COMPLETE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 631572

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 []	Clarence Homi, Evaluation and Planning, R2-12, 373-1097	[] Yes [X] No	05/09/96
	5. Project Title/No./Work Order No. Tank 241-U-103	6. Bldg./Sys./Fac. No. 241-U-103	7. Approval Designator N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TP-288, Rev. 1-A	9. Related ECN No(s). ECNs: 625723, 627005	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

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

Changed to comply with new template and DOE-RL recommended modifications.

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

See attached distribution.

RELEASE STAMP

DATE: MAY 10 1996

STA: 4

HANFORD RELEASE

ID: 2

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

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) ECN-631572

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
N/A		

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog. Eng. C.S. Homi	5/9/96	PE	
Cog. Mgr. J.W. Hunt	5/9/96	QA	
QA		Safety	
Safety		Design	
Environ.		Environ.	
Other L.M. Sasaki RD Schreil for LMS	5/9/96	Other	
		DEPARTMENT OF ENERGY	
		Signature or a Control Number that tracks the Approval Signature	
		ADDITIONAL	

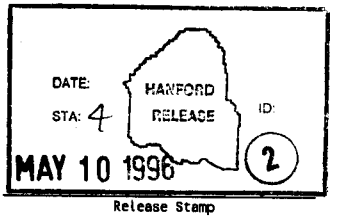
Tank 241-U-103 Tank Characterization Plan

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

EDT/ECN: ECN-631572 UC: 2070
Org Code: 79200 Charge Code: N4G6A
B&R Code: EW 3120074 Total Pages: 10

Key Words: Characterization, General Safety Issues, Specific Safety Issues, Information Requirements, Schedule

Abstract: This document is a plan that identifies the information needed to address relevant issues concerning short-term and long-term storage and long-term management of single-shell tank 241-U-103.



Release Approval 5/10/96 Date

Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number WHC-SD-WM-TP-288	Page 1

(2) Title
TANK 241-U-103 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-288 REV. 0, EDT 610009, January 25, 1995		
1	Complete revision to new format, ECN 625723		
1A RS	Deleted flammable gas requirements ECN 627005		11/16/95
2 RS	Incorporate per ECN-631572.	C.S. Homi	J.W. Hunt
			5/9/96

WHC-SD-WM-TP-288
Revision 2
UC-2070

Tank 241-U-103
Tank Characterization Plan

L. M. Sasaki
Westinghouse Hanford Company

Date Published
May 1996

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

Westinghouse
Hanford Company

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Management and Operations Contractor for the
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Approved for Public Release

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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-U-103 (U-103). It should be understood that the various needs and issues surrounding tank U-103 are evolving as new information about the tank is uncovered. As a result of this progression, this TCP 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 U-103. As necessary, this TCP will be revised to reflect those changes or deviations. This plan reflects the best information available as of May 1996.

Tank U-103 was constructed between 1943 and 1944 and was put into service in February 1947. Tank U-103 received metal waste from the first quarter of 1947 until the fourth quarter of 1956. During 1955, waste was removed for the uranium recovery process and in the fourth quarter of 1956, the heel was sluiced. The tank received reduction oxidation (REDOX) waste from the first quarter of 1957 until the second quarter of 1975. Tank U-103 also occasionally received waste water between 1952 and 1976. From the third quarter of 1975 to the fourth quarter of 1977, the tank received transfers of evaporator feed and other wastes from various tanks. In the fourth quarter of 1977, the tank received NIT, a $HNO_3/KMnO_4$ solution used for partial neutralization of evaporator feed (Agnew et al. 1996). Currently, the waste is classified as non-complexed waste.

The tank is classified as sound and was labelled inactive in 1978. Tank U-103 is passively ventilated and has been partially isolated. The tank is awaiting interim stabilization (Brevick et al. 1995).

Tank U-103 currently contains a total volume of 1,771 kL (468 kgal) of waste, which is equivalent to 422 cm (166 in) of waste as measured from the baseline of the tank (Hanlon 1996).

This tank is on the Flammable Gas and Organic Watch Lists.

Near-term sampling and analysis activities are focused on either verifying or changing the Watch List tank status and identifying any new safety issues. Should any other 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-U-103

This section identifies the various program elements, and identifies which of these programs require characterization data from tank U-103.

2.1 GENERAL SAFETY ISSUES

The *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995) describes the sampling and analytical requirements that are used to screen waste tanks for unidentified safety issues. Analytical requirements for the safety screening of a tank are energetics, total alpha activity, moisture content, density 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 on the Organic Watch List. Sampling and analysis requirements must be performed per the *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue* (Turner et al. 1995). The analyses employed will determine the total organic carbon (TOC), energetics, presence of a free organic liquid phase, and moisture content.

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 on the Flammable Gas Watch List. The applicable data quality objective (DQO) for this safety issue is *Flammable Gas Safety Program: Data Requirements for Core Sample Analysis Developed through the Data Quality Objectives Process* (McDuffie 1995). However, the DQO states that core sampling of the single-shell tanks that are part of the Flammable Gas Watch List is not planned at this time.

2.2.5 Vapor

All 177 underground tanks must be vapor sampled for organic solvent screening as per *Recommendation 93-5 Implementation Plan* (DOE-RL 1996). Some tanks may require additional vapor sampling due to other program needs. These tanks may be classified into four categories: (1) those tanks which are to be rotary mode core sampled (as a consequence of the rotary mode core sampling system exhauster

permit requirements); (2) tanks on the Organic or Ferrocyanide Watch Lists; (3) tanks in C farm; and (4) tank 241-BX-104 due to vapor exposure. Information needs must satisfy *Data Quality Objectives for Tank Hazardous Vapor Safety Screening* (Osborne and Buckley 1995) and for rotary mode core only, *Rotary Core Vapor Sampling Data Quality Objective* (Price 1994) and *Data Quality Objective for Regulatory Requirements for Hazardous and Radioactive Air Emissions Sampling and Analysis* (Mulkey and Markillie 1995) as amended by *Status of the Current Understanding of the Toxic Air Pollutants (TAPS) and Hanford Tank Farm Vapor Space Characterization; Recommended Path Forward and Justification for Continued RMCS Exhauster Operations* (Laws 1996).

Tank U-103 was vapor sampled in February 1995 in support of Osborne et al. (1994).

2.2.6 Criticality

No information separate from that for the general safety issue of tank U-103 are currently identified for this program element. However, if the general safety screening of tank U-103 identifies a potential criticality concern, analyses for fissile materials and neutron sorbers and poisons will be performed as identified in the safety screening DQO.

2.3 CONTINUING OPERATIONS

2.3.1 Compatibility/Stabilization

Tank U-103 waste was sampled to determine compatibility. Sampling and analysis requirements were performed per the *Data Quality Objectives for the Waste Compatibility Program* (Carothers 1994). The analyses employed were transuranics such as ^{239}Pu and ^{241}Am, total organic carbon (TOC), and heat generation as determined by the amount of ^{90}Sr and ^{137}Cs.

2.3.2 Evaporator

This section does not apply to tank U-103.

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank U-103 is a single-shell tank.

2.5 DISPOSAL

2.5.1 Retrieval

Current retrieval needs (Bloom and Nguyen 1995) do not call for test samples to be taken from tank U-103.

2.5.2 Pretreatment/Vitrification

Tank U-103 has not been identified as a bounding tank for pretreatment/disposal process development strategy (Kupfer et al. 1995). All tanks were prioritized using the pretreatment strategy in the *Tank Waste Characterization Basis* (Brown et al. 1995) document and a portion of archive sample material could be used for pretreatment testing if available. The strategy does not require any specific analyses to be done on the samples.

2.6 HISTORICAL MODEL EVALUATION

This tank is identified as an acceptable alternative for the spatially complex tank 241-S-107 (S-107) in *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). The applicability of these analyses will be determined based on tank S-107's sampling and analysis and will be documented in the tank specific sample and analysis plan.

3.0 HOW INFORMATION WILL BE OBTAINED

The number of samples required to characterize a tank is a function of waste heterogeneity and the desired confidence to make a correct decision. As directed by the safety screening DQO, if inadequate information exists to determine an appropriate number of samples, two vertical profiles will be obtained. These vertical profiles may be obtained using core, auger (for shallow tanks), or grab samples. If analysis of these profiles reveals that additional profiles are necessary to meet data needs, more sample profiles will be requested.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling was completed in February 1995. Grab sampling was completed in May 1995. Push mode core sampling is scheduled to begin in July 1996 (Stanton 1996). Refer to Table 4-1 for the current DQO requirements and planned sampling and analytical requirements.

Table 4-1: Integrated DQO Requirements and Priorities

Sampling Event	Applicable Issues	Sampling Requirements*	Analytical Requirements*
Vapor Sampling	-Organic Solvent Layer 93-5 Vapor Issue -Hazardous Vapor DQO	Steel canisters, Triple Sorbent Traps, Sorbent Trap Systems	Flammable Gas Organic Vapors Permanent Gases
Grab Sampling	-Compatibility DQO	3 grab samples	Energetics, Moisture, Anions, Cations, Radionuclides, TOC, pH, Specific gravity, Total inorganic carbon, Separable organics, Percent solids
Push Core Sampling	-Safety Screening DQO -Organic DQO -Flammable Gas DQO (see Section 2.2.4)	Core samples from 2 risers separated radially to the maximum extent possible. Combustible gas measurement.	Flammability, Energetics, Moisture, Density, Total alpha activity, TOC, Separable organics

* Consult each applicable DQO in force at the time for sampling and analytical requirements.

5.0 WHEN INFORMATION WILL BE AVAILABLE

According to Stanton (1996) data are expected to be available from the push core sampling event for tank U-103 in November 1996. This time may be altered if the sampling schedule changes. Data are available for the February 1995 vapor sampling and the May 1995 grab sampling.

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DISTRIBUTION SHEET

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Distribution	Evaluation and Planning	Date 05/09/96
Project Title/Work Order		EDT No. N/A
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