

ENGINEERING CHANGE NOTICE

Page 1 of 2

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Proj.
ECN

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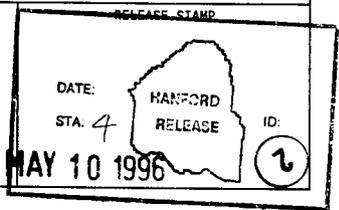
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13a. Justification (mark one)

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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.



Tank 241-SX-104 Tank Characterization Plan

C. S. Homi
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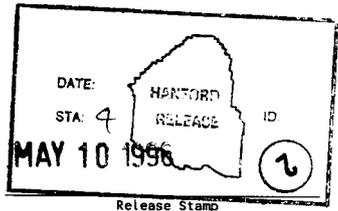
Abstract: This document is a plan that identifies the information needed to address relevant issues concerning short-term and long-term storage and long-term management of single-shell tank 241-SX-104.

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Approved for Public Release

Tank 241-SX-104 Tank Characterization Plan

R. D. Schreiber
Westinghouse Hanford Company

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TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	PROGRAM ELEMENTS REQUIRING INFORMATION FOR TANK 241-SX-104	2
2.1	GENERAL SAFETY ISSUES	2
2.2	SPECIFIC SAFETY ISSUES	2
2.2.1	Ferrocyanide	2
2.2.2	Organic	2
2.2.3	High Heat	2
2.2.4	Flammable Gas	2
2.2.5	Vapor	2
2.2.6	Criticality	3
2.3	CONTINUING OPERATIONS	3
2.3.1	Compatibility/Stabilization	3
2.3.2	Evaporator	3
2.4	DOUBLE-SHELL TANK WASTE ANALYSIS PLAN	3
2.5	DISPOSAL	3
2.5.1	Retrieval	3
2.5.2	Pretreatment/Vitrification	4
2.6	HISTORICAL MODEL EVALUATION	4
3.0	HOW INFORMATION WILL BE OBTAINED	4
4.0	PRIORITY OF INFORMATION REQUIREMENTS	4
5.0	WHEN INFORMATION WILL BE AVAILABLE	5
6.0	REFERENCES	6

LIST OF TABLES

4-1	Integrated DQO Requirements and Priorities	5
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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-SX-104 (SX-104). It should be understood that the various needs and issues surrounding tank SX-104 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-104. 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 SX-104 was constructed between 1953 and 1954 and was put into service in 1955. Tank SX-104 received Reduction Oxidation (REDOX) waste from the first quarter of 1955 until the third quarter of 1971. The tank received evaporator bottoms and REDOX ion exchange waste from the fourth quarter of 1971 until the second quarter of 1975. From the third quarter of 1975 until the second quarter of 1976, the tank received evaporator bottoms and recycle wastes from the 242-S Evaporator. The tank received concentrated evaporator feed during the third quarter of 1976. From the fourth quarter of 1976 until the fourth quarter of 1977, the tank received residual evaporator liquor waste. From the first quarter of 1978 until the fourth quarter of 1979, the tank contained partial neutralized feed waste. In the first quarter of 1980, the contents of the tank was classified as double-shell slurry feed. Tank SX-104 is classified as an assumed leaker (with a leak volume of approximately 23 kl [6 kgal] in 1988) and was designated inactive in 1980. The tank is ventilated by an operating exhauster and was partially isolated in June 1985. The tank is awaiting interim stabilization (Anderson 1990; Brevick et al. 1994).

Tank SX-104 currently contains a total volume of approximately 2,324 kl (614 kgal), which is equivalent to 581 cm (229 in) of waste as measured from the baseline of the tank (Hanlon 1996).

This tank is on the Flammable Gas Watch List.

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-104

This section identifies the various program elements, and identifies which of these programs require characterization data from tank SX-104.

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 not on the Organic Watch List; 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; 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 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* (Mulky 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-104 was vapor sampled in July 1995 in support of Osborne et al. (1995).

2.2.6 Criticality

No information separate from that for the general safety issue of tank SX-104 are currently identified for this program element. However, if the general safety screening of tank SX-104 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 SX-104 waste will be sampled to determine compatibility. Sampling and analysis requirements must be performed per the *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Fowler 1995). The analyses employed will be for transuranics such as ^{239}Pu and ^{241}Am , total organic carbon 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-104.

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank SX-104 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-104.

2.5.2 Pretreatment/Vitrification

Tank SX-104 has been identified as a bounding tank for pretreatment/disposal process development strategy (Kupfer et al. 1995). The Strategy only requires that sample material be made available via archive samples and 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 *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). Tank SX-104 has been identified as a primary bounding tank for the R1 and S1 saltcake waste types. 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 necessary to meet data needs, more sample profiles will be requested. Prior to rotary sampling it is necessary to vapor sample the tank per the requirements of *Rotary Core Vapor Sampling Data Quality Objective* (Price 1994).

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling was completed in July 1995. Rotary mode core sampling is scheduled to begin in October 1996. Grab sampling is scheduled to begin in June 1997 (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
Rotary Mode Core Sampling	-Safety Screening 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, Moisture, Total alpha activity, Density, Anions, Metals, Radionuclides, TOC
Grab Sampling	-Compatibility DQO	3 grab samples	Energetics, Moisture, Anions, Cations, Radionuclides, Specific gravity, Percent solids, pH, Separable organics, TOC, Total inorganic carbon

* 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-104 in October 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 July 1995 vapor sampling.

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WHC-SD-WM-TP-321, REV 1

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