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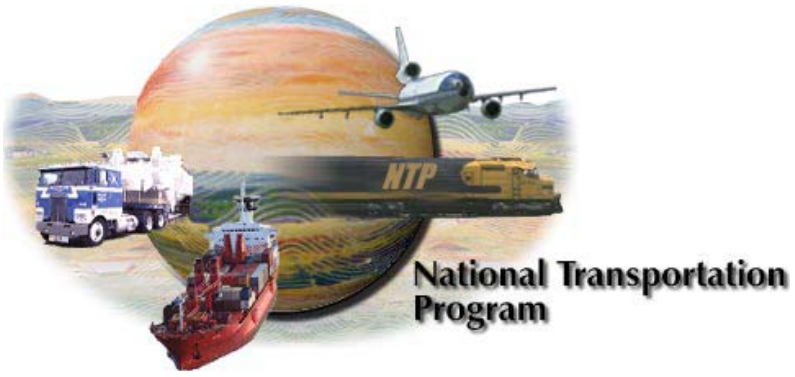
U. S. Department of Energy Environmental Management Program

Waste and Materials Disposition

"Transportation Challenges"



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U. S. Department of Energy

Environmental Management Program

Waste and Material Disposition

"Transportation Challenges"

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SUMMARY

The 2000 *U. S. Department of Energy (DOE) Environmental Management (EM) Waste and Materials Disposition "Transportation Challenges"* report is provided as an update to or status report on the transportation "barriers" analysis conducted in October 1999 and published in November 1999 as the National Transportation Program (NTP) *Transportation Challenges "Problems Tied to Disposition Pathways."* Much of the programmatic information concerning the "barriers" or, more accurately, "issues," has not changed since the first publication; however, efforts to resolve the issues have progressed to varying degrees over the last year.

This report provides a current status of efforts to eliminate or mitigate the issues, and includes new issues identified since the original analyses were conducted. Resolving these issues will increase the probability of successful waste and materials disposition and decrease the likelihood of delays due to inadequate transportation resources or infrastructure. The issues addressed in this report generally affect more than one site and more than one waste or material stream.

Issues currently being addressed are:

1. Timely processing of Type B and fissile packaging certification requirements;
2. Expansion of the capability to ship transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP);
3. Methodologies to ship small quantities of TRU Waste to WIPP and/or other potential consolidation locations;
4. Improving corporate and site level transportation and packaging planning;
5. Standardized procedures for sharing Type B packaging among sites and/or programs;
6. Consistent execution of waste and materials transportation planning across DOE EM programs;
7. Bounding costs related to packaging and transportation within disposition projects;
8. Examination of the standardization of low-level radioactive waste (LLW) packaging design, procurement, and quality assurance/quality control (QA/QC);
9. Hydrogen gas generation as a factor in determining the appropriate packaging for certain materials;
10. Additional certified nuclear materials (NM, also known as special nuclear materials) packagings that need to be developed;
11. Specific spent nuclear fuel (SNF) packagings that need to be developed;
12. Specific high-level radioactive waste (HLW) packagings that need to be developed;
13. Resolving potentially conflicting double containment requirements for plutonium (Pu);
14. Remote-handled (RH) TRU packagings that need to be developed;

15. Rail access to the proposed repository for SNF and HLW must be evaluated;
16. Packaging for unique waste and material types must be developed;
17. Integration of the efforts to resolve various hydrogen gas generation issues;
18. The EM funding profile is not compatible with the repository shipping schedule;
19. Coordination of cask design(s) to eliminate redundancies and to develop rail-capable cask(s) for TRU and SNF.

CONTENTS

ACRONYMS

AC/PC	Accelerated Cleanup, Paths to Closure
AL	Albuquerque Operations Office
DOE	Department of Energy
DOT	Department of Transportation
DP	Defense Programs
EIS	Environmental Impact Statement
EM	Environmental Management
EMI	Environmental Management Integration
ER	Environmental Restoration
HLW	High-level (radioactive) Waste
HQ	DOE Headquarters
ID	Idaho Operations Office
IPABS	Integrated Planning, Accountability, and Budgeting System
LLW	Low-level (radioactive) Waste
LSA	Low Specific Activity
MLLW	Mixed Low-level Waste
M/LLW	Mixed and Low-level Waste
MWFA	Mixed Waste Focus Area
NM	Nuclear Materials
NRC	Nuclear Regulatory Commission
NTP	National Transportation Program
Pu	Plutonium
QA/QC	Quality Assurance/Quality Control
RH	Remote-handled
RL	Richland Operations Office
SARP	Safety Analysis Report for Packaging
SNF	Spent Nuclear Fuel
STCG	Site Technology Coordinating Group
TEC/WG	Transportation External Coordination Working Group
TRU	Transuranic
TRUPACT-II	Transuranic Package Transporter, Model II
TTP	Technical Task Plan
WIPP	Waste Isolation Pilot Plant
WM	Waste Management

U. S. Department of Energy

Environmental Management Program

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"Transportation Challenges"

PURPOSE

The purpose of this report is to (1) identify and enhance understanding of the most significant issues that affect or potentially affect the ability to transport Environmental Management (EM) waste and materials for treatment, storage and disposition, (2) describe the status of efforts to resolve them and, (3) in some cases, outline possible solution alternatives that have been suggested in various forums. This information is expected to provide a basis for further development and analysis of possible solutions to the problems posed by these issues.

The issues addressed in this report generally affect more than one site and more than one waste or material stream. Resolving these issues would increase the probability of successful, timely, and cost effective waste and materials disposition. No attempt is made in this report to evaluate suggested solutions. In all cases, the Department of Energy (DOE), its contractors, and appropriate stakeholders will carefully analyze the alternatives before selecting a solution and beginning implementation.

BACKGROUND

EM has pursued a number of options over the years in an effort to develop corporate solutions to DOE complex-wide waste and materials disposition issues. While the EM Program experienced success in resolving many site-specific issues, a mechanism was needed to formally exchange lessons-learned and conduct complex-wide planning to ensure cost effective use of anticipated resources. In response, EM developed the *Accelerated Cleanup, Paths to Closure (AC/PC) Plan*, a supporting database, and an annual budgeting process to support an annual update to the original baseline plan.

Several integration initiatives grew out of the AC/PC effort. Most were targeted on identifying common issues affecting timely cleanup, remediation, and ultimately, material disposition. Historically, each issue was considered as an "opportunity" that, when resolved, would lead to enhanced and cost-effective use of EM resources in accomplishing the cleanup and disposition mission. Transportation was, and remains, the enabling activity to consolidate materials at corporate treatment and storage facilities, and ultimately move materials to final disposition sites.

Supporting efficient and timely transportation of EM waste and material is the responsibility of the National Transportation Program (NTP). Since decentralization and redeployment, the NTP has augmented its capabilities by incorporating the ability to perform detailed and thorough analysis of possible approaches to issue resolution that, when implemented, resolve identified transportation issues. With timely stakeholder input, the results may then be used to develop integrated and coordinated solution recommendations for affected EM programs.

The 2000 *U. S. Department of Energy Environmental Management Waste and Materials "Transportation Challenges"* report is provided as an update to or status report on the transportation systems analysis conducted in October 1999 and published in November 1999 as the NTP *Transportation Challenges "Problems Tied to Disposition Pathways."* Much of the programmatic information concerning the problems or, more accurately, "issues" has not changed since the first publication; however, efforts to resolve the issues have progressed to varying degrees over the past year.

The "Transportation Issues" section of this report describes transportation-related issues facing DOE that are complex, varied, interdependent, and potentially "show-stopping," if not properly addressed. Program and project managers may use the information in this section to better understand transportation issues and to coordinate with other programs and projects potentially affected by various program-specific transportation decisions. Understanding the issues facilitates effective coordination of necessary transportation planning and execution activities between affected stakeholders and EM management. Additionally NTP, in conjunction with the various disposition programs, may use this information to prioritize and coordinate the development and maintenance of necessary resources and infrastructure to support and ensure timely, cost-effective transportation of all materials to be moved for treatment and disposition.

EM Waste and Materials Disposition Maps

EM faces significant technical and financial challenges in cleaning up the environmental legacy of nuclear weapons production. EM has developed a comprehensive system that integrates the waste stream disposition plans for legacy materials and wastes for over fifty DOE EM sites. The EM annual Integrated Planning, Accountability, and Budgeting System (IPABS) data-call allows programs and sites to collect essential planning data. The data provide detailed waste stream information, which in turn facilitates the generation of material disposition maps. These maps graphically display waste and material quantities at each site, as well as the associated planned disposition paths. This system also aids development of interactive disposition maps highlighting issues that may be associated with a particular waste stream or activity. Disposition maps for all sites can be found on the DOE-EM web site at http://www.em.doe.gov/closure/fy2000/fy2000map.html.

The data and their graphical representations (disposition maps) identify issues by site and program. This information provides a wealth of useful planning data, including

waste and material types, quantities, location, destination, issues, packaging, transportation mode, and schedule.

National Programs, Focus Areas, Centers of Excellence

Available documentation from national programs, focus areas, centers of excellence and other DOE entities was reviewed to identify transportation-related issues:

- Mixed and Low-Level Waste Center
- National Transportation Program
- National Materials Stabilization/Plutonium Stewardship Program
- National Spent Nuclear Fuel Program
- Tanks Focus Area
- Subsurface Contaminants Focus Area
- Decontamination and Decommissioning Focus Area
- Office of Civilian Radioactive Waste Management
- DOE-AL-sponsored Nuclear Materials Packaging and Shipping Committee
- National Transportation Program Packaging Management Council
- National Transuranic Waste Program.

Site Technology Coordinating Groups

Within the DOE Science and Technology Program, Site Technology Coordinating Groups (STCG) identify issues that require the application of new science and technology. These issues, and their associated technology needs, were reviewed for transportation impacts and included, as appropriate, in the transportation issues section of this report.

Regional Government Groups

Several stakeholder groups have been organized to address issues related to DOE waste and material transportation and to assist in the development of solutions to issues that may affect the public. These groups have made recommendations for improving the safety and efficiency of DOE waste and materials transportation. The issues tied to these recommendations were analyzed as part of this effort and are provided as references in the transportation issues section where appropriate. Among the stakeholder groups whose recommendations were studied are the:

- Environmental Management Advisory Board
- Transportation External Coordination Working Group (TEC/WG)
- State and Tribal Governments Working Group
- Site-Specific Advisory Boards
- Western Governors Association
- Southern States Energy Board

- Midwest Council of Governments
- Northeast Council of Governments
- National Governors Association.

NTP and EM Integration Workshops

The NTP and EM Integration Program (EMI) have sponsored a number of workshops over the past four years during which subject matter experts from various DOE sites and programs met to identify joint issues and to propose potentially feasible integrated issue solutions. For example, the first transportation workshop held in March 1997 identified more than twenty transportation issues, many of which have since been resolved using processes described in this report. Subsequent workshops have addressed unresolved or new issues and/or have been held to gather additional detailed information for analysis prior to development of implementation options for DOE, its contractors, and/or the affected stakeholders.

The 1999 NTP "Barriers" Workshop

The October 19-21, 1999 Transportation Barriers Workshop held in Albuquerque, New Mexico, further defined the transportation challenges associated with planned waste and materials disposition. Workshop attendees included EM program representatives and several site transportation managers. The attendees analyzed DOE's EM waste and material disposition pathways to identify and prioritize transportation issues which needed to be addressed by the National Transportation Program. After detailed review of the waste stream disposition maps and other sources, the workshop participants developed a list of sixteen transportation-specific issues or areas requiring resolution.

The workshop participants analyzed each issue to determine its programmatic disposition risk category. Each issue was qualitatively categorized based on the definitions from the 1999 IPABS data-call guidance. The risk category definitions are detailed below. Note that the risk categories are tied to a disposition map "stoplight" color: RED, YELLOW, or GREEN. Stoplight icons are interactively depicted on each disposition map pathway as the pathway is analyzed by a responsible waste or material stream expert.

Risk Categories for Transportation Issues

The risk categories for transportation issues are:

- **RED** – Path may not be able to be executed as currently planned. Significant issues must be resolved before implementation can be accomplished. *High Risk* - red stoplight on disposition map path.

- **YELLOW** - Path forward is identified, but not assured. Some uncertainty or minor issues exist that could impede implementation. *Medium Risk* - yellow stoplight on disposition map path.

- **GREEN** - Path can be successfully executed. No significant issues or schedule delays are anticipated. Improvements may increase efficiency and/or reduce costs. *Low Risk* - green light on disposition map path.

Once the risk categorization process was complete, workshop participants then completed a high-level qualitative prioritization of the sixteen issues. The issues agreed to as having the highest priority for near-term resolution are listed below in descending order of importance:

1. Timely processing of Type B and fissile packaging certification requirements;
2. Expansion of the capability to ship transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP);
3. Methodologies to ship small quantities of TRU Waste to WIPP and/or other potential consolidation locations;
4. Improving corporate and site level transportation and packaging planning;
5. Standardized procedures for sharing Type B packaging among sites and/or programs;
6. Consistent execution of waste and materials transportation planning across DOE EM programs;
7. Bounding costs related to packaging and transportation within disposition projects;
8. Examination of the standardization of low-level radioactive waste (LLW) packaging design, procurement, and quality assurance/quality control (QA/QC);
9. Hydrogen gas generation as a factor in determining the appropriate packaging for certain materials;
10. Additional certified nuclear materials (NM, also known as special nuclear materials) packagings that need to be developed;
11. Specific spent nuclear fuel (SNF) packagings that need to be developed;
12. Specific high-level radioactive waste (HLW) packagings that need to be developed;
13. Resolving potentially conflicting double containment requirements for plutonium (Pu);
14. Remote-handled (RH) TRU packagings that need to be developed;
15. Rail access to the proposed repository for SNF and HLW must be evaluated;
16. Packaging for unique waste and material types must be developed.

The EM Integration FY 2000 Issues Working Session

During an Office of Integration and Disposition (EM-20) sponsored EM Integration working session in Salt Lake City on June 27 and 28, 2000, another updated set of

integration and disposition issues were identified from the latest versions of the EM disposition maps and their associated data. Three more transportation issues were identified requiring resolution. They were:

1. Integration of the efforts to resolve various hydrogen gas generation issues;
2. The EM funding profile is not compatible with the repository shipping schedule;
3. Coordination of cask design(s) to eliminate redundancies and to develop rail-capable cask(s) for TRU and SNF.

METHODOLOGY

Transportation issues were initially identified by analysis of the IPABS data as depicted on various waste stream disposition maps. Waste and material stream experts from the responsible programs entered the issues identified in IPABS. Additional issues were solicited from joint NTP and EMI workshops, Site Technology Coordinating Groups, the various national programs, focus areas, centers of excellence, and regional government groups. Other information sources including various environmental impact statements, nuclear material management plans, and various national program plans were examined but did not yield additional issues.

The list of issues generated from the IPABS analysis was reviewed during the October 19-21, 1999 NTP "Barriers" Workshop. The review team was comprised of representatives from major programs and sites, traffic managers, and NTP representatives from Albuquerque Operations Office (AL), Idaho Operations Office (ID), and DOE Headquarters (HQ). In addition to reviewing the preliminary list, workshop participants also identified a primary NTP staff lead for each issue as well as the external interface or customer that would benefit most by having the issue resolved.

This process initially yielded sixteen transportation issues. Three additional issues have since been added.

FUTURE ACTIVITIES

During FY 2001, a packaging "gaps" analysis will be performed and aid in the development of a packaging strategy for the complex. Through detailed and comprehensive analysis of the current commercial and DOE packaging inventories, issues, if any, tied specifically to waste and material packaging, will be identified and added to the current list of working issues included in this report.

The NTP, in concert with the affected programs and stakeholders, has preliminary work underway toward identifying possible resolution options for many of the issues listed herein. As work progresses, the NTP will initiate new efforts to address any remaining issues, as well as others as they surface during continued waste and materials disposition planning.

TRANSPORTATION ISSUES

This section presents a summary of the nineteen significant DOE transportation issues from all sources. Where possible, background is provided along with a brief summary the status of resolution efforts. The listed references provide additional information related to each issue.

1. Timely Processing of Type B and Fissile Packaging Certification Requirements. **Risk Category: Yellow**	
Background	• A reengineering evaluation, focusing on the timeliness of Type B and fissile container certification, re-certification or modification, was performed by EM in July 1998 which recommended several improvements to the certification process. • Nuclear material packagings, designed to support the removal of Pu residues from Rocky Flats, are awaiting certification.
Status	A comprehensive review of the certification process and the reengineering suggestions are now complete. The results of the review and the analysis were presented to EM 20 during FY-2000. Detailed studies are ongoing with the goal of improving the quality of Safety Analysis Report for Packaging (SARP) submittals.
References	• *Reengineering EM's Packaging Certification Program, Outcomes Resulting from a Process Improvement Workshop to Reengineer the EM-70 Package Certification Process*, DOE/EM-0383, November 1998. • Nuclear Materials Stewardship – Packaging and Shipping Committee Meeting Minutes, DOE-AL dated July 30, 1999
Waste/Material Type	HLW, LLW, mixed low-level waste (MLLW), NM, SNF

2. Expansion of the Capability to Ship TRU Waste to WIPP. **Risk Category: Yellow**	
Background	• The current Nuclear Regulatory Commission (NRC) certified TRUPACT-IIs have limits on payload size, weight, quantity of fissile material, and wattage. • There are some materials within the complex, which do not meet the specified requirements for transport in the TRUPACT-II. • There are waste and materials that will not fit into the TRUPACT-II because of its size or weight limitations.
Status	An analysis of waste shipment modes to WIPP revealed that developing a rail capability may be desirable. This would include the development of a rail container capable of moving larger volumes of waste than the TRUPACT-II. Recommendations for improving transportation efficiency have been identified by the transportation technical team of the "Re-engineering the Pipeline to WIPP" effort. Overall, there are 5-6 separate activities ongoing within the DOE and Stakeholder community to address requirements to ship to WIPP by rail.
References	• STCG Needs: SR99-1001 • Disposition map waste stream: TRU 00294, 00425, 00430, 00431, 00432, 00566, 00567, 00571, 01769, 03039, 03043, 003223 • EM Needs Management System (IPABS Data Requirement #1088): MW-05 *Payload Enhancement for Transporting TRU Waste*, Mixed Waste Focus Area (MWFA) • Land Withdrawal Act – PUBLIC LAW 102-579
Waste/Material Type	TRU

3. Methodologies to Ship Small Quantities of TRU Waste to WIPP and/or Other Potential Consolidation Locations. **Risk Category: Yellow**	
Background	There are small quantities of TRU waste at sites scheduled for early closure that do not meet the TRUPACT-II Certificate of Compliance or the WIPP Waste Analysis Plan. This issue must be addressed to help assure meeting closure schedules."
Status	Shipping TRU waste from small sites to larger sites in the complex to consolidate and package the waste for shipment to WIPP is considered an option provided state equity and packaging issues are agreed upon. Another option under consideration is to ship the waste from the small sites to a central characterization site, possibly at WIPP, for preparation for disposal at WIPP.
References	Disposition Map Waste Stream: TRU 00015, 01726, 01866
Waste/Material Type	TRU

4. Improving Corporate and Site Level Transportation and Packaging Planning.

Risk Category: Green

Background	• Packaging and transportation needs are often not included in corporate and site level planning early enough to enable programs to meet their schedules. • Uncertainty in the waste and nuclear material stream data contributes to the inability to perform timely corporate planning for packaging and transport needs. • Yearly actual transportation activity is not being compared with planned activity. • The Paths to Closure database (IPABS) requires that sites identify the types of packagings needed to support future shipments. Specific data are required for Type B packaging and large items needing transport. • The Packaging Management Tracking System has been recently enhanced to provide Internet capability.
Status	The Transportation Baseline Report and the Transportation Baseline Schedule for FY 2000 include actual amounts of material shipped. Inclusion of this data will continue in future editions of these reports. A packaging strategy is under development that will aid in corporate transportation planning. The quality of the data input to the IPABS improved during FY 2000, and further efforts to improve the data submittals will continue.
References	EM Home Page – Paths to Closure web site
Waste/Material Type	HLW, mixed and low-level waste (M/LLW), NM, SNF, TRU

5. Standardized Procedures for Sharing Type B Packaging Among Sites and/or Programs.

Risk Category: Green

Background	• When a packaging is shared from site to site, it may not be accompanied by operating instructions, Safety Analysis Report, maintenance records, and/or periodic preventive maintenance records. • Liability issues are not covered. There is no scheduling guidance or guidance to identify opportunities to share packagings. • There is no mechanism for disposition of excess packagings. • Currently, there is no uniform formal system of container exchange among DOE sites to optimize the container use. Each site is responsible for designing, procuring, and maintaining containers based on its needs. If needed, the site is also responsible for seeking container approval from NRC or EM based on material to be shipped. • There is a need for uniform procedures defining the responsibilities of container owner sites and container user sites and their respective program offices. One example of such an agreement is recently signed Memorandum of Understanding between EM and Defense Programs (DP) with regard to the use of certain DP-owned containers.
Status	A packaging strategy is under development that will aid in corporate transportation planning. The strategy will include an inventory of available DOE and commercial packagings, a protocol for package sharing, a strategy for leasing, and a corporate strategy for package management in the complex.
References	None
Waste/Material Type	HLW, LLW, SNF, TRU, NM

6. Consistent Execution of Waste and Materials Transportation Planning Across DOE EM Programs. **Risk Category: Yellow**	
Background	• Waste and materials transportation plans, procedures, precedents, and execution are not consistent. This can raise issues as DOE interfaces with stakeholders and state/local/tribal governments. • At the request of stakeholders and DOE Program Managers, a Protocols Task Team has prepared a set of standard protocols for DOE use. Under the direction of the Senior Executive Transportation Forum, this team is working with the TEC/WG to develop standard transportation protocols. • Protocols are to be developed individually by waste and material types.
Status	The protocols continue in stakeholder review and are anticipated to be released in FY 2001
References	• State and Tribal Governments Working Group recommendation 1997 • Western Governors Association, Resolution 98 – 006, June 30, 1998 • Foreign Research Reactor West Coast Shipment SNF Transportation, External Lessons Learned, October 5, 1998
Waste/Material Type	HLW, M/LLW, NM, SNF, TRU

7. Bounding Costs Related to Packaging and Transportation within Disposition Projects.

Risk Category: Green

Background	• Project planning and budget requests do not explicitly bound, identify, and monitor transportation and packaging costs associated with program execution. • The boundaries of "transportation" have not been defined well. • Because programs do not identify transportation costs as a separate item, they may consider the costs to be insignificant.
Status	Transportation data are now included in the IPABS data-call, however, the quality of the input data needs improvement. A packaging strategy is under development that will aid in corporate transportation planning. A strategic plan will be developed during FY 2001 that will outline strategies to define transportation parameters, capture and track costs, and determine program direction.
References	• NTP-sponsored, October 19-21, 1999 Transportation Issues Workshop • *Evaluation of the Container Working Group Long-Term Recommendation Related to Standardization of Waste Containers and Adoption of Transport Packaging Policy*, dated June 1999
Waste/Material Type	HLW, M/LLW, NM, SNF, TRU

8. Examination of the Standardization of LLW Packaging Design, Procurement, and QA/QC.

Risk Category: Green

Background	Leakage from a LLW container was discovered in 1997 (Kingman, AZ) while in transit from Fernald, OH to the Nevada Test Site. The incident received significant press coverage and was found to be typical of several packaging failures noted at the receiving site. DOE's Container Working Group researched the issue and developed several recommendations. DOE-AL organized a team of experts to evaluate the recommendations for implementation. This team developed an implementation plan to improve the design, testing, procurement, and QA of LLW packaging.
Status	A working group has been established to find approaches to develop test criteria, to standardize containers, and to improve the QA and procurement processes.
References	• Disposition map waste stream: TRU 03039, 03043 • *Type B Accident Investigation Board Report of the 12/15/97 Leakage of Waste Containers Near Kingman, AZ*, dated February 1998 • *Recommendations for Meeting Department of Transportation (DOT) Requirements for Strong and Tight Containers and Industrial Packaging*, dated April 1998 • *Evaluation of the Container Working Group Long-Term Recommendation Related to Standardization of Waste Containers and Adoption of Transport Packaging Policy*, dated June 1999
Waste/Material Type	M/LLW

9. Hydrogen Gas Generation as a Factor in Determining the Appropriate Packaging for Certain Materials. **Risk Category: Red**	
Background	• There is an inability to meet regulatory concerns (NRC IN 84-72) with regard to gas generation in some transport containers without costly processing or repackaging. • Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-1 noted that some TRU materials have the potential for hydrogen gas generation (e.g., plutonium isotopes mixed with hydrogenous materials). Although this recommendation focused primarily on plutonium storage, implications for shipment must also be considered. • The currently approved WIPP shipping casks have very conservative NRC regulatory limits for hydrogen gas concentration. • Current models for estimating projected hydrogen gas generation in waste packages are also very conservative and severely limit the amount of such materials that can be shipped.
Status	Working sessions and analyses during FY 2000 indicated the need to build a comprehensive technology "roadmap" that describes and evaluates ongoing research in this area, as well as identify program management approaches to solving this issue. Initial release of the draft "roadmap" is slated for early FY 2001.
References	• Disposition map waste stream: TRU 03223 • DNSFB Recommendation 94-1 • STCG Needs: SR99-1001, SR99-5018, SR-5017, RF-SNM01, RF-WM03, AL-09-01-15, AL-09-01-17, ID-S.1.03, ID-3.1.38, ID-3.1.33, ID-3.1.34 • MWFA Technical Task Plan (TTP) AL16MW43 (99), Hydrogen Gas Getters for TRU Waste, and TTP ID09MW41 (99) Deployment of TRU Solutions • *Hydrogen Gas Generation Research and the Resolution of Programmatic Issues in the DOE Complex*, J. G. McFadden DOE Richland (RL), April 29, 1999. • NRC Information Notice 84-7
Waste/Material Type	NM, TRU

10. Additional Certified NM Packagings that Need to be Developed. Risk Category: Red	
Background	Some suitable nuclear materials (NM) packagings have not yet received certification. There are some forms of NM for which no suitable packaging has been designed.
Status	The NTP planned effort for FY 2001 includes assembling a detailed inventory of existing packagings and matching that inventory with packaging requirements from programs. Gaps in capabilities will be identified and strategies for closing the gaps identified and documented. The data-call was issued in late FY 2000. The results will be documented in the overall packaging strategy effort. Protocols for sharing packages will also be developed as part of this strategy.
References	None
Waste/Material Type	NM

11. Specific SNF Packagings that Need to be Developed. Risk Category: Red	
Background	• No certified Type B packagings exist for some types of SNF. • Many forms of SNF have never been shipped off-site.
Status	The cask development effort by the SNF National Program continues. Conceptual design is complete. The use of casks developed by commercial vendors is a possible approach.
References	• Disposition map waste stream: TRU 01568; SNF 00728, 00730, 00732, 00738, 00740, 00742, 00744, 02688 • STCG Needs: ID-1.1.14
Waste/Material Type	SNF

12. Specific HLW Packagings that Need to be Developed. Risk Category: Red	
Background	• There are no certified Type B packagings for HLW. • There are no casks designed for shipment of vitrified HLW at RL, Idaho National Engineering and Environmental Laboratory, Savannah River Site, West Valley Demonstration Project.
Status	National SNF Program is working on a rail cask that would be a viable option to transport HLW. The development effort by the SNF National Program continues. Conceptual design is complete.
References	• Disposition Map Waste Stream: HLW 00634 • STCG Needs: ID-1.1.14
Waste/Material Type	HLW

13. Resolving Potentially Conflicting Double Containment Requirements for Pu.

Risk Category: Green

Background	• Under current NRC requirements, double containment is required for all forms of plutonium containing over 20 Ci/pkg except for specified solids in the form of reactor fuel elements, metal or metal alloys, or vitrified HLW. NRC allows "other plutonium bearing solids" to be exempted on a case-by-case basis, but the exemption process is time consuming and costly to pursue for each specific waste form. • DOT regulations determining limits for non-dispersible and dispersible materials, known as the A-1 and A-2 values respectively, take radiological risks into account for each individual radionuclide, including those of plutonium, when setting packaging limitations.
Status	A working group has been formed and is functioning with the charter to build a strategy to re-address the regulatory requirements surrounding double containment for Pu waste. A white paper as been submitted to the NRC describing possible solution paths.
References	• 10 CFR Part 71.63 *Special Requirements for Plutonium Shipments.* • EM Needs Management System (IPABS Data Requirement #1088): Pu-*03 Pu Packaging and Storage*.
Waste/Material Type	NM, SNF, TRU, HLW

14. RH TRU Packagings that Need to be Developed. **Risk Category: (Changed from Red) Yellow**	
Background	• No certified Type B packagings exist for RH TRU. • RH TRU has never before been shipped for off-site disposal.
Status	The shielded pipe component is currently under review by the NRC. The NRC has completed certification of the 72 B Cask. The Chem-Nuclear 10-160 B cask is now being certified by the NRC to carry RH TRU nuclear waste, and DOE Ohio is pursuing certification for the cask to carry RH TRU waste to WIPP.
References	• Disposition Map Waste Stream: TRU 00294, 00430, 00431, 00566, 00567
Waste/Material Type	RH TRU

15. Rail Access to the Proposed Repository for SNF and HLW must be Evaluated. **Risk Category: Yellow**	
Background	• No rail access currently exists for SNF and HLW at the proposed repository. • Rail access is being considered in the Yucca Mountain environmental impact statement (EIS). • A Rail access to NTS would also benefit the LLW Program. LLW shipments are currently being made only by truck to the NTS for disposal. In addition, some affected states have strongly requested that the highway route across Hoover Dam not be used for DOE waste and material shipments.
Status	No change.
References	• Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada • *Life-cycle Cost and Risk Analysis of Alternatives Configurations for Shipping Low-Level Radioactive Waste to the Nevada Test Site*, September 1999, Draft. • Final waste management (WM) Programmatic Environmental Impact Statement (DOE/EIS-0200-F) Appendix E Transportation, Part 1.
Waste/Material Type	HLW, SNF, LLW

16. Packaging for Unique Waste and Material Types must be Developed. **Risk Category: Red**	
Background	• Some waste and materials are too large or are of unusual shapes and will not fit into existing packaging. Also some material generates unusually high radiation fields requiring extraordinary shielding. • Fifty years of nuclear material research, development, and production has resulted in waste and material of unique form, size, shape, and radioactivity levels. The disposition of these items requires resizing, reshaping, and treatment, or some type of special packaging. In some cases, it is more appropriate to resize or dilute the item, while in other cases it is necessary to develop special packaging. Examples of these unique items are gloveboxes, piping, shielding, process equipment, and extremely high activity sources. • No certified Type B packagings for some types of M/LLW. • Currently in the IPABS dataset, there are 4,795 m^3 of non-LSA Type B M/LLW. • Unique wastes and materials must be evaluated on a case-by-case basis for resolution.
Status	An analysis of waste shipment modes to WIPP revealed that developing a rail capability is desirable, which would include the development of a rail container capable of moving larger volumes of waste than the TRUPACT-II. This container would also be capable of moving oversized or irregularly shaped waste. The development of this capability will continue into FY 2001 with initial design efforts proceeding after the final report on the rail study is issued.
References	• Disposition Map Waste Stream: ER 00021 • STCG Needs: RF-DD11, NV07-9902-05, DD02 • EMI Opportunity A-13 *Disposition of Material and Waste with no path to disposal*.
Waste/Material Type	HLW, M/LLW, NM, SNF, TRU, NM

17. Integration of the Efforts to Resolve Various Hydrogen Gas Generation Issues.

Risk Category: TBD

Background	(See #9)
Status	Working sessions and analyses during FY 2000 indicated the need to build a comprehensive technology "roadmap" that describes and evaluates ongoing research in this area, as well as identify program management approaches to solving this issue. Initial release of the draft "roadmap" is slated for early FY 2001.
References	• Disposition map waste stream: TRU 03223 • DNSFB Recommendation 94-1 • STCG Needs: SR99-1001, SR99-5018, SR-5017, RF-SNM01, RF-WM03, AL-09-01-15, AL-09-01-17, ID-S.1.03, ID-3.1.38, ID-3.1.33, ID-3.1.34 • MWFA TTP AL16MW43 (99), Hydrogen Gas Getters for TRU Waste, and TTP ID09MW41 (99) Deployment of TRU Solutions • *Hydrogen Gas Generation Research and the Resolution of Programmatic Issues in the DOE Complex*, J. G. McFadden DOE-RL, April 29, 1999. • NRC Information Notice 84-7 • Issue #9 Transportation Challenges
Waste/Material Type	HLW, M/LLW, NM, SNF, TRU

18. The EM Funding Profile is not Compatible with the Repository Shipping Schedule. **Risk Category: TBD**	
Background	The site by site baseline schedule for shipping SNF and HLW to the Proposed Geological Repository does not appear to be executable based on the current design basis for the repository.
Status	The DOE National Spent Fuel Program is examining costs and schedules to ensure that the baseline is executable.
References	None
Waste/Material Type	HLW, NM, SNF

19. Coordination of Cask Design(s) to Eliminate Redundancies and to Develop Rail-Capable Cask(s) for TRU and SNF. **Risk Category: Yellow**	
Background	(See #1, #11, #12, #14, and #16)
Status	TBD
References	Challenges Report Issues #1, #11, #12, #14, and #16
Waste/Material Type	HLW, SNF, TRU

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