COMPLETE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 631522

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, Data Assessment and Interpretation, R2-12, 373-1097	[] Yes [X] No	04/24/96
	5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Approval Designator
	Tank 241-BY-106	241-BY-106	N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.)	9. Related ECN No(s).	10. Related PO No.
	WHC-SD-WM-TP-217, Rev. 3	See Block 12	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

Changed all sections to a generic format.

Block 9 continued - Related ECN No(s): 614163, 614169, 617817, 617821, 617832, 623941, 629901, and 629948.

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

Full revision.

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

See attached distribution.

RELEASE STAMP

DATE: JUL 24 1996

STA: 4

HANFORD RELEASE ID: 3

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

A-7900-013-1

ENGINEERING CHANGE NOTICE	Page 2 of 2	1. ECN (use no. from pg. 1) ECN-631522

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	C S Homi	5/21/96		PE	
Cog. Mgr. J.G. Kristofzski	John Kristofzski	5/22/96		QA	
QA				Safety	
Safety				Design	
Environ.				Environ.	
Other K.E. Bell	Kevin Bell	5/22/96		Other	
				DEPARTMENT OF ENERGY	
				Signature or a Control Number that tracks the Approval Signature	
				ADDITIONAL	

Tank 241-BY-106 Tank Characterization Plan

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

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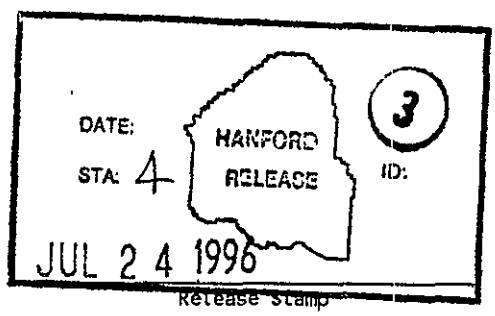
Key Words: Characterization, General Safety Issues, Specific Safety Issues, Information Requirements, Schedule

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 (SST) 241-BY-106.



Release Approval Date

Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number WHC-SD-WM-TP-217	Page 1

(2) Title
TANK 241-BY-106 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-217, REV 0, EDT 605693, June 10, 1994.		
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0C	Replaced pages A-22 and A-23, ECN 617817.		
0D	Replaced page A-18, ECN 617821.		
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Revision 4
UC-2070

Tank 241-BY-106
Tank Characterization Plan

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Date Published
May 1996

Prepared for the U.S. Department of Energy
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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 safe storage and long-term management of single-shell tank (SST) 241-BY-106 (BY-106). It should be understood that the various needs and issues surrounding tank BY-106 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 SST BY-106. This TCP will be revised as necessary to reflect those changes or deviations.

Tank BY-106 was constructed between 1948 and 1949 and was put into service in 1950. Tank BY-106 received first cycle waste in the second quarter of 1953. The tank held first cycle waste until it was sluiced for uranium recovery in the fourth quarter of 1954. Tank BY-106 received in-plant ferrocyanide waste from the first quarter of 1955 until the first quarter of 1957. In the first quarter of 1956, the tank was used as a settling tank for ferrocyanide scavenged waste. During 1956 and 1957, supernatant was sent to a crib and ditch. Also, from the third quarter of 1957 until the third quarter of 1974, the tank received wastewater. Beginning in the fourth quarter of 1961, the tank received coating waste periodically until the second quarter of 1970. In the first quarter of 1968, the tank began to receive evaporator bottoms waste. The tank received in-tank solidification bottoms and recycle waste between the third quarter of 1970 and the second quarter of 1976. The tank received evaporator feed from the third quarter of 1976 until the fourth quarter of 1977. Activity in the tank was restricted in the third quarter of 1976.

Presently, the tank waste is classified as non-complexed. This tank currently has a total waste volume of 2,430 kL (642 kgal), which is equivalent to 611.91 centimeters (240.91 inches) of waste as measured from the baseline of the tank. The waste is comprised of 2,070 kL (547 kgal) of saltcake; 359 kL (95 kgal) of sludge and no supernatant with 806 kL (213 kgal) of pumpable liquid remaining (Brevick 1995).

The tank is an assumed leaker [with a leak of approximately 30.3 kL (8 kgal) in 1984] and was declared inactive in 1977. Tank BY-106 is passively ventilated, was partially isolated in December 1982 and is awaiting interim stabilization. The last solids volume update was obtained on April 28, 1982 (Hanlon 1996) and the last photo was taken on November 4, 1982. The 1982 photographic montage indicates a bright yellow to gold crusty material which appears to be sitting on top of or possibly mixed in with a white, salt-like surface. Throughout the surface are pools of reddish-brown liquid (Brevick 1994).

Tank BY-106 is on the Ferrocyanide Watch List. Near-term sampling and analysis activities are focused on either verification of the watchlist tank status, identification of any new safety issues or changing the 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-BY-106

This section identifies the various program elements, and identifies which of these programs require characterization data from tank BY-106.

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. 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 et al. 1995). Waste energetics, cyanide, total organic carbon (TOC), nickel, and moisture content are the key data requirements. These data will be used to answer the questions: 1) does ferrocyanide still exist in the tank?; 2) did the ferrocyanide age?; 3) is there enough total fuel to support a propagating reaction?; and 4) is there enough moisture to prevent a propagating reaction?

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. A potential problem with regard to the complexed salts exists 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 Complexant Safety Issue* (Turner et al. 1995). The analyses employed will determine the TOC, energetics, 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 not on the Flammable Gas Watch List however, Westinghouse Hanford Company has recommended to the Department of Energy that tank BY-106 be included in the flammable gas USQ and be identified as a Watch List tank (WHC 1996). Presently, 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. Information needs must satisfy *Data Quality Objectives for Generic In-Tank Health and Safety Vapor Issue Resolution* (Osborne et al. 1995) and, for Rotary Mode Core Sampling, *Rotary Sampling Core Vapor Sampling Data Quality Objective* (Price 1994). Since tank BY-106 is categorized in one of the above four groups, vapor sampling is required.

2.2.6 Criticality

No information separate from that for the general safety issue of tank BY-106 are currently identified for this program element. However, if the general safety screening of tank BY-106 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

Tank BY-106 waste was sampled to determine compatibility. Sampling and analysis requirements were performed as per *Data Quality Objectives for the Waste Compatibility Program* (Carothers 1994). The analyses employed were for 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

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-106 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 BY-106.

2.5.2 Pretreatment/Vitrification

Tank BY-106 is not identified as a bounding tank for pretreatment/disposal process development strategy (Kupfer el 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 the DQO *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). Tank BY-106 has been identified as a primary bounding tank for the ferrocyanide waste type. All single-shell tanks were prioritized using the Historical DQO in the *Tank Waste Characterization Basis* (Brown et al. 1995) document.

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. A rotary core, push core, and vapor sampling events for tank BY-106 have been completed. The rotary and push mode sampling types have been chosen over other sampling modes due to both the depth of the waste (making auger sampling inadequate) and the fact that the surface of tank BY-106 is comprised of salt cake. Prior to rotary sampling it is necessary to vapor sample the tank as per requirements of the rotary core sampling DQO (Price 1994). The minimum sampling requirement of two profiles is requested initially. If analysis of samples from these profiles reveals that additional profiles are required to meet data needs, more sample profiles will be requested.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling was completed in July 1994. Rotary mode sampling was completed January 25, 1995 and push mode sampling on January 2, 1996 (Stanton 1996). Only 10 of the expected 13 segments were recovered during the push mode sampling.

Table 4-1: Integrated DQO Requirements and Priorities

Sampling Event	Applicable Issues	Sampling Requirements	Analytical Requirements*
Vapor Sampling	-Health & Safety Vapor Issue Resolution DQO -Rotary Sampling Core Vapor Sampling DQO	3 Steel canisters 6 Triple Sorbent Traps 8 Sorbent Trap Systems	Gas Flammability Gas Toxicity -Organic Vapors -Permanent Gases
Rotary/ Push Core Sampling	-Safety Screening DQO -Ferrocyanide DQO -Organic DQO -Historic DQO -Compatibility DQO	Core samples from 2* risers separated radially to the maximum extent possible. Combustible gas meter. * see section 3.0	Flammability, Energetics, Moisture, Total Alpha, Anions, Cations, Radio-nuclides, Density, Total Organic carbon, CN

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

5.0 WHEN INFORMATION IS NEEDED

Data are required for Tank BY-106 during FY 1996 for safety screening, vapor, ferrocyanide, organic, compatibility, and historical DQOs.

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DISTRIBUTION SHEET

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Distribution	Data Assessment and Interpretation	Date 04/24/96
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