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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 Double-Shell Tank (DST) 241-AP-104.

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Tank 241-AP-104

Tank Characterization Plan

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Westinghouse Hanford Company

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LIST OF ABBREVIATIONS

AP-104	241-AP-104
DQO	Data Quality Objective
DSSF	Double-Shell Slurry Feed
HTCE	Historical Tank Content Estimate
NCPLX	Non-complexed waste
TCP	Tank Characterization Plan
TLM	Tank Layering Model
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 Double Shell Tank 241-AP-104 (AP-104). It should be understood that the various needs and issues surrounding tank AP-104 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 tank AP-104. As necessary, this Tank Characterization Plan will be revised to reflect those changes or deviations.

Tank AP-104 was constructed in the mid-1980s and entered into service in October 1986. From July 1986 until May 1990, AP-104 received Hanford facility waste. From the first quarter until the third quarter of 1987, tank AP-104 received N Reactor waste. From June 1990 until March 1994, the tank waste was designated as dilute non-complexed. AP-104 is currently active and has received 1,625 kL of non-complexed waste from Tank SY-102 in July 1995. This tank currently contains waste with a total waste volume of 1,798 kL (475 kgal), which is equivalent to 439 centimeters (172.7 inches) of waste as measured from the baseline of the tank (Hanlon 1995).

A single waste sample (identified as T-513) was obtained from tank AP-104 and was analyzed on August 5, 1987. The sample was a yellow brown liquid with almost no solids. The chemical analysis revealed a high concentration of sodium and phosphorous cations with phosphate and sulfate anions (Brevick 1995b). The phosphorous cation as measured by inductively couple plasma is the same phosphorous in the phosphate anion as measured by ion chromatography. Terbium and cobalt were the primary radionuclides found during the analysis.

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-AP-104

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

2.1 GENERAL SAFETY ISSUES

The Tank Safety Screening Data Quality Objective (Dukelow 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 Organic Watch List and; therefore, no information needs are currently identified for this program element.

2.2.3 High Heat

This tank is not listed as high heat 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. This tank is not categorized in one of the above four groups, therefore characterization of the tank headspace is not needed.

2.2.6 Criticality

No information separate from that for the general safety issue of tank AP-104 are currently identified for this program element. However, if the general safety screening of tank AP-104 identifies a potential criticality concern, analyses for fissile materials and neutron sorbers 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 AP-104 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 ^{239}Pu and ^{241}Am , Total Organic Content (TOC), heat generation (by determining the amount of ^{90}Sr and ^{137}Cs) 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

No information needs are currently identified for this program element, although work to identify these needs is in progress and expected to be completed in fiscal year 1995.

2.5 DISPOSAL

2.5.1 Retrieval

Current retrieval needs (Bloom 1995) do not call for test samples to be taken from tank AP-104.

2.5.2 Pretreatment/Vitrification

Tank AP-104 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 and McCain 1995). Tank AP-104 is not identified as a primary bounding tank for historical model evaluations.

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 grab sampling has been scheduled in fiscal year 1996. No other sampling is scheduled through fiscal year 1996 (Stanton 1995).

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Grab sampling has been scheduled for December 1995. Further sampling activities are not presently scheduled or required.

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Grab Sampling	-Compatibility DQO -Safety Screening DQO	3 vertical profile grab samples	Energetics, Moisture, Major Anions, Cations & Radionuclides, SpG & pH, Pu, U, Separable Organics

5.0 WHEN INFORMATION IS NEEDED

Data are required for Tank AP-104 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

WHC-SD-WM-TP-414, REV 0

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