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Tank 241-AX-104 Tank Characterization Plan

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U.S. Department of Energy Contract DE-AC06-87RL10930

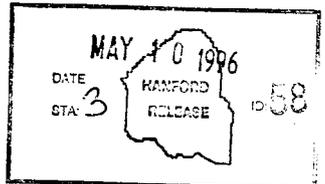
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Abstract: This document is a plan that identifies the information needed to address relevant issues concerning short-term and long-term storage and long-term management of single-shell tank 241-AX-104.

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TANK 241-AX-104 TANK CHARACTERIZATION PLAN

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Tank 241-AX-104 Tank Characterization Plan

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Waste Management



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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-AX-104 (AX-104). It should be understood that the various needs and issues surrounding tank AX-104 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 AX-104. 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 AX-104 was constructed in 1964 and entered into service in 1965. From third quarter of 1965 to fourth quarter of 1972 AX-104 received Plutonium Uranium Extraction (PUREX) waste. From the first quarter of 1973 to the second quarter of 1976, the tank contained PUREX sludge supernatant. Water was added in the second quarter of 1974. The tank contained evaporator feed from the third quarter of 1976 through the first quarter of 1978. Cesium feed was sluiced in the third quarter of 1976. The tank was sluiced for strontium and cesium recovery during the third quarter of 1977. In 1977 the tank was declared an assumed leaker with an approximate 8,000-gal leak volume. The leak was attributed to a vapor line and vessel vent header. A level adjustment was made during May 1978 and the tank was primary stabilized in September 1978. Tank AX-104 is categorized as an assumed leaker and its waste is classified as non-complexed (Brevick et al. 1995).

This tank currently contains waste with a total waste volume of 27 kL (7 kgal), which is equivalent to 6 cm (2 in) 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 verifying 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 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-AX-104

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

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 AX-104 are currently identified for this program element. However, if the general safety screening of tank AX-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 (DQO).

2.3 CONTINUING OPERATIONS

2.3.1 Compatibility/Stabilization

This section does not apply to tank AX-104.

2.3.2 Evaporator

This section does not apply to tank AX-104.

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank AX-104 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 AX-104.

2.5.2 Pretreatment/Vitrification

Tank AX-104 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 Plan and 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 AX-104 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. If analysis of these profiles reveals that additional profiles are necessary to meet data needs, more sample profiles will be requested.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Auger sampling was performed in February 1995 in accordance with Babad and Redus, (1995). Another auger sampling event is scheduled for January 1997 and a vapor sampling event for June 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 Sampling	-Organic Solvent Layer 93-5 Vapor Issue -Hazardous Vapor DQO	Steel canisters, Triple Sorbent Traps, Sorbent Trap Systems	Flammable Gas Organic Vapors Permanent Gases
Auger Sampling	-Safety Screening DQO	1 auger sample each from 2 risers. 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 January 1997 auger sampling event for tank AX-104 in May 1997. The vapor data are expected in August 1997. These times may be altered if the sampling schedule changes.

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