

SUCCESS AND CHALLENGES IN TRANSPORTING FOREIGN RESEARCH REACTOR SPENT NUCLEAR FUEL

Mr. William D. Clark, Jr.
Manager, Spent Nuclear Fuel Program
U.S. Department of Energy
Savannah River Operations Office

ABSTRACT

The U.S. Department of Energy (DOE) resumed shipments of foreign research reactor (FRR) spent nuclear fuel (SNF) to the Savannah River Site (SRS) in 1996, completing seven shipments in the first two years of a 13 year program. While the foreign aspects of the shipments have continued much as they did for shipments in the 1960's through the 1980's, the domestic transportation of this material has been unique and consistently a challenge. Each shipment has been conducted in an entirely safe manner. But each shipment has also been different. Extensive transportation planning involving affected State and Federal agencies was conducted prior to the first shipment. Rail has been the preferred mode of travel versus the historical preference for truck. Security, radiological protection, and emergency preparedness have received special scrutiny. The first seven shipments of FRR SNF to SRS have provided opportunities for DOE to solve problems in real time and incorporate those issues into lessons learned for all future shipments. Among the challenges that have arisen in these early shipments are: all aspects of communications, interactions with local communities along the routes, public notifications of shipments, compliance with applicable regulations, oversight of transportation activities, and the coordination of the large number of personnel and organizations required to make the activity a success.

This paper will review the major challenges associated with the FRR SNF shipments to SRS and the resolutions that have been developed for each situation. The successes noted for each shipment will be reviewed. In addition, a look ahead at future challenges in transporting FRR SNF will be provided.

INTRODUCTION

The U.S. Department of Energy (DOE) resumed shipments of foreign research reactor (FRR) spent nuclear fuel (SNF) to the Savannah River Site (SRS) in 1996, completing seven shipments in the first two years of a 13 year program. While the foreign aspects of the shipments have continued much as they did for shipments in the 1960's through the 1980's, the domestic transportation of this material has been unique and consistently a challenge. Each shipment has been conducted in an entirely safe manner. But each shipment has also been different.

Extensive transportation planning involving affected State and Federal agencies was conducted prior to the first shipment. Rail has been the preferred mode of travel versus the historical preference for truck. Security, radiological protection, and emergency preparedness have

received special scrutiny. The first seven shipments of FRR SNF to SRS have provided opportunities for DOE to solve problems in real time and incorporate those issues into lessons learned for all future shipments. Among the challenges that have arisen in these early shipments are: all aspects of communications, interactions with local communities along the routes, public notifications of shipments, compliance with applicable regulations, oversight of transportation activities, and the coordination of the large number of personnel and organizations required to make the activity a success.

The FRR SNF shipment program expires in May, 2009. Until that time, four to six shipments from overseas will be made annually to SRS. One or two per year will be made to the Idaho National Engineering and Environmental Laboratory (INEEL). Many more shipments will be made to SRS annually over land if and when the Canadians choose to participate in the program. Each of these will present opportunities to improve the transportation process.

PAST SUCCESSES

In May of 1996, DOE began planning for the first of about 100 shipments of FRR SNF to SRS. This initial planning effort involved agencies from South Carolina, DOE, and other federal agencies. An integrated transportation plan was developed with input from all parties. Security, emergency preparedness, health physics, and public communications were consolidated into a single plan. The transportation plan was not so prescriptive that unforeseen circumstances could not be addressed in real time as they arose.

Among the unique issues that had to be addressed in preparation for the first shipment, and every shipment since then, were time restrictions. In cooperation with the State, the Port Authority, the U.S. Coast Guard, and the Naval Weapons Station – Charleston (NWS-C), specific windows of opportunity for the ships to transit from the sea buoy through Charleston harbor to NWS-C. An effort was made to conduct as much of the offloading and transportation operations during daylight hours. A requirement to limit residence time at NWS-C to 24 hours was included with the intent to limit residence time to a minimum to avoid conflicts with defense related activities at the facility. Ship schedules have been modified to avoid conflicts with defense related activities at NWS-C.

Other considerations include managing the number of people and organizations involved with a shipment. Typically, approximately 50 non-NWS-C personnel play some role in the performance of a shipment. This has led to DOE holding a shipment planning meeting on the day before a shipment to ensure all preparations are completed and the required support is available. Similar to pre-shipment briefings, post-shipment lessons learned are also used to ensure continuous improvement.



Figure 1 - FRR SNF Shipment Offloading Operations

One issue that arose early in the shipment planning process was how to best ensure the shipment arrives at SRS in a timely manner. Since commercial rail service is utilized, these special shipments must be routed with all of the other shipments on CSX's rail lines. A portion of the route from Charleston to SRS comprises the main north-south rail line along the east coast and is heavily traveled. In addition, because of Federal Railroad Administration (FRA) requirements limiting crew duty time to 12 hours, the crew that started the shipment in the early morning hours at NWS-C was hard pressed to complete the shipment to SRS. To address these concerns, a special meeting was convened between DOE, NWS-C, CSX, FRA, and South Carolina State Law Enforcement Division to develop an acceptable path forward. Crew changes now take place prior to the shipment leaving the main yard in Charleston. The CSX dispatch personnel make every effort to minimize the transit time of the FRR SNF shipments by limiting the number of stops to allow larger, quicker trains to pass.

Unique solutions to issues that have arisen during shipments have been developed and become part of the normal way of doing business. Use of standardized radiological survey forms for the containers and railcars is an example. Use of a shipment checklist during wharf operations to ensure all parties concur with planned actions has become a standard part of every shipment.

The shipments conducted to date have had the benefit of enhanced oversight by DOE, the State of South Carolina, the FRA, the Nuclear Regulatory Commission (NRC), and others. These organizations have worked together in a professional manner to ensure the safety of the shipments. Pre-inspections, joint survey teams, pre-staging of equipment, early preparation of documentation and paperwork, and round-the-clock communications are just a few of the

initiatives that have been taken by the organizations involved in these shipments to ensure their safe, timely completion.



Figure 2 - FRR SNF Shipment in Transit

FUTURE CHALLENGES

During 1999, DOE will undertake the next major portion of the FRR SNF transportation program, the movement of Training, Research, Isotope, General Atomics (TRIGA) SNF through the NWS-C to SRS and then cross country to INEEL. DOE-Savannah River Operations Office, in cooperation with the DOE-Idaho Operations Office and DOE-Headquarters, began this effort in the fall of 1998. An approach that utilizes three regional energy groups, the Southern States Energy Board, the Council of State Governments – Midwest, and the Western Governors Association, to communicate with the 15 or so states affected by these shipments was selected. Affected Tribal Nations have been invited to participate in the planning process as have federal agencies involved in the oversight of these shipment including the Department of Transportation and NRC. The first meeting of the Cross Country Transportation Working Group (CCTWG) was held in Savannah, Georgia in early December, 1998. From that meeting more than 100 issues and concerns were identified that must be addressed in preparing for these shipments.

The challenges in undertaking the transportation planning for such a shipment include managing a large group of professionals, ensuring that all issues are documented and resolved, communications, and timely decision making. Current plans call for the second of three meetings of the CCTWG to occur in March, 1999 with a focus on the draft transportation plan, route selection, and issue resolution. The third meeting will be held in May-June, 1999 with the primary objective of that meeting being tabletop exercises. The culmination of the 11 month

planning effort will be the successful shipment of 5 casks of TRIGA SNF from SRS to INEEL in late summer, 1999.

One concern that is beginning to be identified frequently is a lack of coordination and integration between DOE's many transportation planning efforts. Many states are affected by planning for shipments of transuranic waste to the Waste Isolation Pilot Project in New Mexico. Some states are looking ahead to projected shipments of DOE-owned radioactive and/or hazardous materials across their highways. The plea from these states is for DOE to coordinate its efforts, pool its resources, and standardize its approach so that the states can effectively use their resources in planning for future shipments. DOE's National Transportation Program has undertaken this task and is actively working to resolve the concerns.

One of the real threats to the continued success in the transportation of FRR SNF is complacency. Seven shipments by rail and one by truck have been made under the program, not counting the two made by rail under the urgent relief program in 1994-1995. There is a sense of routineness to the shipments now. Failure on the part of DOE or any organization involved in making the shipments safely and efficiently to diligently execute the transportation plan for these shipments could eventually lead to a mistake. An accident or even a failure to execute a shipment in compliance with applicable regulations would severely erode the public confidence and trust built by DOE with the successful completion of past shipments.

From a transportation planning perspective, the last remaining challenge will be the resumption of Canadian shipments by truck to SRS. The Canadians have deferred a decision on participation in the program pending a national policy decision of spent fuel management. Should they decide to participate, a whole new set of states will be involved in planning for transportation of SNF from Canada. Trucks will likely be preferred over rail. The frequency of the Canadian shipments will also be different than overseas shipments with 20-40 single cask truck shipments being made between April and September each year. DOE would undertake such a campaign much as the FRR SNF shipments to SRS and the cross country shipments have been planned. These shipments are not likely to begin before 2001.

CONCLUSIONS

DOE's FRR SNF receipt program has made significant accomplishments during the first three years. A new way of doing business working in full cooperation with State and Federal agencies to ensure safe shipments has become the norm. Technical and administrative issues can be resolved in real time. Professionalism is evident in all aspects of the shipments.

New and different challenges lie ahead. A process similar to the one used for shipments from Charleston to SRS will be used to plan for the shipments across the United States to INEEL and for shipments from Canada. Attention to detail, compliance with applicable requirements, and execution of the transportation plan must be maintained.