COMPLETE

# ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 621558

Proj. ECN

| 2. ECN Category (mark one) | 3. Originator's Name, Organization, MSIN, and Telephone No. | 3a. USQ Required? | 4. Date |
|---|---|---|---|
| Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void [] | Clarence Homi, Evaluation and Planning, R2-12, 373-1097 | [] Yes [X] No | 05/09/96 |
| | 5. Project Title/No./Work Order No. | 6. Bldg./Sys./Fac. No. | 7. Approval Designator |
| | Tank 241-S-110 | 241-S-110 | N/A |
| | 8. Document Numbers Changed by this ECN (includes sheet no. and rev.) | 9. Related ECN No(s). | 10. Related PO No. |
| | WHC-SD-WM-TP-205, Rev. 1-D | ECNs: 609267, 609269, 621339, 613660, 623942 | N/A |

| 11a. Modification Work | 11b. Work Package No. | 11c. Modification Work Complete | 11d. Restored to Original Condition (Temp. or Standby ECN only) |
|---|---|---|---|
| [] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d) | N/A | N/A<br>Cog. Engineer Signature & Date | N/A<br>Cog. Engineer Signature & Date |

12. Description of Change

Complete revision.

13a. Justification (mark one)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Criteria Change | [X] | Design Improvement | [] | Environmental | [] | Facility Deactivation | [] |
| As-Found | [] | Facilitate Const | [] | Const. Error/Omission | [] | Design Error/Omission | [] |

13b. Justification Details

Changed to comply with new template and DOE-RL recommended modifications.

14. Distribution (include name, MSIN, and no. of copies)

See attached distribution.

RELEASE STAMP

DATE: MAY 10 1996

STA: 4

HANFORD RELEASE ID: R2

A-7900-013-2 (11/94) GEF095

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1. ECN (use no. from pg. 1) ECN-631558

| 15. Design Verification Required | 16. Cost Impact | | | | 17. Schedule Impact (days) | |
|---|---|---|---|---|---|---|
| | ENGINEERING | | CONSTRUCTION | | | |
| [ ] Yes | Additional | [ ] $ | Additional | [ ] $ | Improvement | [ ] |
| [X] No | Savings | [ ] $ | Savings | [ ] $ | Delay | [ ] |

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

| | | | | | |
|---|---|---|---|---|---|
| SDD/DD | [ ] | Seismic/Stress Analysis | [ ] | Tank Calibration Manual | [ ] |
| Functional Design Criteria | [ ] | Stress/Design Report | [ ] | Health Physics Procedure | [ ] |
| Operating Specification | [ ] | Interface Control Drawing | [ ] | Spares Multiple Unit Listing | [ ] |
| Criticality Specification | [ ] | Calibration Procedure | [ ] | Test Procedures/Specification | [ ] |
| Conceptual Design Report | [ ] | Installation Procedure | [ ] | Component Index | [ ] |
| Equipment Spec. | [ ] | Maintenance Procedure | [ ] | ASME Coded Item | [ ] |
| Const. Spec. | [ ] | Engineering Procedure | [ ] | Human Factor Consideration | [ ] |
| Procurement Spec. | [ ] | Operating Instruction | [ ] | Computer Software | [ ] |
| Vendor Information | [ ] | Operating Procedure | [ ] | Electric Circuit Schedule | [ ] |
| OM Manual | [ ] | Operational Safety Requirement | [ ] | ICRS Procedure | [ ] |
| FSAR/SAR | [ ] | IEFD Drawing | [ ] | Process Control Manual/Plan | [ ] |
| Safety Equipment List | [ ] | Cell Arrangement Drawing | [ ] | Process Flow Chart | [ ] |
| Radiation Work Permit | [ ] | Essential Material Specification | [ ] | Purchase Requisition | [ ] |
| Environmental Impact Statement | [ ] | Fac. Proc. Samp. Schedule | [ ] | Tickler File | [ ] |
| Environmental Report | [ ] | Inspection Plan | [ ] | | [ ] |
| Environmental Permit | [ ] | Inventory Adjustment Request | [ ] | | [ ] |

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

| Document Number/Revision | Document Number/Revision | Document Number Revision |
|---|---|---|
| N/A | | |

20. Approvals

| Signature | Date | Signature | Date |
|---|---|---|---|
| OPERATIONS AND ENGINEERING | | ARCHITECT-ENGINEER | |
| Cog. Eng. C.S. Homi | 5/9/96 | PE | |
| Cog. Mgr. J.W. Hunt | 5/9/96 | QA | |
| QA | | Safety | |
| Safety | | Design | |
| Environ. | | Environ. | |
| Other L.L. Buckley | 5/9/96 | Other | |
| | | | |
| | | DEPARTMENT OF ENERGY | |
| | | Signature or a Control Number that tracks the Approval Signature | |
| | | ADDITIONAL | |
| | | | |

# Tank 241-S-110 Tank Characterization Plan

C. S. Homi
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: ECN-631558 UC: 2070
Org Code: 79200 Charge Code: N4G6A
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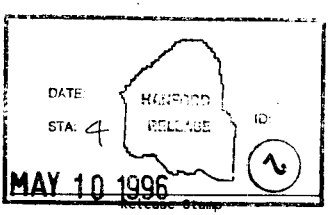
Key Words: Characterization, General Safety Issues, Specific Safety Issues, Information Requirements, Schedule

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-S-110.






Release Approval 5/9/96
Date

**Approved for Public Release**

| RECORD OF REVISION | (1) Document Number WHC-SD-WM-TP-205 | Page 1 |
|---|---|---|

(2) Title
TANK 241-S-110 TANK CHARACTERIZATION PLAN

CHANGE CONTROL RECORD

| (3) Revision | (4) Description of Change - Replace, Add, and Delete Pages | Authorized for Release | |
|---|---|---|---|
| | | (5) Cog. Engr. | (6) Cog. Mgr. Date |
| 0 | (7) EDT 604257 3/31/94 | | |
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| 1A | Replace pages 3 and 6 of REV 1; ECN 609269, 4/20/94. | | |
| 1B | Replace pages 2 and 3, ECN 621339. | | |
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| RS 1D | Revised per ECN 623942. | C.S. Homi | 5/24/94 |
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| 2 RS | Incorporate per ECN-631558. | C.S. Homi | J.W. Hunt |
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WHC-SD-WM-TP-205
Revision 2
UC-2070

# Tank 241-S-110
# Tank Characterization Plan

L. L. Buckley
Westinghouse Hanford Company

Date Published
May 1996

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

Westinghouse
Hanford Company

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Approved for Public Release

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## LIST OF TABLES

# 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-110 (S-110). It should be understood that the various needs and issues surrounding tank S-110 are evolving as new information about the tank is uncovered. As a result of this progression, this TCP 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 tank S-110. This TCP will be revised as necessary to reflect those changes or deviations. This plan reflects the best information available as of May 1996.

Tank S-110 was constructed between 1950 and 1951 and was put into service in 1952. Initially tank S-110 received waste from the Reduction Oxidation (REDOX) facility from the second quarter of 1952 until the fourth quarter of 1973. During the third and fourth quarters of 1953 the tank also received REDOX cladding waste. From the first quarter of 1954 until the third quarter of 1974, the tank received wastewater. From the first quarter of 1974 until the first quarter of 1978, the tank was filled with various wastes from BX, S, SX, T, TX and U Tank Farms and the 242-S Evaporator. The tank received partial neutralized feed waste from the second quarter of 1978 until the third quarter of 1980. The tank contains non-complexed waste, is sound, and is passively ventilated. It was removed from service and labeled inactive in 1976 (Brevick et al. 1995).

Tank S-110 currently contains waste with a total volume of 1,476 kL (390 kgal), which is equivalent to 379 cm (149 in) of waste as measured from the baseline of the tank.

Tank S-110 is not on any Watch List.

Near-term sampling and analysis activities are focused on either verifying or changing the Watch List tank status, and identifying any new safety issues. 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-110

This section identifies the various program elements, and identifies which of these programs require characterization data from tank S-110.

## 2.1 GENERAL SAFETY ISSUES

The *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995) describes the sampling and analytical requirements that are used to screen waste tanks for unidentified safety issues. Analytical requirements for the safety screening of a tank are energetics, total alpha activity, moisture content, density, and flammable gas concentration.

## 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

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

### 2.2.5 Vapor

All 177 underground tanks must be vapor-sampled for organic solvent screening as per *Recommendation 93-5 Implementation Plan* (DOE-RL 1996). Some tanks may require additional vapor sampling due to other program needs. These tanks 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 exhauster permit requirements); (2) tanks on the Organic or Ferrocyanide Watch Lists; (3) tanks in C farm; and (4) tank 241-BX-104, due to vapor exposure. Information needs must satisfy *Data Quality Objectives for Tank Hazardous Vapor Safety Screening* (Osborne and Buckley 1995), and for rotary mode only, *Rotary Core Vapor Sampling Data Quality Objective* (Price 1994), and *Data Quality Objective for Regulatory Requirements for Hazardous and Radioactive Air Emissions Sampling and Analysis* (Mulkey and Markillie 1995) as amended by *Status of the Current Understanding of the Toxic Air Pollutants (TAPS) and Hanford Tank Farm Vapor Space Characterization; Recommended Path Forward and Justification for Continued RMCS Exhauster Operations* (Laws 1996).

Tank S-110 was vapor sampled in December 1995 in support of Osborne et al. (1994).

### 2.2.6 Criticality

No information separate from that for the general safety issue of tank S-110 are currently identified for this program element. However, if the general safety screening of tank S-110 identifies a potential criticality concern, analyses for fissile materials and neutron sorbers and poisons will be performed as identified in the safety screening data quality objective (DQO).

## 2.3 CONTINUING OPERATIONS

### 2.3.1 Compatibility/Stabilization

Tank S-110 waste will be sampled to determine compatibility. Sampling and analysis requirements must be performed as per *Data Quality Objectives for the Waste*

*Compatibility Program* (Fowler 1995). The analyses employed will be used to quantify transuranics such as $^{239}Pu$ and $^{241}Am$, Total Organic Content (TOC), and heat generation (as determined by the amount of $^{90}Sr$ and $^{137}Cs$.

### 2.3.2 Evaporator

This section does not apply to tank S-110.

## 2.4 DOUBLE-SHELL TANK WASTE ANALYSIS PLAN

This section does not apply because tank S-110 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-110.

### 2.5.2 Pretreatment/Vitrification

Tank S-110 has been identified as a bounding tank for pretreatment/disposal process development strategy (Kupfer el al. 1995). The strategy only requires that sample material be made available via archive samples and does not require any specific analyses to be done on the samples.

## 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-110 has been identified as a primary bounding tank for high level REDOX waste and saltcake waste types. All single-shell tanks were prioritized in the *Tank Waste Characterization Basis* (Brown et al. 1995) document using the Historical DQO .

# 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. Prior to rotary sampling it is necessary to vapor sample the tank per the requirements of *Rotary Core Vapor Sampling Data Quality Objective* (Price 1994).

## 4.0 PRIORITY OF INFORMATION REQUIREMENTS

Vapor sampling was completed in December 1995. Grab sampling was completed in March 1996. Rotary mode core sampling was scheduled to begin in March 1996 but has been delayed for operational reasons (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 Layer 93-5 Vapor Issue<br>-Rotary Mode Sampling DQO<br>-Hazardous Vapor DQO | Steel canisters, Triple Sorbent Traps, Sorbent Trap Systems | Flammable Gas<br>Organic Vapors<br>Permanent Gases |
| Rotary Mode Core Sampling | -Safety Screening DQO<br>-Historical Model DQO | Core samples from 2 risers separated radially to the maximum extent possible<br><br>Combustible gas measurement | Flammability, Energetics, Moisture, Total alpha activity, Density, Anions, Metals, Radionuclides, Total Organic Carbon |
| Grab Sampling | -Compatibility DQO | 3 grab samples. | Energetics, Moisture, Anions, Cations, Radionuclides, Specific gravity, pH, Separable Organics, Total Organic Carbon, Total Inorganic Carbon, Percent Solids |

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

## 5.0 WHEN INFORMATION WILL BE AVAILABLE

According to Stanton (1996) data are expected to be available from the grab sampling event for tank S-110 in July 1996. Since rotary mode core sampling is not yet authorized, data can not be expected until approximately 105 days after sampling actually occurs. Data are available from the December 1995 vapor sampling.

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