through out the US DOE Complex to facilitate identification of packaging and transportation issues
- Packaging needs questionnaires sent to specific field staff and contractor contacts.

The primary focus of these activities was on issues relevant to the packaging and transportation of radioactive waste. However, some contacts with programs responsible for shipping radioactive products were made.

SUMMARY OF FINDINGS

Information Management and Collection

The results of these activities represent a preliminary survey of the US DOE complex to identify how, where, and by whom information necessary for transportation planning is collected and processed. However, some general conclusions can be made on the basis of the current level of effort.

Three major US DOE data bases were reviewed; the Shipment Mobility and Accountability Collection (SMAC), the Waste Management Information System (WMIS), and the Integrated Data Base (IDB). Review of these data bases indicates that transportation and packaging issues have not been considered sufficiently in the design and implementation of the data bases, and in the collection and analysis of data. SMAC is a data management system that is used to collect and process detailed information on all US DOE commercial transportation shipments. SMAC contains significant information on actual shipments, including limited descriptions of the material

and the packaging used. The IDB is a compilation of data on current inventories of US DOE-owned radioactive wastes and commercial spent fuel. The data base receives information from all of the field offices regarding both quantities and certain characteristics of the waste stored throughout the US DOE complex. The WMIS is being developed as part of the Waste Information Network (WIN) for the US DOE by HAZWRAP (Hazardous Waste Remedial Action Program). This data system is still in a developmental stage. It is intended to provide the US DOE with a comprehensive and consistent tracking of waste stream storage, treatment, and disposal throughout its complex. None of these data bases were designed with the perspective of evaluating packaging needs for future transportation.

The identification and assessment of packaging needs throughout the US DOE complex is not a simple task. Uncertainties exist with respect to the accuracy of waste characterization, the location, and the format in which information relevant to packaging needs is maintained. Often, information is not maintained in a useful format at all. This uncertain environment stems from a tendency to not incorporate packaging and transportation as an integral part of overall strategic planning. The root cause of this is a failure to recognize the need for transportation planning in the US DOE program planning process. This lapse in planning is pervasive throughout the US DOE complex.

The current method of collecting and managing information in the US DOE does not adequately encompass packaging issues as a constituent aspect of the data to be collected. Historically, data bases have not been designed to adequately address waste characteristics and other information necessary to track packaging needs.

Strategic Planning and Documentation

Planning documentation from US DOE headquarters and the US DOE field sites (US DOE 1990, US DOE 1989) is limited with respect to packaging and transportation issues. Some notable exceptions where such issues have been addressed as a fundamental component of the program plans are the Waste Isolation Pilot Plant (WIPP) (US DOE 1991, US DOE 1990, US DOE 1990), the Defense High Level Waste (DHLW) management program (US DOE 1983), the Office of Civilian Radioactive Waste Management (OCRWM) spent fuel repository program (OTA 1985), and the Three Mile Island 2 cleanup program (Vigil et al. 1981). However, the inclusion of packaging issues in strategic planning (e.g., roadmapping) is not typical in the US DOE's planning process. This situation is exacerbated by the current organizational relationships between US DOE-EM 561 and other US DOE offices. US DOE-EM 561 does not have sufficient influence to ensure the inclusion of packaging and transportation in overall program planning.

STRATEGIES TO ADDRESS NEEDS

Strategies which meet the packaging and transportation needs of the 1990s are proposed in three categories, near-term, long term, and overarching. The near-term strategies involve actions that can be taken in the next one to two years. Long-term strategies involve actions that can be undertaken within the next two to ten years. Overarching strategies address issues whose resolutions must span the entire time horizon of the US DOE's activities. Recommended strategies are listed below by category (i.e., near-term, long-term, and overarching).

Near-Term Strategies:

1. Continue and improve the needs assessment.
2. Commence a comprehensive process of conducting US DOE on-site interviews with project managers and back-up mail surveys of US DOE packaging and transportation needs.
3. Develop a generic response form for on-site surveys to define packaging needs. The form should address the following important waste stream characteristics and information for packaging needs assessment:
 - a. Quantity of Waste Stream or Products
 - b. Redemption/Processing Plans for Waste (e.g., Incineration followed by grouting, vitrification)
 - c. Chemical Description of Waste, for example:
 - (1). Corrosivity - Acidic or Alkaline
 - (2). Ignitability - Ignitability Group
 - (3). Reactivity - Reactive Group
 - (4). Thermal Energy Generation Rates
 - d. Physical Description of Waste (e.g.; Solid, liquid, or gas; sludge, metal, rubber; absorbents, labpack, equipment)
 - e. Cask/Packaging Status for Waste or Product
 - f. Packaging and Transportation Plans for Waste or Product:
 - (1). On-site
 - (2). Off-site
 - (3). Estimate Time Frame of Shipping Campaign
4. Perform detailed studies to assess applicability of existing US DOE data bases to packaging needs assessment.
5. Include US DOE-EM 561 and contractor staff in US DOE roadmapping exercises for overall program planning.
6. Improve tradeoffs between optimizing waste form for compatibility with transportation and disposal criteria.
7. Improve relationship between the field office and contractor traffic managers.

Long-Term Strategies:

1. Develop a detailed transportation plan for each US DOE radioactive material category or waste form that would provide a strategic framework upon which other program elements

can be attached.

2. Promote the centralized, professional services of US DOE-EM 561 program.
3. Consider the promulgation of a US DOE Order that requires US DOE-EM 561 sign-off of program plans that include major transportation operations.
4. Consider offering transportation planning services from US DOE-EM 561.
5. Examine transportation activities to eliminate duplication of activities at multiple US DOE sites.
6. Develop the capability for offering turn-key transportation services at reasonable and competitive cost.
7. Educate project officers to consult US DOE-EM 561 professionals early in project planning activities.

Overarching Strategies:

1. Develop documentation of transportation plans that explicitly state the assumptions for transportation of the product or item produced.
2. Provide US DOE-EM 561 support to the EM Assistant Secretary's Office so that the US DOE-EM 561 will have input into EM program planning at the formative stage.

CURRENT ACTIVITIES

Roadmapping

Roadmapping is a process used by the US DOE-EM to show issue-based planning activities necessary for achieving final waste disposal, completing site remediation, and bringing waste operations into compliance with all pertinent regulations (US DOE 1991). Roadmaps are developed by a systematic process that focuses on issue identification, root-cause analysis, and issue resolution.

The roadmap methodology includes nine steps that are grouped into three phases:

- Assessment Phase
 - Establish Assumptions
 - Establish Regulatory Requirements
 - Establish Committed Milestones
 - Depict Logic and Planned Activities
- Analysis Phase

- Define Issues
- Perform Root-Cause Analysis
- Translate Issues into Activities
- Develop Issue Resolution Schedules
- Issue Resolution Phase
 - Integrate Issue Resolution Activities with Planned Activities

The roadmap process is being applied to the US DOE Headquarters and field offices to identify specific issues and programs which will form a context for developing programs to implement the strategies identified above (US DOE 1992). As an example, the US DOE headquarters' comprehensive Roadmap identified **Packaging Selection** as one of the US DOE's functional activities. Figure 1 is the logic diagram for the Depict Logic and Planned Activities step of the Assessment Phase of the Roadmap being developed for package selection. This logic was developed based on information and insights gained in the previous steps of the process, and it will provide guidance and input to the next phase of the roadmap process, the Analysis Phase. Issues will be defined and analyzed, and activities to address and resolve these issues in the Analysis and Issue Resolution Phases of the Roadmap process.

SUMMARY

The US DOE accounts for a relatively small fraction of the U.S. national shipments of radioactive material. Yet defining packaging and transportation needs for the US DOE presents a problem which has very wide scope because of the breadth of the US DOE's activities. Enormous quantities of material are shipped each year throughout the US DOE establishment to carry on the work of the Department in the field offices, national laboratories, and contractors. Departmental programs which involve the movement of radioactive material include naval reactors, fossil energy, waste management, weapon production, and other areas vital to the U.S. national interest.

The PATN activity of TRAIN indicates that there are specific needs that currently exist for packaging and transportation services. In addition, it is clear that there is also a pressing need for a more global and strategic view of transportation and packaging needs in the overall US DOE strategic planning efforts.

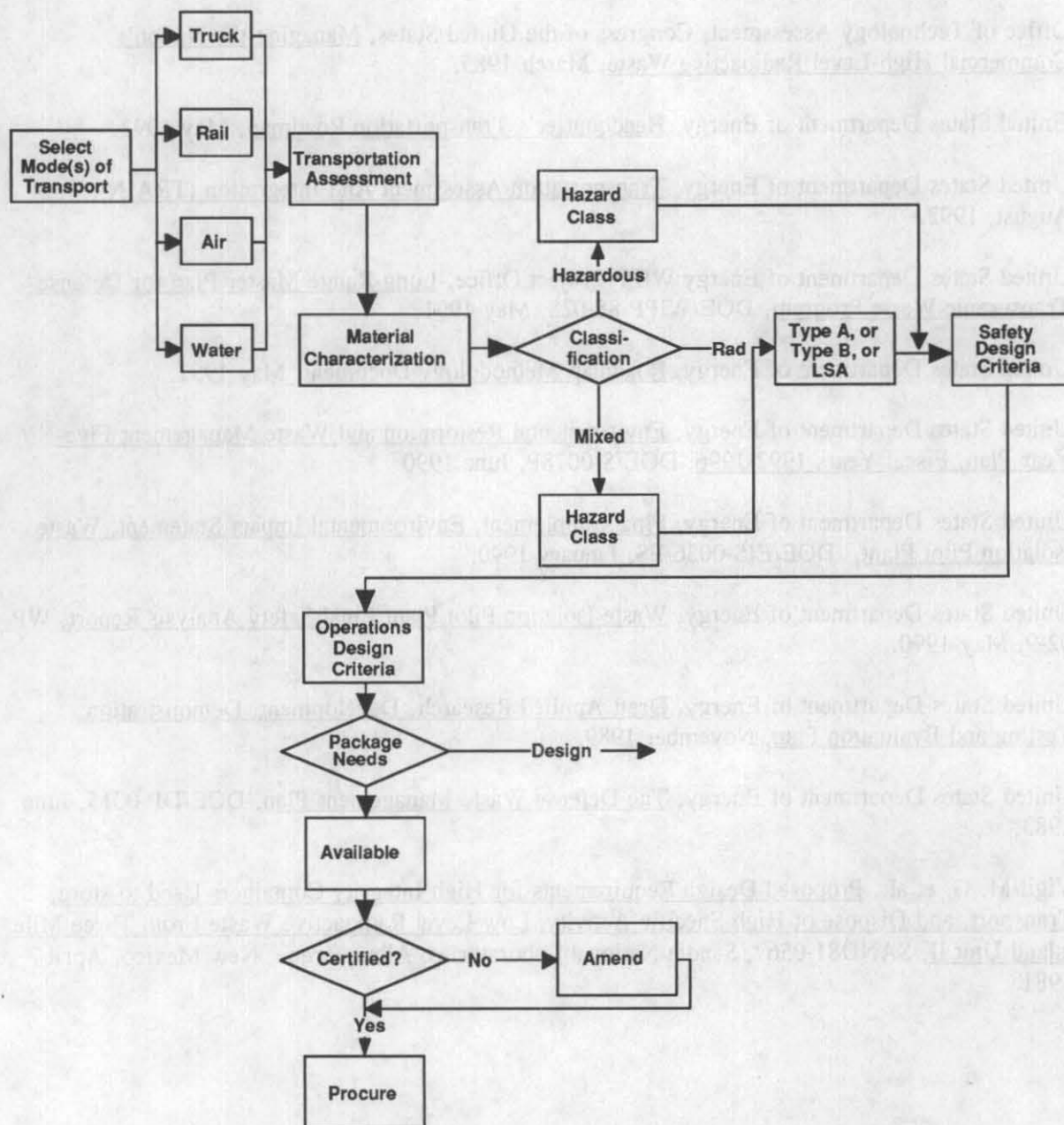


Figure 1. Packaging Selection Logic

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