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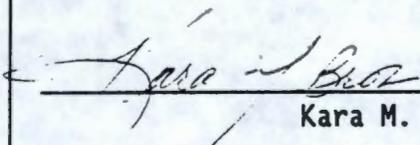
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This document is a plan identifies the information needed to address relevant issues concerning short-term and long-term safe storage and long-term management of Single-Shell Tank (SST) 241-S-105.		
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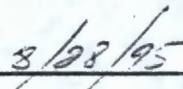
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Tank 241-S-105 Tank Characterization Plan

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LIST OF ABBREVIATIONS

DQO	Data Quality Objective
HTCE	Historical Tank Content Estimate
NCPLX	Non-complexed
S-105	Tank 241-S-105
SUMMA®	Trademark of Molectrics, Inc.
SST	Single-Shell Tank
TCP	Tank Characterization Plan
TOC	Total Organic Carbon
WHC	Westinghouse Hanford Company

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-S-105 (S-105). It should be understood that the various needs and issues surrounding tank S-105 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-105. This Tank Characterization Plan will be revised as necessary to reflect those changes or deviations.

Tank S-105 was constructed between 1943 and 1944 and was put into service in 1953. Initially tank S-105 received REDOX facility waste from the second quarter of 1953 until the third quarter of 1973. In the first quarter of 1974 the tank received bottoms and recycle wastes from the 242-S Evaporator/Crystallizer until the tank was salt filled in the fourth quarter of 1974. From the first quarter of 1978 until the third quarter of 1980, the tank received partial neutralized feed waste. Presently, the tank waste is classified as non-complexed. This tank currently contains a total waste volume of 1,726.2 kL (456 kgal), which is equivalent to 440.1 centimeters (173.3 inches) of waste as measured from the baseline of the tank. The waste is comprised of 1,718.7 kL (454 kgal) of saltcake and 7.6 kL (2 kgal) of sludge with 49.2 kL (13 kgal) of pumpable liquid remaining (Brevick 1994a).

The tank is sound and was removed from service in 1976 and labeled inactive in 1978. Tank S-105 is passively ventilated, interim stabilized in September 1988 with intrusion prevention completed in September of 1990. The last photo was taken on April 12, 1989. The 1989 photographic montage indicates that the tank contents are completely dry, at least on the surface (Brevick 1994b). The last solids volume update was obtained on September 26, 1988 (Hanlon 1995).

Samples of S-105 waste taken between September 1971 and September 1974. The most recent sample analyses, in 1974, are more representative of current tank contents. The tank contains terminal liquors of which the main constituents were sodium nitrate, sodium nitrite, sodium aluminate and sodium hydroxide with smaller quantities of other sodium compounds.

This tank is not on any 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 changing the non-Watch List status. 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-S-105

This section identifies the various program elements, and identifies which of these programs require characterization data from tank S-105.

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

Tank S-105 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-105 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-105 are currently identified for this program element. However, if the general safety screening of tank S-105 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. Sampling of this tank is required to confirm the non-Watch List status.

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

No information needs are currently identified for this section because tank S-105 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-105.

2.5.2 Pretreatment/Vitrification

Tank S-105 has not been identified as a bounding tank for pretreatment/disposal process development (Kupfer 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-105 has not been identified as a primary bounding tank.

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 TX-115 are scheduled: one vapor sampling event and a rotary sampling event. No other sampling is scheduled through fiscal year 1997 (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-105 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-105 solids, as determined from the process records, is 38.2%; based on the HTCE (Brevick 1994a). Estimates (Toth et al 1995) of water content in tank S-105 saltcake and sludge are 8.5% 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 actual moisture content may be close enough to the threshold that sample analysis cannot provide assurance that it exceeds the threshold. The TOC contained within the saltcake and sludge is estimated (Toth et al 1995) to be 0.4% and 0.1% (wet basis) respectively, which is significantly lower than the level of concern. Initially two core samples will be requested for this tank and this should meet the requirements for the above parameters.

Presently there is no information on the availability of tank S-105 risers. It is recommended that risers be chosen 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 risers and assessed to determine if more samples are required. Alternate sampling methods, installation of a riser or removal of equipment from risers 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 to be performed in fiscal year 1996 (Stanton 1995). Rotary mode sampling is scheduled for FY 1997 (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	Core samples from a minimum of 2 risers separated to the maximum extent possible	Energetics, Moisture, Total Alpha

5.0 WHEN INFORMATION IS NEEDED

Data are required for tank S-105 during FY 1996 for safety screening and to prepare a Tank Characterization Report.

6.0 REFERENCES

- Babad, H, K. S. Redus, J. W. Hunt, 1995a, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev 1, Westinghouse Hanford Company, Richland, Washington.
- Babad, H., S. M. Blacker, K. S. Redus, 1995b, *Data Quality Objective to Support Resolution of the Organic Fuel Rich Tank Safety Issue*, WHC-SD-WM-DQO-006, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Bloom, G. R., 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 East 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.

- Brown, T. M., S. J. Eberlein, *Tank Waste Characterization Plan and Basis*, 1995, WHC-SD-WM-TA-164, Rev 0, Westinghouse Hanford Company, Richland, Washington.
- Fowler, K.D., 1995, *Data Quality Objectives for the Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 1, April 1995, Westinghouse Hanford Company, Richland, Washington.
- Hanlon, B.M., 1995, *Waste Tank Summary for Month Ending June, 1995*, WHC-EP-0182-87, Westinghouse Hanford Company, Richland, Washington.
- Homi, C. S., 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, 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.
- McDuffie, N. G., 1995, *Flammable Gas Tank Safety Program: Data Requirements for Core Sample Analysis Developed Through the Data Quality Objectives (DQO) Process*, WHC-SD-WM-DQO-004, Rev 2, Westinghouse Hanford Company, Richland, Washington.
- Meacham, J. E., R. J. Cash, B. A. Pulsipher, 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, 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., 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, 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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