



**PROGRESS OF THE UNITED STATES
FOREIGN RESEARCH REACTOR
SPENT NUCLEAR FUEL ACCEPTANCE PROGRAM**

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ABSTRACT

The United States Department of Energy (DOE), in consultation with the Department of State (DOS), adopted the Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel in May 1996. To date, the Foreign Research Reactor (FRR) Spent Nuclear Fuel (SNF) Acceptance Program has completed 23 shipments. Almost 5,000 spent fuel assemblies from eligible research reactors throughout the world have been accepted into the United States under this program. Over the past year, another cross-country shipment of fuel was accomplished, as well as two additional shipments in the fourth quarter of calendar year 2001. These shipments attracted considerable safeguards oversight since they occurred post September 11. Recent guidance from the Nuclear Regulatory Commission (NRC) pertaining to security and safeguards issues deals directly with the transport of nuclear material. Since the Acceptance Program has consistently applied above regulatory safety enhancements in transport of spent nuclear fuel, this guidance did not adversely effect the Program. As the Program draws closer to its termination date, an increased number of requests for program extension are received. Currently, there are no plans to extend the policy beyond its current expiration date; therefore, eligible reactor operators interested in participating in this program are strongly encouraged to evaluate their inventory and plan for future shipments as soon as possible.

Introduction

The Foreign Research Reactor (FRR) Spent Nuclear Fuel (SNF) Acceptance Program, in the sixth year of implementation, has completed 23 shipments safely and successfully to date. 27 countries have participated so far, returning a total of 4,957 spent nuclear fuel elements to the United States for management at Department of Energy (DOE) sites in South Carolina and Idaho. 19 of the 23 shipments, containing aluminum-based spent nuclear fuel from research reactors, went to the Savannah River Site (SRS) in South Carolina. The other four, containing Training, Research, Isotope, General Atomic (TRIGA) spent nuclear fuel, were transported to the Idaho National Engineering and Environmental Laboratory (INEEL). The FRR SNF Acceptance Program focuses on the planning and implementation of these shipments of research reactor spent fuel to the United States in support of worldwide nuclear nonproliferation efforts. Along with shipment logistics, the Department continues to address many other issues of importance to the program. Resolution of these issues is important in helping to improve our implementation activities.

Discussion

Several implementation successes were achieved over the past year in the Acceptance Program. Between January 2001-2002, a total of five shipments were safely completed under the program. Spent fuel from Argentina, Chile, Austria, Sweden, the Netherlands, Germany, Japan and Denmark entered the United States at the Charleston Naval Weapons Station (NWS) and was shipped by rail or truck to the SRS. In July of 2001, the third cross-country shipment of TRIGA spent fuel, German fuel arriving at the Charleston NWS, was safely completed. The cross-country shipment of TRIGA fuel, consisting of 126 spent fuel elements in 3 casks, was accomplished by truck shipment from SRS to the INEEL. This shipment encountered the usual high level of public and media interest in response to the movement of nuclear material, and extensive discussions were held among the DOE and State government officials along the planned transportation route. By working together closely with federal, State and international contacts during the planning stages, we were able to ensure that when the time came for shipment, the transport would occur smoothly. Approximately one cross country shipment per year is expected over the remaining eight years of the Acceptance Program, and DOE will build upon lessons learned from this and other cross-country shipments in making future plans.

This year also saw larger numbers of casks entering the United States as part of a single shipment. On July 19, 2000, a revision to the *Record of Decision (ROD) on a Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel* was published in the U.S. Federal Register. This revision increased the maximum number of casks on a single ocean-going vessel to 16. The May 1996 ROD limited the number of casks containing spent fuel on a single ocean-going vessel to eight, based upon the analysis in the *Final Environmental Impact Statement on a Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel*. At the time the ROD was issued, the worldwide supply of spent fuel casks available for use in transporting FRR SNF was very limited, and thus DOE forecasted that no more than eight casks could be made available to support any one shipment. However, since 1996, the worldwide supply of spent fuel casks has increased to the point where it is possible to transport up to sixteen casks on a single ocean-going vessel, thus potentially helping reduce the number of ocean transits and saving money for both high-income economy shippers and DOE. This revision to the ROD was first put to use in October 2001, when a total of 12 casks, containing a total of 438 fuel elements, were received at the Charleston NWS in a single shipment and then transported to the SRS.

The FRR SNF program continues to be successful in large part due to the aggressive planning efforts between the United States and those countries eligible to ship their research reactor fuel. It is imperative that cask licensing be initiated as soon as possible in the planning process. The 2001 cross-country shipment came dangerously close to being rescheduled because of significant delays regarding receipt of cask application materials and responses to requests for additional information from the Nuclear Regulatory Commission (NRC). The shipment timeline was saved due to extended efforts of many involved, including the German licensing authority and the NRC. The Acceptance Program enjoys a very professional working relationship with NRC staff and as such, wishes to take every measure possible to respect this relationship by ensuring that cask applications are timely and complete. In the past the Acceptance Program may have been able to rely on NRC to readjust its workload to accommodate a special request for package review and certification under less than optimum deadlines. However, the post-September 11 environment now has U.S. federal staff weighted down with evaluations into safeguards practices and preventive measures. Timelines for cask application submittals must be closely adhered to, and allowing more time for review is always a welcome move. In addition, it is important that we continue to schedule shipments as soon as possible in order to allow for as much spent fuel to be shipped to the United States over the remaining seven years of the program. It is also important to note that countries interested in participating in the Program should express their interest as soon as possible so that fuel and facility assessments can be scheduled and shipments may be entered in

the long-term shipment forecast. The Program may not be able to accommodate a large number of last minute requests, particularly from geographically isolated regions. With more casks available for shipment and more casks allowed on a single ocean-going vessel, and with transportation plans into and across the United States established and implemented, shipments can be made more efficiently for all parties involved. Although some reactor operators and contractors have voiced support for extension of the program expiration date, it should be understood by all involved parties that the DOE has no plans, at this time, to seek extension of the FRR SNF Acceptance Policy. We remain committed to our program goals and hope to work with all remaining eligible research reactors to plan for shipments of their eligible spent fuel. The DOE continues to support research reactor operators' needs and would be happy to meet any interested parties to discuss the program.

A primary goal of the Acceptance Program is to support worldwide nonproliferation efforts by shipping high enriched uranium (HEU) of U.S.-origin to the United States for management and disposition. Integral to this process is the U.S. assistance offered in helping reactor operators convert their cores to low enriched uranium (LEU) as the reduced enrichment fuels become qualified and available. In addition, DOE plays a strategic role in ensuring a supply of enriched uranium for fuel fabrication. In the Acceptance Program, we realize our primary goal is intertwined with the missions of the Reduced Enrichment for Research and Test Reactors Program and the Enriched Uranium Operations group out of DOE's Y-12 plant in Oak Ridge, TN. We remain committed to working with staff in these other program offices within DOE to do whatever we can to assist in smooth transitions of core enrichment level and a steady supply of fuel.

The first research reactor to benefit from these policy changes within DOE was the High Flux Reactor (HFR) at the Joint Research Center in Petten, the Netherlands. On January 10, 2000 a diplomatic note was signed between the Government of the U.S. and the European Commission concerning supply of HEU for the HFR reactor and subsequent shipments of spent research reactor fuel from this facility to the United States. Petten has agreed to convert the core to LEU by May 2006. The U.S. has agreed to export HEU to France, for fabrication into fuel assemblies for Petten, while Petten awaits license approval for the converted core. This will allow Petten to continue operation pending regulatory approval and conversion. The Department has a contract with Euratom for the sale of material for Petten. Shipment of the first batch of fresh HEU occurred in 2001.

As alluded to earlier, security issues are now occupying a central focus as a result of the September 11 terrorist attack. The DOE, working in conjunction with international, federal, State, Tribal and local authorities, is re-examining procedures and requirements for transport of radioactive material, particularly commodities such as spent fuel. A temporary halt on all DOE-owned shipments of radioactive material in the U.S. was ordered by senior DOE management immediately after the September 11 attack, and again in October after commencement of the air campaign over Afghanistan. This action was taken in conjunction with other security measures throughout the DOE weapons complex and the nation at large. DOE was, and is, in constant contact with the Federal Bureau of Investigation, the Department of Defense, the Nuclear Regulatory Commission and other federal agencies responsible for transportation and infrastructure safety.

Historically spent nuclear fuel shipments have not been considered attractive targets for terrorist attack or sabotage, and threat assessments undertaken by law enforcement since last September seem to corroborate this view. However, across the globe spent fuel shipments are a matter of high concern for public officials due to the perceived perception that spent fuel transportation presents a heightened risk as compared to transport of other hazardous materials (e.g. propane and liquid natural gas). In addition, inspection, escort and other enforcement duties related to safe, routine transport can tax law enforcement and emergency response assets that could otherwise be deployed elsewhere.

Within the United States, discussions and advances concerning the Yucca Mountain permanent geologic repository have renewed and invigorated ardent support, both pro- and anti-nuclear. Major steps have recently been taken in the U.S. with respect to identifying and backing Yucca Mountain as the proposed permanent geologic repository. The public has voiced opinions on both ends of the anti-nuclear spectrum; they are not comfortable with transport of nuclear material across interstate roadways, nor are they comfortable with having spent fuel and other high level radioactive waste stored at the 131 temporary storage facilities across the United States. Like others interested in permanent disposition of spent fuel, the Program continues to monitor closely developments in this issue.

Conclusion

We will have many challenges in 2002 as we resume planning for cross-country shipments of spent nuclear fuel for the first time since September 11. The United States, and likely as well for the international nuclear transport community, will have a more watchful public. Some of the issues DOE and other agencies are examining now include impact for State, Tribal and local resources should shipments be halted again, or should the additional temporary measures - such as those recommended in recent NRC guidance - become permanent. Advance notification and information are emerging as important related issues given the stricter climate of security; electronic mail, conference calls and fax machines have done much to improve how shipment planning and operations are accomplished, but the need for safeguarding sensitive information may change how these functions are performed. In addition, we can expect increased international coordination amongst security officials in order to ensure safety of the ship, its crew and cargo. In short, while DOE does not anticipate that security concerns will have a long-term impact on the schedules of the FRR SNF Acceptance Program, there may be short-term delays as a new concept of operations emerges. DOE expects to continue to work closely with reactor operators and others to ensure spent fuel is shipped safely.