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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-SX-108.

8. RELEASE STAMP

RELEASE AUTHORIZATION

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Tank 241-SX-108 Tank Characterization Plan

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LIST OF ABBREVIATIONS

DQO	Data Quality Objective
HTCE	Historical Tank Content Estimate
NCPLX	Non-complexed
SUMMA®	Trademark of Molectrics, Inc.
SST	Single-Shell Tank
SX-108	Tank 241-SX-108
TCP	Tank Characterization Plan
TOC	Total Organic Carbon
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 Single-Shell Tank (SST) 241-SX-108 (SX-108). It should be understood that the various needs and issues surrounding tank SX-108 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 SST SX-108. This Tank Characterization Plan will be revised as necessary to reflect those changes or deviations.

Tank SX-108 was constructed between 1953 and 1954 and was put into service in November 1955. Initially tank SX-108 received REDOX facility waste, from the fourth quarter of 1955 until the second quarter of 1964. From the fourth quarter of 1955 until the fourth quarter of 1963, the tank received wastewater. During the fourth quarter of 1968, the sludge in the tank was air dried. From the first quarter of 1969 until the third quarter of 1971 and, from the third quarter of 1976 until the third quarter of 1977, SX-108 was air-cooled. Presently, SX-108 contains waste classified as non-complexed. This tank currently contains a total waste volume of 435.3 kL (115 kgal), which is equivalent to 119.6 centimeters (47.1 inches) of waste as measured from the baseline of the tank. The waste is comprised of 435.3 kL (115 kgal) of sludge with no pumpable liquid remaining (Brevick 1994a).

The tank is was removed from service and labeled an assumed leaker in 1962 (with an approximate leak of 9.1 kL to 132.5 kL [2.4 kgal to 35 kgal]). The tank was administratively interim stabilized in August 1979, intrusion prevention was completed in December 1982. Tank SX-108 is ventilated by an operating exhauster. The last photo was taken on March 6, 1987 (Brevick 1994b). The 1987 photographic montage indicates that the waste may be completely dry. There ia a small amount of brown residue on the surface of the solid waste material and the waste material appears to be light grey. Records indicate that the bottom of SX-108 is bulged. The last solids volume update was obtained on December 31, 1993 (Hanlon 1995).

Samples of SX-108 waste were collected and analyzed in April 1961 and June 1966. In 1961 the supernatant was examined and found to contain nitrates, nitrites and sulfates. The 1966 analysis was performed to determine the radiological constituents. It was found that the tank contained a large quantity of ^{134}Cs and ^{137}Cs.

This tank is not on any Watch list. Near-term sampling and analysis activities are focused on either verification of the non-watchlist tank status, identification of any new safety issues or changing the non-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-SX-108

This section identifies the various program elements, and identifies which of these programs require characterization data from tank SX-108.

2.1 GENERAL SAFETY ISSUES

The *Tank Safety Screening Data Quality Objective* (Babad 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 not on the Ferrocyanide Watch List and; therefore, no information needs are currently identified for this program element.

2.2.2 Organic

This tank 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

This tank is not on the Flammable Gas Watch List and; therefore, 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 (a prerequisite to rotary sampling); (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 SX-108 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 et al. 1995) and *Rotary Sampling Core Vapor Sampling Data Quality Objective* (Price 1994). 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 SX-108 are currently identified for this program element. However, if the general safety screening of tank SX-108 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. Sampling of this tank is required to support the non-Watch List status.

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 section because tank SX-108 is a Single-Shell Tank.

2.5 DISPOSAL

2.5.1 Retrieval

Current retrieval needs (Bloom 1995) do not call for test samples to be taken from tank SX-108.

2.5.2 Pretreatment/Vitrification

Tank SX-108 has 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 et al. 1995). Tank SX-108 has been identified as a primary bounding tank for Redox waste.

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. Several sampling events of tank SX-108 are scheduled: two vapor sampling events and a rotary sampling event. No other sampling is scheduled through fiscal year 1996 (Stanton 1995). The rotary mode sampling type has been 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 SX-108 is comprised of saltcake (which is not conducive to good push mode core sampling recovery). 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).

The best current estimate of the water content in tank SX-108 solids, as determined from the process records, is 61.5%; based on the HTCE (Brevick 1994a). Estimates (Toth et al 1995) of water content in tank SX-108 sludge is 44.7% (generated from a model based on sample data from similar tanks). If the variance of water in tanks already sampled and a statistical power curve is used then a minimum of two cores are needed to demonstrate a water content above 17% at 95% confidence. Should the measured mean be lower than anticipated or the measured variance higher, additional samples may be required. The TOC contained within the sludge is estimated (Toth et al 1995) to be 0.2% (wet basis), which is significantly lower than the level of concern. Two core samples will be requested for this tank and this should meet the requirements for the above parameters.

The best current information indicates that 3 risers are available for sampling of tank SX-108, 12" (30.5 cm) risers R7, R16 and R17. Initial information will be taken from two of these risers and assessed to determine if more samples are required. Five additional riser are available but, equipment will have to be removed from these risers to utilize them for sampling. Alternate sampling methods, installation of a riser or removal of equipment from risers presently considered unavailable, are possible future options.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Characterization of flammable and toxic vapors is a high priority for this tank. Vapor sampling is expected to be performed in fiscal year 1996 (Stanton 1995). Rotary mode sampling is scheduled for FY 1996 (Stanton 1995).

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Vapor Sampling	-Health & Safety Vapor Issue Resolution DQO -Rotary Sampling Core Vapor Sampling DQO	3 SUMMA® canisters 6 Triple Sorbent Traps 8 Sorbent Trap Systems	Gas Flammability Gas Toxicity -Organic Vapors -Permanent Gases
Rotary Core Sampling	-Safety Screening DQO -Flammable Gas DQO -Historic DQO	Core samples from 2 risers separated to the maximum extent possible	Energetics, Moisture, Total Alpha, Major Cations & Anions, Radionuclides

5.0 WHEN INFORMATION IS NEEDED

Data are required for tank SX-108 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

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