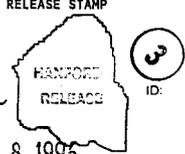


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Tank 241-AN-104 Tank Characterization Plan

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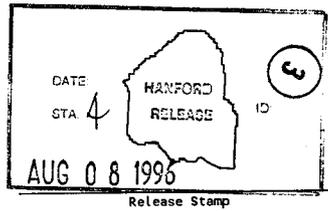
Abstract: This document is a plan that identifies the information needed to address relevant issues concerning short-term and long-term storage and long-term management of double-shell tank 241-AN-104.

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Tank 241-AN-104 Tank Characterization Plan

C. S. Homi
Westinghouse Hanford Company

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1.0 INTRODUCTION

This Tank Characterization Plan (TCP) identifies the information needed to address issues related to short-term and long-term safe storage and long-term management of double shell tank 241-AN-104 (AN-104). It should be understood that needs and issues surrounding tank AN-104 are evolving as new information becomes available. As a result, this TCP addresses only issues that have been identified to date. It is expected that changes may be necessary as additional issues or needs arise which impact the management of tank AN-104. As necessary, this TCP will be revised to reflect changes. This plan reflects the best information available as of August 1996.

Tank AN-104 entered into service in September 1981. Waste was transferred from tank 241-AW-102 during the fourth quarter of 1982. The tank continued to receive non-complexed waste until November 1982. The tank has contained double-shell slurry feed waste from December 1982 until the present. During the fourth quarter of 1983, the tank also received low-level waste from Plutonium Uranium Extraction (PUREX). The tank has not received waste since the second quarter of 1985. The slight level changes are attributed to slurry growth as a result of gas generation. The tank is currently inactive and is considered a concentrated waste holding tank (Brevick et al. 1995).

This tank currently contains a total volume of 4013 kL (1060 kgal) of waste, which is equivalent to 979 cm (386 in) of waste as measured from the baseline of the tank (Hanlon 1996).

Tank AN-104 is currently on the Flammable Gas Watch List.

Near-term sampling and analysis activities are focused on verifying or changing the Watch List tank status, and identifying any new safety issues. If new safety issues are identified, analysis activities consistent with the identified issue will be performed.

In addition to resolving safety issues, it is intended that all tank waste will be subject to pretreatment and retrieval to prepare it for final storage or disposal. Presently, these long-range plans are not yet fully identified and, therefore, are not included in this document.

2.0 PROGRAM ELEMENTS REQUIRING INFORMATION FOR TANK 241-AN-104

This section lists the Tank Waste Remediation System program elements and identifies those that require characterization data from tank AN-104.

2.1 GENERAL SAFETY ISSUES

2.1.1 Safety Screening

The *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995) describes the sampling and analytical requirements that are used to screen tank waste for unidentified safety issues. Analytical requirements for tank safety screening are energetics, total alpha activity, moisture content, density and flammable gas concentration. Based on these analytical results, additional analysis may be performed.

2.1.2 Vapor Safety Screening

All 177 underground tanks must be vapor-sampled for organic solvent screening in accordance with the *Recommendation 93-5 Implementation Plan* (DOE-RL 1996a). Organic solvent screening will be performed using the *Scope Increase of "Data Quality Objective to Support Resolution Of the Organic Complexant Safety Issue" Rev. 2* (Cash 1996b). The primary vapor analyses conducted will determine Total Non-methane Hydrocarbon content. All previous vapor samples were analyzed for Total Non-methane Hydrocarbon content.

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 Phenomenology

Tank AN-104 is not on the Organic Watch List. It also has not been identified as in scope of the organic DQO by either the *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue* (Turner et al. 1995) or the *Scope Increase of "Data Quality Objective to Support Resolution Of the Organic Complexant Safety Issue" Rev. 2* (Cash 1996b). Therefore, no information needs are currently identified for this program element.

2.2.3 Flammable Gas

Tank AN-104 has been identified as in scope of the *Flammable Gas Safety Program: Data Requirements for Core Sample Analysis Developed through the Data Quality Objectives Process* (McDuffie 1995) or the *Application of "Flammable Gas Tank Safety Program: Data Requirements For Core Sampling Analysis Developed Through the Data Quality Objectives Process" Rev. 2* (Cash 1996a). The waste analyses conducted will determine both physical and chemical properties that may affect gas retention in the waste.

2.2.4 Vapor Space Phenomenology

No information needs from tank AN-104 have been identified for this program item.

2.2.5 Criticality

No information other than that for the general safety issue of tank AN-104 is 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 DQO (Dukelow et al. 1995).

2.2.6 High Heat Load

Tank AN-104 is not on the High Heat Watch List; therefore, no information needs are currently identified for this program element.

2.3 CONTINUING OPERATIONS

2.3.1 Compatibility/Stabilization

This section does not apply to tank AN-104.

2.3.2 Evaporator

This section does not apply to tank AN-104.

2.3.3 Caustic Mitigation

The caustic concentration in tank AN-104 is within specification limits (WHC 1996).

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

Requirements for double-shell waste analyses are found in *Double-Shell Tank Waste Analysis Plan* (Mulkey and Jones 1995). This plan uses the compatibility (Fowler 1995) and safety screening (Dukelow et al. 1995) DQOs as the basis for identifying data requirements and criteria for the safe storage and mixing of wastes.

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 AN-104.

2.5.2 Process Testing

Tank AN-104 has been identified as a bounding tank for the pretreatment/disposal process development strategy (Kupfer et al. 1995). The strategy only requires that sample material be available from archive samples and does not require any specific analyses to be conducted on the samples.

2.5.3 Privatization

This section does not apply because tank AN-104 has not been chosen to represent a waste envelope as given in the TWRS Privatization Request for Proposal (RFP) (DOE-RL 1996b).

2.6 HISTORICAL MODEL EVALUATION

This section does not apply because tank AN-104 is not identified as a primary or alternate 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

4.1 Characterization Basis

The priorities of all the tanks were determined by addressing safety, disposal, and characterization issues in the *Tank Waste Characterization Basis* (Brown et al. 1996) document. The safety issues with their respective references are: flammable gas (McDuffie 1995, Cash 1996a), organic fuel phenomenology (Turner et al. 1995, Cash 1996b), tank safety screening (Dukelow et al. 1995), vapor screening (DOE-RL 1996a, Cash 1996b), vapor space phenomenology (DOE-RL 1996a) and ferrocyanide (Meacham et al. 1995). The disposal issues with their respective references are: privatization (Slankas and Kupfer 1995), process testing (Kupfer et al. 1995), and retrieval (Bloom and Nguyen 1995). The characterization issue with its respective reference is the historical model evaluation (Simpson and McCain 1996). These issues were ranked by priority in the *Meeting Minutes of April 26 and 30, 1996 Meetings To Determine TWRS Issue Priorities* (TWRS Technical Basis 1996).

Based on resultant priorities and sampling constraints, tank AN-104 is included in the list for sampling and analysis during FY 1996.

4.2 Sampling Schedule

Push mode core sampling is scheduled to begin July 1996. Vapor sampling is scheduled to begin in August 1998.

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 Screening (DOE-RL 1996a, Cash 1996b)	Steel canisters	Organic Vapors
Push Mode Core Sampling	-Flammable Gas DQO -Safety Screening DQO	Core samples from 2 risers separated radially to the maximum extent possible Combustible gas measurement	Flammability, Energetics, Moisture, Total alpha activity, Anions, Cations, Radionuclides, Density, Physical properties, pH, Total Organic Carbon, Total Inorganic Carbon, Cr(VI).

* Consult each applicable DQO in force at the time for sampling and analytical requirements.

5.0 WHEN INFORMATION WILL BE AVAILABLE

According to the FY-97 TWAP Sampling Schedule (Stanton 1996), data are expected to be available from the push mode core sampling event for tank AN-104 in December 1996 and for vapor sampling in December 1998. This date may be altered if the sampling schedule changes.

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