The United States Foreign Research Reactor (FRR) Spent Nuclear Fuel (SNF) Acceptance Program: 2006 Update

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Abstract

The United States (U.S.) Department of Energy (DOE), in consultation with the Department of State, adopted the *Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel* in May 1996. The policy has been extended to expire May 12, 2016 providing an additional 10 years to return fuel to the U. S. and the program has transitioned to the National Nuclear Security Administration (NNSA). This paper provides a brief update on the program and discusses program initiatives and future activities. The goal of the program continues to be recovery of nuclear materials, which could otherwise be used in weapons, while assisting other countries to enjoy the benefits of nuclear technology. NNSA is seeking feedback from research reactor (RR) operators to help us understand ways to include eligible RRs who have not yet participated in the program.

Introduction

The Foreign Research Reactor (FRR) Spent Nuclear Fuel (SNF) Acceptance Program, (the Acceptance Program) now in the eleventh year of implementation, has to date completed 36 shipments safely and successfully, and another is expected to be completed soon. Twenty-seven countries have participated so far, returning a total of 7,290 spent nuclear fuel elements to the United States for management at Department of Energy (DOE) sites in South Carolina and Idaho, pending final disposition in a geologic repository. Twenty eight (28) of the 36 shipments contained aluminum-based spent nuclear fuel from research reactors and were placed into storage at the Savannah River Site (SRS) in South Carolina. One shipment was forwarded on to the Y-12 National Security Complex since the fuel was only slightly irradiated and eligible for receipt at the facility. The remaining shipments were placed into storage at the Idaho National Laboratory (INL). The most recent shipments were completed without incident, arriving at the INL on October 20, 2006. This last shipment was the sixth containing Training, Research, Isotope, General Atomic (TRIGA) spent nuclear fuel. During the upcoming calendar year (January - December 2007), the program is planning a potential seven shipments of fuel from various locations.

Focus on Advance planning

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 while assisting other countries to enjoy the benefits of nuclear technology. Along with shipment logistics, NNSA continues to address many other issues of importance to the program. As we pass the endpoint of the original Acceptance Policy, May 2006, we continue to address and resolve issues that may impose barriers to program success. The most critical issue associated with the program remains early scheduling and coordination of planned shipments. It is always important that NNSA clearly

understands each Reactor Operator's plans and intentions so planning can be well integrated and supported to meet the Reactor Operator's needs. Budget limitations could challenge implementation of shipping plans while NNSA and the Department of Energy receiving facilities also face increasing challenges in preparing to receive material, particularly when shipping plans are not well known.

Some countries require the issuance of an End-Use or Dual-Use Undertaking in order to obtain an export license. In the past, DOE provided that document to the reactor operator when requested. DOE no longer provides that document. However, assurances are already provided to those countries through the Agreement for Nuclear Cooperation between that country and the United States. The U.S. Department of State can validate those assurances to the participating country as necessary. We recommended that these requirements be identified and resolved by the reactor operators as early as possible to ensure this political process is completed without shipment delays.

One issue has been noted to be a problem for reactor operators in high-income economy countries who participate in joint shipments. Nuclear liability insurance associated with the ocean transport has the potential to adversely affect the total cost of shipping. This is because the shippers are sometimes required to have overlapping insurance coverage and also may have different requirements for minimum coverage. It is important for reactor operators to plan early for the required coverage and how to provide coverage in the least expensive manner. Consideration should be given for reactor operators entering into a joint shipment to coordinate in obtaining their nuclear liability insurance with the same pool or under a joint contract, where possible, in order to mitigate overlapping insurance costs. It is also important to be conscious of this potential problem and budget for any added cost that cannot be mitigated.

Because there are limited resources for review of cask licenses, it is necessary for our customers to provide adequate time in the preparation process, scheduling for early application for review and approval of cask licenses. The Acceptance Program enjoys a very good working relationship with Nuclear Regulatory Commission (NRC) staff and, as such, wishes to take every measure possible to respect this relationship by ensuring that cask applications are timely and complete. Since early 2004, DOE has been meeting periodically with NRC to discuss planned shipments and forecasted support required to meet the needs of the Acceptance Program and our customers. DOE and NRC are working now to finalize a new Inter-Agency Agreement that will support certificate reviews and other key activities.

Efforts to Improve and Accelerate

The Acceptance Program has now passed its approximate midpoint. More than ever before, DOE and reactor operators need to work together to schedule shipments as soon as possible, to optimize shipment efficiency over the remaining years of the program. Countries interested in participating in the Acceptance 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. New and current Acceptance Program participants should also coordinate with DOE approximately 18 months in advance to ensure DOE can meet the Reactor Operator's plans and needs. Accelerated schedules are possible if there are no significant issues over past shipments. However, decreasing resources and coordination requirements with other agencies such as the Nuclear Regulatory Commission and Department of Transportation have the potential to limit DOE's capability to support these accelerated schedules. Specifically, the Acceptance Program may not be able to accommodate a large number of requests at the end of the program, particularly from geographically isolated regions.

The Office of Global Threat Reduction has reorganized in order to better use available resources and align the offices within three global regions and three cross-cutting program pillars. The regions include The Office of North & South American Threat Reduction (NA-211), Office of European & African Threat Reduction (NA-212), Office of Former Soviet Union and Asian Threat Reduction (NA-213). The organizational pillars include Convert Protect, and Remove. A more detailed description of this organization may be provided in a separate conference paper or presentation. The FRR SNF Acceptance program, as a Remove function, is located under the Office of FSU and Asian Threat Reduction. Although the program is managed under the Office of FSU and Asian Threat Reduction, the program operates globally across all regions. The program Technical Lead will continue to implement the program and will be the primary point-of-contact for this program. Regional Country Officers will assist in program coordination and shipment implementation. Therefore, this reorganization should be essentially transparent to the reactor operator and other supporting shipment participants.

The DOE Environmental Management (DOE-EM) organization that used to manage the FRR SNF Acceptance Program is making strides to further disposition the repatriated spent nuclear fuel. The DOE-EM organization is considering continuing with the DOE Programmatic Spent Nuclear Fuel Environmental Impact Statement [1] and associated Record of Decision [2]. This decision included transporting fuel to place all aluminum clad spent fuel at the SRS and stainless steel fuel such as TRIGA fuel at INL. This allows for a potential decision to further treat the aluminum clad fuel in the H-Canyon facilities at SRS for disposition as waste in the same fashion as other high level waste material within the DOE complex. Any decision to further treat the material would be subject to further evaluation under the National Environmental Policy Act.

No fee increase has been initiated, but NNSA continues to evaluate ways to accelerate repatriation activities. Therefore, fees may change in the future and/or other changes may be implemented. We are also continuing to try to keep the reactor operator's cost to participate in the FRR Acceptance programs low as possible. Any suggestions of methods to accelerate repatriation of Spent Nuclear Fuels, especially Highly Enriched Uranium would be welcomed and given all due consideration.

A primary goal of the Acceptance Program is to support worldwide nonproliferation efforts by shipping highly enriched uranium (HEU) which was enriched in 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 (RERTR) Program and the Enriched Uranium Operations group from DOE's Y-12 plant in Oak Ridge, Tennessee. DOE Acceptance Program staff 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.

Conclusion

The United States remains committed to supporting worldwide nonproliferation goals while assisting other countries to enjoy the benefits of nuclear technology such as those for which this program was designed. We are striving to Accept eligible fuel now rather than later. We strongly encourage reactor operators to work closely with our technical points-of-contact in order to ensure shipping schedules are accurate and achievable. We hope to work with all remaining eligible research reactors to plan for shipments of their eligible spent fuel as early as possible. NNSA continues to support research reactor operators' needs and would be happy to meet any interested parties to discuss the program.

References

[1] Final Environmental Impact Statement for Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs DOE/EIS-0203-F (60 FR 20979, April 28, 1995)

[2] Record of Decision on the Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (60 FR 28680, June 1, 1995)