COMPLETE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN № 625708

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	10/04/95
	5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Approval Designator
	TANK 241-BY-108 TANK CHARACTERIZATION PLAN	BY-108	N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) 10/4/95 EAB	9. Related ECN No(s).	10. Related PO No.
	WHC-SD-WM-TP-275 REV X OE	N/A	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

Complete revision.

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

Format change.

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

See attached Distribution Sheet

RELEASE STAMP

OFFICIAL RELEASE BY WHC DATE OCT 05 1995

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

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) 625708

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	10/4/95	PE		
Cog. Mgr. S. J. Eberlein	S. J. Eberlein	10/4/95	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other			Other		
			DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

RELEASE AUTHORIZATION

Document Number:	WHC-SD-WM-TP-275, REV 1
Document Title:	Tank 241-BY-108 Tank Characterization Plan
Release Date:	10/4/95

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 10/4/95

Kara Broz

SUPPORTING DOCUMENT

1. Total Pages 12

2. Title	3. Number	4. Rev No.
TANK 241-BY-108 TANK CHARACTERIZATION PLAN	WHC-SD-WM-TP-275	1

5. Key Words

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

6. Author

Name: C. S. HOMI

Signature 10/4/95

Organization/Charge Code 75320/N4G6A

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-BY-108.

8. RELEASE STAMP

OFFICIAL RELEASE BY WHC DATE OCT 05 1995

RECORD OF REVISION	(1) Document Number WHC-SD-WM-TP-275	Page 1

(2) Title
TANK 241-BY-108 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) WHC-SD-WM-TP-275, REV. 0, EDT 609586		
0A	Added Appendix B; ECN 617812		
0B	Replaced pages A.1, A.2, A.6, A.11, A.12, and A.13 of Appendix A.		
0C	Added Appendix C; ECN 617837		
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Revision 1
UC-2070

Tank 241-BY-108
Tank Characterization Plan

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Westinghouse Hanford Company

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Approved for Public Release

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

BY-108	Tank 241-BY-108
DQO	Data Quality Objective
HTCE	Historical Tank Content Estimate
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 (SST) 241-BY-108 (BY-108). It should be understood that the various needs and issues surrounding tank BY-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 BY-108. As necessary, this Tank Characterization Plan will be revised to reflect those changes or deviations.

Tank BY-108 was constructed between 1948 and 1949 and was put into service in April 1951. Initially tank BY-108 received first cycle waste from the tank 241-BY-107 cascade from the first quarter of 1951 until the second quarter of 1953. The tank received U plant waste from the second quarter of 1953 until the first quarter of 1959. The tank became a ferrocyanide waste receiver in 1954 and the tank received in-plant ferrocyanide waste from the fourth quarter of 1954 until the first quarter of 1957. Various transfers out of the tank went to a ditch or a crib. From the second quarter of 1959 until the first quarter of 1968, the tank contained U plant waste and coating waste. Between the second quarter of 1968 and the second quarter of 1973, the tank received evaporator bottoms waste. The evaporator bottoms waste was from the in-tank solidification process. From the third quarter of 1972 until the fourth quarter of 1975, the tank received wastewater. Presently, the tank waste is classified as non-complexed. This tank currently contains a total waste volume of 863.1 kL (228 kgal), which is equivalent to 229.51 centimeters (90.36 inches) of waste as measured from the baseline of the tank. The waste is comprised of 238.5 kL (63 kgal) of saltcake; 624.6 kL (165 kgal) of sludge with no supernatant and pumpable liquid remaining (Brevick 1994a).

The tank is an assumed leaker (with a leak approximately greater than 18.9 kL (5 kgal) in 1973) and was labeled out of service in 1972. Tank BY-108 is passively ventilated, was partially isolated in December 1982 and was interim stabilized in February 1985. The last solids volume update was obtained on April 28, 1982 and the last photo was taken on October 15, 1986. The 1986 photographic montage shows a white waste surface (Brevick et al 1994).

There is no record of historical sampling and analysis information for tank BY-108. 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-BY-108

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

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 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, ^{137}Cs and ^{90}Sr (Meacham 1994).

2.2.2 Organic

This tank is not on the Organics Watch List but, it has been decided to analyze the tank waste for this concern. 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 (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 BY-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) 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 BY-108 are currently identified for this program element. However, if the general safety screening of tank BY-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 BY-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 BY-108.

2.5.2 Pretreatment/Vitrification

Tank BY-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 BY-108 has been identified as an alternate bounding tank for the PFeCN1 (ferrocyanide) waste type, but will not be assessed against the historical DQO unless directed by the program.

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 BY-108 are scheduled: one vapor sampling event and a rotary sampling event. No other sampling is scheduled through fiscal year 1996 (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 BY-108 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 *Rotary Core Vapor Sampling Data Quality Objective* (Price 1994).

The best current estimate of the water content in tank BY-108 solids, as determined from the process records, is 45.8%; based on the HTCE (Brevick et al). Estimates (Toth et al 1995) of water content in tank BY-108 saltcake and sludge are 16.9% and 37.9% respectively (generated from a model based on sample data from similar tanks). The TOC contained within the saltcake and sludge are estimated (Toth et al 1995) to be 0.7% and 0.1% (wet basis) respectively, which is significantly lower than the level of concern. Two core samples will be requested for this tank. If the true concentration of water is near the 17% action limit, it may not be possible to demonstrate through core samples that it is above the action limit.

The best current information indicates that 2 risers are available for sampling of tank BY-108, 12" (30.5 cm) riser R12A and 4" (10.2 cm) riser R5. It is recommended that these risers be chosen because, they are risers that are separated radially 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 riser are available, but equipment will have to be removed from one of these risers to utilize it for sampling. Alternate sampling methods, installation of a riser or removal of equipment from risers presently considered unavailable, are possible future options.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Characterization of flammable and toxic vapors is a high priority for this tank. Vapor sampling was completed in October 1994 (Stanton 1995). Auger sampling was completed in December 1994. Rotary mode sampling was completed in July 1995 (Stanton 1995).

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 12 Triple Sorbent Traps 6 Sorbent Trap Systems	Gas Flammability Gas Toxicity -Organic Vapors -Permanent Gases
Rotary Core and Auger Sampling	-Safety Screening DQO -Ferrocyanide DQO -Organic Fuel-Rich DQO -Pretreatment 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 PRIORITY OF INFORMATION REQUIREMENTS

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

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