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2	1	Cog. Eng. C.S. Homi	<i>[Signature]</i>	5/19/96							
2	1	Cog. Mgr. J.W. Hunt	<i>[Signature]</i>	5/19/96							
		QA									
		Safety									
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1	1	D.L. Banning	<i>[Signature]</i>	5/19/96							

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Tank 241-SX-107 Tank Characterization Plan

C. S. Homi
Westinghouse Hanford Company, Richland, WA 99352
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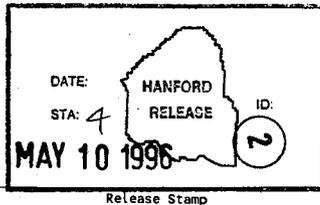
Abstract: This document is a plan that identifies the information needed to address relevant issues concerning short-term and long-term storage and long-term management of single-shell tank 241-SX-107.

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Tank 241-SX-107 Tank Characterization Plan

D. L. Banning
Westinghouse Hanford Company

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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-107 (SX-107). It should be understood that the various needs and issues surrounding tank SX-107 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-107. 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-107 was constructed between 1953 and 1954 and put into service in the second quarter of 1956. Tank SX-107 received waste from the Reduction Oxidation (REDOX) facility from the second quarter of 1956 until the fourth quarter of 1966. From the third quarter of 1957 until the fourth quarter of 1966 the tank received waste water. During the first quarter of 1960 the tank received REDOX cladding waste. In addition, the tank contains 41 bottles of neutralized waste from the 100 F; each bottle has less than 1 g ²³⁹Pu. In the fourth quarter of 1967, the tank was labeled a suspect leaker. The tank was primary stabilized in 1978 and administratively interim isolated in September 1982. The tank is identified as a high-heat load tank and is actively ventilated (Brevick 1994).

Tank SX-107 contains a total volume of 394 kL (104 kgal) of waste, which is equivalent to 109 cm (43 in) of waste as measured from the baseline of the tank (Hanlon 1996).

This tank is not on any Watch List.

Near-term sampling and analysis activities are focused on either verification 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 the 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-107

This section identifies the various program elements, and identifies which of these programs require characterization data from tank SX-107.

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 not on the Flammable Gas Watch List; therefore, no information needs are currently identified for this program element.

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).

2.2.6 Criticality

No information separate from that for the general safety issue of tank SX-107 are currently identified for this program element. However, if the general safety screening of tank SX-107 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 (DQO).

2.3 CONTINUING OPERATIONS

2.3.1 Compatibility/Stabilization

This section does not apply to tank SX-107.

2.3.2 Evaporator

This section does not apply to tank SX-107.

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank SX-107 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-107.

2.5.2 Pretreatment/Vitrification

Tank SX-107 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 *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). Tank SX-107 is not identified as a primary bounding tank for historical model evaluations.

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. The minimum sampling requirement of two samples is requested initially. 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 per the requirements of *Rotary Sampling Core Vapor Sampling Data Quality Objective* (Price 1994).

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling is scheduled to begin in January 1997 and rotary sampling in July 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	-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	Core samples from 2 risers separated to the maximum extent possible. Combustible gas measurement	Flammability, Energetics, Moisture, Total alpha activity, Density

* 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 vapor sampling event for tank SX-107 in February 1997. The rotary mode core data are expected in October 1997. These times may be altered if the sampling schedule changes.

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