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Tank 241-A-104 Tank Characterization Plan

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Westinghouse Hanford Company, Richland, WA 99352

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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-A-104.

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Tank 241-A-104

Tank Characterization Plan

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May 1996

Prepared for the U.S. Department of Energy
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Approved for Public Release

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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-A-104 (A-104). It should be understood that the various needs and issues surrounding tank A-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 A-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 A-104 was constructed between 1954 and 1955 and was put into service in 1957. Initially tank A-104 received waste water from the second quarter of 1957 until the second quarter of 1959. From the third quarter of 1959 until the fourth quarter of 1961, the tank received Plutonium Uranium Extraction (PUREX) high activity neutralized acid waste. From the third quarter of 1960 until the first quarter of 1968, the tank received organic wash waste from the PUREX plant. The tank waste was the self-concentrating or boiling type. Between the second and fourth quarters of 1969, tank A-104 was sluiced for strontium and cesium recovery, and it was declared a spare tank in the fourth quarter of 1969. The tank contained sluicing water from the fourth quarter of 1969 until the third quarter of 1972. The tank received B plant waste in the fourth quarter of 1972. From the first quarter of 1973 until the third quarter of 1974, the tank received washed PUREX sludge. The tank was sluiced starting in the third quarter of 1974 to reduce the sludge heel and for saltcake storage. The tank was declared an assumed leaker in 1975. Tank A-104 is actively ventilated and was interim stabilized in September 1978 with intrusion prevention completed in 1983 (Anderson 1990; Brevick et al. 1994).

Tank A-104 currently contains a total waste volume of 106 kL (28 kgal), which is equivalent to approximately 25 cm (10 in) of waste 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-A-104

This section identifies the various program elements, and identifies which of these programs require characterization data from tank A-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 exhaust 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 A-104 are currently identified for this program element. However, if the general safety screening of tank A-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 A-104.

2.3.2 Evaporator

This section does not apply to tank A-104.

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

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

2.5.2 Pretreatment/Vitrification

Tank A-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 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 A-104 has been identified as a primary bounding tank for the AR waste type

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(waste from various washes of sludge in the AR Vault). All single-shell tanks were prioritized in the *Tank Waste Characterization Basis* (Brown et al. 1995) document using the historical DQO.

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 is scheduled for September 1996. Vapor sampling is scheduled for May 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*
Auger Sampling	-Safety Screening DQO -Historical DQO	Auger samples from 2 risers separated to the maximum extent possible Combustible gas measurement	Flammability, Energetics, Moisture, Total alpha activity, Density, Anions, Metals, Radionuclides, TOC
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

* 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 auger sampling event for tank A-104 in January 1997. The vapor sampling data are expected in July 1997. These times may be altered if the sampling schedule changes.

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