

Remote-Handled Transuranic Waste Status, Activities, and Challenges at the Hanford Site

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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F. Complete for a Journal Article

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1. Title for Conference or Meeting Waste Management Symposia 2000

2. Group Sponsoring WM 2000

3. Date of Conference 2/27-3/02/2000

4. City/State Tuscon, AZ

5. Will Information be Published in Proceedings? ☐ No ☒ Yes

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Date Published
February 2000

To Be Presented at
Waste Management Symposia 2000

WM 2000
Tuscon, AZ

2/27 - 3/02/2000

Published in
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ABSTRACT

A significant portion of the Department of Energy's forecast volume of remote-handled (RH) transuranic (TRU) waste will originate from the Hanford Site. The forecasted Hanford RH-TRU waste volume of over 2000 cubic meters may constitute over one-third of the forecast inventory of RH-TRU destined for disposal at the Waste Isolation Pilot Plant (WIPP).

To date, the Hanford TRU waste program has focused on the retrieval, treatment and certification of the contact-handled transuranic (CH-TRU) wastes. This near-term focus on CH-TRU is consistent with the National TRU Program plans and capabilities. The first shipment of CH-TRU waste from Hanford to the WIPP is scheduled early in Calendar Year 2000.

Shipments of RH-TRU from Hanford to the WIPP are scheduled to begin in Fiscal Year 2006 per the National TRU Waste Management Plan. This schedule has been incorporated into milestones within the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement). These Tri-Party milestones (designated the "M-91" series of milestones) relate to development of project management plans, completion of design efforts, construction and contracting schedules, and initiation of process operations. The milestone allows for modification of an existing facility, construction of a new facility, and/or commercial contracting to provide the capabilities for processing and certification of RH-TRU wastes for disposal at the WIPP.

The development of a Project Management Plan (PMP) for TRU waste is the first significant step in the development of a program for disposal of Hanford's RH-TRU waste. This PMP will address the path forward for disposition of waste streams that cannot be prepared for disposal in the Hanford Waste Receiving and Processing facility (a contact-handled, small container facility) or other Site facilities. The PMP development effort has been initiated, and the PMP will be provided to the regulators for their approval by June 30, 2000. This plan will detail the path forward for the Hanford RH-TRU program.

HANFORD RH-TRU WASTE STREAM DESCRIPTIONS

The total life-cycle volume of RH-TRU at Hanford is estimated to be approximately 2,000 cubic meters. Of this RH-TRU waste volume, only about 200 cubic meters is currently in storage, with the remainder forecast to be generated by onsite waste management and remediation activities. The current inventory of stored RH-TRU wastes at Hanford are comprised of wastes in a variety of forms and containers, including loose wastes in underground caissons with dose rates up to 15,000 R/hr at contact (Figure 1.), shielded drums, large boxes and failed equipment (Figure 2.), unique waste forms like glassified waste produced as part of research and development activities (Figure 3.) and various sludge streams currently contained in tanks or basins (Figure 4.).

Figure 1. Internal View of Hanford TRU Caisson



Figure 2. Large Boxes of Hanford TRU Waste in Storage

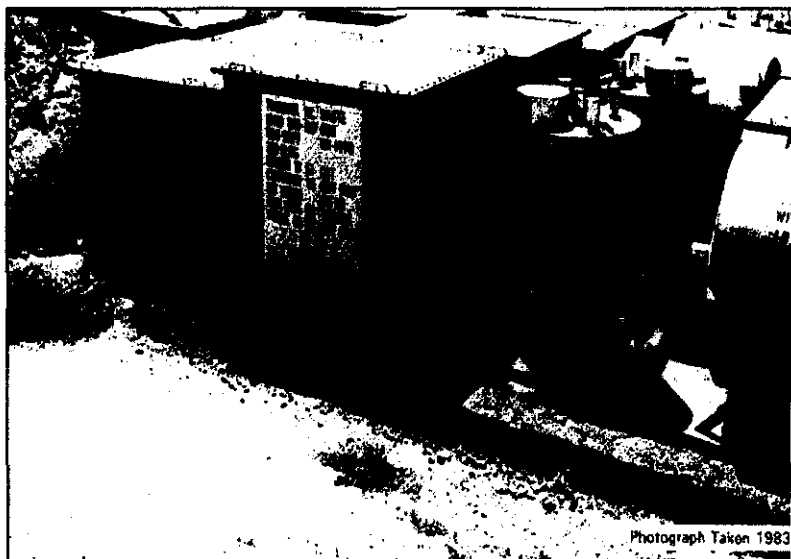


Figure 3. Glassified RH-TRU Waste Stored in Casks

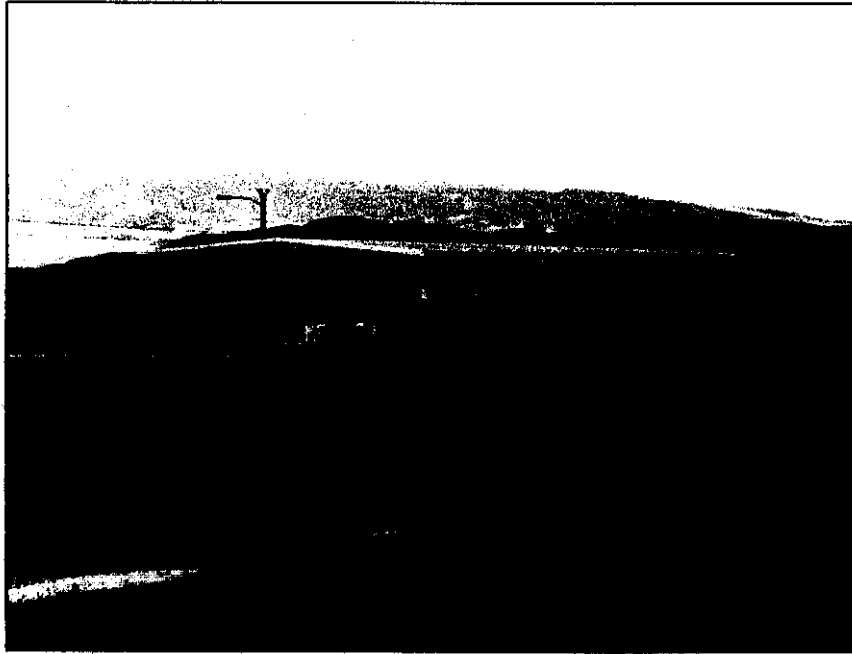
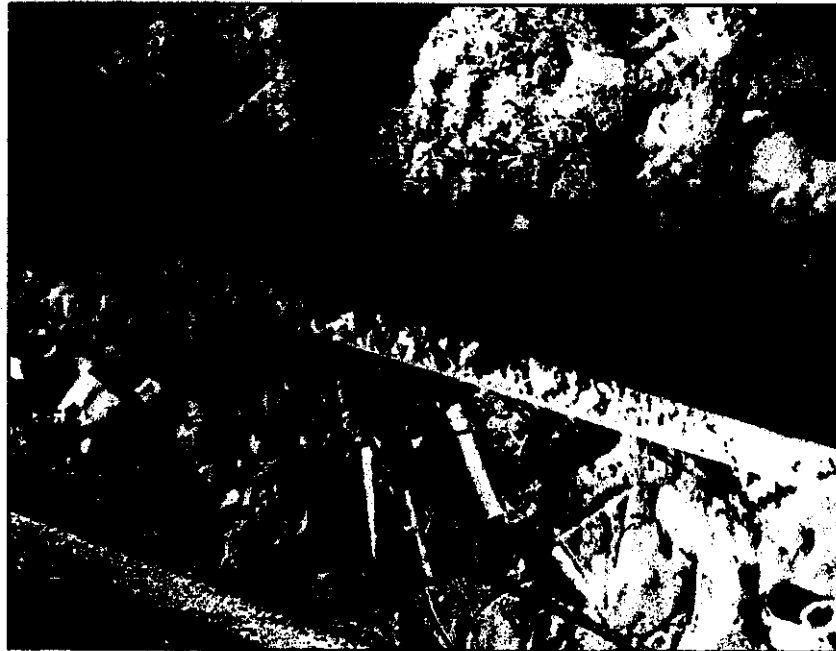


Figure 4. Cleanout of Fuel Storage Basins Will Generate a Significant TRU Sludge Waste Stream



Much of the forecasted Hanford RH-TRU waste will consist of failed equipment generated by transition and disposition of inactive site facilities and by tank farm waste management and disposal operations (Figure 5.). A significant portion of the forecast RH-TRU waste will consist of very large, unwieldy waste packages, some exceeding 18 cubic meters in volume and 20,000 kilograms in weight.

Figure 5. An Example of Tank Farm Long-Length Equipment



HANFORD TRANSURANIC WASTE MANAGEMENT PROGRAM

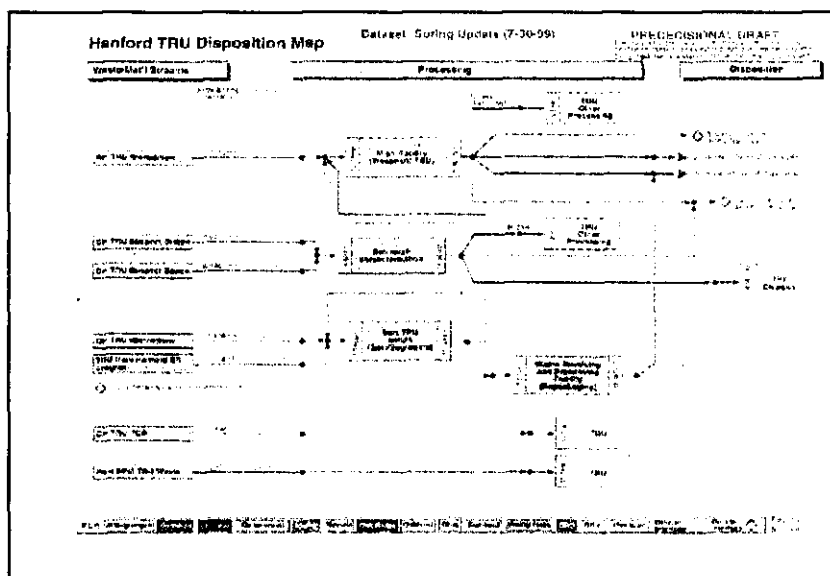
The Hanford Transuranic Waste Management Program is included as part of the workscope of the Project Management Hanford Contract (PHMC), managed by Fluor Hanford, for the Department of Energy, Richland Operations Office.

Within the PHMC, the responsibility for the Transuranic Waste Management Program falls within the Waste Management Project. The TRU Waste Management Program is responsible for coordination and implementation of all aspects (post-generator) of TRU waste management at Hanford, including receipt and interim storage of newly-generated TRU waste generated by other Hanford Site programs and projects, retrieval of stored post-1970 TRU waste, development and implementation of the TRU waste certification program to allow shipment of waste to the Waste Isolation Pilot Plant, and planning and development of future TRU waste management facilities as needed.

ONGOING AND PLANNED ACTIVITIES

The Hanford TRU waste management program baseline is functionally illustrated in the disposition map from the Environmental Management Analysis and Visualization System (Figure 6.).

Figure 6. Hanford Site AVS TRU Waste Disposition Map



As can be seen on the disposition map, processing and disposition of Hanford's RH-TRU will occur at the "M-91 Facility". The "M-91" designation for the facility is derived from the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) milestone numbering system. These Tri-Party Agreement milestones relate to development of project management plans, completion of design efforts, construction and contracting schedules, and initiation of process operations for RH-TRU wastes. The milestone allows for modification of an existing facility, construction of a new facility, and/or commercial contracting to provide the capabilities for processing and certification of RH-TRU wastes for disposal at the WIPP.

The development of a Project Management Plan (PMP) for TRU waste is the first significant step in the development of a program for disposal of Hanford's RH-TRU waste. This PMP will address the path forward for disposition of waste streams that cannot be prepared for disposal in the Hanford Waste Receiving and Processing facility (WRAP, a contract-handled, small container facility) or other Site facilities.

Previous estimates for a facility to address Hanford RH-TRU waste disposition needs ranged from \$400 million to \$1 billion. One of the objectives of the PMP is to define a path forward that minimizes capital requirements. The use of existing facilities may provide an answer to minimizing capital costs. Emphasis has been placed on the

on the “reuse” of such facilities as the T Plant canyon (Figure 7.), which has defined waste storage missions (including storage of RH-TRU wastes) that may mesh well with a future processing and certification mission.

Figure 7. View of the T Plant Canyon, Potential RH-TRU Processing Facility



The PMP development effort has been initiated and will use a systems engineering approach to developing a path forward for RH-TRU waste disposition. The PMP will be provided to the regulators for their approval by June 30, 2000.

CHALLENGES

Disposition of these wastes will provide many challenges to the Hanford Site. Specific challenges to be addressed include the following:

- **Technology Needs.** The RH-TRU waste at Hanford present a number of technology needs, that are not necessarily unique to Hanford wastes alone. These technology needs include remote size reduction capabilities, materials handling for large, heavy, high-exposure wastes, and assay capabilities for high-exposure wastes sufficient to meet WIPP acceptance criteria.
- **Unique Waste Forms.** Hanford may have some RH-TRU waste forms that will require present unique challenges certification for disposal at WIPP, including fuel storage basin sludges (reactive metal contents) and failed melters from waste glassification activities (extremely large and heavy, waste classification issues).

- Post-WIPP RH-TRU Wastes. There is a small volume of RH-TRU waste included in the Hanford life-cycle forecast that will be generated after the current baseline date for WIPP closure.
- RH-TRU Waste That Does Not Qualify for WIPP. Hanford RH-TRU inventories include wastes that may be difficult to qualify for WIPP because of exposure limitations (<1000 R/hr) or because of issues with Defense versus Non-Defense categorization issues.

Activities are underway to begin addressing these challenges. Paths forward for resolution of some of them are expected to be included in the upcoming M-91 Project Management Plan. It is hoped that some of them will also be resolved as DOE Complex-wide challenges, and the resolutions can be applied to Hanford wastes.

CONCLUSIONS

The Hanford Site TRU waste program is well underway to initiating disposal of CH-TRU and shipments of such wastes to the WIPP for disposal are expected to begin early in Calendar Year 2000. An emphasis is now being put on development of the RH-TRU portion of the program, and is reflected in Hanford Federal Facility Agreement and Consent Order milestone agreements between the U. S. Department of Energy, the State of Washington and the U. S. Environmental Protection Agency.

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