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THE UNITED STATES FOREIGN RESEARCH REACTOR (FRR) SPENT NUCLEAR FUEL (SNF) ACCEPTANCE PROGRAM: 2008 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 will expire May 12, 2019, providing Foreign Research Reactors (FRRs) an opportunity to return fuel to the U. S. This paper provides a brief update on the program, now under the National Nuclear Security Administration (NNSA) 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.

1. Introduction

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 will expire May 12, 2019, providing Foreign Research Reactors (FRRs) an opportunity to return fuel to the U. S. DOE's implementation plan includes identification of program metrics, placing the highest priority on the return of highly enriched uranium (HEU) nuclear fuel, contract implementation, DOE's receipt facility requirements, over all planning and execution of the plan, and incorporation of lessons learned during the process. A brief discussion of these points is provided. This paper also includes an update to the progress of the Foreign Research Reactor (FRR) Spent Nuclear Fuel (SNF) Acceptance Program, (the Acceptance Program).

2. Acceptance Program Metrics

The Acceptance Program, now in the thirteenth year of implementation, has completed 44 shipments to date, safely and successfully, and another is expected to be completed soon. Twenty-seven countries have participated so far, returning a total of 8,545 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. Some slightly irradiated material has been sent to Tennessee for disposition. Thirty five (35) of the 45 shipments contained aluminum-based spent nuclear fuel from research reactors and were placed into storage at the Savannah River Site (SRS) in South Carolina. Two shipments were forwarded on to the Y-12 National Security Complex, since the fuel was only slightly irradiated and eligible for receipt at that facility. The remaining eight (8) shipments were placed into storage at the Idaho National Laboratory (INL). During the next calendar year (January - December 2009), the program is planning to receive as many as five shipments of SNF from various locations.

3. Contractual Requirements

3.1 Contract Extensions

Some research reactors which have already converted to LEU fuel may need a contract extension to authorize shipments wanted after May, 2009. DOE is modifying these contracts with priority given to those who are scheduled to ship in the near future. Reactor Operators in this situation are strongly encouraged to coordinate with the Acceptance Program office to negotiate the extension of the FRR-DOE contract authorizing continued Acceptance Program participation. It would be very helpful at this time to present a proposed schedule of shipments to assist planning, both for receipt activities and for contract preparation.

3.2 Contract Implementation

DOE enters into a contract with each of the customers who return SNF to the United States. It is very important that the contracting parties clearly understand and adhere to all of the provisions in the contract. Contract requirements are usually described in detail prior to the first shipment as well as when the contract is negotiated. As time passes and personnel change, some understanding of these requirements may be lost. Further questions or discussion on contract requirements can always be addressed to the Acceptance Program office. Compliance with all contract requirements must be maintained. One very important article in the contracts which has been misunderstood in the past covers public disclosure of any shipping plans or shipment information, or the individual details comprising such plans or information. Any such disclosure must comply with limitations required by U. S. government regulations. This means that information concerning dates and/or schedules and specific information about the contents of the shipment cannot be published until the shipment has arrived at the material's final destination. Before arrival, information must only be revealed to those who have a legitimate need to know in order to support shipment activities. Information on security measures to protect shipments should not be published. Compliance with this article is an important obligation to support security for any shipment activity. DOE believes premature release of this information would be an unwarranted violation of the contract which made the security of the shipment more vulnerable. Premature release of information would also violate the United States Nuclear Regulatory Commission regulations under which shipments are authorized. Further, The Convention on the Physical Protection of Nuclear Material entered into by states which support the Acceptance Program requires that each state protect the

confidentiality of this information. Our ability to continue this program depends on our customers following the agreed process to protect all parties engaged in these shipments.

3.3 Appendix A Data

The Appendix A to the contract provides a description of the fuel characteristics for the receiving facility to evaluate criticality safety as well as plan for interim storage and final disposition of the authorized material. Because of this, it is important that the Appendix A data actually reflects the “as-shipped” condition of the fuel. After the authorized material is accepted, the FRR should not perform any activity such as cropping which would change the fuel characteristics without consulting the program office and the receiving facility.

4. 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, the DOE Office of Global Threat Reduction (GTR) continues to address many other issues of importance to the program.

4.1 Shipment Scheduling

The most critical barrier to smooth operation associated with the program remains early scheduling and coordination of planned shipments. It is always important that NNSA clearly understands each Reactor Operator’s intentions so that our planning can be well integrated and operational support provided to meet the Reactor Operator’s needs. It is also important that each Reactor Operator submit the required fuel data as early as possible in order to allow the receiving site adequate time to perform necessary reviews and prepare for receipt and storage. Early availability of fuel data is also important for use in verifying transport package license requirements or submitting for a license amendment when required. 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. The GTR Acceptance Program staff will be happy to answer questions about scheduling or clarify what type of information is needed to facilitate receipt of fuel.

As requested by many FRRs, the program was extended to allow additional time for further development of LEU fuels and planning for back end solutions in the fuel cycle. The change was made to benefit the FRRs that needed justifiable relief. Some FRRs are now taking advantage of these benefits by extending their shipping schedules to defer costs. These delays are hurting DOE’s ability to continue normal planning and to maintain adequate resources for the receipt facility. The FRRs are strongly encouraged to continue shipping as early as possible and maintain original schedules and plans as closely as possible. Deferring shipments when spent fuel is available for shipping could result in undesirable program and cost changes. Additionally, deferring shipments may also result in a logjam at the program end. The United States does not guarantee that all who wish to ship late in the program can be accommodated.

This will depend on numerous factors including economic status of the country, preference for recovery of HEU vs. LEU, location of the FRR, ability to conduct joint shipments, cask availability, ability of the FRR to have conducted the shipment at an earlier time, mission importance of the FRRs desiring to ship at that time and DOE's resources available to receive the material.

4.2 Cask License Review

Because there are limited resources for review of cask licenses, our customers must provide adequate time in the preparation process for early application, review and approval of cask licenses in all countries involved including transient countries and in the country in which the ocean-going vessel is flagged. The Acceptance Program enjoys a very good working relationship with Nuclear Regulatory Commission (NRC) staff and wishes to take every measure possible to respect this relationship by ensuring that cask applications are timely and complete. DOE meets periodically with NRC to discuss planned shipments and forecasted support required to meet the needs of the Acceptance Program and our customers.

4.3 End –User Assurances

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 because assurances are already provided through government agreements for cooperation in the peaceful uses of nuclear energy between each country and the United States when one exists or through other avenues. The U.S. Department of State can validate those assurances to the participating country as necessary. However, these agreements are not required to be in place for the FRR to participate in this program. 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.

4.4 Insurance Issues

Nuclear liability insurance associated with the ocean transport has the potential to adversely affect the total cost of shipping for reactor operators in high-income economy countries who participate in joint shipments. Different insurance pools may require overlapping insurance coverage and also may have different requirements for minimum coverage. NNSA is attempting to find ways to mitigate this issue and hope to provide some relief in certain situations. 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.

4.5 Title Transfer Location

The Secretary of Energy has authorized the Department of Energy to consider on a case-by-case basis when it is in the best interest of the United State to take title to certain spent nuclear fuel and target material from reactors located in countries with high-income economies before it reaches the port of entry into the United States. In these cases, the title transfer location would be specified in the contract with the affected reactor operator. This policy change has been approved and issued through a Federal Register Notice Vol 73, No.165, August 25, 2008, pages 50004 – 50006. The Program Office will be required to document appropriate justification in accordance with strict procedures prior to acceptance of this provision.

5. Efforts to Improve and Accelerate

DOE and reactor operators need to work together to schedule shipments as soon as possible and to optimize shipment efficiency over the remaining years of the program. Countries or FRRs 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 DOE's long-term shipment forecast. New and current Acceptance Program participants should also coordinate with DOE approximately 18 - 24 months in advance of planned shipments to ensure DOE can meet the Reactor Operator's plans and needs. Accelerated schedules may be possible if material to be shipped is essentially the same as past shipments. However, decreasing resources and the need to coordinate requirements with other agencies such as the Nuclear Regulatory Commission and Department of Transportation may limit DOE's ability to support 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.

5.1 Potential Fee Changes

NNSA continues to evaluate ways to accelerate repatriation activities. Therefore, fees may change in the future and/or other changes may be implemented, if DOE believes the changes will positively influence program goals. DOE is also continuing to try to keep the reactor operator's cost to participate in the Acceptance Program low as possible. Any suggestions of methods to accelerate repatriation of Highly Enriched Uranium (HEU), will be welcomed and given all due consideration.

5.2 Coordination with Source Recovery Program

Since the last RERTR, the FRR SNF Acceptance Program has begun to coordinate with the Office of Global Threat Reduction's radiological source recovery program to include sources on Acceptance Program shipments. The shipment of spent nuclear fuel from Argentina and Brazil in December of 2007 included an ISO container with Sources from South America recovered by the U.S. Radiological Remove division of GTRI. The shipment set a precedent for future joint shipments of spent nuclear fuel and radiological sources. Such shipments will provide an excellent opportunity for an Acceptance Program customer or other organizations in

the customer's country or surrounding countries to dispose of unwanted radioactive sealed sources, particularly sources that cannot be transported by air.

6. 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. The programmatic goal is to accept eligible fuel sooner rather than later. Reactor operators are strongly encouraged to work closely with technical points-of-contact in order to ensure shipping schedules are accurate and achievable. The GTR staff hopes 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.