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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-S-101.

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Tank Characterization Plan

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Westinghouse Hanford Company

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LIST OF ABBREVIATIONS

DQO	Data Quality Objective
HTCE	Historical Tank Content Estimate
NCPLX	Non-complexed
S-101	Tank 241-S-101
SUMMA®	Trademark of Molectrics, Inc.
SST	Single-Shell Tank
TCP	Tank Characterization Plan
TOC	Total Organic Carbon
WHC	Westinghouse Hanford Company

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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 Single-Shell Tank (SST) 241-S-101 (S-101). It should be understood that the various needs and issues surrounding tank S-101 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 SST S-101. This Tank Characterization Plan will be revised to reflect those changes or deviations.

Tank S-101 was constructed between 1950 and 1951 and was put into service in July 1953. Initially tank S-101 received waste from the REDOX facility which it contained from the third quarter of 1953 until the third quarter of 1973. From the first quarter of 1954 until the third quarter of 1955, the tank received REDOX cladding waste. The tank received wastewaster from the third quarter of 1955 until the first quarter of 1974. From the fourth quarter of 1973 until the third quarter of 1974, the tank received numerous types of waste from U, S and SX tank farms. The tank received bottoms and recycle streams from the 242-S Evaporator from the fourth quarter of 1974 until the second quarter of 1976. the tank contained various types of evaporator waste until the addition of partial neutralized feed in the second quarter of 1978. In the first quarter of 1980, the waste was classified as Double-Shell Slurry Feed. This tank currently contains non-complexed waste with a total waste volume of 1,616.5 kL (427 kgal), which is equivalent to 413.33 centimeters (162.73 inches) of waste as measured from the baseline of the tank. The waste is comprised of 458.1 kL (121 kgal) of saltcake; 314.2 kL (83 kgal) of saltslurry; 798.8 kL (211 kgal) of sludge and 45.4 kL (12 kgal) of supernatant with 340.7 kL (90 kgal) of pumpable liquid remaining (Brevick 1994a).

The tank is sound and was removed from service in 1980. Tank S-101 is passively ventilated and was partially isolated in December 1982. The tank is awaiting interim stabilization and the last photo was taken on March 18, 1988. The 1988 photographic montage demonstrates that most of the waste seems to be solidified with a few small pools of liquid remaining on the surface (Brevick 1994b). The last solids volume update was obtained on September 16, 1980 (Hanlon 1995).

Four samples were obtained from S-101 between 1971 and 1975. The July 1975 sample was a dark brown sludge which had the consistency of soft mud. The analysis indicated that the sample chemical constituents were primarily a nitrate and an aluminum compound.

This tank is presently not on a Watch List. Near-term sampling and analysis activities are focused on either verification of the non-watchlist tank status, identification of any new safety issues or the addition of S-101 to a Watch List. Should any safety issues be identified further analyses will be directed 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.

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2.0 PROGRAM ELEMENTS REQUIRING INFORMATION FOR TANK 241-S-101

This section identifies the various program elements, and identifies which of these programs require characterization data from tank S-101.

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 and; therefore, no information needs are currently identified for this program element.

2.2.2 Organic

This tank is not on the Organics Watch List and; 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 and; therefore, no information needs are currently identified for this program element.

2.2.4 Flammable Gas

This tank has been identified by the Flammable Gas Safety Program as meeting the criteria that may indicate potential for flammable gas generation and retention. For this reason, a vapor sample is warranted (as discussed below). Not all potential flammable gas tanks require core sampling and application of the flammable gas core sampling DQO. The program has not requested application of the DQO for this tank.

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 (a prerequisite to rotary sampling); (2) tanks on the Organic or Ferrocyanide Watch Lists; (3) tanks in C farm; and (4) tank BX-104, due to vapor exposure. Since tank S-101 is categorized in one of the above four groups, information needs must satisfy *Data Quality Objectives for Generic In-Tank Health and Safety Vapor Issue Resolution* (Osborne et al. 1995) and *Rotary Sampling Core Vapor Sampling Data Quality Objective* (Price 1994). Characterization of the tank headspace is needed to: 1) identify those tanks which can be sampled safely with intrusive equipment without risk of gas ignition; 2) identify and estimate concentrations of toxicologically significant compounds present in the tank headspace to establish worker safety precautions; and 3) support the startup and operation of the portable exhauster used during rotary-mode core sampling.

2.2.6 Criticality

No information separate from that for the general safety issue of tank S-101 are currently identified for this program element. However, if the general safety screening of tank S-101 identifies a potential criticality concern, analyses for fissile materials and neutron absorbers 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.

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

This section does not apply because Tank S-101 is a single shell tank.

2.5 DISPOSAL

2.5.1 Retrieval

Current retrieval needs (Bloom 1995) do not call for test samples to be taken from tank S-101.

2.5.2 Pretreatment/Vitrification

Tank S-101 is identified as a bounding tank for pretreatment/disposal process development (Kupfer el 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 S-101 has NOT been identified as a primary bounding tank.

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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. Several sampling events of tank S-101 are scheduled: one vapor sampling events and a rotary sampling event. No other sampling is scheduled through fiscal year 1998 (Stanton 1995). The rotary mode sampling type has been chosen over other sampling modes due to both the depth of the tank (making auger sampling inadequate) and the fact that the surface of tank S-101 is comprised of saltcake (which is not conducive to good push mode core sampling recovery). Prior to rotary sampling it is necessary to vapor sample the tank as per requirements of *Rotary Core Vapor Sampling Data Quality Objective* (Price 1994).

The best current estimate of the water content in tank S-101 solids, as determined from the process records, is 55%; based on the HTCE (Brevick 1994a). Estimates (Toth et al 1995) of water content in tank S-101 saltcake and sludge are 21.6% and 42.4% respectively (generated from a model based on sample data from similar tanks). If the variance of water in tanks already sampled and a statistical power curve is used then a minimum of two cores are needed to demonstrate a water content above 17% at 95% confidence in the sludge. Should the measured mean be lower than anticipated or the measured variance higher, additional samples may be required. The TOC contained within the saltcake is estimated (Toth et al 1995) to be 0.4% (wet basis), which is significantly lower than the level of concern. Two core samples are scheduled at this time.

The best current information indicates that 3 risers are available for sampling of tank S-101, 12" (30.5 cm) riser R7 and two 4" (10.2 cm) risers R4 and R16. It is recommended that these risers be chosen because, they are risers that are separated radially to the maximum extent possible and; therefore, will provide a larger amount of data about the vertical and horizontal waste layers within the tank. Initial information will be taken from 2 of these risers and assessed to determine if more samples are required. Three additional risers are available but, equipment will have to be removed from each individual riser to utilize these risers for sampling. Alternate sampling methods, installation of a riser or removal of equipment from risers presently considered unavailable, are possible future options.

4.0 PRIORITY OF INFORMATION REQUIREMENTS

Characterization of flammable and toxic vapors is a high priority for this tank. Vapor sampling is expected to be performed in fiscal year 1996 (Stanton 1995). Rotary mode sampling is scheduled for FY 1996 (Stanton 1995).

Table 4-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical Requirements
Vapor Sampling	-Health & Safety Vapor Issue Resolution DQO -Rotary Sampling Core Vapor Sampling DQO	3 SUMMA® canisters 6 Triple Sorbent Traps 8 Sorbent Trap Systems	Gas Flammability Gas Toxicity -Organic Vapors -Permanent Gases
Rotary Core Sampling	-Safety Screening DQO -Historical	Core samples from a minimum of 2* risers separated radially to the maximum extent possible *see section 3	Energetics, Moisture, Total Alpha

5.0 PRIORITY OF INFORMATION REQUIREMENTS

Data are required for Tank S-101 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

6.0 REFERENCES

Babad, H, K. S. Redus, and J. W. Hunt, 1995a, *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.

Brevick, C. H., 1994a, *Historical Tank Content Estimate for the Southwest Quadrant of the Hanford 200 West Areas*, WHC-SD-WM-ER-352, Rev. 0a, ICF Kaiser Hanford Company, Richland, Washington.

Brevick, C. H., 1994b, *Supporting Document for the Historical Tank Content Estimate for S Tank Farm*, WHC-SD-WM-ER-323, Rev. 0, ICF Kaiser Hanford Company, Richland, Washington.

9613457.0624

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.

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.

Price, D. N., 1994, *Rotary Core Vapor Sampling Data Quality Objective*, WHC-SD-WM-SP-003, Rev. 0, 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.

Toth, J. J., P. G. Heasler, M. E. Lerchen, J. G. Hill, and P. D. Whitney, 1995, *Analysis of Organic Carbon and Moisture in Hanford Single-Shell Tank Waste*, PNL-10360, Pacific Northwest Laboratory, Richland, Washington.

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