

CRPE: Cesium Return Program Experience FY 1995

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INTRODUCTION

The U.S. Department of Energy (DOE) has returned 309 leased, cesium capsules from IOTECH, Incorporated (IOTECH), Northglenn, Colorado, and is currently planning the Applied Radiant Energy Corporation (ARECO), Lynchburg, Virginia, capsule removal to the Waste Encapsulation and Storage Facility (WESF) at the Hanford Site, to ensure the safe management and storage of the capsules pending their final disposition. The preparations for this move included testing and modifying the Beneficial Uses Shipping System (BUSS) Cask, preparing an Environmental Assessment (EA), developing a comprehensive Transportation Plan, coordinating with the Western Governor's Association (WGA) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and providing a means of communication among the DOE, the media, and the public. Additional activities in implementing this Program include coordinating with Eastern and Midwestern states to revise the Transportation/Emergency Response Plan in support of the ARECO capsule returns.

Westinghouse Hanford Company (WHC) is acting as the designated agent for DOE in returning the Highway Route Controlled Quantity (HRCQ) Cesium-137 Capsules to the Hanford Reservation in southeast Washington State. As a direct result of this role, WHC has researched, developed, implemented, and is currently managing several transportation-related activities to ensure the safe and efficient movement of encapsulated Special Form (SF) Cesium-137 back to the Hanford Reservation.

BACKGROUND

Since 1945, the chemical reprocessing of irradiated nuclear fuels in the Hanford Chemical Separation areas has resulted in the generation of significant volumes of high-level, liquid, radioactive, by-product materials (cesium/strontium). These materials have been contained as alkaline slurries in underground, carbon-steel-lined, reinforced, concrete tanks. The reason for the separation of cesium and strontium from the liquid material was to reduce heat generation (radioactive decay) and to provide physical systems that are suitable for long-term storage. However, because these encapsulated materials were recognized to have beneficial uses, their disposal was delayed. To investigate the possibilities, the By-product Utilization Program (BUP) (Kenna and Schults 1983) was initiated. The program mission was to develop

a means for the application of radioactive-fission products for the benefit of society. Cesium capsules were fabricated and distributed to private irradiation facilities for beneficial product sterilization.

In June of 1988, a small leak developed in one of the cesium capsules at a private irradiator facility located in Decatur, Georgia. This leak prompted DOE to remove these capsules and to re-evaluate the BUP with the irradiator facilities that were currently using cesium capsules. As a result of this evaluation, a recall was issued to require that all remaining cesium capsules be returned to Hanford for safe management and storage pending final capsule disposition. The WHC, under contract to DOE, completed the return of 309 cesium capsules (May 1995) from a private irradiation facility, which is located in Northglenn, Colorado, to the Hanford Reservation. Until May 1991, these capsules were used for the sterilization of medical products.

The DOE is also planning to remove 25 cesium capsules from a small, private irradiator facility located in Lynchburg, Virginia. The capsule removal effort will occur sometime in mid-1996. This small irradiator facility is currently operational and uses the cesium capsules for the underwater irradiation of wood-flooring products.

DESCRIPTION

Program Experience

The preparations and eventual safe return of all 309 cesium capsules to the Hanford Reservation required several safety/environmental analyses to facilitate operations and transportation activities. Each of these activities demonstrated lessons learned, providing a safe, high-quality, and effective management of this type of radioactive-transportation activity.

Safety Analysis

The Safety Analysis Report for Packaging (SARP) (SNL 1991) provides the documentation of the analysis, the required testing, and the operational and Quality Assurance (QA) requirements to ensure that the package meets Type-B packaging regulations.

Verification testing is required to ensure that the as-fabricated packaging conforms to the SARP and to associated analyses. Verification testing of the BUSS Cask required configuration changes and modifications to the SARP and to the packaging. This testing was shown to be a valuable tool in both the design and use of the packaging.

A determination was also required, specifically for the cesium capsule payload, to ensure that the current SARP and the Certificate of Compliance (CoC) (DOE 1994; NRC 1994) assumptions and evaluations were accurate. Successful verification testing was performed on the capsules, demonstrating that they met the requirements of the SARP and the CoC.

All of these safety analysis activities are required prior to transporting a Type B package to ensure that both the packaging and its payload meet the requirements of the SARP/CoC.

Environmental Analysis

National Environmental Policy Act (NEPA) documentation (Jansky 1994) was developed to ensure that all of the environmental requirements were met. This documentation is reviewed by the public and is provided to adequately answer all questions regarding the safe return of cesium capsules to the Hanford Reservation. This analysis, and the associated documentation, resulted in a "Finding of No Significant Impact (FONSI)", which was issued by DOE.

The NEPA documentation is required to show that the proposed transportation of the radioactive material will be safe to the public and to the environment.

Operational Activities

Several operational procedures were written for the safe handling and maintenance of the packaging and its payload. Operational activities also include the fabrication of a designated trailer to accommodate the BUSS Cask (Clements 1993). Designated trailers for the transport of Type B radioactive materials must be designed and fabricated to ensure compliance with the regulations of the U.S. Department of Transportation (DOT) (49 CFR 173 1993), the National Highway Traffic Safety Administration (NHTSA), and the North American Standard Commercial Vehicle Safety Alliance (CVSA).

To ensure that the cask, as fabricated, met the requirements of Title 10, Code of Federal Regulations (CFR), Part 71(H), QA audits were also performed (10 CFR 71 1992).

Operational activities are required to ensure that the package is safely tested, loaded, transported, unloaded, and maintained, in accordance with appropriate procedures, as required by the SARP.

Transportation Activities

Transportation, emergency response, bad-weather policy, and communication plans were specifically developed to identify the roles and responsibilities for returning the cesium capsules from Colorado to the Hanford Reservation (DOE-OEM 1994). All of the transportation-related documentation was distributed to and was commented upon by the WGA, by the CTUIR, and by direct interface with the public and the media.

As part of the Transportation Plan, the transport carrier interacts with all of the State, Tribal, law enforcement, and local emergency-response officials to exchange information that is necessary to support the shipping campaign (Hoag 1994). Logistical-transportation corridors and communication-monitoring systems was incorporated to satisfy all of the stakeholders concerns.

The plans were written to ensure adequate, well-organized transportation, emergency-response, bad-weather policy, and communication capabilities between all of the stakeholders (if required) throughout the entire transport corridor.

CONCLUSIONS

As discussed above, the Cesium Return Program (CRP) has been successful based upon the specific items that have been mentioned. It was proven early on, from experience, that the transportation of this type of radioactive material can occur without incident. However, it was recognized that future shipments would require that more detailed and concise information be shared with all of the stakeholders. As part of that sharing process, information was reviewed, exchanged, commented upon, and resolved, to satisfy all of the stakeholder concerns.

As a direct result, the CRP has laid the foundation for these types of successful transportation activities to continue and to improve. Through proper planning, testing, documenting, training, and sharing of lessons learned, this type of transportation success can continue to be achieved throughout the DOE complex.

In spite of the great success of this transportation campaign, it must be recognized that the expense for these types of transportation strategies are significant. The increased cost to the DOE, the stakeholders, and ultimately the U.S. taxpayer must be evaluated. Such evaluation must consider and recognize safe, adequate, and reasonable transportation requirements for future hazardous materials conveyance.

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