

## RMIS View/Print Document Cover Sheet

This document was retrieved from the Documentation and Records Management (DRM) ISEARCH System. It is intended for Information only and may not be the most recent or updated version. Contact a Document Service Center (see Hanford Info for locations) if you need additional retrieval information.

Accession #: D196040512

Document #: SD-SNF-PLN-015

Title/Desc:

K BASIN SLUDGE PACKAGING DESIGN CRITERIA & SARP  
APPROVAL PLAN

Pages: 13

MAR 07 1996

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 608261

2. To: (Receiving Organization) K Basins Projects	3. From: (Originating Organization) Engineering Support	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: SNF Project	6. Cog. Engr.: <i>LAB 2/22/96</i> <i>S. A. Brisbin D. R. Precechtel</i>	7. Purchase Order No.: N/A
8. Originator Remarks: For approval and release		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: N/A
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date:

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-SNF-PLN-015	A11	0	K Basin Sludge Packaging Design Criteria (PDC) and Safety Analysis Report for Packaging (SARP) Approval Plan	DSQ	1	1	

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval	4. Review	1. Approved	4. Reviewed no/comment
		2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
		3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G)	(H)									(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1	1	Cog. Eng. D. R. Precechtel	<i>D.R. Precechtel</i>	<i>2/22/96</i>	R3-48	J. W. Osborne	<i>J. W. Osborne</i>	<i>2/28/96</i>	K3-80	1	1
1	1	Cog. Mgr. F. W. Moore	<i>F. W. Moore</i>	<i>2/22/96</i>	X3-85	W. E. Ross	<i>W. E. Ross</i>	<i>2/28/96</i>	S5-07	1	1
1	1	QA C. R. Hoover	<i>C. R. Hoover</i>	<i>2/25/96</i>	G1-11	W. J. Schlauder	<i>W. J. Schlauder</i>	<i>2/26/96</i>	S7-84	1	1
1	1	Safety D. W. McNally	<i>D. W. McNally</i>	<i>2/20/96</i>	G1-11	D. W. Smith	<i>D. W. Smith</i>	<i>2/24/96</i>	R3-11	1	1
		Env.				P. L. Smith	<i>P. L. Smith</i>	<i>2/26/96</i>	R3-08	1	1
1	1	J. G. Field	<i>J. G. Field</i>	<i>2/28/96</i>	G1-11	C. A. Thompson	<i>C. A. Thompson</i>	<i>2/26/96</i>	R3-85	1	J
1	1	F. J. Muller	<i>F. J. Muller</i>	<i>2/28/96</i>	X3-85	J. Weber	<i>J. Weber</i>	<i>2/26/96</i>	S1-57	1	1
6		K Basins Project File X3-85				SNF Project Files R3-11				6	

18. S. A. Brisbin <i>S. A. Brisbin</i> Signature of EDT Originator	2/22/96 Date	19. F. W. Moore <i>F. W. Moore</i> Authorized Representative for Receiving Organization	2/22/96 Date	20. E. W. Moore <i>E. W. Moore</i> Cognizant Manager	2/22/96 Date	21. DOE APPROVAL (if required) Ctrl. No. <i>311/96</i> <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
--	-----------------	---	-----------------	--	-----------------	--

# K Basin Sludge Packaging Design Criteria (PDC) and Safety Analysis Report for Packaging (SARP) Approval Plan

S. A. Brisbin

Westinghouse Hanford Company, Richland, WA 99352  
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 608261 UC: 600  
Org Code: 2C500 Charge Code: LD124  
B&R Code: EW3135040 Total Pages: 10

Key Words: PDC, Safety Analysis, SARP, Sludge, K Basin, Transport

Abstract: This document delineates the plan for preparation, review, and approval of the Packaging Design Criteria for the K Basin Sludge Transportation System and the associated on-site Safety Analysis Report for Packaging. The transportation system addressed in the subject documents will be used to transport sludge from the K Basins using bulk packaging.

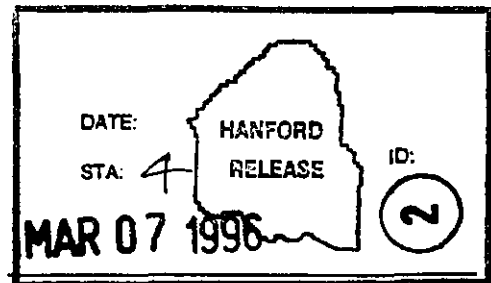
---

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

  
Release Approval

3/6/96  
Date



Approved for Public Release

CONTENTS

1.0	INTRODUCTION . . . . .	1
1.1	Background . . . . .	1
1.2	Purpose and Scope . . . . .	2
2.0	DEFINITIONS . . . . .	2
2.1	Packaging . . . . .	2
2.2	Package . . . . .	2
2.3	Conveyance . . . . .	2
2.4	Payload . . . . .	2
3.0	REQUIREMENTS BASES . . . . .	2
4.0	PDC AND SARP PREPARATION AND APPROVAL . . . . .	3
4.1	Scope of the PDC and SARP . . . . .	3
4.2	Packaging Design Criteria . . . . .	3
4.3	Safety Analysis for Packaging . . . . .	3
4.4	Approval Process . . . . .	3
5.0	ORGANIZATIONAL RESPONSIBILITIES AND INTERFACES . . . . .	4
5.1	WHC -- SNF Project . . . . .	4
5.2	WHC -- Packaging Engineering (PE) . . . . .	4
5.3	WHC -- Tank Waste Remediation System . . . . .	4
5.4	WHC -- Quality Assurance . . . . .	5
5.5	WHC -- Safety . . . . .	5
5.6	WHC -- Safety and Environmental Advisory Council (SEAC) Waste, Analytical, and Environmental Services subcouncil (WAES) . . . . .	5
5.7	Department of Energy, Richland Operations (RL) . . . . .	5
6.0	REVIEW PROCESS . . . . .	5
7.0	REFERENCES . . . . .	8

**K BASIN SLUDGE PACKAGING DESIGN CRITERIA (PDC) AND  
SAFETY ANALYSIS REPORT FOR PACKAGING (SARP)  
APPROVAL PLAN**

**1.0 INTRODUCTION**

**1.1 Background**

The K Basins, built in the early 1950s, have stored N Reactor fuel underwater from 1978 through 1987. In 1992, the decision to deactivate the PUREX Plant left approximately 2,100 metric tons of N Reactor spent nuclear fuel (SNF) in the K Basins with no means for near term processing. A significant fraction of the SNF has become degraded due to cladding breaches during reactor discharge and corrosion has continued during storage.

The N Reactor fuel in the K East basin is stored in open top canisters, some which have closed bottoms and others which have screened bottoms. The open canisters release fission products into the basin water, that, combined with environmental particulate matter have settled to the bottom as sludge. Depths exceeding three feet have been measured in some locations. Using sludge depth measurements, the total sludge volume in the K East Basin was estimated to be as high as 67.5 m<sup>3</sup>.

The basin water and sludge may leak to the environment due to the age and condition of the basin. It is desired to remove the sludge, transport it to, then pump it into, a Tank Waste Remediation System (TWRS) Double Shell Tank (DST) located in the 200 East Area. This preferred sludge path forward alternative is documented in WHC-SD-SNF-SP-001, *Westinghouse Hanford Company Recommended Strategy for K-Basin Sludge Disposition*, Revision 0.

The Packaging Design Criteria (PDC) establishes the onsite design criteria for a reusable packaging and transport system that will be used to transport KE Basin sludge and water. The PDC will provide the basis for the development of an onsite Safety Analysis Report for Packaging (SARP); document the packaging contents and safety class of the package; and provide design criteria for the packaging and transport systems.

The SARP will document approval of the sludge transportation system for use on the Hanford Site and will demonstrate that the packaging meets the transportation safety requirements of WHC-CM-2-14, *Hazardous Material Packaging and Shipping*, thereby providing an equivalent degree of safety as would be provided by a package in commerce meeting DOT safety regulations.

## 1.2 Purpose and Scope

The purpose of this document is to delineate the plan for preparation, review, and approval of the PDC for the K Basin Sludge Transportation System and the associated on-site SARP. The K Basin Sludge Transportation System is a conveyance consisting of a trailer, installed packaging, and installed support systems.

The scope of this document is limited to the PDC and SARP for the K Basin Sludge Transportation System.

## 2.0 DEFINITIONS

### 2.1 Packaging

The assembly of components necessary to ensure compliance with the materials containment and securement requirements delineated in the PDC. It may consist of a container, spacing structures, radiation shielding, devices for cooling and for mechanical shock, and criticality control features. The conveyance, and ancillary equipment will be designated as part of the supporting systems.

### 2.2 Package

The package is the packaging together with the radioactive waste contents as presented for transport.

### 2.3 Conveyance

The device used for transporting the package.

### 2.4 Payload

The package contents (i.e., sludge and water).

## 3.0 REQUIREMENTS BASES

The K Basins Sludge Transportation System packaging will be developed for on-site (Hanford) use as provided for in RL Letter 95-SWT-186. This PDC and SARP Approval Plan is developed to facilitate implementation of the direction given in the RL Letter 95-SWT-186. For packages used exclusively on the Hanford Site, this letter provides for the use of a company policy that establishes a defensible safety bases for transfer of hazardous materials. The policy is established in WHC-CM-2-14, *Hazardous Material Packaging and Shipping*. WHC-SD-TP-RPT-001, *Report on Equivalent Safety for Transportation and Packaging of Radioactive Materials*, provides the approach and methodology for demonstration of an equivalent degree of safety to the requirements of 10CFR71.

#### 4.0 PDC AND SARP PREPARATION AND APPROVAL

The PDC will be developed utilizing the current regulatory bases, methodology, and policy for on-site transportation. Preparation of the SARP will be based on requirements defined in the PDC, information and analyses developed during the course of the K Basin Sludge Transportation System design, and analyses performed to demonstrate compliance of the design with the PDC requirements.

##### 4.1 Scope of the PDC and SARP

The scope of the K Basin Sludge Transportation System PDC and associated on-site SARP will include packaging and transportation of K Basins sludges on the Hanford Site from the K Basins to an existing double-shell tank located in the 200 East Area. The SARP will document compliance of the transportation packaging and conveyance with the PDC requirements, as well as establish administrative and site access controls required during shipment. The SARP will also include an overview of packaging and loadout operations at K Basin and an overview of the offloading operations at the receiving facility.

##### 4.2 Packaging Design Criteria

A PDC shall be prepared in accordance with the WHC Transportation and Packaging Desk Instruction DI-84100-006-00, May 14, 1993, *Packaging Design Criteria Format (On-site Transfers)*. The design of the K Basin sludge transportation system will be based on the PDC.

##### 4.3 Safety Analysis for Packaging

The SARP shall be prepared under the format identified in the WHC Transportation and Packaging Desk Instruction DI-84100-002-02, May 11, 1995, *Safety Analysis Report For Packaging (On-site) Format*. The SARP describes the packaging, defines the payload, and contains the analysis performed to demonstrate that the package design meets the requirements identified in the PDC.

##### 4.4 Approval Process

Approval Designators are identified in WHC-CM-3-5, Section 12.7. Because the anticipated payload is expected to be a Type B, Highway Route Controlled Quantity, fissile waste material, RL review and approval will be required for the SARP. Although not explicitly specified in WHC-CM-3-5, the PDC shall follow the same approval requirements as the SARP. The reviewing organizations and levels of review required for the PDC and SARP are shown in Table 1.

## 5.0 ORGANIZATIONAL RESPONSIBILITIES AND INTERFACES

The roles and responsibilities of the various organizations involved with the preparation and approval of the PDC and SARP are summarized below:

### 5.1 WHC -- SNF Project

#### 5.1.1 K Basins Projects

This organization controls the sludge transportation system scope, budget, and schedule. The K Basins Projects Project Engineer will ensure that the PDC and SARP are consistent with the project baseline.

#### 5.1.2 Sludge Removal System Design Authority

This organization has overall responsibility for the design, engineering, and integration of systems and equipment related to the K Basin Sludge Transportation System.

#### 5.1.3 Fuel Handling Operations

This organization will be the "owner" of the K Basin Sludge Transportation System. Fuel Handling Operations will ensure that the PDC and SARP are consistent with K Basins requirements.

### 5.2 WHC -- Packaging Engineering (PE)

The Packaging Engineering organization, which provides support to the Hanford Site, implements RL policy and establishes criteria for on-site packaging. Packaging Engineering has the sole authority and responsibility for this function. Packaging Engineering will prepare both the PDC and the SARP for the K Basin Sludge Transportation System to ensure that both documents are prepared in the correct format and include the required content. Packaging Engineering will ensure the technical adequacy of the documents through independent review of the documents.

### 5.3 WHC -- Tank Waste Remediation System

The Tank Waste Remediation System is designated as the receiving organization for the shipment; therefore, TWRS will review and approve the PDC and the SARP to ensure the K Basin Sludge Transportation System will be acceptable for receipt.



#### 5.4 WHC -- Quality Assurance

The Quality Assurance (QA) Engineer assigned to Packaging Engineering will provide QA review and approval for the PDC and the SARP. The QA Engineer assigned to Packaging Engineering will also provide QA oversight for the design and fabrication of the K Basin Sludge Transportation System.

#### 5.5 WHC -- Safety

The Nuclear Safety Programs and Projects safety representative assigned to Packaging Engineering will provide independent safety review and approval of the PDC and the SARP and will coordinate, as necessary, the safety reviews of the Fire Protection, Industrial Hygiene, Radiation Protection, Criticality Safety, and Industrial Safety departments.

#### 5.6 WHC -- Safety and Environmental Advisory Council (SEAC) Waste, Analytical, and Environmental Services subcouncil (WAES)

The Waste, Analytical, and Environmental Services Subcouncil (WAES) of the Safety and Environmental Advisory Council (SEAC) provides high level multi-disciplined review of the PDC and SARP to ensure compliance with WHC policy and procedures, and ensure that the transportation system protects workers, public, and the environment.

#### 5.7 Department of Energy, Richland Operations (RL)

The RL Traffic Management organization will grant approval of the PDC and the SARP for on-site transfers. Approval by the RL Traffic Manager requires the concurrence of the RL SNF Project Office (SPO).

### 6.0 REVIEW PROCESS

The PDC is an essential design document and must be approved prior to start of design. The approval signatories for the PDC are identified in Table 1. The PDC and the SARP are subjected to the same review and approval process. Informal reviews by each of the signatory organizations may be conducted in parallel with the development of these documents. The routing for formal approval is sequenced. For both the PDC and SARP, Packaging Engineering and the Nuclear Safety Programs and Projects safety representative assigned to Packaging Engineering approve the documents then forward the documents to the SNF Project, TWRS, and QA for approval. The documents are then transmitted to SEAC subcouncil for review. Packaging Engineering interfaces with the SEAC subcouncil to resolve review comments. Following SEAC subcouncil review, the documents are presented to RL for final review and approval. Packaging Engineering interfaces with RL to resolve RL review comments.

## WHC-SD-SNF-PLN-015, Revision 0

The K Basin Sludge Transportation System SARP input data will be developed by Packaging Engineering in conjunction with the system design. Packaging Engineering will prepare the SARP. During the SARP development effort, any Seller prepared SARP input descriptions and design analyses shall be submitted to Packaging Engineering for consideration. Packaging Engineering will integrate the Sludge Transportation System SARP data, ensure that the input is in the correct format and includes the required content, and distribute the SARP chapter drafts to the appropriate reviewers. Packaging Engineering will coordinate and disposition review comments, assuring that the dispositioned comments are appropriately incorporated into the SARP.

Reviews will be conducted in accordance with the requirements of WHC-CM-6-1 and WHC-CM-2-14. Table 1 identifies the review scope for each organization:

WHC-SD-SNF-PLN-015, Revision 0

Table 1 (PDC/SARP Approval Signatory List)

Organization	Approval Signatory List	Review Scope
WHC - SNF Project	Design Authority - Sludge Removal System	Verify the PDC/SARP are consistent with design and other project function interface requirements.
	Project Engineer - K Basins Projects	Verify the PDC/SARP are consistent with the project baseline.
	Manager - Fuel Handling Operations	System Owner. Verify that PDC/SARP are consistent with K Basin requirements.
WHC - TWRS	Manager - Evaporator Project	Verify that the PDC/SARP are consistent with the receiving facility requirements.
WHC - PE	Manager - Packaging Engineering	As the WHC designated design agent and regulatory interpretive authority, verify that the PDC complies with all applicable regulations.
	Engineer - Packaging Engineering (PDC/SARP)	Prepare the PDC and SARP and verify format and content meet the applicable requirements. Also, independently check technical accuracy and ensure other independent analyses are performed where required.
	Engineer - Packaging Engineering (Independent Review)	Note that the review by the Packaging Engineering (Independent Review) also includes verification that all applicable packaging regulatory requirements are adequately addressed in both the PDC and SARP.
WHC - Safety	Nuclear Safety Programs/Projects	Provides oversight safety review for compliance with applicable regulatory requirements, and coordinates reviews by Industrial Hygiene, Industrial Safety, Fire Protection, Criticality Safety, and Radiation Protection, as necessary (PDC & SARP).
WHC - Quality Assurance	Analytical Environmental Quality Assurance	Provides QA requirements review (PDC & SARP).
WHC - SEAC WAES subcouncil	NA - Review Only	Provides a high-level review of PDC & SARP. The purpose of this review is to independently verify that the both documents comply with all applicable WHC and regulatory requirements.
DOE - RL	Traffic Manager	Independent review of the PDC & SARP.  Note that approval by the Traffic Manager indicates approval concurrence by the SNF Project Office.

7.0 REFERENCES

DI-84100-002-02, WHC Desk Instruction, *Safety Analysis Report for Packaging (On-site) Format*, May 11, 1995.

DI-84100-006-00, WHC Desk Instruction, *Packaging Design Criteria Format (On-site Transfers)*, May 14, 1993.

DOE Order 1540.1, *Materials Transportation and Traffic Management*.

DOE Order 5480.1B, *Environmental, Safety, and Health Program for Department of Energy Operations*.

Title 10 CFR 71, *Packaging Radioactive Material for Transportation*.

Title 49 CFR, Parts 0 - 199, *Transportation*.

WHC-CM-2-14, *Hazardous Material Packaging and Shipping*.

WHC-CM-4-29, *Nuclear Criticality Safety Manual*.

WHC-CM-6-1, *Standard Engineering Practices*.

WHC-SD-TP-RPT-001, Rev 0, *Report on Equivalent Safety for Transportation and Packaging of Radioactive Materials*.

## DISTRIBUTION SHEET

<b>To</b>	<b>From</b>	<b>Page 1 of 1</b>
Distribution	Engineering Support	Date March 6, 1996
Project Title/Work Order		EDT No. 608261
K Basin Sludge Packaging Design Criteria (PDC) and Safety Analysis Report for Packaging (SARP) Approval Plan		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
C. J. Alderman	R3-48	X			
S. A. Brisbin	R3-48	X			
D. W. Claussen	S7-55	X			
J. G. Field	G1-11	X			
J. E. Geary	S5-07	X			
O. M. Holgado	S7-41	X			
C. R. Hoover	G1-11	X			
D. W. McNally	G1-11	X			
F. W. Moore	X3-85	X			
F. J. Muller	X3-85	X			
J. W. Osborne	X3-80	X			
K. L. Pearce	R3-48	X			
D. R. Precechtel	R3-48	X			
W. J. Schlauder	S7-84	X			
D. W. Smith	R3-11	X			
P. L. Smith	R3-08	X			
C. A. Thompson	R3-85	X			
T. A. Tomaszewski	G1-11	X			
J. Weber	S1-57	X			
M. J. Wiemers	X3-85	X			
K Basins Project File	X3-85	X			
SNF Project Files	R3-11	X			