

FINAL ENVIRONMENTAL IMPACT STATEMENT

on a

Proposed Nuclear Weapons Nonproliferation
Policy Concerning Foreign Research Reactor
Spent Nuclear Fuel

Appendix H General Provisions of Transportation Planning for the Shipments of Foreign Research Reactor Spent Nuclear Fuel



United States Department of Energy
Assistant Secretary for Environmental Management
Washington, DC 20585

Table of Contents

Table of Contents	iii
List of Figures	v

Appendix H

General Provisions of Transportation Planning for the Shipments of Foreign Research Reactor Spent Nuclear Fuel

.....	H-1
H.1 Overview	H-1
H.2 Transportation Considerations	H-1
H.2.1 Organizational Roles and Responsibilities	H-2
H.2.2 Advance Information	H-3
H.2.3 Tracking of Shipment	H-3
H.2.4 Implementation of United States/International Atomic Energy Agency Agreement	H-4
H.2.5 Packaging Description	H-4
H.3 Emergency Preparedness Considerations	H-5
H.3.1 Emergency Preparedness	H-5
H.3.2 Notifications and Communications	H-5
H.3.3 Emergency Response	H-6
H.4 Security Considerations	H-8
H.5 Communication Considerations	H-10
H.5.1 Public and Media Communication	H-10

List of Figures

Figure H-1 Typical Spent Nuclear Fuel Transportation Cask H-4

Appendix H

General Provisions of Transportation Planning for the Shipments of Foreign Research Reactor Spent Nuclear Fuel

H.1 Overview

This appendix is prepared to provide a description of the transportation, emergency response, security, and communications planning that would typically occur prior to any acceptance of foreign research reactor spent nuclear fuel under Management Alternative 1 or Management Alternative 3. Appendix H expands upon Sections 2.0 (Proposed Action and Alternatives) and 2.7 (Characteristics of Emergency Management and Response) in this Environmental Impact Statement (EIS). The information in this appendix is based on U.S. Department of Energy (DOE), State, Tribal, and local authorities' composite experience in planning for several successful radioactive material shipping campaigns, such as Urgent Relief Acceptance of Foreign Research Reactor Spent Nuclear Fuel and Cesium 137 Capsule Return Program shipments. This appendix is not meant to be all-inclusive as each shipping campaign differs slightly because of the material being shipped, the transportation mode, and the level of involvement of State, Tribal, and local governments.

The implementation of Management Alternative 1 or Management Alternative 3 would involve an ongoing and interactive planning process between DOE, States, Tribes, local authorities, other Federal agencies, the shipper of record/shipper's agent, and the carrier. In past shipping campaigns, these participants have developed an overall "Transportation Plan." This Plan is a blueprint for transportation, emergency response, security, and communications operations that would take place prior to, during, and after the completion of a shipment. Agreements between the various parties are detailed in the Plan. What follows is a description of the main elements of such a Plan. Additional information is available in the *DOE Program Manager's Guide to Transportation Planning* (DOE, 1995).

H.2 Transportation Considerations

Transportation planning integrates a wide range of expertise and requirements, including program management, material handling and packaging, transportation operations (traffic management), key governmental involvement, public information, environmental safety and health, and emergency preparedness. Planning would be clarified in a Transportation Plan that would document the planned logistics for foreign research reactor spent nuclear fuel shipments. The focus of this Plan would be operational; e.g., the handling, packaging, and transport of the foreign research reactor spent nuclear fuel shipment through sequential steps resulting in safe transport of this material to a management site. The plan would include organizational responsibilities of DOE, foreign research reactor operator/shipper of record, corridor jurisdictions and other Federal agencies. It would contain information on shipment schedules, the port(s) of entry, the mode of transport from port(s) of entry to a selected management site, an illustration of the shipment route, emergency plans and contacts, and communications strategies. The plan would include graphic representation of schedules of requirements for pre-, during, and post-shipment activities showing number of days to prepare, load, ship, unload and return the empty cask.

H.2.1 Organizational Roles and Responsibilities

DOE Headquarters: DOE Headquarters sets overall policy for the spent nuclear fuel program and for transportation, resolves policy questions, issues guidance, and provides information for use in transportation activities. DOE Headquarters provides a management team that offers general guidance and technical assistance to the field office implementing the program activities. As the responsible government agency for this program, DOE would ensure overall program coordination with involved organizations and agencies as outlined in this appendix. DOE is committed to providing corridor jurisdictions with technical assistance to help prepare for any shipments, and to supporting the management sites in implementing this program if foreign research reactor spent nuclear fuel is accepted into the United States. Prior to the implementation of a foreign research reactor spent nuclear fuel acceptance policy, DOE would coordinate with corridor jurisdiction authorities to resolve issues related to transport, emergency response, security, and communications management. DOE Headquarters would ensure, through contractual agreement, that the foreign research reactor operators comply with DOE's transportation, emergency response, security, and communications provisions, which exceed U.S. Nuclear Regulatory Commission (NRC) and/or U.S. Department of Transportation regulatory requirements.

Management Sites: The management site would be responsible for overall program management for shipments to the storage facility and transfer of spent nuclear fuel elements from the foreign research reactor to the management site. The management site would require shipping activities to be in compliance with applicable regulations and considerations. When necessary based on shipping experience and reactor operator capabilities, DOE would have a team of specialists from the management site travel to foreign research reactor facilities to verify that spent nuclear fuel and shipping arrangements meet DOE's transportation acceptance requirements. The management site would coordinate all communications activities with DOE Headquarters, other Federal agencies, and corridor jurisdiction authorities. Unloading and cross-site movement to a temporary storage facility would be conducted in accordance with management site operating procedures for acceptance and unloading of spent nuclear fuel.

Reactor Operators: The reactor operator would either perform the duties of the "Shipper of Record", as specified below, or contract with a shipping firm to act as the "Shipper of Record."

Shipper of Record: The Shipper of Record would submit a composite transportation physical security plan to the NRC, for domestic transport, which would contain a U.S. Department of Transportation-approved or State-designated route for highway or rail shipments. At DOE's request, the Shipper of Record would also develop its transportation planning document, which would address considerations such as vessel selection, pre-notifications, import authorizations, port arrangements, U.S. customs clearance, carrier arrangements, schedule, and emergency response. The reactor operator and/or the Shipper of Record are often referred to as the licensee. The licensee refers to the license that has been granted by the NRC to handle spent nuclear fuel.

Other Federal Agencies: Other Federal agencies would cooperate with DOE to ensure safe transportation of the foreign research reactor spent nuclear fuel. These agencies include:

Department of Transportation: The U.S. Department of Transportation would perform rail track inspections; ensure that each shipment was in compliance with the regulations for the transport of spent nuclear fuel; and serve as the U.S. Competent Authority in the review of foreign transportation packaging certificates. The U.S. Department of Transportation also maintains a list of State-designated alternative highway routes.

NRC: The NRC would be responsible for review and approval of the composite transportation physical security plan, which would include the routes submitted by the foreign research reactor operators or the shipper of record. The NRC could perform radiological monitoring of the transportation packages at the port.

Department of Defense: If a military port-of-entry were utilized, organizational responsibilities would be defined and agreed upon in advance between DOE and the U.S. Department of Defense. Interagency Agreements would be established between DOE and the appropriate U.S. Department of Defense element to define the provisions under which DOE would be allowed to ship through the U.S. Department of Defense port. Security and safeguard measures would comply with military requirements in addition to NRC requirements.

Corridor Jurisdictions: State, Tribal, and local authorities have primary responsibility for the health and welfare of their citizens. Most State, Tribal, and local emergency preparedness organizations have, as a minimum, the basic capabilities to respond to a transportation emergency. In addition, the following authorities could be exercised:

- Corridor jurisdictions could exercise responsibility for vehicle and equipment inspections.
- Corridor jurisdictions would be responsible for notifying DOE of any road, rail or weather conditions that could affect a shipment crossing their jurisdiction.
- Corridor jurisdictions would designate a central point of contact.
- Corridor jurisdictions would interact with local officials on information and emergency planning activities.
- If highway transport were utilized, DOE, corridor jurisdictions, and the carrier would jointly establish policies regarding bad weather/road conditions and safe parking procedures.

Carrier: The carrier would be responsible for safely transporting the spent nuclear fuel packages and transport containers from the port of entry to the management site. If a shipment were to be completed by rail, this responsibility would include ensuring that rail lines and equipment were properly inspected and in good operating order, following NRC approval of the composite transportation physical security plan, and coordinating with the corridor jurisdictions to arrange inspections as required. If shipment were by highway, this responsibility could include obtaining required State permits, using the designated highway route-controlled quantity route, and arranging for vehicle inspections, as required. The carrier would be required to have a transport plan addressing considerations such as emergency recovery, transportation regulation compliance, two-way communication with rail/truck operators, and subcontractor emergency response plans.

H.2.2 Advance Information

Prior to the transport of spent nuclear fuel within or through a State, the Shipper of Record would notify the Governor or the Governor's designee in writing.

H.2.3 Tracking of Shipment

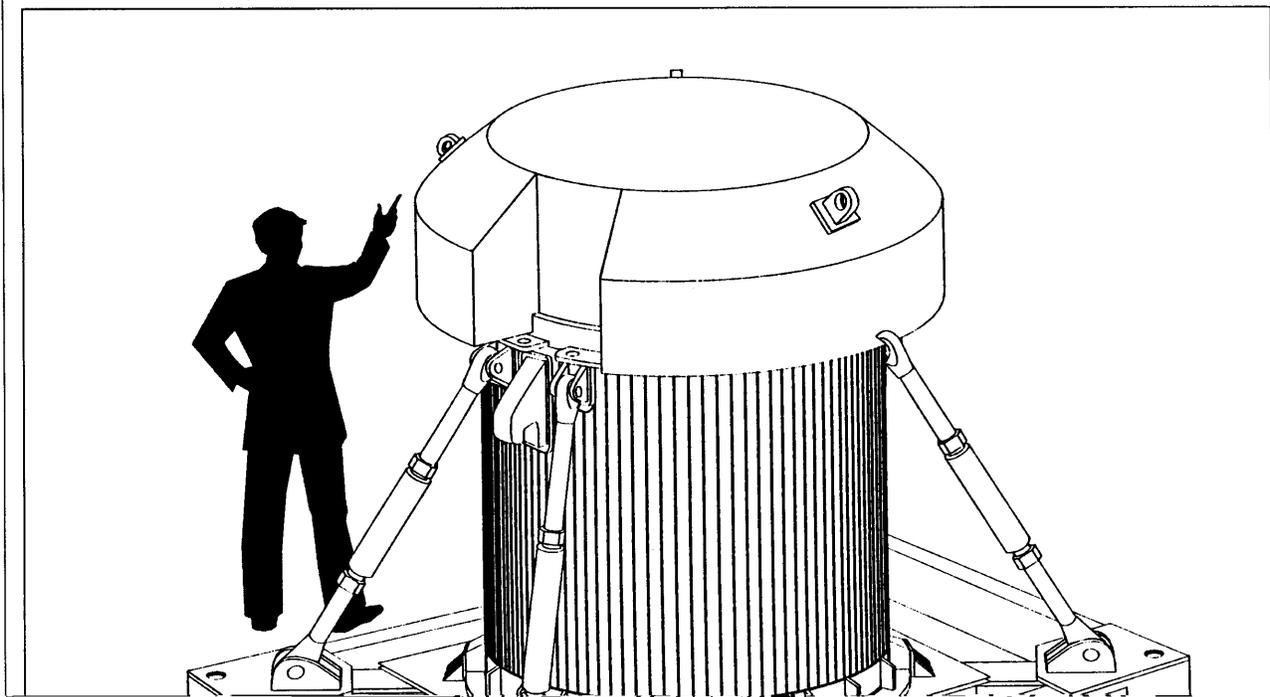
For shipments of foreign research reactor spent nuclear fuel, DOE policy would require that a satellite tracking/communication system be used.

H.2.4 Implementation of United States/International Atomic Energy Agency Agreement

The International Atomic Energy Agency is an agency of the United Nations headquartered in Vienna, Austria. The International Atomic Energy Agency establishes standards for radioactive materials transport. These model regulations may be adopted by individual nations. The emphasis of the International Atomic Energy Agency model regulations is on package integrity. The NRC and the U.S. Department of Transportation both periodically review and revise their regulations to bring them into general accord with the International Atomic Energy Agency regulations.

H.2.5 Packaging Description

The packaging for transporting spent nuclear fuel is designed to provide containment of its contents as required by international and Federal regulation. Type B packages, used to transport spent nuclear fuel, are designed to protect and retain their contents in both normal and severe accident conditions. Foreign-licensed Type B package designs are reviewed and approved for acceptance by the U.S. Department of Transportation. Figure H-1 displays a transportation cask typically used to transport spent nuclear fuel.



H.3 Emergency Preparedness Considerations

Emergency preparedness for transport of spent nuclear fuel is a vital part of the transportation planning process. Corridor jurisdictions having authority over areas through which these shipments would pass have primary responsibility for protecting the public and the environment and for establishing incident command in the unlikely event that an emergency should occur involving the shipments. DOE would work with State, Tribal, and local authorities to complement existing emergency preparedness capabilities. The carrier for these shipments would be responsible for providing emergency response assistance and recovery/restoration actions, if required. DOE would provide technical operations advice and radiological monitoring assistance to civil authorities and carriers of these shipments, when requested.

H.3.1 Emergency Preparedness

Corridor jurisdiction authorities have primary responsibility for the health and welfare of their citizens. Most States maintain specialized teams capable of responding to hazardous materials incidents. Through the capabilities these teams currently possess for dealing with potential accidents involving other hazardous materials (i.e., hazardous chemicals), they should already have the capability to deal with most plausible accidents involving spent nuclear fuel. Nevertheless, to assist in planning and preparedness for an unlikely but theoretically possible transportation emergency involving any foreign research reactor spent nuclear fuel shipments, DOE would offer a variety of emergency response resources and information to complement existing emergency preparedness programs, and also maintains a comprehensive emergency management system, particularly for radiological emergencies. The emergency management system includes training courses, Regional Coordinating Offices, and DOE Radiological Assistance Program teams.

Corridor Jurisdictions Hazardous Materials or Radiological Response Teams: Most corridor jurisdictions maintain specialized hazardous materials response teams that could be activated to provide technical assistance and mitigation during emergencies. State teams are activated at the request of an Incident Commander or other appropriate State or local authority.

Carrier Emergency Response Assistance: The carrier would provide technical response assistance to corridor jurisdiction responders as required by event scene conditions.

DOE Radiological Assistance Program: DOE's Radiological Assistance Program teams are administered by eight Regional Coordinating Offices. Each Regional Coordinating Office has access to radiological monitoring and assessment capabilities to provide assistance in radiological emergencies. Additional DOE technical experts are available to provide advice on material characteristics and mitigation, packaging and its tie-downs, and radiological monitoring and assessment requirements.

H.3.2 Notifications and Communications

In the unlikely event of a transportation incident involving foreign research reactor spent nuclear fuel, the carrier operator would notify the appropriate State and local authorities, the carrier dispatch center, and the management site communication center. The management site would also inform the appropriate corridor jurisdiction authorities. In any case, State, Tribal, and local authorities would be tied into the transportation plan's communication network arranged for the shipment.

The management site would serve as the designated communication center. DOE policy for transporting foreign research reactor spent nuclear fuel requires that a satellite communication system be used. The carrier may also provide its own transportation tracking system. Further details for the notification, communications, and other responsibilities of the communication center would be outlined in the Shipper of Record's transportation plan.

H.3.3 Emergency Response

If an accident requiring emergency response were to occur, the following emergency-related roles and responsibilities would be provided:

Carrier Response: If an accident were to occur, the carrier operator and/or escort would notify local emergency response personnel as predetermined in both the DOE and Shipper of Record's Transportation Plans. They would also undertake first aid actions and initial incident scene control, provide assistance to first responders, and other emergency actions as defined in the carrier's emergency plan. The carrier operator would provide technical response assistance to State, Tribal, and local responders as required by event scene conditions.

First Responders: Local emergency response personnel would respond to the incident scene when notified by a predetermined notification network initiated by the "Initial Responder." Their first action would be the evaluation of the accident scene (with assistance from the "Initial Responder") for the presence of radiological or other hazards. The response personnel would then act to reduce the hazard and control the event scene. The coordination of the accident scene would typically be under the Incident Command System utilized by local fire departments.

Responders would have information sources available to them in the form of the Department of Transportation *Emergency Response Guidebook* and by available emergency response information accompanying the shipping papers and normally available to responders in the vehicle, or accessible via the satellite communications and tracking system. Response to other hazards identified at the accident scene would be guided by information also contained in the Emergency Response Guidebook or other appropriate protective measures and response guidelines. In all cases, the Incident Commander would be a corridor jurisdiction authority. If States and local responders have additional procedures that provide more specific guidance, responders would follow those procedures.

Local organizations typically involved in first on-scene response include:

- Law enforcement,
- Emergency medical services,
- Cognizant transportation department,
- Hazardous materials team, and
- Fire services.

Responder Support: Response organizations would arrive at the incident scene to support and assist the initial and first on-scene responders as requested by the "First Responders." The Incident Commander would coordinate the actions of these trained personnel coming from agencies within or outside the initial response jurisdiction. Requests for resource augmentation could be performed through local mutual aid associations as part of a response support network. Utilization of response resources would be based upon

communication and coordination with State, Tribal, and local agencies, and shipper/carrier response personnel. For incidents that exceed the capabilities of local, State, or Tribal government, Federal assistance could be requested from DOE. DOE could provide Radiological Assistance Program teams that include personnel and instruments for radiological monitoring, provide medical advice, and request assistance from other Federal agencies.

"Responder Support" assistance could involve traffic and/or access control, support of incident mitigation activities, appropriate notification (hospitals, mutual-aid emergency management system), technical assistance for assessment of health risks, and coordination of emergency health services or technical assistance for assessment of environmental risks and coordination of emergency planning for cleanup and recovery as defined in applicable emergency response plans. Organizations typically involved in responder support include:

- Fire services,
- Law enforcement,
- Cognizant transportation department,
- Hazardous materials team,
- Health protection oversight,
- Environmental oversight, and
- DOE Radiological Assistance Program team.

Package Recovery Actions: If package recovery, repositioning, or placement on another vehicle were required, provisions for necessary service would be prearranged. The carrier would have primary responsibility for package and transporter recovery operations. These activities would not begin until the emergency phase of any accident was terminated, following a decision that no radiological or other hazard was present. Recovery planning is initiated prior to termination of an emergency. DOE would assist the carrier in recovery operations where appropriate. Specific procedures for shipping cask recovery would be included in the shipper of record's agent/carrier's transportation plan. Corridor jurisdictions could exercise highway vehicle inspection authority before permitting the recovery vehicle to continue to a management site. Organizations typically involved in recovery actions include:

- Shipper's representative
- Carrier representatives,
- Management sites representative,
- DOE contractor representatives, and
- State, Tribal, and local authorities.

Cleanup and Incident Scene Restoration: In over forty years of experience with spent nuclear fuel shipments, there has never been an incident in which a spent nuclear fuel transportation cask has released any of its contents, even as a result of an accident. In the unlikely event that there was a release of radioactive material, DOE would be ready to provide whatever assistance was needed to respond to the situation. On the other hand, cleanup of nonradioactive aspects of an accident and scene restoration are a

part of any accident response. The carrier would have primary responsibility for cleanup and site restoration following an emergency and would provide the necessary resources. Cleanup planning could be initiated prior to termination of an emergency. Standards for such actions would be established by regulation and by authorities in the affected jurisdiction(s). Organizations typically involved in cleanup/restoration oversight actions include:

- Carrier representatives,
- Carrier cleanup/restoration representatives,
- Management site representative,
- DOE contractor representatives,
- Federal environmental oversight, and
- State, Tribal, and local authorities.

Carriers are financially responsible for accident response. The carrier is responsible for maintaining \$5 million of insurance to cover costs incurred from an accident. Cost incurred by local first responders (firefighters, police, etc.) to an incident scene are part of the carrier's financial responsibility. Further, the Price-Anderson Amendment Act ensures coverage of cost incurred beyond the \$5 million carrier limit for

spent nuclear fuel accidents. The Price-Anderson Act was partly established to ensure that funds are available to compensate the public for personal injury and property damage caused by the release of radioactivity (NRC, 1988). Such coverage would only take effect if the Price-Anderson Act conditions are met such as the resultant damage from the release of radioactivity during the accident exceeded the liability protection of the carrier.

H.4 Security Considerations

Domestic transportation of the foreign research reactor spent nuclear fuel would be regulated by the U.S. Department of Transportation and NRC. The objectives of the security measures employed during foreign research reactor spent nuclear fuel shipments would be to minimize the possibility of unauthorized

GENERAL PROVISIONS OF TRANSPORTATION PLANNING FOR THE
SHIPMENTS OF FOREIGN RESEARCH REACTOR SPENT NUCLEAR FUEL

response to a security event or a call for assistance. Advance NRC approval of the U.S. Department of Transportation or State-designated alternative routes used for road and rail shipments of spent nuclear fuel, and of any U.S. ports where vessels carrying spent nuclear fuel shipments were scheduled to stop would be required. Shipments would be planned so that scheduled intermediate stops would be avoided to the extent practicable; at least one escort would maintain visual surveillance of the shipment during periods when the shipment vehicle was stopped, or the shipment vessel was docked. Shipment escorts would make calls to the communications center at least every two hours to advise of the status of the shipment for road and rail shipments, and for sea shipments while shipment vessels were docked at U.S. ports. These escorts (other than members of local law enforcement agencies, or ship's officers serving as unarmed escorts) would have successfully completed required training. In addition to NRC licensee requirements, DOE and the licensee could develop extra-regulatory guidelines, as necessary. These guidelines would be established in the overall transportation plan.

Shipment by Sea: The management site would provide a representative at the shipment point of origin to observe the preparation and loading of the material. NRC could also send a representative to the point-of-origin to inspect transport packages and conduct radiological surveys prior to departure.

Advance NRC approval of the routes used for road and rail shipments of spent nuclear fuel, and of any U.S. ports where vessels carrying spent nuclear fuel shipments were scheduled to stop is required. The local law enforcement agencies, at U.S. ports where the ship was docked, would be contacted and arrangements would be made for their response in the event of an emergency situation concerning the spent nuclear fuel.

A shipment vessel, while docked at a U.S. port within a heavily populated area, would be protected by two armed escorts stationed on board the shipment vessel, or stationed on the dock at a location that would permit observation of the shipment vessel; or a member of a local law enforcement agency equipped with normal local law enforcement agency radio communications, who would be stationed on board the shipment vessel, or on the dock at a location that would permit observation of the shipment vessel.

A shipment vessel, while within U.S. territorial waters or while docked at a U.S. port not within a heavily

escorts would have the capability to communicate with their communications center, each other, and the local law enforcement agency. The local law enforcement agency would be able to direct a prompt response to counter a threat to the spent nuclear fuel. The transport vehicle would be equipped with a feature approved by the NRC, which would allow the driver or on-board escort to immobilize the cab or cargo-carrying portion of the vehicle should an attempt be made to seize control of the vehicle. Both the driver and the on-board escort would have appropriate training.

Shipment by Rail: The NRC requires advance approval of the routes used for rail shipments of spent nuclear fuel. A rail shipment car within a heavily populated area would be accompanied by two armed escorts (who are often members of the local law enforcement agency). At least one escort would be stationed at a location on the train that would permit observation of the shipment car while in motion.

A rail shipment car outside heavily populated areas would be accompanied by at least one escort stationed at a location on the train that would permit observation of the shipment car while in motion. Escorts would have the capability to communicate with the communications center and the cognizant local law enforcement agency.

Reporting of Safeguards Events: The Shipper of Record would notify the NRC Operations Center within one hour of discovery of credible threat (e.g., theft or significant physical damage), entry of unauthorized person, or failure/degradation in a safeguard system. Other notification time criteria would be put in place for less significant safeguards events.

H.5 Communication Considerations

In the case of extended or high visibility shipping campaigns, such as in the implementation of Management Alternative 1 or Management Alternative 3, a written public and media communications plan would be included in the overall Transportation Plan. The communication plan would generally be completed by public affairs personnel at the management sites (in cooperation with State, Tribal, and local authorities). The purpose of this plan is to ensure the exchange of accurate and timely information among the foreign research reactor operators (and their agents, if applicable), the States and Tribes, other Federal agencies, the public, and the media.

H.5.1 Public and Media Communication

The public and media communication plan for a foreign research reactor spent nuclear fuel shipment would establish public information points of contact for each agency and jurisdiction through which a shipment would pass, coordinate public education and information activities in those jurisdictions, promote communication among shipment participants by keeping State, Tribal, and local points of contact informed, and detail the procedures and sources of information in the event of an accident or other incident. To accomplish these goals, the communication plan could include the following:

Roles and Responsibilities: The roles and responsibilities of the management site, the States and Tribes, other Federal agencies, the Shipper of Record or the shipper's agent, the land carrier, the port authorities, and regional State association (if any) would be detailed.

Congressional and State Notification: DOE Headquarters Congressional and Intergovernmental Liaison Office would make appropriate Congressional notifications and respond to requests from Congressional staff and elected officials for additional information. Prior to the transport of spent nuclear fuel within or through a State, the Governor of that State would be notified in writing.

Stakeholder, State and Tribal Notification: The management site, States, and Tribes generally provide for appropriate stakeholder and special interest group notification, as needed, and would respond to requests from stakeholders for additional information consistent with NRC regulations concerning safeguards.

Media Interactions: Media interactions would be coordinated by the management site and would take place prior to the shipment, during the shipment, at the port of entry, after arrival at the management site, and at the completion of the shipment. These activities could range from the press briefings prior to the first shipment to a complete listing of State, Tribal, and local media print and broadcast media, to broad distribution of press releases, radio and TV news spots with accompanying factsheets, videos, and other information materials.

Public Interactions: The management site would interact with the public by answering questions, conducting briefings and meetings, and disseminating material. The States and Tribes often choose to distribute additional information packages through their emergency response organizations, civic and service organizations, local government agencies, or other special interest groups.

Emergency Procedures: In the unlikely event of an accident or an incident, the management site, the Shipper of Record or its agent, and the State, Tribal, and local authorities have a coordinated approach to dealing with information about the emergency, providing timely information to the press and to the pre-established State and local contacts.

References

DOE (U.S. Department of Energy), 1995, *Program Manager's Guide to Transportation Planning*, Office of Transportation, Emergency Management, and Analytical Services of the Office of Environmental Management, Washington, DC, June.

NRC (U.S. Nuclear Regulatory Commission), 1988, *The Price-Anderson System*, NUREG BR-0079, Office of Nuclear Reactor Regulation, Washington, DC.