

RMIS View/Print Document Cover Sheet

This document was retrieved from the Boeing ISEARCH System.

Accession #: D196069762

Document #: SD-WM-TP-211

Title/Desc:

TANK 241C108 TANK CHARACTERIZATION PLAN

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN No **625717**

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. C. S. HOMI, 75320, R2-12, 373-1097	3a. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Date 10/04/95	
	5. Project Title/No./Work Order No. TANK 241-C-108 TANK CHARACTERIZATION PLAN	6. Bldg./Sys./Fac. No. C-108	7. Approval Designator N/A	
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TP-211 REV <u>2</u> <u>1A</u>	9. Related ECN No(s). N/A	10. Related PO No. N/A	

11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. N/A	11c. Modification Work Complete N/A _____ Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A _____ Cog. Engineer Signature & Date
---	------------------------------	---	---

12. Description of Change
 Complete revision.

13a. Justification (mark one)

Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
 Format change.

14. Distribution (include name, MSIN, and no. of copies) See attached Distribution Sheet	RELEASE STAMP OFFICIAL RELEASE <u>(2)</u> BY WHC DATE OCT 05 1995 <i>Sto 4</i>
---	--

RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-TP-211, REV 2

Document Title: Tank 241-C-108 Tank Characterization Plan

Release Date: 10/5/95

**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:



Kara Broz



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.

This report has been reproduced from the best available copy. Available in paper copy. Printed in the United States of America. To obtain copies of this report, contact:

Westinghouse Hanford Company - Document Control Services
P.O. Box 1970, Mailstop H6-08, Richland, WA 99352
Telephone: (509) 372-2420; Fax: (509) 376-4989

SUPPORTING DOCUMENT

1. Total Pages *12*

2. Title

TANK 241-C-108 TANK CHARACTERIZATION PLAN

3. Number

WHC-SD-WM-TP-211

4. Rev No.

2

5. Key Words

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

6. Author

Name: C. S. HOMI

Signature

Organization/Charge Code 75320/N4G6A

CSH 10/4/95

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 Single-Shell Tank (SST) 241-C-108.

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE OCT 05 1995
He 4



Tank 241-C-108 Tank Characterization Plan

C. S. Homi
Westinghouse Hanford Company

Date Published
October 1995

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



Westinghouse
Hanford Company

P.O. Box 1970
Richland, Washington

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

Approved for Public Release

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 PROGRAM ELEMENTS REQUIRING INFORMATION FOR 241-C-108 2

 2.1 GENERAL SAFETY ISSUES 2

 2.2 SPECIFIC SAFETY ISSUES 2

 2.2.1 Ferrocyanide 2

 2.2.2 Organic 2

 2.2.3 High Heat 2

 2.2.4 Flammable Gas 2

 2.2.5 Vapor 3

 2.2.6 Criticality 3

 2.3 CONTINUING OPERATIONS 3

 2.2.1 Compatibility/Stabilization 3

 2.2.2 Evaporator 3

 2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN 3

 2.5 DISPOSAL 3

 2.5.1 Retrieval 3

 2.5.2 Pretreatment/Vitrification 4

 2.6 HISTORICAL MODEL EVALUATION 4

3.0 HOW INFORMATION WILL BE OBTAINED 4

4.0 WHEN INFORMATION IS NEEDED 5

5.0 PRIORITY OF INFORMATION REQUIREMENTS 5

6.0 REFERENCES 6

LIST OF TABLES

Table 5-1: Integrated DQO Requirements 5

LIST OF ABBREVIATIONS

C-108	Tank 241-C-108
DQO	Data Quality Objective
DSSF	Double Shell Slurry Feed
NCPLX	Non-complexed
SST	Single-Shell Tank
SUMMA®	Trademark of Molectrics, Inc.
TCP	Tank Characterization Plan
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 Single-Shell Tank 241-C-108 (C-108). It should be understood that the various needs and issues surrounding tank C-108 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 SST C-108. As necessary, this Tank Characterization Plan will be revised to reflect those changes or deviations.

Tank C-108 was constructed between 1943 and 1944 and was put into service in September 1947. Initially tank C-108 received first cycle, from the cascade overflow of tank C-107, waste from in September 1947 to March 1948 and; again, in 1952. During the second quarter of 1952, the entire contents of C-108 (which was first cycle waste) was transferred to B-106. In December 1952 it was discovered that the cascade overflow line to C-109 was plugged. During the first and second quarters of 1953, C-108 received uranium recovery waste. During the third quarter of 1957, tank C-108 received wastewater. During the third and fourth quarters of 1957, C-108 received in-tank ferrocyanide waste. During the second quarter of 1961, the tank received PUREX cladding waste. C-108 received strontium recovery waste during the second quarter of 1965. Between the second quarter of 1970 and the first quarter of 1973, C-108 received cladding waste, organic wash waste and ion exchange waste. From the second quarter of 1973 until the second quarter of 1976, the tank received various types of waste. Presently, the tank waste is classified as non-complexed. This tank currently contains waste with a total waste volume of 249.8 kL (66 kgal), which is equivalent to 49.4 centimeters (19.5 inches) of waste as measured from the baseline of the tank. The waste is comprised entirely of sludge with no pumpable liquid remaining (Brevick 1994a).

The tank has been categorized as sound, was removed from service in 1976, declared inactive in 1977 and was interim stabilized in 1978 with intrusion prevention completed in December 1982. Tank C-108 is passively ventilated. The last photo was taken on December 5, 1974. The 1974 photographic montage is not currently available (Brevick 1994b). The last solids volume update was obtained on February 24, 1984 (Hanlon 1995).

Tank C-108 was sampled during June 1975. The sample was a clear light yellow liquid that contained no solids even when cooled to 5°C and held at that temperature for 35 minutes.

This tank is on the Ferrocyanide Watch list. The tank has an Unreviewed Safety Question (USQ) because of the potential consequences of a radiological release resulting from the ignition of the ferrocyanide constituents. Near-term sampling and analysis activities are focused on either verification of the watchlist tank status, identification of any new safety issues, changing the Watch List status, or resolving the USQ. 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-C-108

This section identifies the various program elements, and identifies which of these programs require characterization data from tank C-108.

2.1 GENERAL SAFETY ISSUES

The Tank Safety Screening Data Quality Objective (Babad et al. 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 on the Ferrocyanide Watch List. Sampling and analysis requirements must be performed as per *Data Requirements for the Ferrocyanide Safety Issue Developed through the Data Quality Objectives Process* (Meacham 1995). The analyses employed will determine the total fuel concentration and moisture content. Total fuel concentration and moisture content are the primary data requirements. Also, further analyses will be employed to obtain secondary data such as temperature (data will be obtained from tank thermocouple(s)), nickel, total cyanide, TOC, ¹³⁷Cs and ⁹⁰Sr (Meacham 1995).

2.2.2 Organic

Tank C-108 is not on the Organics Watch List and; therefore, no information needs are currently identified for this program element.

2.2.3 High Heat

This tank is not on the High Heat Watch List 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. Since tank C-108 is categorized in one of the above four groups, information needs must satisfy *Data Quality Objectives for Generic In-Tank Health and Safety Vapor Issue Resolution* (Osborne et al. 1995). Characterization of the tank headspace is needed to: 1) identify those tanks which can be sampled safely with intrusive equipment without risk of gas ignition; 2) identify and estimate concentrations of toxicologically significant compounds present in the tank headspace to establish worker safety precautions; and 3) support the startup and operation of the portable exhauster used during rotary-mode core sampling.

2.2.6 Criticality

No information separate from that for the general safety issue of tank C-108 are currently identified for this program element. However, if the general safety screening of tank C-108 identifies a potential criticality concern, analyses for fissile materials and neutron absorbers 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

No information needs are currently identified for this program element.

2.3.2 Evaporator

No information needs are currently identified for this program element.

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank C-108 is a single shell tank.

2.5 DISPOSAL

2.5.1 Retrieval

Current retrieval needs (Bloom 1995) do not call for test samples to be taken from tank C-108.

2.5.2 Pretreatment/Vitrification

Tank C-108 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 1995). Tank C-108 has not been identified as a primary bounding tank.

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. Vapor sampling and auger sampling events are required. Presently, the auger sampling has been completed and the vapor sampling has not been scheduled. The auger sampling type has been chosen over other sampling modes due to both the depth of the tank (C-108 is a shallow tank making rotary core sampling unnecessary) and the fact that the surface of tank C-108 is comprised saltcake.

The best current estimate of the water content in tank C-108 solids, as determined from the process records, is 69.7%; based on the HTCE (Brevick et al). Estimated (Toth et al 1995) water content in tank C-108 sludge is 48.2% (generated from a model based on sample data from similar tanks). If the variance of water in tanks already sampled and a statistical power curve is used then a minimum of two cores are needed to demonstrate a water content above 17% at 95% confidence. Should the measured mean be lower than anticipated or the measured variance higher, additional samples may be required. The TOC contained within the sludge is estimated (Toth et al 1995) to be 0.2% (wet basis) respectively, which is significantly lower than the level of concern. Two core samples will be requested for this tank and this should meet the requirements for the above parameters.

Presently, there is no information on the availability of tank C-108 risers. It is recommended that risers be chosen that are separated radially to the maximum extent possible and; therefore, will provide a larger amount of data about the vertical and horizontal waste layers within the tank. Initial information will be taken from 3 risers and assessed to determine if more samples are required. Alternate sampling methods, installation of a riser or removal of equipment from risers are possible future options.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling is required but, it has not been scheduled at this time. Auger sampling was completed in November 1994 (Stanton 1995).

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Vapor Sampling	-Health & Safety Vapor Issue Resolution DQO	3 SUMMA® canisters 6 Triple Sorbent Traps 8 Sorbent Trap Systems	Gas Flammability Gas Toxicity -Organic Vapors -Permanent Gases
Auger Sampling	-Safety Screening DQO -Ferrocyanide DQO	Core samples from 2 risers separated radially to the maximum extent possible	Energetics, Moisture, Total Alpha, SpG, Total Organic Carbon, Ni, CN

5.0 WHEN INFORMATION IS NEEDED

Data are required for Tank C-108 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

6.0 REFERENCES

- Babad, H. K. S. Redus, and J. W. Hunt, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev 1, Westinghouse Hanford Company, Richland, Washington.
- Bloom, G. R., and Q. H. Nguyen, 1995, *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., 1994a, *Historical Tank Content Estimate for the Northeast Quadrant of the Hanford 200 East Areas*, WHC-SD-WM-ER-349, Rev. 0a, ICF Kaiser Hanford Company, Richland, Washington.
- Brevick, C. H., 1994b, *Supporting Document for the Historical Tank Content Estimate for BY Tank Farm*, WHC-SD-WM-ER-312, Rev. 0, ICF Kaiser Hanford Company, Richland, Washington.
- Brown, T. M., S. J. Eberlein, D. A. Dodd, T. J. Kunthara, B. C. Simpson, and N. W. Kirch, *Tank Waste Characterization Plan and Basis*, 1995, WHC-SD-WM-TA-164, Rev 0, 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 May, 1995*, WHC-EP-0182-82, Westinghouse Hanford Company, Richland, Washington.
- Homi, C. S., and 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, and 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, and 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.
- Osborne, J.W., J.L. Huckaby, E.R. Hewitt, C.M. Anderson, D.D. Mahlum, B.A. Pulsipher, and J.Y. Young, 1995, *Data Quality Objectives for Generic In-Tank Health and Safety Vapor Issue Resolution*, WHC-SD-WM-DQO-002, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Price, D. N., 1994, *Rotary Core Vapor Sampling Data Quality Objective*, WHC-SD-WM-SP-003, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Simpson, B. C., and 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 4.3, (internal memo 74320-95-04, to distribution, March 24)*, Westinghouse Hanford Company, Richland,

Washington.

Toth, J. J., P. G. Heasler, M. E. Lerchen, J. G. Hill, and P. D. Whitney, 1995, *Analysis of Organic Carbon and Moisture in Hanford Single-Shell Tank Waste*, PNL-10360, Pacific Northwest Laboratory, Richland, Washington.