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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-BX-106.

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Tank 241-BX-106 Tank Characterization Plan

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LIST OF ABBREVIATIONS

BX-106	Tank 241-BX-106
DQO	Data Quality Objective
HTCE	Historical Tank Content Estimate
DSSF	Double Shell Slurry Feed
NCPLX	Non-complexed
SST	Single-Shell Tank
TCP	Tank Characterization Plan
TOC	Total Organic Carbon
USQ	Unreviewed Safety Question
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 241-BX-106 (BX-106). It should be understood that the various needs and issues surrounding tank BX-106 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 BX-106. As necessary, this Tank Characterization Plan will be revised to reflect those changes or deviations.

Tank BX-106 was constructed between 1946 and 1947 and was put into service in June 1949. Initially tank BX-106 received metal waste from September 1949 until January 1950. The tank received and transferred wastes via cascade lines from March 1949 until April 1951. The tank received metal waste until the first quarter of 1955. The supernatant was sent to tank 241-BY-109 in 1954. The tank was sluiced for uranium recovery in the second quarter of 1955. From the second quarter of 1956 until the second quarter of 1967, the tank received coating waste, evaporator bottoms waste and ion exchange waste. The tank contained ion exchange waste from the first quarter of 1969 until the third quarter of 1970. Between the second quarter of 1972 and the first quarter of 1975, the tank received various wastes. From the second quarter of 1975 until the second quarter of 1976, the tank contained evaporator bottoms, ion exchange and B plant low level wastes. The tank contained evaporator feed between the third quarter of 1976 and the fourth quarter of 1977. Presently, the tank waste is classified as non-complexed. This tank currently contains waste with a total waste volume of 174.2 kL (46 kgal), which is equivalent to 31 centimeters (12.2 inches) of waste as measured from the baseline of the tank. The waste is comprised of 18.9 kL (5 kgal) of unknown; 98.4 kL (26 kgal) of sludge and 56.8 kL (15 kgal) of supernatant with 56.8 kL (15 kgal) of pumpable liquid remaining (Brevick 1994a).

The tank is sound and is partially isolated. Tank BX-106 is passively ventilated and awaiting interim stabilized and intrusion prevention. The last photo was taken on May 19, 1988. The 1988 photographic montage of the tank interior indicates a dark liquid surface with a ring of sludge at the perimeter. (Brevick 1994b). The last solids volume update was obtained on April 28, 1982 (Hanlon 1995).

Four analyses were performed on BX-106 waste samples between April 1974 and April 1975. The first two samples were yellow, the third was green and the 1975 sample was light brown.

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. 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-BX-106

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

2.1 GENERAL SAFETY ISSUES

The *Tank Safety Screening Data Quality Objective* (Badad 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

Tank BX-106 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 (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. Since tank BX-106 is not categorized in one of the above four groups and; therefore, vapor sampling is not required for this tank.

2.2.6 Criticality

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

2.2.7 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.

2.3 CONTINUING OPERATIONS

2.3.1 Compatibility/Stabilization

Tank BX-106 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 (TRUs) such as ²³⁹Pu and ²⁴¹Am, Total Organic Content (TOC), heat generation (by determining the amount of ⁹⁰Sr and ¹³⁷Cs) and measuring the "pumpability" of the waste (i.e. density, viscosity, percent of volume composed of solids...etc).

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 BX-106 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 BX-106.

2.5.2 Pretreatment/Vitrification

Tank BX-106 has not 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 1995). Tank BX-106 has not been identified as a primary bounding tank.

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. Only an auger sampling event is scheduled and required. The auger sampling type has been chosen over other sampling modes due to both the depth of the tank (BX-106 is a shallow tank making rotary core sampling unnecessary) and the fact that the surface of tank BX-106 is comprised saltcake.

The best current estimate of the water content in tank BX-106 solids, as determined from the process records, is 57.4%; based on the HTCE (Brevick 1994a). Estimated (Toth et al 1995) water content in tank BX-106 sludge are 38.2% and 44.7% respectively (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 saltcake and 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.

Present information show that five tank BX-106 risers have truck access. Two Grab samples with 3 portions each were collected from tank BX-106 in March 1995. It is recommended that risers be chosen that are separated radially to the maximum extent possible and; therefore, will provide a larger amount of data about the vertical and horizontal waste layers within the tank. Initial information will be taken from 3 risers and assessed to determine if more samples are required. Alternate sampling methods, installation of a riser or removal of equipment from risers are possible future options.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling is not required for this tank. Grab sampling was completed in March 1995. Auger sampling is scheduled for December 1995 (Stanton 1995).

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Auger Sampling	-Safety Screening DQO	Core samples from 2 risers separated radially to the maximum extent possible	Energetics, Moisture, Total Alpha, Total Organic Carbon, SpG
Grab Sampling	-Compatibility DQO	2 grab samples	Energetics, Moisture, Major Anions, Cations & Radionuclides, SpG & pH, Total Organic Carbon, Separable Organics

5.0 WHEN INFORMATION IS NEEDED

Data are required for Tank BX-106 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

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