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**WASTE MANAGEMENT PLAN FOR HANFORD SPENT NUCLEAR FUEL
CHARACTERIZATION ACTIVITIES**

S. A. Chastain
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September 1994

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WASTE MANAGEMENT PLAN FOR HANFORD SPENT NUCLEAR FUEL CHARACTERIZATION ACTIVITIES

1.0 INTRODUCTION

A joint project was initiated between Westinghouse Hanford Company (WHC) and Pacific Northwest Laboratory (PNL) to address critical issues associated with the Spent Nuclear Fuel (SNF) stored at the Hanford Site. Recently, particular attention has been given to remediation of the SNF stored in the K Basins. A waste management plan (WMP) acceptable to both parties is required prior to the movement of selected material to the PNL facilities for examination.

N Reactor and Single Pass Reactor (SPR) fuel has been stored for an extended period of time in the N Reactor, PUREX, K-East, and K-West Basins. Characterization plans call for transport of fuel material from the K Basins to the 327 Building Postirradiation Testing Laboratory (PTL) in the 300 Area for examination. However, PNL received a directive¹ stating that no examination work will be started in PNL hot cell laboratories without an approved disposal route for all waste generated related to the activity. Thus, as part of the Characterization Program Management Plan for Hanford Spent Nuclear Fuel,² a waste management plan which will ensure that wastes generated as a result of characterization activities conducted at PNL will be accepted by WHC for disposition is required.

This document contains the details of the waste handling plan that utilizes, to the greatest extent possible, established waste handling and disposal practices at Hanford between PNL and WHC. Standard practices are sufficient to provide for disposal of most of the waste materials, however, special consideration must be given to the remnants of spent nuclear fuel elements following examination. Fuel element remnants will be repackaged in an acceptable container such as the single element canister and returned to the K Basins for storage.

2.0 SCOPE AND OBJECTIVES

2.1 SCOPE

This waste handling plan is limited to the SNF and sludge in the K Basins to be examined in the PNL hot cell facilities. This plan ensures that all wastes generated by the PNL activities in support of the Hanford Spent Nuclear Fuel Project will be accepted and dispositioned by WHC, including residual spent nuclear fuel material (SNFM) which will be returned to the K Basins for storage until a disposition strategy is established. It is understood and documented in the PNL Waste Management Plan for SNF Materials

Characterization³ that waste streams generated as part of the PNL characterization activities must conform with WHC Waste Acceptance Criteria (WAC) for solid and liquid effluents. The residual SNFM is a special exception to these criteria, and will be accepted by the K Basins for storage.

2.2 OBJECTIVES

- 2.2.1 Summarize the standard waste paths currently approved for radioactive waste from facilities used for characterization activities of K Basins fuel. Close adherence to standard waste paths will ensure that when waste is produced from characterization activities, disposal will not be delayed or repackaging required prior to transfer to storage facilities.
- 2.2.2 Describe the repackaging process planned for the return of residual SNFM to the K Basins. Return of SNFM to K Basins is essential because a waste stream does not currently exist for SNFM.

3.0 PURPOSE OF THE WASTE MANAGEMENT PLAN

Management of waste disposal activities required to support characterization of K Basin fuel are summarized herein, including responsibilities of PNL and WHC. This plan describes waste streams and handling and packaging procedures. By approval of this document, WHC commits to accept for disposition the wastes generated by the PNL SNFM characterization activities provided those wastes meet the requirements referenced in Section 2.0 of this document. Furthermore, by approval of this document, PNL and WHC agree that repackaging of SNFM remnants for return to K Basins following examination will be the method for disposition of residual SNFM. WHC cannot be expected to accept those waste streams which do not or cannot meet the requirements of the applicable WAC. It is the responsibility of PNL to ensure that waste streams generated by PNL activities will be capable of being accepted by WHC, and this is documented in the PNL Waste Management Plan for SNF Materials Characterization.³

It is understood that PNL will make every effort to meet the waste acceptance criteria prescribed by WHC-EP-0063-4, "Hanford Site Solid Waste Acceptance Criteria" for all radioactive waste generated by this project. If, however, in the course of PNL performing this task for WHC, a waste stream is generated that cannot meet the criteria prescribed by WHC-EP-0063-4, as written, a waiver may be submitted to WHC Acceptance Services, per the procedures noted in EP-0063-4.

4.0 INTERIM STORAGE

During examination of fuel assemblies in PNL facilities, remnants of fuel elements will be stored in the 327 Building PTL underwater storage basin until released for disposition. PNL has responsibility for ensuring that the basin ambient water is protected, for monitoring pressure in the single element canisters, and for measurement of any unexpected release of contamination through use of PTL standard handling procedures.

Storage of spent nuclear fuel from K Basins is limited to the equivalent weight of uranium in 20 N-fuel elements at one time in the PTL basin. In addition, two elements or their equivalent may be present in each selected examination cell within the PTL facility.

5.0 TRANSPORTATION

Transportation of K Basin spent nuclear fuel to selected examination facilities shall be accomplished using packaging specifically authorized to transport K Basin spent nuclear fuel samples over Hanford Site roadways to provide the greatest degree of safety. The fuel element shipments will be made using a packaging such as the ChemNuclear CNS 1-13G cask, which has been authorized by the Nuclear Regulatory Commission to transport spent nuclear fuel on public roadways. As described in the site-specific Safety Evaluation for Packaging,⁴ an internal support rack and single element canisters were designed and shall be used in the cask for shipment of K Basin fuel elements to provide a degree of safety equivalent to that provided for in the Certificate of Compliance (CoC). The cask provides primary containment and the single element canister provides a second confinement boundary. Shipments shall be made in compliance with all applicable DOE regulations.

6.0 WASTE HANDLING AND DISPOSAL

Several varying waste types will be generated by activities associated with the spent fuel characterization program. These wastes shall be handled in accordance with approved facility procedures and in accordance with the requirements of WHC-EP-0063-4, "Hanford Site Solid Waste Acceptance Criteria"⁵ and Radioactive Liquid Waste System (RLWS) Requirements.^{6,7} WHC and PNL staff shall interact frequently to remain cognizant of facility specific concerns and requirements throughout the characterization process. These interactions will be incorporated as part of the weekly WHC-PNL characterization interface meetings. Wastes will be characterized as required by the WAC documents to meet acceptance criteria for waste storage. In the event that the WHC WAC changes as a result of revisions to regulatory requirements, PNL and WHC will negotiate the changes that will have to be made to (1) grandfather wastes

generated prior to the changes, or (2) evaluate waste against criteria to minimize impacts and modify waste streams and waste containers where necessary to properly dispose of all waste materials, or (3) renegotiate this document before proceeding further. Again, if in the course of PNL performing this task for WHC, a waste stream is generated that cannot meet the criteria prescribed by WHC-EP-0063-4, as written, a waiver may be submitted to WHC Acceptance Services, per the procedures noted in EP-0063-4.

6.1 WASTE HANDLING AND DISPOSAL METHODS USED AT THE 327 BUILDING

As with all other radioactive materials normally handled at PTL, fissile material accountability data is required prior to receipt. Adequate information describing the irradiated materials provides necessary information for utilization of standard waste handling methods. Waste stream surveys are on file in the 327 Building and available through the facility waste representative.

- 6.1.1 Low level waste generated in the spent nuclear fuel characterization activities may involve more than one packaging and disposal method. These wastes shall be handled in accordance with Standard Operating Procedure (SOP) PTL-137, "Low Level Waste (LLW) Handling and Packaging," and an approved WHC storage/disposal approval document. The PNL Waste Management Plan for SNF Materials Characterization,³ will incorporate the evaluation of each LLW stream as an appendix as a method of documenting the evaluation process.
- 6.1.2 Remote handled transuranic (RH-TRU) waste from the spent fuel characterization processes shall be packaged for shipment to WHC as contact handled transuranic (CH-TRU) waste in lead lined drums (LLD). Packaging shall be performed in compliance with accepted and approved methods.⁸ Accordingly, packaging shall be done in accordance with SOP PTL-129, "In-Cell Packaging of TRU Waste for Disposal," and an approved WHC storage/disposal approval document. Transfer to WHC shall be in compliance with the Safety Analysis Report for Packaging⁹ and all applicable DOT regulations. Storage at SWD facilities shall be in compliance with the SARs (SD-WM-SAR-049, Rev. 0A)¹⁰/(WHC-SD-SAR-025, Rev. 0)¹¹ for Central Waste Complex/Transuranic Waste Storage Facility (CWC/TRUSAF) respectively and all applicable state and federal regulations. The PNL Waste Management Plan for SNF Materials Characterization³ will incorporate the evaluation of each TRU waste stream as an appendix as a method of documenting the evaluation process.

- 6.1.3 Radioactive liquid wastes generated in the spent fuel characterization processes shall be discharged through the RLWS to the 340 Building for disposal. This waste shall be handled in accordance with SOP PTL-136, "Liquid Discharges to the RLWS System," and be authorized by an approved request to discharge liquid to the RLWS drain.^{6,7} The PNL Waste Management Plan for SNF Materials Characterization³ will incorporate the evaluation of each liquid waste stream in an appendix as a method of documenting the evaluation process.
- 6.1.4 All fuel element remnants and unprocessed samples resulting from characterization of K Basin SNF shall be repackaged in single element canisters and returned to the 100-K areas for disposition determination. The single element canisters shall be loaded in accordance with SOP PTL-54, "General Operating Procedure (A Cell)" or SOP PTL-70, "F Cell General Operating Procedure." The shipping container shall be loaded for shipment in accordance with SOP PTL-57, "Receiving, Loading or Unloading, and Shipping Vertical Casks." The PNL Waste Management Plan for SNF Materials Characterization³ will document in an appendix the methods used for repackaging the residual SNFM.
- Upon receipt at the K Basins, the fuel will be repackaged and stored in approved containers per K Basin Process Standards, C-303, B.1.
- 6.1.5 Data assembled from the actual characterization process may dictate some variations in the handling processes at WHC and/or PNL facilities. If changes to the process are outside current acceptable parameters, actions necessary to accommodate the changes will be mutually agreed upon by WHC and PNL.

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