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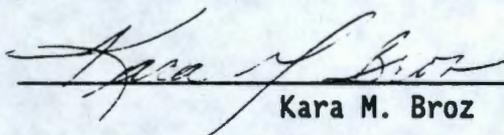
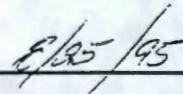
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7. Abstract This document is a plan identifies the information needed to address relevant issues concerning short-term and long-term safe storage and long-term management of Single-Shell Tank (SST) 241-AN-104.		
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Tank 241-AN-104 Tank Characterization Plan

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LIST OF ABBREVIATIONS

AN-104	241-AN-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
WHC	Westinghouse Hanford Company

1.0 INTRODUCTION

This Tank Characterization Plan (TCP) identifies the information needed to address relevant issues concerning short-term safe storage and long-term management of Double Shell Tank 241-AN-104 (AN-104). It should be understood that the various needs and issues surrounding tank AN-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 AN-104. This Tank Characterization Plan will be revised as necessary to reflect those changes or deviations.

Tank AN-104 was constructed from 1978 to 1980 and entered into service in September 1981. The tank received non-complexed waste until November 1982. From December 1982 until present the tank received double-shell slurry feed. AN-104 is currently inactive and holds concentrated waste. On January, 1991 the tank AN-104 was added to the Flammable Gas Watch List.

Tank AN-104 currently stores 4005 KL (1058 Kgal) of waste. The current surface level, as read manually with a Food Instrument Corporation gauge, is 9.8 meter (384 in). The waste is comprised of 3006 KL (794 Kgal) of supernatant, and 999 KL (264 Kgal) of sludge with 94 kL (25 kgal) of drainable interstitial liquid (Hanlon 1995). The most recent sampling event for tank AN-104 was performed on December, 1986.

This tank is on the Flammable Gas Watch list. Near-term sampling and analysis activities are focused on either verification of the watch list tank status, identification of any new safety issues, or changing the 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-AN-104

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

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, 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 listed as high heat, therefore, no information needs are currently identified for this program element.

2.2.4 Flammable Gas

Tank AN-104 is on the Flammable Gas Watch List. Data from core samples are needed to provide an understanding of the mechanisms for gas generation, conditions which cause gas retention, the source terms for dose consequence calculations, and to support tank behavior models. Clarification of tank behavior using models is needed to 1) develop appropriate mitigation methods and 2) make rational safety analysis decisions on future operations to prevent the creation of additional flammable gas tanks. In order to achieve these objectives, many chemical and radionuclide composition and physical property analyses are needed along with supporting operational data. The most reliable information can be obtained from complete core samples. The applicable DQO is: *Flammable Gas Safety Program: Data Requirements for Core Sample Analysis Developed through the Data Quality Objectives (DQO) Process* (McDuffie et al. 1995). Flammable gas program has requested sludge samples with retained gas sampler (used with the push mode core sampler system) and will provide a test plan for the analyses of those samples.

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 AN-104 are currently identified for this program element. However, if the general safety screening of tank AN-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. Sampling of this tank is required to support the flammable gas safety issue.

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 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 AN-104.

2.5.2 Pretreatment/Vitrification

Tank AN-104 is not identified as a bounding tank for pretreatment/disposal process development (Kupfer et al. 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 AN-104 is not identified as a primary bounding tank for historical model evaluations.

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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 push mode sampling has been scheduled for fiscal year 1996*. No other sampling is scheduled through fiscal year 1997 (Stanton 1994).

The availability of AN-104 risers, for sampling, has not been determined.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Characterization of flammable vapor production in the solid waste is a high priority for this tank. Push mode sampling is scheduled for FY 1996.

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Core Sampling Push Mode	-Safety Screening DQO -Flammable Gas DQO	2 cores from risers separated radially to the maximum extent possible (Grab samples may be used to obtain the supernate)*	Energetics, Moisture, Gas Composition, Major Anions & Cations, Radionuclides, Physical Properties, Total U, Total alpha

* Push sampling of the sludge region coupled with multi-position grab samples of the supernate is an alternative method of obtaining a vertical profile.

5.0 WHEN INFORMATION IS NEEDED

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

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6.0 REFERENCES

- Babad, H. K. S. Redus, and J. W. Hunt, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev 1, Westinghouse Hanford Company, Richland, Washington.
- Bloom, G. R., and Q. H. Nguyen, 1995, *Characterization Data Needs for Development, Design, and Operation of Retrieval Equipment Developed Through the Data Quality Objective Process*, WHC-SD-WM-DQO-008, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Brown, T. M., S. J. Eberlein, D. A. Dodd, T. J. Kunthara, B. C. Simpson, and N. W. Kirch, *Tank Waste Characterization Plan and Basis*, 1995, WHC-SD-WM-TA-164, Rev 0, Westinghouse Hanford Company, Richland, Washington.
- Hanlon, B.M., 1995, *Waste Tank Summary for Month Ending May, 1995*, WHC-EP-0182-82, Westinghouse Hanford Company, Richland, Washington.
- Homi, C. S., and S. J. Eberlein, 1995, *Fiscal Year 1996 Tank Waste Remediation System Tank Waste Analysis Plan*, WHC-SD-WM-PLN-101, Rev 0, Westinghouse Hanford Company, Richland, Washington
- Kupfer, M. J., W. W. Schultz, and J. T. Slankas, 1995, *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology*, WHC-SD-WM-TA-154, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- McDuffie, N. G., 1995, *Flammable Gas Tank Safety Program: Data Requirements for Core Sample Analysis Developed Through the Data Quality Objectives Process*, WHC-SD-WM-DQO-004, Rev. 2, Westinghouse Hanford Company.
- Meacham, J. E., R. J. Cash, B. A. Pulsipher, and G. Chen, 1995, *Data Requirements for the Ferrocyanide Safety Issue Developed through the Data Quality Objectives Process*, WHC-SD-WM-DQO-007, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Osborne, J.W., J.L. Huckaby, E.R. Hewitt, C.M. Anderson, D.D. Mahlum, B.A. Pulsipher, and J.Y. Young, 1995, *Data Quality Objectives for Generic In-Tank Health and Safety Vapor Issue Resolution*, WHC-SD-WM-DQO-002, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Simpson, B. C., and D. J. McCain, 1995, *Historical Model Evaluation Data Requirements*, WHC-SD-WM-DQO-018, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Stanton, G. A., 1995, *Baseline Sampling Schedule, Revision 4.3*, (internal memo 74320-95-04, to distribution, March 24), Westinghouse Hanford Company, Richland, Washington.

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