9613457.0562

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0042238

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1. EDT No. 613111

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Tank 241-T-109/Waste Management/CPCR/Technical Basis Characterization	John M. Conner	N/A
8. Originator Remarks: This document is being released into the Supporting Document System for retrievability purposes.		**9. Equip./Component No.:** N/A
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(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-TP-368	N/A	0	Tank 241-T-109 Tank Characterization Plan	Q	1	1	1

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

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18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
A.E. Young Ann E. Young 8-14-95 Signature of EDT Originator Date	N/A Authorized Representative for Receiving Organization Date	J.G. Kristofzski R.D. Hall for 8/15/95 Cognizant Manager Date	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

BD-7400-172-1

RELEASE AUTHORIZATION

Document Number:	WHC-SD-WM-TP-368, Rev. 0
Document Title:	Tank 241-T-109 Tank Characterization Plan
Release Date:	8/15/95

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Chris Willingham 8/15/95

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SUPPORTING DOCUMENT

1. Total Pages 7

2. Title	3. Number	4. Rev No.
Tank 241-T-109 Tank Characterization Plan	WHC-SD-WM-TP-368	0

5. Key Words	6. Author
Tank 241-T-109, Tank T-109, T-109, Tank Characterization Plan, TCP	Name: John M. Conner Signature: JM Conner Organization/Charge Code 75310/N4168

7. Abstract

N/A

8. RELEASE STAMP

OFFICIAL RELEASE BY WHC DATE AUG 15 1995

Sta. 21

WHC-SD-WM-TP-368
Revision 0

Tank 241-T-109 Tank Characterization Plan

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

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LIST OF ABBREVIATIONS

DQO	Data Quality Objective
DSSF	Double Shell Slurry Feed
NCPLX	Non-complexed
SST	Single-Shell Tank
T-109	Tank 241-T-109
TCP	Tank Characterization Plan
TOC	Total Organic Carbon
USQ	Unreviewed Safety Question
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-T-109 (T-109). It should be understood that the various needs and issues surrounding tank T-109 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 T-109. As necessary, this Tank Characterization Plan will be revised to reflect those changes or deviations.

This tank is not on any Watch list. Near-term sampling and analysis activities are focused on either verification of the non-Watch List tank status, identification of any new safety issues or changing the non-Watch List status. In addition, the information gained will be used for historical purposes. Should any safety issues be identified, additional analysis will occur consistent with the identified issue.

2.0 PROGRAM ELEMENTS REQUIRING INFORMATION FOR TANK 241-T-109

This section identifies the various program elements, and identifies which of these programs require characterization data from tank T-109.

2.1 GENERAL SAFETY ISSUES

Tank T-109 was put into service in December 1945. Initially tank T-109 began filling with first cycle decontamination waste from the cascade overflow line connected to Tank 241-T-108. Presently, the tank waste is classified as non-complexed. This tank currently contains waste with a total waste volume of 220 kL (58 kgal), which is equivalent to 41 centimeters (16 inches) of waste as measured from the bottom-sidewall elevation of the tank. The waste is predicted to contain 220 kL (58 kgal) of saltcake with no pumpable liquid remaining (Brevick, et al., 1994).

The tank has been declared an assumed leaker and was removed from service in 1974. Tank T-109 is passively ventilated and was administratively interim stabilized in 1984 with intrusion prevention completed in 1982. The last photograph, taken on February 25, 1993, indicated an uneven surface with a non-uniform mix of chemical compounds. The last solids volume update was obtained on December 30, 1984 (Hanlon 1995).

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. The scheduled auger sampling event addresses the energetics, total alpha activity, and moisture content issues (Conner 1995). The tank vapor space is screened for radiological and flammability concerns prior to any tank intrusion (such as auger sampling). In addition, vapor sampling to address the flammable gas issue will be conducted at a later date.

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 T-109 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 is not on the Flammable Gas Watch List and therefore, no information needs are currently identified for this program element from condensed phase samples.

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 (as a consequence of the rotary sampling system); (2) tanks on the Organic or Ferrocyanide Watch Lists; (3) tanks in C farm; and (4) tank 241-BX-104, due to vapor exposure. Since tank T-109 is NOT categorized in one of the above four groups, the tank is not currently scheduled for vapor sampling.

2.2.6 Criticality

No information separate from that for the general safety issue of tank T-109 are currently identified for this program element. However, if the general safety screening of tank T-109 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.

2.3 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 program element, although work to identify these needs is in progress and expected to be completed in fiscal year 1995.

2.5 DISPOSAL

2.5.1 Retrieval

The latest DQO for retrieval (Bloom and Nguyen, 1995) does not request any data from tank waste samples at this time. Waste characterization data may be requested after the tank retrieval sequence has been determined.

2.5.2 Pretreatment/Vitrification

Long-range planning for disposal needs are currently under development as testing for bounding tanks is performed. The tanks from which samples are desired for pretreatment testing are found in *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology* (Kupfer, et al., 1995). Tank T-109 is identified as a tank of interest. Therefore, if sufficient material remains after safety analyses and archiving, composite samples from T-109 will be prepared and shipped for pretreatment studies.

2.6 HISTORICAL MODEL EVALUATION

Bounding tanks and data requirements for historical model evaluations are found in DQO *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). Tank T-109 has been identified as a secondary bounding tank for T1 salt cake. Therefore, analyses will be performed to support this DQO.

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. Only an auger sampling event is scheduled and required. The auger sampling type has been chosen over other sampling modes due to the depth of the tank (T-109 is a shallow tank making rotary core sampling unnecessary) and the fact that the surface of tank T-109 is comprised of saltcake.

4.0 WHEN INFORMATION IS NEEDED

Reporting requirements are given in the appropriate Sampling and Analysis Plan (Conner 1995). Additional data requirements for this section are under development.

5.0 PRIORITY OF INFORMATION REQUIREMENTS

Table 5-1: Integrated DQO Requirements

Sampling Event	Applicable DQO	Sampling Requirements	Analytical and Archival Requirements
Auger Sampling	-Safety Screening DQO -Historical Model DQO -Pretreatment DQO	Auger samples from 2 risers separated radially to the maximum extent possible	Energetics, Moisture, Total Alpha, Metals, Anions except oxalate, Cs-137, Sr-90 Retain archive material Provide composite samples for pretreatment

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