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Office of Civilian Radioactive Waste Management

National Transportation Plan

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CHANGE HISTORY

Revision Number	Interim Change No.	Effective Date	Description of Change
0	0	01/12/2009	Initial issue

EXECUTIVE SUMMARY

This Plan outlines the Department of Energy's (DOE) current strategy and planning for developing and implementing the transportation system required to transport spent nuclear fuel (SNF) and high-level radioactive waste (HLW) from where the material is generated or stored to the proposed repository at Yucca Mountain, Nevada. The Plan describes how DOE's Office of Civilian Radioactive Waste Management (OCRWM) intends to develop and implement a safe, secure and efficient transportation system and how stakeholder collaboration will contribute to the development of that transportation system.

As set forth in the Plan, DOE has engaged in significant planning for the transportation of SNF and HLW to the repository, including acquisition planning and parallel operational and institutional planning efforts. To support the development of the transportation system, DOE has two capital projects, *i.e.*, the National Transportation Project and the Nevada Rail Infrastructure Project. The National Transportation Project has responsibility for the acquisition of rail and truck cask systems; design, acquisition, manufacture, testing and acceptance of rolling stock; and development of facilities to maintain and store casks and rolling stock. The Nevada Rail Infrastructure Project has responsibility for the design and construction of a new rail line and associated support facilities within the State of Nevada. It also encompasses the design, acquisition of materials and equipment, construction, testing, and certification of a Nevada rail line for the transportation of SNF and HLW to the Yucca Mountain repository.

The Plan identifies major transportation system components and activities and specifically addresses: 1) **capital asset acquisitions**, including how the hardware, facilities and other physical assets needed for the transportation system will be acquired by the National Transportation Project and the Nevada Rail Infrastructure Project; 2) **operations development**, including the operations planning and logistics management activities currently being conducted, or planned to be conducted to ensure a safe, secure and efficient transportation system; and 3) the **institutional program**, including how OCRWM has and will continue to collaborate with stakeholders.

This Plan will be updated as appropriate to accommodate changes to the waste management system, reflect progress in the development and implementation of the transportation system and incorporate stakeholder and public comments. OCRWM also anticipates that detailed implementation plans will be developed in the future in collaboration with the stakeholder community.

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ACRONYMS

AAR	Association of American Railroads
BLM	Bureau of Land Management
CD	Critical Decisions
CMF	Cask Maintenance Facility
CONOPS	*Transportation System Concept of Operations*
CVSA	Commercial Vehicle Safety Alliance
DHS	U.S. Department of Homeland Security
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EIS	Environmental Impact Statement
EM	Office of Environmental Management
FEIS	Final Environmental Impact Statement
FRA	Federal Railroad Administration
FRR	Foreign Research Reactor
FY	fiscal year
HLW	high-level radioactive waste
ISFSI	independent spent fuel storage installation
MTHM	Metric Tons of Heavy Metal
NCSL	National Conference of State Legislatures
NEPA	National Environmental Policy Act of 1969
NNPP	Naval Nuclear Propulsion Program
NRC	U.S. Nuclear Regulatory Commission
NWPA	Nuclear Waste Policy Act of 1982, as amended
OCRWM	Office of Civilian Radioactive Waste Management
OLM	Office of Logistics Management
OSHA	Occupational Safety and Health Administration
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
SNF	spent nuclear fuel
SRG	State Regional Group
STB	Surface Transportation Board

TAD	Transportation, Aging, and Disposal
TEC	Transportation External Coordination Working Group

I. INTRODUCTION

This Plan outlines the Department of Energy's (DOE) current strategy and planning for developing and implementing the transportation system required to transport spent nuclear fuel (SNF) and high-level radioactive waste (HLW) from where the material is generated or stored to the proposed repository at Yucca Mountain, Nevada. The Plan provides information about how DOE's Office of Civilian Radioactive Waste Management (OCRWM) intends to develop and implement a safe, secure and efficient transportation system and how stakeholder collaboration will contribute to the development of that transportation system.

A. BACKGROUND AND PURPOSE

The Nuclear Waste Policy Act of 1982, as amended (NWPA), establishes a process for the siting, construction and operation of one or more national repositories for permanent disposal of the Nation's SNF and HLW. Pursuant to the NWPA, Yucca Mountain has been designated as the site for the Nation's first repository, and DOE has submitted an application to the Nuclear Regulatory Commission (NRC) for approval to construct the repository. As part of its obligations under the NWPA, DOE is also responsible for developing and implementing a system to transport SNF and HLW to the Yucca Mountain repository.

This Plan describes the elements of the national transportation system that OCRWM is developing, the phases of that development effort and how OCRWM will collaborate with stakeholders in the development and implementation of that system. This Plan describes the transportation system that will be needed when the repository is operating at full capacity. The transportation system will be developed in stages that are consistent with waste acceptance schedules and the startup and subsequent operation of the repository. The transportation infrastructure will continue to expand until full operating capability is achieved. The development and operation of the OCRWM transportation system will build on many decades of safe and secure transportation of SNF in the United States and abroad.

This Plan will be updated as appropriate to reflect progress in the development and implementation of the transportation system, accommodate changes to the waste management system, and incorporate stakeholder and public comments. OCRWM also anticipates that detailed implementation plans[1] will be developed in the future in collaboration with the stakeholder community. This document provides the framework for that future detailed planning.

B. HISTORY OF SPENT FUEL TRANSPORTATION

SNF has been shipped safely and securely for many decades, and more than 70,000 metric tons of SNF have been safely transported worldwide to date. Since the early 1960s, more than 3,000

[1] OCRWM anticipates that the more detailed planning documents for the national transportation system will include, but not be limited to, a national operations plan, campaign plans, an implementation plan for the NWPA Section 180(c) policy, fleet maintenance and inventory management plans, security plans, and emergency response plans.

shipments of commercial SNF have been conducted safely and securely in the United States, having traveled more than 1.7 million miles. DOE ships SNF by highway and rail in a manner that meets or exceeds Department of Transportation (DOT) and NRC safety and security requirements and standards applicable to commercial shippers. There has never been an SNF transportation accident that resulted in any release of radioactive material harmful to the public or the environment.

This demonstrated safety record is a result of the use of robust certified casks and of the strict regulatory standards that apply to every aspect of logistics, including material characterization, packaging, loading, marking, equipment inspections, pre-shipment testing, routing, training, security, and shipment monitoring.[2] The long history of safely transporting SNF in the United States provides a sound experience base for the development of the OCRWM transportation system. OCRWM is working with the transportation industry to design and build the equipment and processes needed for a safe, secure and efficient Yucca Mountain transportation system.

C. APPROACH TO DEVELOPMENT OF THE TRANSPORTATION SYSTEM

DOE has divided the development of the OCRWM transportation system into two capital projects: the National Transportation Project and the Nevada Rail Infrastructure Project (also known as the Nevada Rail Line Project). The National Transportation Project has responsibility for: the acquisition of rail and truck cask systems; design, acquisition, manufacture, testing and acceptance of rolling stock; and development of facilities to maintain and store casks and rolling stock. The Nevada Rail Infrastructure Project has responsibility for the design and construction of a new rail line and associated support facilities within the State of Nevada. It also encompasses the design, acquisition of materials and equipment, construction, testing, and certification of a Nevada rail line for the transportation of SNF and HLW to the Yucca Mountain repository.

The two capital projects are subject to DOE Order 413.3A, *Program and Project Management for the Acquisition of Capital Assets.* In accordance with this order, any large capital asset project is required to be approved through a series of Critical Decisions (CD) by DOE's Energy Systems Acquisition Advisory Board. These approvals come in five stages which include: Approve Mission Need (CD-0); Approve Cost and Schedule Range and authorize development of a performance baseline (CD-1); Approve the Performance Baseline and the start of final design (CD-2); Approve Start of Construction (CD-3); and Approve Start of Operations or Project Closeout (CD-4). Figure A illustrates the CD process. The NWPA established the mission need (CD-0) for the transportation projects. These projects received CD-1 approval for their cost and schedule ranges in June 2004.

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[2] In 2006, the National Academy of Sciences (NAS), Committee on Transportation of Radioactive Waste, issued a report entitled *Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States*. This report concluded that the NAS Committee could identify no fundamental technical barriers to the safe transport of SNF and HLW in the United States and that from a technical viewpoint the transportation of such materials is a low radiological risk activity when conducted with strict adherence to existing regulations.

The capital projects will integrate into an operating transportation system through the transportation program development activities. These activities include systems engineering and operations planning and development; national institutional and intergovernmental activities; providing funds for training of emergency responders and for technical assistance in accordance with provisions of Section 180(c) of the NWPA; acquisition of physical security systems; and all associated procurements. The projects and the parallel institutional and operational planning efforts will build on best transportation practices learned from benchmarking of other complex shipping campaigns of hazardous materials and on input from the stakeholder communities.

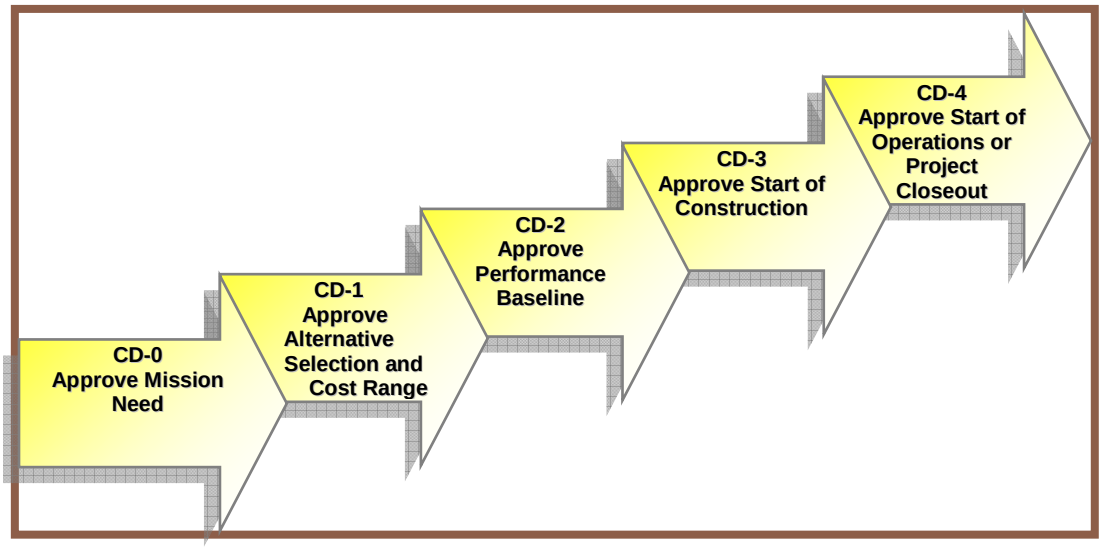

Figure A. Critical Decision Process

1. Materials to be Transported

The types and amount of materials planned to be transported to the repository include:

- Commercial SNF – 63,000 Metric Tons of Heavy Metal (MTHM)
- DOE SNF and Naval Nuclear Propulsion Program (NNPP) SNF – 2,333 MTHM
- DOE HLW – 4,667 MTHM

a. Commercial SNF

SNF is fuel that has been withdrawn from a nuclear reactor following irradiation. The sources of commercial SNF are the commercial nuclear power plants throughout the United States.

The commercial SNF inventory in the United States includes commercial SNF generated by 104 operating reactors and 14 reactors that have ceased operation. Under NRC licenses, commercial nuclear power plants store SNF in spent fuel pools and/or aboveground in an independent spent fuel storage installation (ISFSI). Figure B illustrates a typical fuel assembly.

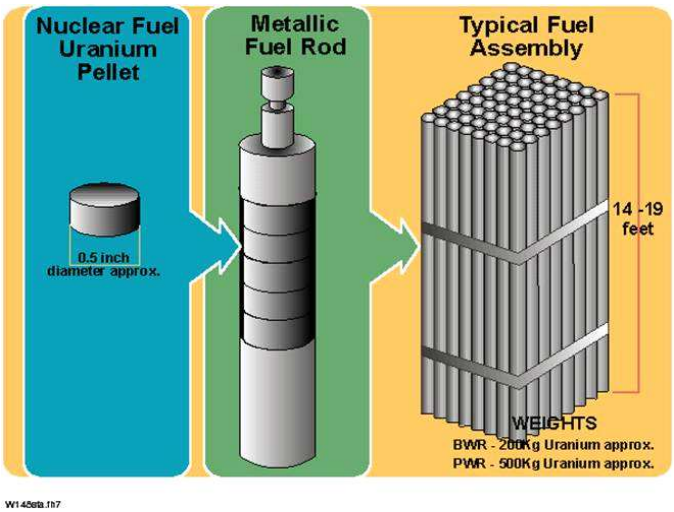

Figure B. Typical Fuel Assembly

b. Department of Energy SNF and HLW

DOE has generated SNF from weapons production reactors, research reactors and certain other reactors. DOE has also generated HLW, which is highly radioactive material that results from the reprocessing of commercial and DOE SNF. DOE stores SNF and/or HLW at the Hanford Site in Washington State, the Idaho National Laboratory in Idaho, and the Savannah River Site in South Carolina. Commercial HLW is also stored at the West Valley site in New York State. All HLW to be transported to Yucca Mountain will be processed into a stable solid form and put into canisters and shipped in transportation casks. No liquid HLW will be transported.

c. Naval Nuclear Propulsion Program SNF

The NNPP also has SNF, the source of which is nuclear-powered Navy warships – surface ships and submarines – when refueled or defueled in support of United States Navy operational requirements. The NNPP stores NNPP SNF at the Idaho National Laboratory. Under an agreement with OCRWM, the NNPP is responsible for managing transportation for delivery of NNPP SNF shipments to the repository and for meeting all applicable requirements.

2. Transport Modes

In April 2004, DOE selected the mostly rail scenario analyzed in the *Final 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* (FEIS) as the transportation mode both on a national basis and in the State of Nevada. Under the mostly rail scenario, DOE will rely on a combination of rail, truck and possibly barge to transport SNF and HLW to the repository from 76 sites, with most of the material being transported by rail. This will require construction of a rail line in Nevada to the repository.

In July 2005, OCRWM issued a policy stating that dedicated trains will be the usual mode of rail transportation for SNF and HLW to the Yucca Mountain repository. The term “dedicated train” refers to train service dedicated to one commodity (in this case, SNF and HLW destined for

Yucca Mountain). In adopting this policy, however, OCRWM recognized that such materials can be shipped safely regardless of mode or type of service due to the stringent regulatory standards in place and the robust nature of the transportation packages involved. OCRWM has also identified that the primary benefit of using dedicated trains is the significant cost savings over the lifetime of the Yucca Mountain program due to such factors as reduced transit and turnaround time for casks and rail cars and greater operational flexibility and efficiency.

Rail shipments will be the mode of choice for sites with rail access. For sites without rail access, other options for transport could include:

- Overweight/Legal weight truck – For commercial SNF sites that do not have the capability to handle rail casks, DOE could transport SNF by overweight or legal weight trucks.

- Intermodal with Heavy-haul truck – For the 22 commercial SNF sites that currently have the capability to handle and load rail casks, but do not have direct railroad service, DOE could transport SNF casks to nearby railheads by heavy-haul truck. The viability of this approach is illustrated by the approximately 200 heavy-haul shipments of SNF that are conducted in France each year.

- Intermodal with Barge - Barge shipments of rail casks containing SNF could also be considered from 16 (a subset of the 22 commercial sites without direct rail access) commercial sites that are on or near navigable waterways. Barge transport would be done to another facility with rail access.

The potential use of these modes of transport will be site specific and will be considered on a case by case basis as appropriate.

3. Planning to Date

Planning for the development of the transportation system has been ongoing since the inception of OCRWM. This planning has been done in conjunction with stakeholders through a collaborative planning process. DOE has been interacting with key stakeholders including State Regional Groups (SRGs), Tribes, and industry through Transportation External Coordination Working Group (TEC) meetings, vendor meetings, and the issuance of notices and requests for information. Examples of areas in which stakeholders have provided input include the dedicated train policy, the planned use of rail cars that meet the stringent Association of American Railroads (AAR) standards for shipping SNF, and the revisions to the proposed Section 180(c) policy. As the system matures, OCRWM anticipates that more detailed planning documents will be developed in collaboration with stakeholders.

4. Transportation Requirements

The costs to complete development and implementation of the integrated transportation system are reflected in the *Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program, Fiscal Year 2007,* DOE/RW-0591, July 2008, (TSLCC). The TSLCC presents OCRWM's May 2007 total system cost estimate for the disposal of the Nation's

SNF and HLW, including detailed estimated costs associated with both the National Transportation Project and the Nevada Rail Infrastructure Project. OCRWM has established preliminary schedules for both projects. Both the cost and the schedule for both projects and for the development of the transportation system will be dependent upon the availability of funding and necessary appropriations.

The *Transportation System Requirements Document*, DOE/RW-0425, Rev. 5, addresses system requirements. A Transportation System Operations Plan will be developed and will identify operational requirements based on a functional analysis of the transportation system and identification of regulatory requirements that must be adhered to in operating the transportation system. A Transportation Program Management Plan will also be developed and will identify transportation programmatic requirements and will define how they will be implemented. Once developed, the operational and programmatic requirements will be added to the requirements management system. OCRWM anticipates that technical, regulatory, programmatic, and operational requirements will be reflected in a matrix that maps requirements to steps in the processes involved in shipping SNF and HLW to the repository at Yucca Mountain.

Safety and security requirements and standards for the development, design and operation of the OCRWM transportation system are detailed in DOE M 460.2-1A, *U.S. Department of Energy Radioactive Material Transportation Practices Manual* and the final *Supplemental 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* (Repository SEIS), Appendix H. These documents reflect DOE's longstanding commitment to meet or exceed the DOT and NRC safety and security requirements and standards that apply to comparable commercial shipments. The NWPA explicitly requires DOE to ship SNF and HLW to a repository in transportation casks certified by NRC (NWPA § 180(a)), to comply with NRC notification requirements prior to conducting such shipments (NWPA § 180(b)), and to provide States and Tribes technical assistance and funds for training for public safety officials on procedures for safe routine transportation and for dealing with emergency response situations (NWPA § 180(c)). In fulfilling its safety and security responsibilities, DOE will work closely with Federal, State, Tribal and local entities and utilize their expertise and resources as appropriate to promote cooperation and efficiency.

II. DEVELOPMENT OF THE TRANSPORTATION SYSTEM

The transportation system will be comprised of capital assets, the capabilities and personnel to operate the system, and an institutional program which engages stakeholders in a collaborative planning process. OCRWM plans to develop the transportation system incrementally and this section identifies and describes current planning for major transportation system components.

A. ACQUISITION OF CAPITAL ASSETS

1. Nevada Rail Infrastructure Project

a. Scope of the Nevada Rail Infrastructure Project

The Nevada Rail Infrastructure Project is responsible for the development of a railroad to provide access between the repository at Yucca Mountain and an existing main rail line within Nevada. As discussed further below, DOE has decided to construct and operate a railroad along a rail alignment within the Caliente corridor. Figure C represents the selected Caliente rail alignment for the Nevada rail line. DOE also has decided to allow shipments of general freight on the rail line (Shared-Use Option) subject to obtaining a certificate of public convenience and necessity from the Surface Transportation Board (STB) and other necessary regulatory approvals. Next steps will include obtaining the certificates and all other necessary permits and authorizations, acquisition of private land, detailed characterization of the alignment, development of a preliminary design, development of the final design, construction, development of a railroad operating plan, and commissioning activities to transition to operations.

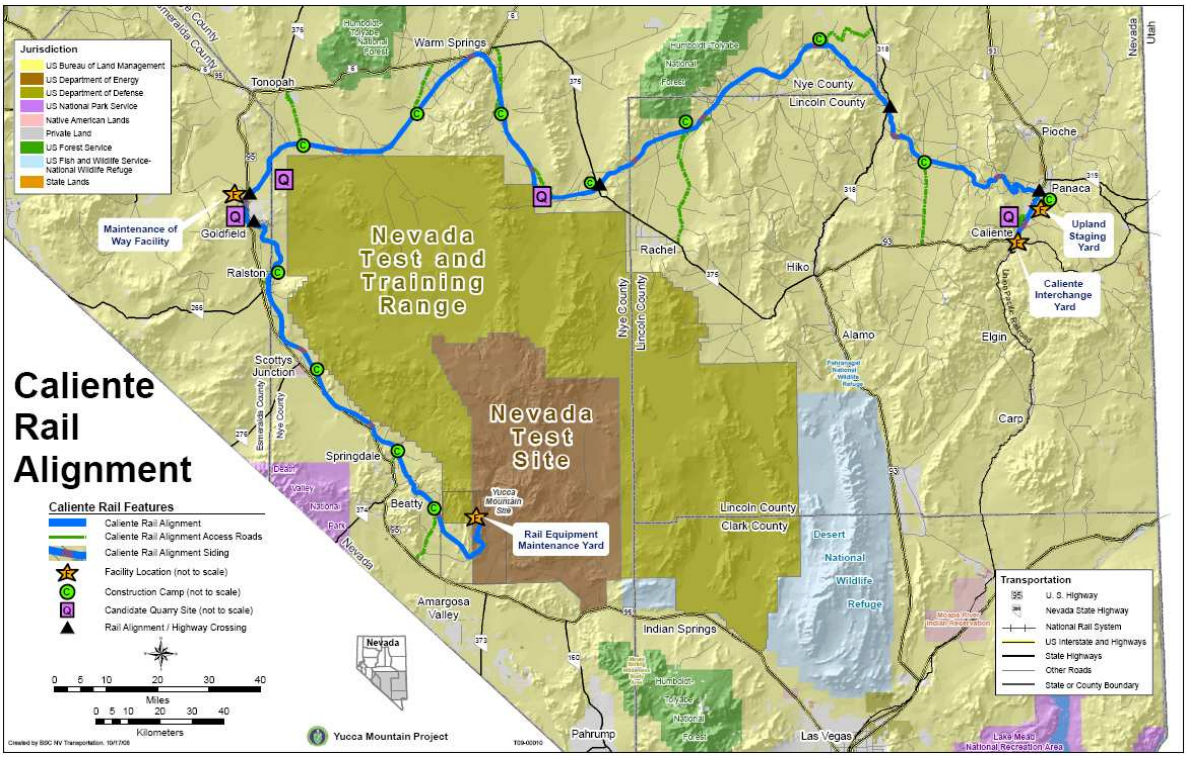

Figure C. Caliente Rail Alignment

b. Current Status of the Nevada Rail Infrastructure Project

In July 2008, DOE issued the *Final Supplemental 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 – Nevada Rail Transportation Corridor* (Nevada Rail Corridor SEIS) and *Final Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geological Repository at Yucca Mountain, Nye County, Nevada* (Rail Alignment EIS).

The Final Nevada Rail Corridor SEIS and Final Rail Alignment EIS were prepared to evaluate the potential environmental impacts of constructing and operating a railroad for shipments of SNF and HLW from an existing rail line in Nevada to a geologic repository at Yucca Mountain.[3] The Nevada Rail Corridor SEIS supplements the FEIS that DOE issued in 2002 and analyzes the potential impacts of constructing and operating a railroad for shipments of SNF and HLW in the Mina corridor and updates information, as appropriate, regarding the other rail corridors analyzed in detail in the FEIS. The Rail Alignment EIS analyzes the potential environmental impacts associated with constructing and operating a railroad along specific alignments within the Caliente and Mina rail corridors.

In October 2008, DOE issued a Record of Decision (ROD) to construct and operate a railroad along a rail alignment within the Caliente corridor. As stated in the ROD, DOE has also decided to allow shipments of general freight on the rail line (Shared-Use Option), subject to obtaining a certificate of public convenience and necessity from the STB and other necessary regulatory approvals.

In the final Rail Alignment EIS and ROD, DOE has identified preliminary best management practices and mitigation measures. DOE will undertake mitigation processes in consultation with federal, state, and local regulatory authorities having jurisdiction over the construction and operation of the railroad, and in consultation with directly affected parties. To that end, DOE proposes to constitute one or more Mitigation Advisory Boards to assist DOE in developing, implementing, and monitoring best management practices and mitigation measures during the construction and operation of the railroad.

c. Future Nevada Rail Infrastructure Project Activities

DOE's decision to construct and operate a railroad in Nevada requires completion of the physical characterization of the selected alignment, completion of a preliminary rail line design, final design, permitting, construction of the rail line, development of a rail line operating plan and commissioning activities to transition to normal operations. These activities will be carried out through a series of contracts as funds become available. DOE anticipates requesting input from the private sector prior to initiating major procurements.

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[3] The U.S. Air Force, STB, BLM, Lincoln County, Esmeralda County, Nye County, and the City of Caliente, Nevada, were cooperating agencies in the preparation of the Final Nevada Rail Corridor SEIS and the Final Rail Alignment EIS.

d. Nevada Rail Infrastructure Project Acquisition Strategy

On June 30, 2004, DOE's Acquisition Executive approved the Alternative Selection and Cost Range (CD-1) for the Nevada Rail Infrastructure Project. The Project's original Acquisition Strategy was approved as part of the CD-1 package. In December of 2007, a significant revision to the acquisition strategy for all OCRWM capital projects was approved, which addressed the use of Transportation, Aging and Disposal (TAD) canisters for commercial SNF.

A key element of the acquisition strategy is to seek input from potential vendors regarding the appropriate strategy for a competitive procurement that supports the objectives of the spent nuclear fuel and high-level waste management program and is attractive to potential offerors. OCRWM issued a Request for Information to potential vendors in June 2007 and met with vendors interested in various elements of rail design, construction, construction management and operations in September 2007. Information from these vendors will be considered as procurements are pursued by OCRWM.

2. National Transportation Project

The National Transportation Project includes the acquisition of transportation casks and ancillary equipment for truck and rail shipments, specialty rail cars, any maintenance facilities necessary to maintain the casks, intermodal transfer equipment, monitoring and maintenance equipment, and an operations center. Barges and/or heavy-haul trucks may be used for short-distance transport of SNF from those sites lacking access to nearby railroads. OCRWM currently anticipates that it would procure services for barge, legal and overweight truck and heavy-haul truck shipments.

In January of 2004, OCRWM met with rail car and cask vendors to discuss the hardware inventory needed to conduct SNF and HLW shipments. This information was considered in developing project plans, and in June 2004, OCRWM obtained CD-1 approval for the National Transportation Project. This approval authorized development of a performance baseline with detailed technical, cost, and schedule requirements for the project.

a. Cask Systems

1. <u>Scope of Cask Systems</u>

aa. Transportation, Aging, and Disposal (TAD) canister-based systems

The TAD canister-based systems will comprise the bulk of the transportation cask fleet. The TAD canisters will be loaded with commercial SNF and sealed at utility reactor sites. TAD canisters will be placed into a transportation cask, or overpack, at utility reactor sites prior to transport to the repository. At the repository, the TAD canister will be removed from the transportation cask and handled using a shielded transfer cask for placement into either an aging overpack or directly into a waste package for disposal emplacement. Figure D represents a schematic of the TAD canister.

Features of the TAD canister-based systems[4] include:

- Simplification and improvement of operations; and
- Reduction of the number of times individual SNF assemblies are handled from the reactor pool to dry storage, to transportation, and disposal.

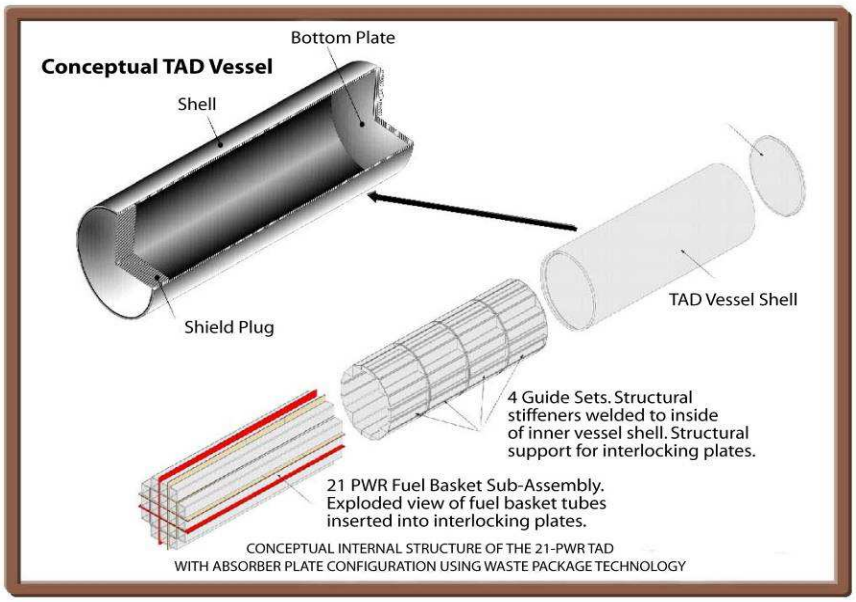

Figure D. TAD Canister Conceptual Schematic

bb. Other Casks for Commercial SNF Assemblies

Although the TAD canister-based system will be the basis of the DOE handling system, other types of transportation casks for both truck and rail shipments will also be required. Additional transportation cask acquisitions will ensure that all acceptable waste forms can be transported successfully.

DOE's approach to transporting SNF assemblies that have not been loaded into TAD canisters includes the following:

- A portion of the SNF inventory will be transported in casks not using TAD canisters, either due to fuel parameters or to utility site infrastructure limitations.
- As necessary, these SNF assemblies will be directly loaded into bare fuel transportation casks for shipment to the repository.

[4] The TAD canisters will be designed in compliance with the regulatory requirements for packages in 10 CFR Part 71 (transportation), 10 CFR Part 72 (storage), and 10 CFR Part 63 (disposal), as applicable.

- Bare fuel casks will be used to transport these assemblies via legal or overweight trucks or rail.

- Other NRC certified transportation systems may also be used.

cc. Department of Energy SNF and HLW Casks

Currently, DOE SNF and HLW is stored at the Hanford Site, the Idaho National Laboratory, and the Savannah River Site.

- Storage facilities at these sites are managed by DOE's Office of Environmental Management (EM).

- By agreement with EM, OCRWM will be responsible for the design, certification by NRC and fabrication of transportation cask system(s) for DOE SNF and HLW.

- EM is responsible for ensuring that its canisters of SNF and HLW can be approved as contents for transportation in NRC certified casks.

dd. Naval Nuclear Propulsion Program SNF Casks

Currently, NNPP SNF is stored at the Idaho National Laboratory.

- The NNPP is responsible for the design, fabrication, and certification by NRC of transportation cask systems for NNPP SNF.

- The NNPP is also responsible for managing transportation for delivery of NNPP SNF to the repository and for meeting all applicable requirements.

ee. Ancillary Equipment

Ancillary equipment encompasses all components used in cask handling operations to move the cask, operate the working mechanisms of the cask, and complete the cask loading and unloading process. These components include lifting yokes, lifting slings, vacuum drying systems, hoses and tubing, torque wrenches and other hand tools, and other equipment as required by the cask vendor to operate a specific cask system. These components will be designed in conjunction with any new cask system designs.

2. Current Status of Cask System Activities

OCRWM is currently engaged in a process to design and license the TAD canister-based system. Following issuance of a preliminary TAD performance specification in November 2006, vendors prepared "proof of concept" designs for DOE review. DOE issued a final performance specification in June 2007, a Request for Proposals in July 2007, and issued two contracts for design and licensing of the TAD canister-based system in June 2008.

3. Future Cask System Activities

OCRWM intends to procure the transportation casks needed for startup. After the repository opens and shipments begin, DOE anticipates continued procurement of TAD canister-based systems and other casks.

4. Cask Systems Acquisition Strategy

The goal of cask acquisition is to procure the casks that will be needed to support initial waste acceptance. OCRWM has used a range of estimates and assumptions for determining the likely size of the cask fleet. Current estimates use conceptual transportation turnaround times and cask capacities. Under this analytical scenario, approximately 35 TAD canisters will be needed for initial operational capabilities. Approximately 100 transport casks will be needed to meet full throughput requirements. OCRWM is continuing to model potential operational practices and will refine its estimates of the appropriate cask fleet size and composition when TAD designs are certified. Flexibility in the acquisition approach will enable OCRWM to adapt to changing circumstances.

b. Rolling Stock

1. Scope of Rolling Stock Activities

Components of the rolling stock include the following specifically designed railcars: cask cars, buffer cars, and escort cars. Standard locomotives will be used. The cask car will carry the cask and cask cradle and may be positioned in the middle of the train consist. The buffer car will act as a spacer between the cask car(s) and the security escort car, as well as between the cask car(s) and the locomotive(s). The security escort car will be used for the government shipment escort personnel. Figure E represents a schematic of the train consist including the cask cars, buffer cars, and escort car.

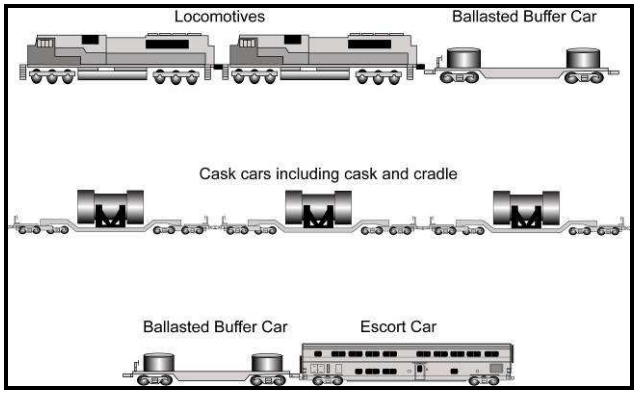

Figure E. Rolling Stock, Escort and Buffer Car Schematic

2. Current Status of Rolling Stock Activities

Rolling stock will be designed and tested to meet the AAR S-2043 standard. Current rolling stock activities are focused on evaluating the AAR S-2043 requirements and modeling hardware performance. Rolling stock design began in FY 2007 with work to design the escort car in collaboration with the NNPP. Escort car design work is continuing. Prior to procuring cask and buffer cars, OCRWM anticipates that it will reengage with potential vendors on contracting approaches.

3. Future Rolling Stock Activities

Future rolling stock activities will focus on meeting the AAR standard requirements for testing and acceptance of new rail cars. Project schedules include the time required for prototype development and acceptance testing. Once acceptance testing has been completed, and the results accepted by the AAR, production cars would be fabricated. While fewer cars will be needed at the start of shipments, it may be more efficient and economical for OCRWM to initially contract for larger deliveries.

4. Rolling Stock Acquisition Strategy

Preliminary fleet estimates to meet initial operating capability for rail transport will require approximately 35 cask cars, 20 buffer cars, and 10 escort cars. To meet full operating capability, OCRWM will need approximately 100 cask cars, 40 buffer cars, and 20 escort cars.

Based on current estimates, a smaller fleet of tractors and trailers would be required to transport the fleet of truck casks. Tractors for transporting legal weight and over-weight casks are expected to be provided by the logistics vendor. OCRWM is evaluating a range of options for providing trailers. Options include lease or purchase or requiring them as part of logistics services contracts; however, procurement of these items is dependent on the type of cask systems to be used. Therefore, specific procurement decisions are expected to be made during later phases of the cask system acquisition process.

Heavy-haul trucks may need to be used for short-distance transport of SNF from those sites lacking direct rail access. OCRWM may procure heavy-haul services from the private sector which has significant capacity and experience with providing these services.

c. Cask Maintenance

1. Scope of Cask Maintenance Facility

The Cask Maintenance Facility (CMF) will service and maintain the canister-based transportation cask fleet (i.e., transportation overpacks) used by OCRWM.

2. Current Status of Cask Maintenance Facility

The reduction in funding in FY 07 and FY 08 for the project has impacted overall schedules and milestones. As a result, project timelines have been extended. Design of the CMF will continue as funding allows.

3. Future Status of Cask Maintenance Facility

Future activities for the CMF will focus on conceptual and final designs for the facility. The facility for maintenance of the canister-based transportation casks will have the ability to maintain and store the casks, ancillary equipment, spare parts and consumables in a controlled environment. It will be designed to implement radioactive contamination control and personnel and public dose protection in accordance with applicable regulations.

4. Cask Maintenance Facility Acquisition Strategy

OCRWM will utilize a competitive bidding process to develop its cask maintenance facility and to procure maintenance services. Since the repository system is designed to maximize the use of TAD canisters, it is currently anticipated that maintenance of the small number of casks used to ship individual SNF assemblies will be contracted as a service and performed at a commercial facility. Prior to issuing requests for proposals, OCRWM will request input from the private sector on their views for developing this maintenance capability.

d. Transportation Operations Center

1. Scope of Transportation Operations Center

All transportation operations will be managed from a Transportation Operations Center. The following functional capabilities could be provided through the operations center:

- Coordination with the shipping sites, the repository, carriers, and other involved parties
- Scheduling the use and maintenance of casks, ancillary equipment, and rolling stock
- Pre-shipment notification
- Monitoring and tracking of shipments
- En route communication, and
- Initiation of emergency management activities including a 24-hour call-in number.

2. Current Status of Transportation Operations Center Activities

Conceptual and final design of the Transportation Operations Center will be undertaken by OCRWM as funding becomes available.

3. Future Transportation Operations Center Activities

Integration of the operations centers for transportation, repository operations and emergency management is being considered. Ongoing benchmarking activities will inform decisions regarding future functions and capabilities. Initial activities will entail developing a conceptual design for the Transportation Operations Center.

4. Transportation Operations Center Acquisition Strategy

The acquisition strategy for the Transportation Operations Center will be developed by OCRWM as funding becomes available.

B. OPERATIONS DEVELOPMENT

1. Operations Development

a. Scope of Operations Development

A major activity in the development of the OCRWM transportation system will be the development of the capability to operate the system. This capability includes shipment planning, coordination with stakeholders, dispatch of unloaded casks and associated equipment to an origin site, transport of loaded casks to the repository, secure communications, shipment tracking, and maintenance of casks and ancillary equipment. The *DOE Radioactive Material Transportation Practices Manual*, DOE M 460.2-1A, supplementing DOE Order 460.2-1, provides guidance for the procedures to be used for transportation operations.

b. Current Status of Operations Development

Due to the early stage of system development, operational planning has been limited. A preliminary operational construct is described in the *Transportation System Concept of Operations (CONOPS),* April 2006. The *CONOPS* is a high-level description of transportation system design, and it defines the fundamental operational elements of the transportation system. The *CONOPS* identifies:

- Vision, mission, and scope
- Stakeholders
- High-level capabilities
- Geographical and physical features
- Functions and activities, and
- Operational processes and interfaces.

OCRWM is currently developing a generic transportation operations plan that will be used as a basis for hardware development and operational training, resource deployment, preparatory activities, and full scale operations. Transportation planning activities include developing generic descriptions of each step of the transportation process, associated regulatory and operational requirements, creation of shipment preparation check lists, selection of modes and suites of routes to be used, selection of communications and tracking systems and planning for public communications. States, Tribes, carriers, and utilities will be involved in development of this generic operations plan. This plan will support future development of detailed campaign plans that address site specific transportation issues.

c. Future Operations Development Activities

The major activities involved in developing and executing operational capability are discussed below.

1. Assessment of Existing Infrastructure

OCRWM will not fund upgrades to transportation infrastructure at shipping sites or the national transportation system. Since it will be necessary to understand the capabilities of the existing infrastructure, however, OCRWM has, and will continue to assess that infrastructure and those capabilities through the following activities:

- On-site assessments: Prior assessments (*Facility Interface Capability Assessment*, (1992) and the Facility Interface Data sheets (2004-2005)) have evaluated utility on-site capabilities to ship SNF, including crane load capacity, pool depth, rail infrastructure and other operational interface issues. Data provided by these assessments will be updated through data calls and by field surveys to support OCRWM transportation planning and scheduling and will be used in concert with the final delivery commitment schedules. This data will allow OCRWM to identify the shipment mode, the type of casks and the ancillary equipment required for each facility. Utilities and DOE sites are responsible for any necessary infrastructure upgrades within their gates. This information will be incorporated into the site specific campaign plans described below.

- Near-site infrastructure assessments: A prior study for OCRWM of infrastructure outside reactor facilities (*Near-Site Transportation Infrastructure Project: Final Report*, (1992)) assessed the capabilities of highway, bridge, railroad and barge access to each utility site. OCRWM intends to update this data as needed. Due to the long lead time for infrastructure upgrades by States, counties, and railroads, OCRWM expects to consult with the Federal Railroad Administration (FRA) to review short-line railroad track capability near reactors. In addition, OCRWM anticipates that it will consult with State transportation departments through the SRGs to identify long range transportation plans for highway and bridge upgrades in the vicinity of the shipping sites. OCRWM also anticipates that DOE sites will be surveyed as necessary to assess their infrastructure adequacy for purposes of shipping DOE SNF and HLW to the repository.

- National infrastructure assessments: Existing interstate highways and rail lines serve a large volume of traffic, and DOE will operate over that system like any other shipper. OCRWM will work with States, Tribes and industry on routing options, as needed, to assess and address shipment size, weight and dimensional considerations.

2. Campaign Planning

OCRWM plans to manage shipments according to DOE's disposal contracts with commercial utilities, which are contracts provided for under the NWPA and known as the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (Standard Contract).[5] A site campaign plan will contain step-by-step, real-time instructions for completing a shipment from an origin site. It is anticipated that a site campaign plan will be developed annually for each origin site scheduled to ship material to the repository. Shipments will be based on the

[5] Pursuant to the NWPA, the Secretary of Energy has entered into contracts with utilities for the acceptance and disposal of their commercial SNF. The terms for the Standard Contract are set forth in 10 CFR Part 961.

approved Final Delivery Schedule. A site specific campaign plan will include, but not be limited to:

- Identification of the type and number of casks and canisters required
- Identification of the transportation service provider for the origin site
- Identification of any restrictions on use of the selected shipping routes
- Details on how inter-modal transfers would be provided, if required
- Locations for the delivery of empty casks and equipment to the origin site
- DOE criteria for acceptance of loaded casks, and
- Identification of actual routes to be used from the national suite of routes.

OCRWM anticipates that these and other details will be provided in site campaign plans developed in coordination with the shipping site, States, Tribes and commercial carriers at least two years prior to initiation of the campaign.

3. Notification

As required by Section 180(b) of the NWPA, all OCRWM shipments to the repository would abide by NRC regulations on advance notification of State governments. Currently, the NRC's regulations (10 CFR Part 73) provide for written notice to governors or their designees in advance of irradiated reactor fuel shipments through their States. NRC regulations allow States to release certain advance information to local officials on a need-to-know basis. NRC is considering a similar regulation to permit notification to Tribal authorities in addition to States. Notification of shipments to a repository will be in accordance with NRC regulations in effect at the time of shipments.

4. Inspections

Prior to shipment from the origin site, it is expected that transportation equipment will be inspected, and any defect will be corrected prior to its deployment. Loaded shipments also will be inspected prior to departure from the origin site for compliance with appropriate requirements. These inspections will include radiological surveys of radioactive material packages to ensure that they meet the radiation level limits of 49 CFR 173.441 and surface contamination limits of 49 CFR 173.443.

OCRWM rail shipments will also be inspected in accordance with 49 CFR 174.9 and the FRA's High-Level Nuclear Waste Rail Transportation Inspection Policy in Appendix A of *Safety Compliance Oversight Plan for Rail Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel, 1998* shipment inspection program and the State's rail safety programs. In addition, the Final Rule issued by DOT's Pipeline and Hazardous Materials Safety Administration (73 FR 72182, November 26, 2008) requires that rail carriers shipping certain hazardous materials, including Highway Route-Controlled Quantities of class 7 (radioactive) material, as defined by 49 CFR 173.403, conduct inspections of railcars for signs of tampering or suspicious items.

Truck shipments will be inspected according to the Commercial Vehicle Safety Alliance (CVSA) Level VI inspection program. Shipments in-transit may be inspected by State, Federal and industry inspectors, as appropriate.

Barge shipment inspections may involve the United States Coast Guard and Port Captains.

5. Shipment Tracking

OCRWM will implement continuous near real-time position tracking using a satellite tracking system with a continuous, centralized monitoring and communications capability.[6] OCRWM will provide authorized State and Tribal governments with the capability and training to monitor shipments to the repository through their jurisdictions using this system. Trained personnel could use such a system to monitor shipment progress and communicate with the dispatch center. The Transportation Operations Center would be in contact with carriers and the escorts throughout each shipment. In addition, all truck and rail escort cars would have communications equipment. OCRWM will also develop detailed backup procedures to ensure safe operations in the event that the tracking system was temporarily unavailable. User designation and access will be consistent with NRC regulations to ensure that safeguards information, such as schedules and itineraries for specific shipments, is protected against unauthorized disclosure and is provided only to authorized individuals.

Closer to the start of shipping, OCRWM will assess available tracking systems and determine whether use of updated technology, if any, is appropriate. DOE would provide authorized State and Tribal governments with the capability and training to monitor OCRWM shipments to the repository through their jurisdictions.

6. Communications

Transportation system communications will be coordinated through the Transportation Operations Center. Activities will include routine communications with carrier dispatch centers; coordination between shipping sites, carriers, and the repository, and with States, Tribes, and other Federal agencies; notification of shipment or schedule changes; coordination with parties dealing with operational contingencies; and support of emergency response situations. Secure communications with the armed escorts will also be maintained by the transportation operations center 24 hours a day, 7 days a week while shipments are in transit.

7. Operational Contingencies

Contingency planning will be built into transportation campaign plans. Operational contingencies include:

- Weather and other natural phenomena: These events tend to be local and transitory in nature. OCRWM will instruct commercial highway carriers to follow directions issued

[6] Continuous near real time tracking of shipments accounts for the lag time from on ground visuals to data transmission via satellite to the monitoring station.

by local law enforcement and other authorities regarding route conditions and travel restrictions. Rail shipments will proceed under railroad operating procedures.

- Mechanical: Carriers will be required to have repair plans and to identify contractor support for spares or replacement vehicles, or for equipment rigging and cranes in the event of an emergency in transit.

- Scheduling: Unexpected changes to the schedule would require the operations center to notify the appropriate government officials, utilities, the repository and other parts of the system of any changes to schedules.

8. Security Planning

Security planning will meet or exceed the requirements in 10 CFR Part 73. Assessing Nationwide and specific threats and developing appropriate responses would be done in coordination with Federal, State, Tribal and local officials. OCRWM plans to provide armed escorts with all shipments. Security plans for truck shipments will also meet or exceed the requirements in the DOT HM-232 rulemaking. Security planning will also include operational contingencies to address security concerns that may arise during transit.

9. Demonstration Projects and Reviews

aa. Demonstration projects

DOE will demonstrate the shipping processes using empty casks prior to shipment operations. OCRWM transportation tools and processes could also be validated by use on actual shipments of radioactive material by other DOE programs. Planning will incorporate tabletop exercises as well as demonstration projects to assess the entire transportation system in collaboration with carriers and appropriate law enforcement or other authorities.

bb. Operational Readiness Reviews

Readiness reviews include validation of procedures, tools and processes to ensure that plans, tracking systems, communication channels and other aspects of operations function as intended. Development, implementation, and assessment of readiness reviews may involve origin sites, the repository site, and Federal, State, Tribal, and local officials. The outcome will be a demonstrated capability understood by all involved entities. Operational readiness reviews encompass tabletop, functional and full-scale exercises. Corrective actions will address any gaps in plans or operational functions prior to shipments.

cc. Pilot Projects

OCRWM plans to conduct pilot projects to assess the adequacy of policies, procedures, and processes that are unique to OCRWM's transportation system. These pilot projects will serve to support system development before larger scale investments are made and before commencement of full-scale operations.

10. Benchmarking

The OCRWM logistics benchmarking efforts are intended to identify and incorporate best practices used by transportation service providers. Preliminary findings can be found in the *Office of Logistics Management Radioactive Waste Logistics Benchmarking: Project Status Report, Interim Findings*, May 2007. OCRWM will conduct additional analyses, in coordination with Federal agencies, States, Tribes and private entities to ensure transportation best practices are incorporated into the OCRWM transportation system. The current benchmarking findings include:

- Business Model
  - Extend logistics team to include waste origin/destination sites
  - Build multidisciplinary teams
  - Use pilot testing to refine plans, equipment and operations
  - Develop and manage to comprehensive transportation plans
  - Integrate new developments in tracking, emergency technology

- Contract Management/Outsourcing
  - Consider Federal agency experience in developing transportation procurements
  - Maintain control of mission-critical assets and functions

- Stakeholder Relations
  - Focus on safety and technical operations
  - Collaborate on shipment planning
  - Build relationships using training, demonstrations, and exercises
  - Work through well-established networks
  - Meet commitments

d. Operations Development Acquisition Strategy

OCRWM plans to contract with private industry to the maximum extent possible to conduct shipments. OCRWM will take title of SNF and HLW at the utility site, consistent with the provisions of the Standard Contract. OCRWM federal personnel will be directly involved in State and Tribal interactions and will manage ongoing relationships with States and Tribes.

C. INSTITUTIONAL PROGRAM

1. Scope of Institutional Activities

OCRWM is committed to working with interested stakeholders on the development and implementation of the transportation system. OCRWM has worked collaboratively with stakeholders to resolve a number of issues.

OCRWM's approach to stakeholder interactions is addressed in the *Strategic Plan for the Safe Transportation of Spent Nuclear Fuel and High-Level Radioactive Waste to Yucca Mountain: A Guide to Stakeholder Interactions*, November 2003. That plan presents OCRWM's strategy and

describes the process OCRWM is using to work cooperatively with States, Tribes, local governments, utilities, the transportation industry, and other interested parties to develop and refine the transportation system. OCRWM will continue to seek input from stakeholders to ensure safe, secure, and efficient transportation.

OCRWM communicates with a wide range of stakeholders. These stakeholders include national organizations and groups, industry associations, States, Tribes, and local governments, State and local first responders, and utilities as described below. OCRWM also coordinates on transportation issues with other Federal agencies. Key stakeholder interactions which OCRWM is committed to continuing are identified below.

a. State Regional Groups (SRGs)

OCRWM collaborates with States through State Regional Groups. This working relationship has existed for more than 25 years and is supported by cooperative agreements with these groups. The SRGs which represent the interests of their member States are:

- Council of State Governments' Northeast High-Level Radioactive Waste Transportation Task Force,
- Council of State Governments' Midwestern Radioactive Materials Transportation Committee,
- Southern States Energy Board's Radioactive Materials Transportation Committee, and
- Western Interstate Energy Board's High-Level Waste Committee.

b. National Interactions

OCRWM also exchanges information with interested parties through TEC whose membership includes State, Tribal, and local government organizations; Federal agencies; utility and transportation industries; police, fire, and emergency management professional organizations; and labor unions. TEC members represent government and professional organizations. TEC meets to exchange information and discuss DOE shipping activities and to identify transportation issues of concern to the TEC members' constituents. TEC meetings are open to the public.

To facilitate national planning efforts, OCRWM has awarded cooperative agreements to two organizations, the National Conference of State Legislatures (NCSL), and CVSA, to exchange information and improve understanding by State officials about transportation safety. NCSL is a bipartisan organization that provides research and technical assistance to State legislators and their staffs. CVSA promotes commercial motor vehicle safety and security and all 50 States belong to both of these organizations.

OCRWM also coordinates with NRC, DOT, and the United States Department of Homeland Security (DHS) (including the Federal Emergency Management Agency).

c. Tribal Interactions

Tribal governments are sovereign nations, and OCRWM will interact with Federally-recognized Tribes on a government-to-government basis as described in the *United States Department of Energy American and Alaska Native Tribal Government Policy*, January 2006. OCRWM is

establishing relationships with Tribes along potential shipping routes through one-on-one visits, workshops, tours, and expanded Tribal involvement in TEC. Regional and national meetings with Tribes may be scheduled in the future.

OCRWM will continue to participate in other DOE Tribal outreach efforts, including the State and Tribal Government Working Group, and will continue to coordinate with the Deputy Assistant Secretary for Intergovernmental and Tribal Affairs and DOE Tribal points-of-contact.

d. Local Interactions

OCRWM recognizes that local officials are uniquely qualified to provide information on transportation conditions and impacts within their jurisdictions and, accordingly, are important participants in developing plans for the transportation system. Interactions with local governments will be through designated State officials and directly as appropriate. In planning for safe, secure, and efficient shipping operations and emergency response capability, OCRWM will provide grants and technical assistance to States and Tribes for training of local public safety officials pursuant to Section 180(c) of the NWPA (see Section II.C 2). In addition, OCRWM will coordinate with other training providers, such as the DOE Transportation Emergency Preparedness Program, DHS (including the Federal Emergency Management Agency), and the DOT.

e. Nevada-Specific Interactions

Nevada-specific transportation planning activities will be done in coordination with the Affected Units of Government (AUGs). During preparation of the Nevada Rail Corridor SEIS and the Rail Alignment EIS to support the construction of a rail line linking the repository to the national rail system, OCRWM engaged the State, Tribal, and local governments, community leaders, land owners, and citizens in Nevada through scoping meetings and other interactions relating to potential rail alignment activities. Discussions have included such topics as impact mitigation, access to water and construction materials, and locations of construction camps and rail maintenance facilities. These interactions are expected to continue. Nevada representatives also participate in TEC and the Western Interstate Energy Board's High-Level Radioactive Waste Committee.

2. Current Status of Institutional Activities

Two key areas for which OCRWM is currently seeking stakeholder input are emergency preparedness and route selection.

a. Emergency Management

Shipments to Yucca Mountain will be made in robust casks certified by the NRC and will be monitored by satellite, escorted by armed guards, preceded by notifications to law enforcement, and subject to additional safeguards measures. This provides "defense in depth" from the standpoint of security as well as safety. In the unlikely event of an accident involving a DOE radioactive material shipment, incident command would be established based on the procedures and policies of the State, Tribal, or local jurisdiction in which the accident occurred. DOE has worked and will continue to work with State, Tribal and local response and law enforcement

authorities to plan for accidents, security incidents or other events that might occur. If requested, DOE would also provide technical advice and assistance including access to teams of experts in radiological monitoring and related technical issues.

Additionally, DOE is required by Section 180(c) of the NWPA to provide technical assistance and funds to States and Tribes through whose jurisdictions DOE plans to transport SNF and HLW to the proposed repository for training of local public safety officials. As discussed below, the training is to cover procedures for safe routine transportation of these materials, as well as procedures for addressing emergency response situations.

1. DOE Emergency Plan

DOE will develop an emergency plan that provides requirements and guidelines for DOE management personnel in the event of an off-normal or emergency situation during a shipment. The plan will provide specific guidance on appropriate response actions and notifications. These would be in addition to the immediate notifications and actions by the on-scene carrier personnel. The DOE emergency plan will contain a list of points of contact with State and Tribal emergency response agencies. The plan will also address coordination with on-scene response personnel as well as notifications and communications with other Federal, State, Tribal and local authorities. The plan will also address press and media briefing guidelines. In addition, carrier specific emergency plans are expected to be required under each carrier's contract with DOE.

2. Section 180(c) Implementation

Section 180(c) requires that DOE "provide technical assistance and funds to States for training for public safety officials of appropriate units of local government and Indian Tribes through whose jurisdiction the Secretary plans to transport spent nuclear fuel or high-level radioactive waste [to an NWPA-authorized facility]. Training shall cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations." DOE issued for public comment a revised proposed policy for implementing Section 180(c) on October 31, 2008 (73 FR 64933). OCRWM intends to conduct a pilot program involving a limited number of States and Tribes to test the implementation of the Section 180(c) grant procedures after evaluating public comments received on the revised proposed policy. DOE then plans to issue a new revised proposed policy for public comment and then to issue the final Section 180(c) policy prior to awarding the first 180(c) grants. The first grants are planned to be issued approximately four years prior to the commencement of shipments through a State or Tribe's jurisdiction. Subject to available appropriations, it is intended that funding assistance would last until shipments to the repository are completed.

Under the Section 180(c) revised proposed policy and subject to available appropriations, DOE currently anticipates making available two grants to eligible States and Tribes: (1) an assessment and planning grant and (2) an annual training grant. The assessment and planning grant would be available approximately four years prior to shipments commencing through a jurisdiction. The assessment and planning grant to each eligible State and Tribe will support an initial needs assessment to identify training needs that might be addressed in future training grants to that State or Tribe. Subsequently, DOE intends to issue training grants in each of the three years prior to a scheduled shipment through a State or Tribe's jurisdiction and every year that

shipments are scheduled. The particular funding allocations would be determined in accordance with the approach in the revised proposed policy.

Since State and Tribal governments have primary responsibility to protect the public health and safety in their jurisdictions, they would have flexibility to decide for which allowable activities to request Section 180(c) assistance to meet their unique needs. States and Tribes would be expected to coordinate with local public safety officials and to describe in their grant applications how they would use the grants to provide training to local public safety officials. DOE intends to allow a broad array of eligible planning and training activities, thus providing the recipients flexibility to direct funds toward their individual needs. DOE will require applicants to describe and justify the need for proposed activities, training, and purchases in the grant application package for review and approval by DOE.

Technical assistance to support Section 180(c) activities will consist of non-monetary assistance offering DOE's specific knowledge, expertise, and existing resources to aid training of public safety officials. Technical assistance could also include provision of information packets with materials about the OCRWM Program and shipments, and provision of other training materials and information. In addition, DOE has emergency management planning and training assistance available through EM's Transportation Emergency Preparedness Program (TEPP).

b. Route Identification

1. Truck Routes

Truck shipments of SNF and HLW would be shipped using preferred routes that reduce time in transit. A preferred route is an Interstate system highway, including beltways and bypasses or an alternative route selected by a State or Tribal routing agency in accordance with Title 49 of the Code of Federal Regulations using *Guidelines for Selecting Preferred Highway Routes for Highway Route-Controlled Quantity Shipments of Radioactive Materials* or an equivalent routing analysis that adequately considers overall risk to the public. Factors for analysis by the state or Tribal routing agency can include accident rates, traffic counts, distance, vehicle speeds, population density, land use, timeliness, and availability of emergency response capabilities. Substantive consultation with affected jurisdictions is required prior to designating an alternative route to ensure consideration of all impacts and continuity of designated route.

2. Rail Routes

Railroads are privately owned and operated, and shippers and rail carriers determine routes based on a variety of factors. Route selection for shipments to Yucca Mountain would involve discussions between DOE and the chosen rail carriers, with consideration of input from other stakeholders. Federal rules do not prescribe specific routes for SNF and HLW shipments by rail, although certain factors, as described below, must be considered in route selection.

DOT's Pipeline and Hazardous Materials Safety Administration, in coordination with the FRA and the Transportation Security Administration, has issued a Final Rule revising requirements in the Hazardous Materials Regulations applicable to the safe and secure transportation of certain hazardous materials transported in commerce by rail. The Final Rule requires rail carriers to compile annual data on these shipments, use the data to analyze safety and security risks along

rail routes where those materials are transported, assess alternative routing options, and make routing decisions based on those assessments to select the safest and most secure practicable route. Many factors are to be considered in the safety and security risk analysis of routes, including rail traffic density, time and distance in transit, track class and conditions, environmentally-sensitive or significant areas, population density, emergency response capability, past incidents, availability of practicable alternatives, and other factors.

3. Barge Routes

The U.S. Coast Guard issues regulations regarding the movement of barge shipments of SNF and HLW, including the use of particular facilities, waterways, and vessel and port security procedures. Handling regulations specific to SNF are found in Title 33 of the Code of Federal Regulations. The Coast Guard also designates safety zones and security zones that may apply to a specific port, facility, or waterway, or may describe a zone of exclusion around a moving vessel. DOE would meet or exceed these regulatory standards.

4. Preliminary Suite of National Routes

In advance of shipments, OCRWM plans to identify a preliminary suite of national routes that reflects consideration of the interests of a broad cross-section of stakeholders. Identification of the preliminary suite of routes would facilitate transportation planning activities and support a pilot program for providing Section 180(c) grants. Figure F shows the representative rail and truck routes analyzed in the Final Repository SEIS. These representative routes will be considered when identifying a preliminary suite of national routes.

OCRWM will work with carriers, States, Tribes, local officials, and other key stakeholders to identify routing criteria and to ensure the criteria are consistent with best practices and regulations. Broader public input will also be sought on routing. Additionally, industry standard practices, legislative and regulatory requirements will be considered as OCRWM identifies a preliminary suite of national routes. This approach is consistent with the National Academies' Committee on Transportation of Radioactive Waste 2006 report, *Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States.*

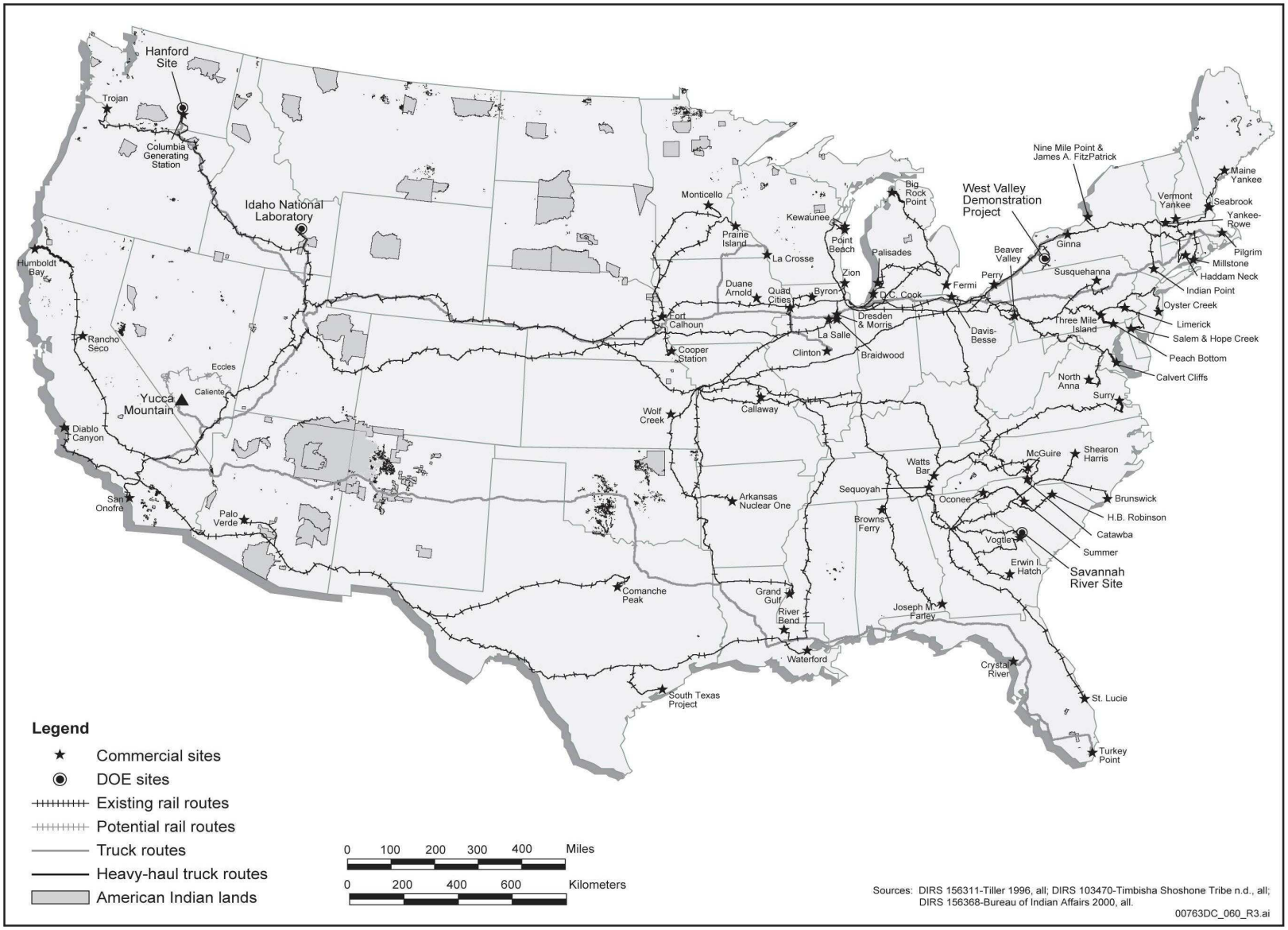

Figure F. Representative Rail and Truck Routes Analyzed in the Final Repository SEIS

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