

ENGINEERING CHANGE NOTICE

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Tank 241-U-102 Tank Characterization Plan

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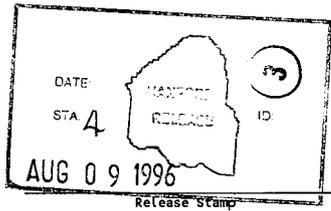
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Abstract: This document is a plan that identifies the information needed to address relevant issues concerning short-term and long-term storage and long-term management of single-shell tank 241-U-102.

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Tank 241-U-102 Tank Characterization Plan

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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 single-shell tank 241-U-102 (U-102). It should be understood that needs and issues surrounding tank U-102 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 U-102. As necessary, this TCP will be revised to reflect changes. This plan reflects the best information available as of August 1996.

Tank U-102 entered into service in the second quarter of 1946. Tank 241-U-102 received metal waste from the second quarter of 1946 until the fourth quarter of 1956. The tank was sluiced in the third quarter of 1955 and the fourth quarter of 1956. The heel was sluiced and the tank was declared empty during the first quarter of 1957. Subsequently, the tank received Reduction Oxidation (REDOX) waste until the second quarter of 1975. From the second quarter of 1975 until the first quarter of 1978, the tank received evaporator bottoms, evaporator feed, residual evaporator liquor, and Hanford defense residual liquor. During this time, the tank also received bottoms and recycle wastes from the 242-T Evaporator. The tank was a slurry receiver for the 242-S Evaporator. In the second quarter of 1978, the waste was classified as non-complexed (Brevick et al. 1994).

Tank U-102 currently contains a total volume of 1416 kL (374 kgal) of waste, which is equivalent to 333 cm (131 in) of waste as measured from the baseline of the tank (Hanlon 1996).

Tank U-102 is not on any 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-U-102

This section lists the Tank Waste Remediation System program elements and identifies those that require characterization data from tank U-102.

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.

Tank U-102 is passively ventilated. Information needs for vapor sampling and analyses of passively ventilated tanks must satisfy *Data Quality Objectives for Tank Hazardous Vapor Safety Screening* (Osborne and Buckley 1995). The primary analyses employed will determine flammable gas, organic vapor, permanent gas, and moisture content in the tank dome space. Based on these analytical results, additional analysis may be performed.

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 U-102 has 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). The primary waste analyses conducted will determine the TOC, energetics, and moisture content.

2.2.3 Flammable Gas

Tank U-102 has not been identified as in scope of the flammable gas DQO by either 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). Therefore, no flammable gas safety program information needs are currently identified for this tank.

2.2.4 Vapor Space Phenomenology

No information needs from tank U-102 have been identified for this program item.

2.2.5 Criticality

No information other than that for the general safety issue of tank U-102 is currently identified for this program element. However, if the general safety screening of tank U-102 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 U-102 is not on the High Heat Watch List; therefore, no information needs are currently identified for this program element.

2.3 CONTINUOUS OPERATIONS

2.3.1 Compatibility/Stabilization

Tank U-102 waste was sampled to determine compatibility. Sampling and analysis requirements were performed according to the *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Fowler 1995). The analyses employed were for anions, cations, pH, physical properties, radionuclides, TOC, total uranium, transuranics, and solids content, and moisture content.

2.3.2 Evaporator

This section does not apply to tank U-102.

2.3.3 Caustic Mitigation

No composition specification is required for tank U-102 (WHC 1996).

2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank U-102 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 U-102.

2.5.2 Process Testing

Tank U-102 has not been identified as a bounding tank for the pretreatment/disposal process development strategy (Kupfer et al. 1995). Even though tank U-102 is not a bounding tank, a portion of archive sample material may be

requested for pretreatment testing. The pretreatment strategy does not require any specific analyses to be conducted on the samples.

2.5.3 Privatization

This section does not apply because tank U-102 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

Tank U-102 is in scope of revision 0 of the Historical DQO. This tank has been sampled prior to the release of revision 1 of the Historical DQO or incorporation of revision 1 of the Historical DQO into this Tank Characterization Plan; therefore, requirements for this program element are identified in revision 0 of the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995) which requires sampling and analysis for energetics, moisture content, TOC, total uranium, density, cations, anions, and radionuclides.

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 U-102 is included in the list for sampling and analysis during FY 1996.

4.2 Sampling Schedule

Vapor sampling is scheduled to begin February 1997. Grab sampling was completed March 1996. Push mode core sampling was completed May 1996 (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 Screening (DOE-RL 1996a, Cash 1996b) -Hazardous Vapor DQO	Steel canisters Triple Sorbent Traps Sorbent Trap Systems	Flammable Gas Organic Vapors Permanent Gases
Grab Sampling	-Compatibility DQO	Grab samples	Energetics, Moisture, Anions, Cations, Radionuclides, TOC, Total inorganic carbon, pH, Specific gravity, Separable organics, Percent solids
Push Core Sampling	-Safety Screening DQO -Organic DQO -Historical DQO (Simpson and McCain 1995)	Core samples from a minimum of 2 risers separated radially to the maximum extent possible. Combustible gas measurement	Flammability, Energetics, Density, Moisture, Total alpha activity, TOC, Separable organics, Anions, Cations, Radionuclides

* 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 core sampling event in September 1996. Vapor sampling data are expected in June 1997. These dates may be altered if the sampling schedule changes. Data are available from the March 1996 grab sampling.

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