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Accession #: D295186471

Document #: SD-WM-TP-415

Title/Desc:

TANK 241AW105 TANK CHARACTERIZATION PLAN

Pages: 14

Sta 4

NOV 08 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT No 613588

2. To: (Receiving Organization) <b>DISTRIBUTION</b>	3. From: (Originating Organization) <b>TWRS/TECHNICAL BASELINE INTEGRATION</b>	4. Related EDT No.: <b>N/A</b>
5. Proj./Prog./Dept./Div.: <b>TWRS CHAR/TECHNICAL BASELINE INTEGRATION</b>	6. Cog. Engr.: <b>C. S. HOMI</b>	7. Purchase Order No.: <b>N/A</b>
8. Originator Remarks: <b>N/A</b> <i>for release</i>		9. Equip./Component No.: <b>N/A</b>
11. Receiver Remarks:		10. System/Bldg./Facility: <b>AW-105</b>
		12. Major Assm. Dwg. No.: <b>N/A</b>
		13. Permit/Permit Application No.: <b>N/A</b>
		14. Required Response Date: <b>11/07/95</b>

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-WM-TP-415		0	TANK 241-AW-105 TANK CHARACTERIZATION PLAN	N/A	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 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
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1		Cog. Eng. C. S. HOMI <i>[Signature]</i> 11/7/95									
1		Cog. Mgr. S. J. EBERLEIN <i>[Signature]</i> 11/2/95									
		Safety									
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18. C. S. HOMI <i>[Signature]</i> 11/7/95 Signature of EDT Originator Date	19. N/A Authorized Representative Date for Receiving Organization	20. S. J. EBERLEIN <i>[Signature]</i> 11/2/95 Cognizant Manager Date	21. DOE APPROVAL (if required) Ctrl. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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## RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-TP-415, REV 0

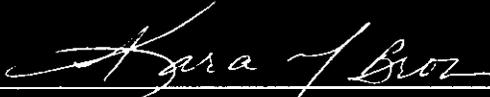
Document Title: Tank 241-AW-105 Tank Characterization Plan

Release Date: 11/7/95

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**SUPPORTING DOCUMENT**

1. Total Pages 10

2. Title

TANK 241-AW-105 TANK CHARACTERIZATION PLAN

3. Number

WHC-SD-WM-TP-415

4. Rev No.

0

5. Key Words

CHARACTERIZATION, GENERAL SAFETY ISSUES, SPECIFIC SAFETY ISSUES, INFORMATION REQUIREMENTS, PRIORITY

6. Author

Name: C. S. HOMI

Signature

Organization/Charge Code 75320/N466A E44330

7. Abstract

This document is a plan that identifies the information needed to address relevant issues concerning short-term and long-term safe storage and long-term management of Double-Shell Tank (DST) 241-AW-105.

8. RELEASE STAMP

OFFICIAL RELEASE  
BY WHC  
DATE NOV 08 1995



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# **Tank 241-AW-105**

## **Tank Characterization Plan**

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**Westinghouse Hanford Company**

**Date Published**  
**November 1995**

Prepared for the U.S. Department of Energy  
Office of Environmental Restoration and  
Waste Management



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P.O. Box 1970  
Richland, Washington

Management and Operations Contractor for the  
U.S. Department of Energy under Contract DE-AC06-87RL10930

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**Approved for Public Release**

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LIST OF ABBREVIATIONS

AW-105 241-AW-105  
DQO Data Quality Objective  
DSSF Double-Shell Slurry Feed  
HTCE Historical Tank Content Estimate  
NCPLX Non-complexed waste  
TCP Tank Characterization Plan  
TLM Tank Layering Model  
TOC Total Organic Carbon  
USQ Unreviewed Safety Question  
WHC Westinghouse Hanford Company

## 1.0 INTRODUCTION

This Tank Characterization Plan (TCP) identifies the information needed to address relevant issues concerning short-term and long-term safe storage and long-term management of Double Shell Tank 241-AW-105 (AW-105). It should be understood that the various needs and issues surrounding tank AW-105 are evolving as new information about the tank is uncovered. As a result of this progression, this Tank Characterization Plan addresses only the issues that, to this date, have been identified. It is expected that deviations from this plan may occur as additional issues or needs arise which impact the management of tank AW-105. As necessary, this Tank Characterization Plan will be revised to reflect those changes or deviations.

Tank AW-105 was constructed in the late 1970s and entered into service in August 1980. The tank received complexant concentrate waste from August 1980 until May 1983. Tank 241-AW-105 received B Plant low-level waste during the first quarter of 1983. The tank received PUREX low-level waste from the second quarter of 1983 until the fourth quarter of 1992. From the third quarter of 1984 until the first quarter of 1990, the tank received zircaloy cladding waste from PUREX. During July 1986, the tank received double-shell slurry feed waste. From June 1990 until March 1994, the tank waste was designated as dilute non-complexed waste and PUREX neutralized cladding removal waste. AW-105 is currently an active dilute receiver tank receiving waste from PUREX (Brevick 1995b). This tank currently contains waste with a total waste volume of 2,260 kL (597 kgal), which is equivalent to 551 centimeters (217.1 inches) of waste as measured from the baseline of the tank (Hanlon 1995).

Sampling data for Tank 241-AW-105 was found for nine reported dates between September 20, 1982 and September 10, 1990. The first sample was reported on September 20, 1982. The sample was a dark brown liquid with no solids present. The sample contained a large quantity of sodium with some aluminum and hydroxide. The sample contained the radionuclides of cesium and strontium in the greatest quantity.

Two samples were reported on May 10, 1984, one from the surface of the waste (R-9837) and one from four feet below the surface (R-9838). Both were clear yellow solutions with a floating organic and a trace of solids. The most abundant chemicals were hydroxide, sodium, and nitrate. The radionuclides in the greatest quantity were cesium and strontium. Both of the samples were similar in chemical composition, but the concentrations were lower in the deeper sample. Sample T-9706 was received on January 6, 1984 and reported on April 30, 1985. This sample was a status report for the tank's contents. The sample was reported as a yellow liquid with very few solids and no visible organics. The sample was tested for chemical constituents only, showing hydroxide, nitrate, and carbonate as the primary anions with aluminum as the primary cation. No test for sodium or radionuclides was made.

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A sample received in early January 1985 was reported on June 10, 1985. The sample, R-4036, was taken to analyze the composition of the waste surface. The sample was clear and colorless with a clear, colorless organic on the surface. Chemical analysis revealed hydroxide, ammonia, fluoride, potassium, and sodium as the primary components. The radiological analysis showed that cesium and promethium were the most common radionuclides.

Another sample was analyzed on June 6, 1986. It was centrifuged and the resulting liquor and solids analyzed. Both contained primarily sodium, potassium, carbonate, and nitrate. The radionuclides in the sample were cesium and ruthenium.

Twelve samples (numbered 7625 through 7636) were analyzed on August 11, 1986 for total plutonium and americium content within the tank. Also on that date, a core sample was drawn and segments 5 through 10 were analyzed. The reported chemicals in the greatest concentration were sodium, potassium, and zirconium. All of the analyzed segments contained white solids. The radionuclides analyzed were plutonium and americium.

On February 18, 1987, a sludge and heel sample were drawn and analyzed. The samples (numbers 7937, 7939, 7940, 7941, 7942, and 7946) were analyzed for chemical and radiological constituents. The resulting analysis showed sodium, fluoride, potassium, and nitrate as the primary chemicals and cesium-137, niobium-95, zirconium-95, antimony-125, cerium-144, and ruthenium-106 as the primary radionuclides. The samples were drawn as core samples from the tank.

The final historical sample analyzed for Tank 241-AW-105 was received on July 8, 1988 and analyzed on September 10, 1990. This sample was used as a status report for the waste in the tank. The primary anions were fluoride, hydroxide and nitrate, and the main cations were sodium and potassium. The most common radionuclides were cesium and promethium.

This tank is not on any Watch list. Near-term sampling and analysis activities are focused on either verification of the non-watchlist tank status, identification of any new safety issues or changing the non-Watch List status. Should any safety issues be identified additional analysis will occur consistent with the identified issue.

In addition to the resolution of the safety issues, it is intended that all tank waste will be subject to pretreatment and retrieval to prepare for final storage or disposal. Presently, these long-range plans have yet to be fully identified and are, therefore, not included in this document.

## 2.0 PROGRAM ELEMENTS REQUIRING INFORMATION FOR TANK 241-AW-105

This section identifies the various program elements, and identifies which of these programs require characterization data from tank AW-105.

## 2.1 GENERAL SAFETY ISSUES

The Tank Safety Screening Data Quality Objective (Dukelow 1995) describes the sampling and analytical requirements that are used to screen waste tanks for unidentified safety issues. The primary analytical requirements for the safety screening of a tank are energetics, total alpha activity, moisture content, and flammable gas concentration.

## 2.2 SPECIFIC SAFETY ISSUES

### 2.2.1 Ferrocyanide

This tank is not on the Ferrocyanide Watch List and; therefore, no information needs are currently identified for this program element.

### 2.2.2 Organic

This tank is not on the Organic Watch List and; therefore, no information needs are currently identified for this program element.

### 2.2.3 High Heat

This tank is not listed as high heat and; therefore, no information needs are currently identified for this program element.

### 2.2.4 Flammable Gas

This tank is not on the Flammable Gas Watch List and; therefore, no information needs are currently identified for this program element.

### 2.2.5 Vapor

The tanks currently scheduled to be vapor sampled may be classified into four categories: (1) those tanks which are to be rotary mode core sampled (as a consequence of the rotary sampling system); (2) tanks on the Organic or Ferrocyanide Watch Lists; (3) tanks in C farm; and (4) tank BX-104, due to vapor exposure. This tank is not categorized in one of the above four groups, therefore characterization of the tank headspace is not needed.

### 2.2.6 Criticality

No information separate from that for the general safety issue of tank AW-105 are currently identified for this program element. However, if the general safety screening of tank AW-105 identifies a potential criticality concern, analyses for fissile materials and neutron sorbers and poisons will be performed as identified in the safety screening data quality objective.

### 2.2.7 Screening Approach Evaluation

The safety screening approach is currently under review. Information is required from key tanks to determine if a revised approach to screening may be adopted, as proposed in Meacham 1995.

## 2.3 CONTINUING OPERATIONS

### 2.3.1 Compatibility/Stabilization

Tank AW-105 waste will be sampled to determine compatibility. Sampling and analysis requirements must be performed as per *Data Quality Objectives for the Waste Compatibility Program* (Fowler 1995). The analyses employed will be for transuranics (TRUs) such as <sup>239</sup>Pu and <sup>241</sup>Am, Total Organic Content (TOC), heat generation (by determining the amount of <sup>90</sup>Sr and <sup>137</sup>Cs) and measuring the "pumpability" of the waste (i.e. density, viscosity, percent of volume composed of solids...etc).

### 2.3.2 Evaporator

No information needs are currently identified for this program element.

## 2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

No information needs are currently identified for this program element, although work to identify these needs is in progress and expected to be completed in fiscal year 1996.

## 2.5 DISPOSAL

### 2.5.1 Retrieval

Current retrieval needs (Bloom 1995) do call for test samples to be taken from tank AW-105.

### 2.5.2 Pretreatment/Vitrification

Tank AW-105 has been identified as a bounding tank for pretreatment/ disposal process development (Kupfer 1995).

**2.6 HISTORICAL MODEL EVALUATION**

Bounding tanks and data requirements for historical model evaluations are found in DQO *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). Tank AW-105 is not identified as a primary bounding tank for historical model evaluations.

**3.0 HOW INFORMATION WILL BE OBTAINED**

The safety screening DQO requires that a vertical profile of the tank waste be obtained from at least two widely spaced risers. This vertical profile may be obtained using core, auger (for shallow tanks), or grab samples. A grab sampling activity was completed in fiscal year 1995. No other sampling is scheduled through fiscal year 1996 (Stanton 1995).

**4.0 PRIORITY OF INFORMATION REQUIREMENTS**

Grab sampling was completed on September 7, 1995. Further sampling activities are not presently scheduled or required.

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Grab Sampling	-Compatibility DQO -Safety Screening DQO	3 grab samples	Energetics, Major Anions, Cations & Radionuclides, SpG & pH, Separable Organics

**5.0 WHEN INFORMATION IS NEEDED**

Data are required for Tank AW-105 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

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### 6.0 REFERENCES

- Bloom, G. R., *Characterization Data Needs for Development, Design and Operation of Retrieval Equipment Developed Through the Data Quality Objective Process*, WHC-SD-WM-DQO-008, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Brevick, C. H., 1995a, *Historical Tank Content Estimate for the Southeast Quadrant of the Hanford 200 East Areas*, WHC-SD-W-ER-350, Rev. 0, ICF Kaiser Hanford Company, Richland, Washington.
- Brevick, C. H., 1995b, *Supporting Document for the Southeast Quadrant Historical Tank Content Estimate Report for AW Tank Farm, Vol I*, WHC-SD-W-ER-316, Rev. 0, ICF Kaiser Hanford Company, Richland, Washington.
- Dukelow, G. T., J. W. Hunt, H. Babad, and J. E. Meacham, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev 2, Westinghouse Hanford Company, Richland, Washington.
- Fowler, K.D., 1995, *Data Quality Objectives for the Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 1, April 1995, Westinghouse Hanford Company, Richland, Washington.
- Hanlon, B.M., 1995, *Waste Tank Summary for Month Ending August 31, 1995*, WHC-EP-0182-89, Westinghouse Hanford Company, Richland, Washington.
- Homi, C. S., S. J. Eberlein, 1995, *Fiscal Year 1996 Tank Waste Remediation System Tank Waste Analysis Plan*, WHC-SD-WM-PLN-101, Rev 0, Westinghouse Hanford Company, Richland, Washington
- Kupfer, M. J., W. W. Schultz, J. T. Slankas, 1995, *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology*, WHC-SD-WM-TA-154, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Meacham, J. E., R. J. Cash, B. A. Pulsipher, G. Chen, 1995, *Data Requirements for the Ferrocyanide Safety Issue Developed through the Data Quality Objectives Process*, WHC-SD-WM-DQO-007, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Simpson, B. C., D. J. McCain, 1995, *Historical Model Evaluation Data Requirements*, WHC-SD-WM-DQO-018, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Stanton, G. A., 1995, *Baseline Sampling Schedule, Revision 4.4*, Westinghouse Hanford Company, Richland, Washington.

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