

**Office of Health, Safety and Security
Site Visit Report**

**Sludge Treatment Project 105-KW
Final Safety Analysis Report Review**



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**Office of Enforcement and Oversight
Office of Health, Safety and Security
U.S. Department of Energy**

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Acronyms

105-KW	105-K West
DOE-RL	U.S. Department of Energy Richland Operations Office
FSAR	Final Safety Analysis Report
HSS	Office of Health, Safety and Security
MCO	Multi-Canister Overpack

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1.0 INTRODUCTION

This report documents the results of a review conducted by the Office of Health, Safety and Security (HSS) of selected aspects of the *105-KW Basin Final Safety Analysis Report* (HNF-SD-WM-SAR-062, Revision 14C) for the Sludge Treatment Project at the Hanford Site.

2.0 BACKGROUND

The Sludge Treatment Project manages the removal of radioactive sludge from the 105-K West (105-KW) spent fuel storage basin to allow decontamination, decommissioning, deactivation, and demolition of the facility. The sludge material has a broad range of characteristics and is divided into separate inventories, based on the residual uranium metal content. One category of the radioactive sludge removed from 105-KW will be loaded into sludge transport and storage containers, and transported to an onsite interim storage facility. Another, smaller, inventory category, will be placed in multi-canister overpacks (MCOs) for storage in the Canister Storage Building on site. This separation of categories will remove the radioactive sludge from the environmentally sensitive Columbia River Corridor. The project has been approved at Critical Decision Level 1. To date, approximately 366 MCO containers have been processed to remove the fuel from the K Basins.

The number of MCOs that remain to be processed is comparatively small. The remaining sludge from the K-East and K-West Basins, which is stored in 105-KW, is of three distinct types: (1) floor and pit sludge in five engineered containers, (2) settler tank sludge in one container, and (3) knockout pot/strainer sludge. For the knockout pot/strainer sludge, the project calls for the material, while still in the K-West Basin, to be washed, sorted, and evaluated in preparation for placement into about five MCO containers. Afterward, the loaded MCO containers will be moved to the Cold Vacuum Drying Facility for drying and then transported to the Canister Storage Building for storage, pending a decision on final disposition. The processing of the knockout pot/strainer sludge is scheduled to start in fiscal year 2012.

The final safety analysis report (FSAR) is being revised to support the removal of knockout pot/strainer sludge. The FSAR also supports the processing of approximately two MCO containers for the category of waste called found fuel (which are fuel parts from sources outside K Basins).

3.0 SCOPE

The scope of the review was to evaluate the adequacy of the K-West Basin safety and support systems in detecting, preventing, and mitigating the events analyzed in the FSAR for the Sludge Treatment Project at the Hanford Site. The review included the FSAR Executive Summary; Chapter 2, Facility Description; Chapter 3, Hazard and Accident Analysis; and Chapter 4, Safety Structures, Systems, and Components. The review was conducted utilizing portions of the HSS criteria, review, and approach document, *Nuclear Facility Safety System Functionality Inspection Criteria, Inspection Activities, and Lines of Inquiry, September 25, 2009 (HSS CRAD 64-17, Rev 0)*, which is available on the HSS website at <http://www.hss.doe.gov/IndepOversight/ESHE/docs.html>.

The review was performed from July 2010 to February 2011. HSS personnel conducted several site visits to meet with the U.S. Department of Energy Richland Operations Office (DOE-RL) and the K-West

Basin contractor managers to discuss and resolve the HSS team's observations, which were documented and provided to DOE-RL. At the concluding visit in January 2011, most of the observations were resolved and closed. The few remaining open items and two recommendations resulting from the review are discussed below.

4.0 RESULTS

The K-Basin FSAR was found to be essentially complete and correct in addressing most hazards and accidents included in the FSAR and the structures, systems, components, controls, and operations to prevent and/or mitigate those hazards and accidents.

However, HSS identified areas for further review by DOE-RL to determine whether additional changes are warranted in the K-West Basin FSAR and/or the systems/components in the K-West Basin at this opportune time, when the documents are being revised and finalized. Specific actions that DOE-RL should consider include:

- Reviewing the MCO transport cask drop into the K-Basin event to verify that the analysis supporting the loss of K-Basin water is adequate.
- Reviewing the analysis of the fire accident event involving the cask in the loadout bay to ensure its adequacy.
- Verifying that there is no potential for K-Basin water loss resulting from siphoning or pump-out after a seismic event.
- Verifying that the fire protection for the K-Basin gantry crane structural supports is adequate.
- Verifying that the MCO heat transfer analysis is adequate for an event involving loss of transport cask water.

HSS provided DOE-RL with additional details for the above items. The implementation of compensatory measures may be considered in these areas, especially because so few MCOs remain to be processed.

5.0 CONCLUSIONS

HSS's review of the K-West Basin FSAR found it to be generally adequate with respect to the scope of this review. However, some aspects of the FSAR accident analyses of two events may warrant further review: MCO transport cask drop into the K-Basin, and the fire accident event involving the cask in the loadout bay. It is important to review the K-West Basin FSAR at this time, when it is being revised to support the Sludge Treatment Project.

6.0 ITEMS FOR FOLLOW-UP

As a follow-up to the open actions described above, HSS will review the status of changes to the K-Basin FSAR after revisions are formulated and submitted to DOE-RL for final review and approval.

APPENDIX A SUPPLEMENTAL INFORMATION

Review Dates

July 2010-February 2011

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