COMPLETE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN No 625709

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. TANK 241-SY-103 TANK CHARACTERIZATION PLAN	6. Bldg./Sys./Fac. No. SY-103	7. Approval Designator N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TP-197 REV 10	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

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

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DATE OCT 05 1995

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

ENGINEERING CHANGE NOTICE

*. ECN (use no. from pg. 1) 625709

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
OPERATIONS AND ENGINEERING		
Cog. Eng. C. S. Homi	C.S. Homi	10/5/95
Cog. Mgr. S. J. Eberlein	S.J. Eberlein	10-5-95
QA		
Safety		
Environ.		
Other		

	Signature	Date
ARCHITECT-ENGINEER		
PE		
QA		
Safety		
Design		
Environ.		
Other		
DEPARTMENT OF ENERGY		
Signature or a Control Number that tracks the Approval Signature		
ADDITIONAL		

RELEASE AUTHORIZATION

Document Number:	WHC-SD-WM-TP-197, REV 1
Document Title:	Tank 241-SY-103 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 10/5/95

SUPPORTING DOCUMENT

1. Total Pages 11

2. Title	3. Number	4. Rev No.
TANK 241-SY-103 TANK CHARACTERIZATION PLAN	WHC-SD-WM-TP-197	1

5. Key Words

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

6. Author

Name: C. S. HOMI

Signature 10/5/95

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-SY-103.

8. RELEASE STAMP

RECORD OF REVISION	(1) Document Number WHC-SD-WM-TP-197	Page 1

(2) Title
TANK 241-SY-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-197, REV. 0, EDT 605686, May 6, 1994		
0A	Replaced pages i and ii, added Appendix A, ECN 610435		
0B	Replaced Appendix A, ECN 617840		
1 RS	Complete revision to new format, ECN 625709	[signature]	[signature] 10-5-95

WHC-SD-WM-TP-197
Revision 1
UC-2070

Tank 241-SY-103
Tank Characterization Plan

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Westinghouse Hanford Company

Date Published
October 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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LIST OF ABBREVIATIONS

DQO	Data Quality Objective
HTCE	Historical Tank Content Estimate
DSSF	Double Shell Slurry Feed
DST	Double-Shell Tank
NCPLX	Non-complexed
PFP	Plutonium Finishing Plant
SY-103	Tank 241-SY-103
TCP	Tank Characterization Plan
TOC	Total Organic Carbon
TRU	Transuranics
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-SY-103 (SY-103). It should be understood that the various needs and issues surrounding tank SY-103 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 DST SY-103. As necessary, this Tank Characterization Plan will be revised to reflect those changes or deviations.

Tank SY-103 was constructed between 1974 and 1976 and was put into service in 1977. Initially tank SY-103 received residual liquor in the second quarter of 1977 and continued to receive this waste until the fourth quarter of 1977. From the first quarter of 1978 until August 1980, the tank received complexant concentrate waste. From October 1980 until May 1990, SY-103 received Double Shell Slurry waste. SY-103 had two unknown transactions occur between the fourth quarter of 1981 and the first quarter of 1983. Tank SY-103 received dilute non-complexed waste from the 200 East Area SSTs, from the second quarter of 1988 until the second quarter of 1989. Gas building up under the crust on the waste surface appears to cause the waste surface to fluctuate. Presently, the tank waste is classified as complexant concentrate. This tank currently contains waste with a total waste volume of 2,827.8 kL (747 kgal), which is equivalent to 690 centimeters (271.6 inches) of waste as measured from the baseline of the tank (Brevick 1994a).

The tank is sound and is currently an inactive concentrated waste holding tank. Tank SY-103 is actively ventilated. The last photo was taken on October 1, 1985. The 1985 montage indicates a surface of black liquid (Brevick 1994b). The last solids volume update was obtained on October 22, 1984 (Hanlon 1995).

A sample of SY-103 waste was obtained and analyzed on December 30, 1988. This sample was a composite from homogenizing four segments (8, 9, 10, and 11) from a 12 segment core. The other segments were either empty (1 and 4), only liquid (3, 5 and 6) or sent to Battelle Pacific Northwest Laboratory for analysis (2, 7 and 12). The composite supernatant and the separated solids were dissolved and analyzed as well. Both analyzed samples contained amounts of sodium, aluminum and nitrate with the supernatant also containing some nitrite. These constituents are also found in samples obtained previous to this sample. Both samples contained cesium as the primary radionuclide. Samples analyzed in the past also contained cesium as a major radionuclide but, also present in past samples was strontium. Also, it should be noted that cadmium was found in high concentrations in sample T-827 (analyzed on May 28, 1980).

This tank is on the Flammable Gas Watch list. The tank has an Unreviewed Safety Question (USQ) because of the potential consequences of a radiological release resulting from a flammable gas burn. 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-SY-103

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

2.1 GENERAL SAFETY ISSUES

The *Tank Safety Screening Data Quality Objective* (Redus 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

Tank SY-103 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

Tank SY-103 is on the Flammable Gas Watch List. Data from core samples are needed to provide an understanding of the mechanisms for gas generation, conditions which cause gas retention, the source terms for dose consequence calculations, and to support tank behavior models needed to 1) develop mitigation methods and 2) make appropriate safety analysis decisions on future operations to prevent the creation of additional flammable gas tanks. In order to achieve these objectives, a multitude of chemical and radionuclide composition and physical property analyses are needed along with supporting operational data. The most reliable information can be obtained from one complete core. The applicable DQO is: *Flammable Gas Safety Program: Data Requirements for Core Sample Analysis Developed through the Data Quality Objectives (DQO) Process* (McDuffie 1995).

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 AX-101 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 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 SY-103 are currently identified for this program element. However, if the general safety screening of tank SY-103 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

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 1995.

2.5 DISPOSAL

2.5.1 Retrieval

Current retrieval needs (Bloom 1995) do not require test samples to be taken from tank SY-103.

2.5.2 Pretreatment/Vitrification

Tank SY-103 has not 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 SY-103 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 push mode sampling events are required. Vapor sampling has not been scheduled at this time. The push mode sampling type was 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 SY-103 is comprised of supernatant and sludge.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling is required for this tank but, has not been scheduled at this time. Push mode sampling was completed in September 1994 (Stanton 1995).

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Push Mode Sampling	-Safety Screening DQO	Core samples from 2 risers separated to the maximum extent possible	Energetics, Moisture, Total Alpha, Total Organic Carbon, Cations, Anions, Radionuclides, SpG

5.0 WHEN INFORMATION IS NEEDED

Data are required for Tank SY-103 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

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