H **COMPLETE**

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 631561

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-SX-103	6. Bldg./Sys./Fac. No. 241-SX-103	7. Approval Designator N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TP-313, Rev. 0-B	9. Related ECN No(s). ECNs: 625429, 627001	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: 3 HANFORD RELEASE ID: 58

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): ECN-631561

15. Design Verification Required
[ ] Yes
[X] No

16. Cost Impact

ENGINEERING			CONSTRUCTION		
Additional	[ ]	$	Additional	[ ]	$
Savings	[ ]	$	Savings	[ ]	$

17. Schedule Impact (days)

Improvement	[ ]
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 J.H. Baldwin	5/9/96	Other	
		DEPARTMENT OF ENERGY	
		Signature or a Control Number that tracks the Approval Signature	
		ADDITIONAL	

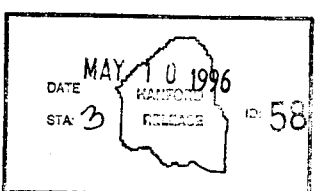
Tank 241-SX-103 Tank Characterization Plan

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

EDT/ECN: ECN-631561 UC: 2070
Org Code: 79200 Charge Code: N4G6A
B&R Code: EW 3120074 Total Pages: 7

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-SX-103.



Release Approval Date

Release Stamp

Approved for Public Release

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

(2) Title
TANK 241-SX-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-313, REV. 0, EDT 610020 March 7, 1995		
0A	First section replaced per ECN 625429		
0B RS	Deleted flammable gas requirements ECN 627001	C.S. Homi 11/16/95	J.W. Hunt 11/16/95
RS 1	Incorporate per ECN-631561.	C.S. Homi 5/9/96	J.W. Hunt 5/9/96

WHC-SD-WM-TP-313
Revision 1
UC-2070

Tank 241-SX-103
Tank Characterization Plan

J. H. Baldwin
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
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

LIST OF TABLES

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-SX-103 (SX-103). It should be understood that the various needs and issues surrounding tank SX-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 SX-103. This TCP will be revised as necessary to reflect those changes or deviations. This plan reflects the best information available as of May 1996.

Tank SX-103 was put into service in 1954. It has an operating exhauster and is actively ventilated. Tank SX-103 is the third tank in a cascade flow series consisting also of tanks 241-SX-104 and 241-SX-102. Tank SX-103 started receiving waste from the Reduction Oxidation (REDOX) facility from the second quarter of 1954 until the first quarter of 1971. REDOX waste was the high-level component of the process waste. From 1971 through 1975, the tank received coating waste, organic wash waste and REDOX waste. In 1975 and 1976, the tank contained evaporator and evaporator bottom wastes. During the periods of 1976-77, 1978-80, and the last two quarters of 1980, the waste in the tank was categorized as residual liquor, partial neutralized feed, and double-shell slurry feed, respectively. The tank was labeled inactive in 1978 and removed from service in 1980. It was partially isolated in June 1985 (Brevick 1994).

Tank SX-103 currently contains 2,470 kL (652 kgals) of non-complexed waste, which is equivalent to 580 cm (230 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 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-SX-103

This section identifies the various program elements, and identifies which of these programs require characterization data from tank SX-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 a 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 DQO is: *Flammable Gas Safety Program: Data Requirements for Core Sample Analysis Developed through the Data Quality Objectives Process* (McDuffie 1995). However, the data quality objective (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 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 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 SX-103 was vapor sampled in March 1995 in support of Osborne et al. (1994).

2.2.6 Criticality

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

2.3 CONTINUING OPERATIONS

2.3.1 Compatibility/Stabilization

Tank SX-103 waste will be sampled to determine compatibility. Sampling and analysis requirements must be performed as per *Data Quality Objectives for the Waste Compatibility Program* (Fowler 1995). The analyses employed will be for transuranics such as ^{239}Pu and ^{241}Am, 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 SX-103.

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank SX-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 SX-103.

2.5.2 Pretreatment/Vitrification

Tank SX-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

Bounding tanks and data requirements for historical model evaluations are found in DQO *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). Tank SX-103 has been identified as a primary bounding tank for Redox waste type. All single shell tanks were prioritized in the *Tank Waste Characterization Basis* (Brown et al. 1995) document using the historical DQO.

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 required to meet data needs, more sample profiles will be requested. 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).

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling was completed in March of 1995. A Grab sample event in July of 1995 failed to retrieve any sample. Grab sampling is scheduled for January 1997. Rotary mode sampling is scheduled to begin in September 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 -Rotary Mode Sampling DQO -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, Specific Gravity, pH, Separable Organics, Total Organic Carbon, Total Inorganic Carbon, Percent Solids
Rotary Sampling	-Safety Screening DQO -Organic DQO -Historical Model 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, Total alpha activity, Density, Moisture, Anions, Metals, Radionuclides, Total Organic Carbon, 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 grab sampling event for tank SX-103 in May 1997. The rotary mode core data are expected in January 1997. These times may be altered if the sampling schedule changes. Data are available from the March 1995 vapor sampling.

6.0 REFERENCES

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., 1994, *Historical Tank Content Estimate for the Southwest Quadrant of the Hanford 200 West Area*, WHC-SD-WM-ER-352, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

Brown, T. M., S. J. Eberlein, and T. J. Kunthara, 1995, *Tank Waste Characterization Basis*, 1995, WHC-SD-WM-TA-164, Rev 1, Westinghouse Hanford Company, Richland, Washington.

DOE-RL, 1996, *Recommendation 93-5 Implementation Plan*, DOE/RL-94-0001, Rev. 1, U.S. Department of Energy, Richland, Washington.

Dukelow, G. T., J. W. Hunt, H. Babad, and J. E. Meacham, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

Fowler, K.D., 1995, *Data Quality Objectives for Tank Farm Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M., 1996, *Waste Tank Summary Report for the Month Ending January 31, 1996*, WHC-EP-0182-94, 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.

Laws, G. L., 1996, *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*, (telephone conference memorandum, 01830-96-022, to Distribution, March 8) Westinghouse Hanford Company, Richland, Washington.

McDuffie, N. G., 1995, *Flammable Gas Tank Safety Program: Data Requirements for Core Sample Analysis Developed Through the Data Quality Objectives Process*, WHC-SD-WM-DQO-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

Mulkey, C.H., and K. D. Markillie, 1995, *Data Quality Objective for Regulatory Requirements for Hazardous and Radioactive Air Emissions Sampling and Analysis*, WHC-SD-WM-DQO-021, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Mulkey, C. H., and J. M. Jones, 1995, *Double-Shell Tank System Waste Analysis Plan*, WHC-SD-WM-EV-053, Rev 3, 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, 1994, *Data Quality Objectives for Generic In-Tank Health and Safety Vapor Issue Resolution*, WHC-SD-WM-DQO-002, Rev. 0, Westinghouse Hanford, Richland, Washington.

Osborne, J. W., and L. L. Buckley, 1995, *Data Quality Objectives for Tank Hazardous Vapor Safety Screening*, WHC-SD-WM-DQO-002, Rev. 2, 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. 0A, Westinghouse Hanford Company, Richland, Washington.

Stanton, G. A., 1996, *Baseline Sampling Schedule, Change 96-02*, (internal memo 75610-96-06, to Distribution, April 17), Westinghouse Hanford Company, Richland, Washington.

Turner, D. A., H. Babad, L. L. Buckley and J. E. Meacham, 1995, *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue*, WHC-SD-WM-DQO-006, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Evaluation and Planning	Date 05/09/96
Project Title/Work Order		**EDT No.** N/A
WHC-SD-WM-TP-313, Rev. 1, "Tank 241-SX-103 Tank Characterization Plan"		**ECN No.** ECN-631561

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
ONSITE					
U. S. Department of Energy - Richland Field Office					
W. Liou	S7-54	X			
N. W. Willis	S7-54	X			
Westinghouse Hanford Company					
J. H. Baldwin	R2-12	X			
G. D. Forehand	S7-21	X			
C. S. Homi	R2-12	X			
Central Files	A3-88	X			
T.C.R.C.	R2-12	X			
OFFSITE					
U. S. Department of Energy - Headquarters Office of Environmental Restoration and Waste Management EM-563 12800 Middlebrook Road Germantown, MD 20874					
J. A. Poppiti		X			