INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

Part I: Background Information

Title: TECHNETIUM MANAGEMENT AT THE HANFORD SITE

Information Category:
☒ Abstract ☐ Journal Article ☐ Summary
☐ Internet ☐ Visual Aid ☐ Software
☐ Full Paper ☐ Report ☐ Other

Publish to OSTI? ☒ Yes ☐ No

Document Number: WRPS-55783-A Date: 8/12/13

Author: Rebecca Robbins

Purpose of Document: Description of WRPS's plans to manage the technetium in Hanford tank waste

Part II: External/Public Presentation Information

Conference Name: Waste Management Conference 2014

Sponsoring Organization(s): WM Symposia

Date of Conference: 3/2/14 Conference Location: 3/6/14

Will Material be Handed Out? ☐ Yes ☒ No Will Information be Published? ☒ Yes ☐ No *(If Yes, attach copy of Conference format instructions/guidance.)*

Part III: WRPS Document Originator Checklist

Description	*Yes*	*N/A*	*Signature*
Information Product meets requirements in TFC-BSM-AD-C-01?	☐	☒	
Document Release Criteria in TFC-ENG-DESIGN-C-25 completed? (Attach checklist)	☐	☒	
If product contains pictures, safety review completed?	☐	☒	

Part IV: WRPS Internal Review

Function	*Organization*	*Date*	*Print Name/Signature/Date*
Subject Matter Expert	SP&TD, WRPS	8/12/13	Thomas H May
Responsible Manager	SP&TD, WRPS	8/12/13	M Wheeler 8/12/13
Other:			

Part V: IRM Clearance Services Review

Description	*Yes*	*No*	*Print Name/Signature*
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Document is Subject to Release Restrictions? *If the answer is "Yes," please mark category at right and describe limitation or responsible organization below:*	☐	☒	Document contains: ☐ Applied Technology ☐ Protected CRADA ☐ Personal/Private ☐ Export Controlled ☐ Proprietary ☐ Procurement – Sensitive ☐ Patentable Info. ☐ Business - Sensitive ☐ Predecisional Info. ☐ UNCNI ☐ Restricted by Operational Security Guidelines ☐ Other (Specify)
Additional Comments from Information Clearance Specialist Review?	☐	☑	Information Clearance Specialist Approval APPROVED By Julia Raymer at 3:15 pm, Aug 15, 2013 Print Name/Signature/Date

When IRM Clearance Review is Complete – Return to WRPS Originator for Final Signature Routing (Part VI)

Part VI: Final Review and Approvals

8-14-13

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WRPS Office of Chief Counsel	☑	☐	
DOE – ORP Public Affairs/Communications	☑	☐	
Other:	☐	☐	
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WRPS Administrative Checklist	☐	☐	
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Technetium Management at the Hanford Site

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

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC27-08RV14800

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Technetium Management at the Hanford Site

The Hanford tank waste contains ~26,000 Ci of technetium-99 (Tc-99), the majority of which is in the supernate fraction. Tc-99 is a long-lived radionuclide with a half-life of ~212,000 years and, in its predominant pertechnetate (TcO_4^-) form, is highly soluble and very mobile in the vadose zone and ultimately the groundwater. Tc-99 is identified as the major dose contributor (in groundwater) by past Hanford site performance assessments and therefore considered a key radionuclide of concern at Hanford.

The United States Department of Energy (DOE) River Protection Project's (RPP) long-term Tc-99 management strategy is to immobilize the Tc-99 in a waste form that will retain the Tc-99 for many thousands of years. To achieve this, the RPP flowsheet will immobilize the majority of the Tc-99 as a vitrified low-activity waste product that will be ultimately disposed on site in the Integrated Disposal Facility. The Tc-99 will be released gradually from the glass at very low rates such that the groundwater concentrations at any point in time would be substantially below regulatory limits. The liquid secondary waste will be immobilized in a low-temperature matrix (cast stone) and the solid secondary waste will be stabilized using grout. Although the Tc-99 that is immobilized in glass will meet the release rate for disposal in IDF, a proportion is driven into the secondary waste stream that will not be vitrified and therefore presents a disposal risk.

If a portion of the Tc-99 were to be removed from the Hanford waste inventory and disposed off-site, (e.g., as HLW), it could lessen a major constraint on LAW waste form performance , i.e., the requirement to retain Tc-99 over thousands of years and have a positive impact on the IDF Performance Assessment.

There are several technologies available at various stages of technical maturity that can be employed for Tc-99 removal. The choice of technology and the associated efficacy of the technology are dependent on the chemical form of the technetium in the waste, the removal location in the flowsheet, and the ultimate disposition path chosen for the technetium product.

This paper will discuss the current plans for the management of the technetium present in the Hanford tank waste. It will present the risks associated with processing technetium in the current treatment flowsheet and present potential mitigation opportunities, the status of available technetium removal technologies, the chemical speciation of technetium in the tank waste, and the available disposition paths and waste forms for technetium containing streams.