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START

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN No 625433

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	3a. USQ Required?	4. Date
Supplemental [ ] Direct Revision [X] Change ECN [ ] Temporary [ ] Standby [ ] Supersedure [ ] Cancel/Void [ ]	C. S. HOMI, 75320, R2-12, 373-1097	[ ] Yes [X] No	08/28/95
	5. Project Title/No./Work Order No. TANK CHARACTERIZATION PLAN	6. Bldg./Sys./Fac. No. 241-BX/200E	7. Approval Designator N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TP-382 REV 0	9. Related ECN No(s). N/A	10. Related PO No. N/A

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[ ] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

Revised pages 5 and 6 to add requirement to perform auger sampling.

13a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[ ]	Environmental	[ ]	Facility Deactivation	[ ]
As-Found	[ ]	Facilitate Const	[ ]	Const. Error/Omission	[ ]	Design Error/Omission	[ ]

13b. Justification Details

Auger sampling is required in accordance with applicable DQOs.

14. Distribution (include name, MSIN, and no. of copies)

See attached Distribution Sheet

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OFFICIAL RELEASE BY WHC DATE AUG 28 1995

A-7900-013-2 (11/94) GEF095

A-7900-013-1

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision

20. Approvals

	Signature	Date		Signature	Date
OPERATIONS AND ENGINEERING			ARCHITECT-ENGINEER		
Cog. Eng. C. S. Homi	C S Homi	8/28/95	PE		
Cog. Mgr. S. J. Eberlein	S J Eberlein	8/28/95	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other			Other		
			DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

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INFORMATION RELEASE REQUEST
PUBLIC DOCUMENT CHANGE/REVISION
(Short Form No. 1)

1. Base Document ID Number: WHC-SD-WM-TP-382

2. Base Document Title:
TANK 241-BX-110 TANK CHARACTERIZATION PLAN

3. Change/Revision Number: 0A

4. Change/Revision Date: 08/28/95

5. Unclassified Category:* UC - 2070

6. Budget & Reporting Code:* B&R - EW3120074

I verify this change/revision to the base document indicated above:

- Complies with the provisions of WHC-CM-3-4
- Contains no Limited-Use information
- Contains no classified or Applied Technology references
- Does not change the intent or meaning of the base document
- And, the base document itself is approved for public release.

7. Responsible Manager: S J Eberlein

MSIN: R2-12 Telephone Number: 376-5029

S J Eberlein (Signature) 8/28/95 (Date)

8. Information Release Administration Specialist:**

(Signature) (Date)

*Required only for full revisions transmitted to OSTI.
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A-6001-401.1 (07/94)

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SUPPORTING DOCUMENT

1. Total Pages 9

2. Title	3. Number	4. Rev No.
TANK 241-BX-110 TANK CHARACTERIZATION PLAN	WHC-SD-WM-TP-382	0A

5. Key Words

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

6. Author

Name: C. S. HOMI

Signature

Organization/Charge Code 75320/N4169

7. Abstract

This document is a plan 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-BX-110.

8. RELEASE STAMP

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DATE AUG 28 1995

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RECORD OF REVISION	(1) Document Number WHC-SD-WM-TP-~~313~~ 382	Page 1

(2) Title
TAMK 241-BX-110 TANK CHARACTERIZATION PLAN

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Original Issue EDT 613361, 08/25/95		
RS OA	Revised to add auger sampling requirement, ECN 625433, 08/28/95.		

WHC-SD-WM-TP-382
Revision 0A
UC-2070

Tank 241-BX-110
Tank Characterization Plan

C. S. Homi
Westinghouse Hanford Company

Date Published
August 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

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LIST OF ABBREVIATIONS

DQO	Data Quality Objective
DSSF	Double Shell Slurry Feed
SST	Single-Shell Tank
SUMMA®	Trademark of Molectrics, Inc.
TCP	Tank Characterization Plan
TOC	Total Organic Carbon
BX-110	Tank 241-BX-110
WHC	Westinghouse Hanford Company

1.0 INTRODUCTION

This Tank Characterization Plan (TCP) identifies the information needed to address relevant issues concerning short-term safe storage and long-term management of Single-Shell Tank (SST) 241-BX-110 (BX-110). It should be understood that the various needs and issues surrounding SST BX-110 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 BX-110. This Tank Characterization Plan will be revised as necessary to reflect those changes or deviations.

Tank BX-110 was constructed between 1946 and 1947 and was put into service in September 1949. Initially tank BX-110 was filled with first cycle waste from September 1949 to January 1950. From the third quarter of 1949 to the first quarter of 1954, the tank contained first cycle waste. The tank periodically cascaded to tank 241-BX-111 from the first quarter of 1951 through the second quarter of 1954. Also, between the second quarter of 1954 until the fourth quarter of 1964, the tank contained evaporator bottoms waste. In the fourth quarter of 1957, scavenged feed was sent to the CR process vault. From the fourth quarter of 1961 until the first quarter of 1968, the tank received wastewater. The tank contained coating waste from the second quarter of 1965 to the third quarter of 1968 and ion exchange waste from the first quarter of 1969 to the first quarter of 1970. Also, during the first quarter of 1969 the tank received cesium recovery waste. From the first quarter of 1972 to the second quarter of 1976, the tank contained in-tank solidification bottoms waste and recycle waste. This tank currently contains waste with a total waste volume of 753.3 kL (199 kgal), which is equivalent to 172.2 centimeters (67.8 inches) of waste as measured from the baseline of the tank. The waste is comprised of 3.8 kL (1 kgal) of supernatant; 159 kL (42 kgal) of saltcake and 552.7 kL (146 kgal) of sludge with 37.9 kL (10 kgal) of pumpable liquid remaining (Brevick 1994a).

The tank is an assumed leaker (with a leak of approximately 30.3 kL [8 kgal] in 1976) and was labeled inactive in 1977. Tank BX-110 is passively ventilated and Partial Isolation was completed in December 1982. Also, interim stabilization was completed in August 1985. The last solids volume update was obtained on October 31, 1994 and the last photo was taken on July 31, 1985. The 1985 photographic montage of tank BX-110 interior indicates a pockmarked sludge surface with pools and rivulets of clear brown liquid (Brevick 1994b).

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.

2.0 PROGRAM ELEMENTS REQUIRING INFORMATION FOR TANK 241-BX-110

This section identifies the various program elements, and identifies which of these programs require characterization data from tank BX-110.

2.1 GENERAL SAFETY ISSUES

The *Tank Safety Screening Data Quality Objective* (Babad et al. 1995a) 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; therefore, no information needs are currently identified for this program element.

2.2.2 Organic

This tank is not on the Organics Watch List but recent work by the Organic Safety Program revealed a question regarding organic complexant salts and a potential problem if all the drainable liquid is pumped from the tank (Webb et al. 1995). Sampling and analysis requirements must be performed as per *Data Quality Objective to Support Resolution of the Organic Fuel Rich Tank Safety Issue* (Babad et al 1995b). The analyses employed will determine the TOC, presence of a free organic liquid phase, moisture content and tank temperature.

2.2.3 High Heat

This tank is not on the High Heat Watch List; 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; 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 (a prerequisite to rotary sampling); (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 BX-110 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) and *Rotary Sampling Core Vapor Sampling Data Quality Objective* (Price 1994). 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 BX-110 are currently identified for this program element. However, if the general safety screening of tank BX-110 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.

2.3 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 BX-110 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 BX-110.

2.5.2 Pretreatment/Vitrification

Tank BX-110 is identified as a bounding tank for pretreatment/disposal process development (Kupfer el al. 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 et al. 1995). Tank BX-110 has been identified as a primary bounding tank for 1C (first cycle decontamination waste from the bismuth phosphate process) waste type.

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. Several sampling events of tank BX-110 are scheduled: one vapor sampling event and a rotary sampling event. No other sampling is scheduled through fiscal year 1997 (Stanton 1995). The rotary mode sampling type has been chosen over other sampling modes due to both the depth of the tank (making auger sampling inadequate) and the fact that the surface of tank BX-110 is comprised of saltcake (which is not conducive to good push mode core sampling recovery). Prior to rotary sampling it is necessary to vapor sample the tank as per requirements of (Price 1994).

The best current estimate of the water content in tank BX-110 solids, as determined from the process records, is 61%; based on the HTCE (Brevick 1994b). Estimates (Toth et al 1995) of water content in tank BX-110 saltcake and sludge are 48.4% and 48.9% respectively (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 saltcake is estimated (Toth et al. 1995) to be 0.6% (wet basis), 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.

The best current information indicates that 3 risers are available for sampling of tank BX-110, 12" (30.5 cm) risers R3, R6, and R2. It is recommended that risers 2 and 6 be chosen because, they are risers 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 these 2 risers and assessed to determine if more samples are required. Two additional risers are available but, equipment will have to be removed from each individual riser to utilize these risers for sampling.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Characterization of flammable and toxic vapors is a high priority for this tank. Vapor sampling is expected to be performed in fiscal year 1996. Auger sampling is scheduled for early FY 1996. Rotary mode sampling is scheduled for FY 1998.

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Vapor Sampling	-Health & Safety Vapor Issue Resolution DQO -Rotary Sampling Core Vapor Sampling DQO	3 SUMMA® canisters 6 Triple Sorbent Traps 8 Sorbent Trap Systems	Gas Flammability Gas Toxicity -Organic Vapors -Permanent Gases
Auger	-Safety Screening DQO -Historical Model DQO	Auger samples from 2 risers separated to the maximum extent possible	Energetics, Moisture, Total Alpha, Cations, Anions, Radionuclides
Rotary Core Sampling	-Safety Screening DQO -Historical Model DQO -Organic Fuel-Rich DQO	Core samples from 2 risers separated to the maximum extent possible	Energetics, Moisture, Total Alpha

5.0 WHEN INFORMATION IS NEEDED

Data are required for Tank BX-110 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

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DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Characterization Support	Date 08-28-95
Project Title/Work Order		EDT No.
Tank 241-BX-110 Tank Waste Characterization Plan (WHC-SD-WM-TP-382 REV 0A)		ECN No. 625433

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