

ENGINEERING CHANGE NOTICE

0050778

1. ECN 653808

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Proj. ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. Duc M. Nguyen, Data Assessment and Interpretation, R2-12, 372-3042	4. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Date 05/26/99	
	6. Project Title/No./Work Order No. Tank 241-AP-107	7. Bldg./Sys./Fac. No. 241-AP-107	8. Approval Designator N/A	
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-SD-WM-ER-362, Rev. 1-B	10. Related ECN No(s). ECNs: 635439, 635522, 644496	11. Related PO No. N/A	

12a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 12b) <input checked="" type="checkbox"/> No (NA Blks. 12b, 12c, 12d)	12b. Work Package No. N/A	12c. Modification Work Complete N/A Design Authority/Cog. Engineer Signature & Date	12d. Restored to Original Condition (Temp. or Standby ECN only) N/A Design Authority/Cog. Engineer Signature & Date
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13a. Description of Change
 This ECN has been generated in order to update the document to reflect results of recent data/information evaluation.

13b. Design Baseline Document? Yes No

Replace pages:
 2-1, 2-2, 5-1, and 5-2

14a. Justification (mark one)

Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

14b. Justification Details

A tank characterization report page change revision is required to reflect the results of recent evaluation of data/information pertaining to adequacy of tank sampling for safety screening purposes (Reynolds et al. 1999, Evaluation of Tank Data for Safety Screening, HNF-4217, Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington).

15. Distribution (include name, MSIN, and no. of copies)
 See attached distribution.

RELEASE STAMP

DATE: MAY 27 1999

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Tank Characterization Report for Double-Shell Tank 241-AP-107

Duc M. Nguyen
Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract 8023764-9-K001

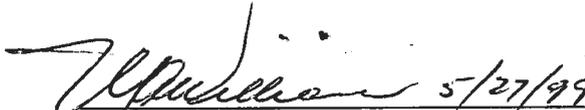
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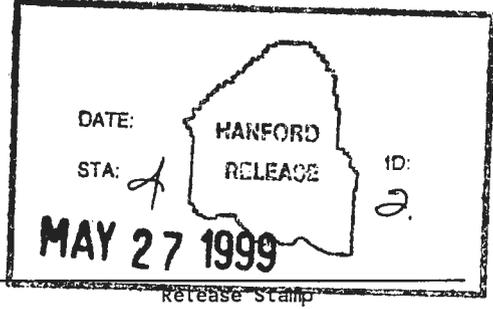
Key Words: Waste Characterization, Double-Shell Tank, DST, Tank 241-AP-107, Tank AP-107, AP-107, AP Farm, Tank Characterization Report, TCR, Waste Inventory, TPA Milestone M-44

Abstract: N/A

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2.0 RESPONSE TO TECHNICAL ISSUES

The technical issue identified for tank 241-AP-107 (Brown et al. 1996) is:

- **Safety Screening:** Does the waste pose or contribute to any recognized potential safety problems?

Data from the recent analysis of grab samples and historical information provided the means to respond to this issue. This response is detailed in the sections below. Appendix B provides sample and analysis data for tank 241-AP-107.

Before the May and June 1995 transfer, the evaporator DQO (Von Bargen 1995) and compatibility DQO (Fowler 1995) applied to tank 241-AP-107. The evaporator DQO no longer applies because no additional waste is currently available for transfer to the 242-A Evaporator. The compatibility DQO no longer applies because compatibility analyses were completed and approved before the tank transfer. As a result, these issues are not addressed in this report.

2.1 SAFETY SCREENING

The data needed for screening the waste in tank 241-AP-107 for potential safety problems are documented in *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995). These potential safety problems include exothermic conditions in the waste, flammable gases in the waste and/or tank headspace, and criticality conditions in the waste. Each condition is addressed separately. The sampling and analytical results are considered sufficient to address the data needs specified in the DQO (Reynolds et al. 1999).

2.1.1 Exothermic Conditions (Energetics)

The first requirement in the safety screening DQO (Dukelow et al. 1995) is to ensure there are not sufficient exothermic constituents (organic or ferrocyanide) to cause a safety hazard. Because of this requirement, energetics in the tank 241-AP-107 waste were evaluated. The threshold limit for energetics is 480 J/g on a dry weight basis. No exothermic reaction was detected in any sample.

2.1.2 Flammable Gas

Testing for flammability in the headspace of tank 241-AP-107 was not required at the time of sampling and flammable gas data are not available. However, the lower flammability limit (LFL) is expected to be well below the notification limit of 25 percent of the LFL because the tank is actively ventilated and radionuclide and organic concentrations are very low.

2.1.3 Criticality

The safety threshold limit for criticality is 1 g ^{239}Pu per liter of waste. Assuming that all alpha activity is from ^{239}Pu and assuming a density of less than or equal to 1.5 g/mL, 1 g/L of ^{239}Pu is greater than or equivalent to 41 $\mu\text{Ci/g}$ of alpha activity. The density of the waste was 1.01 g/mL, and the alpha results were well below this limit. The maximum result for total alpha was $<9.31\text{E-}04 \mu\text{Ci/mL}$ ($<9.4\text{E-}04 \mu\text{Ci/g}$). Because all results were below analytical detection limits and duplicate samples were not obtained, a 95 percent confidence interval was not calculated.

2.2 OTHER TECHNICAL ISSUES

A factor in assessing tank safety is heat generation from radioactive decay. The tank heat load calculated from the best-basis inventory data of Section 3.0 was 5.72 W (19.5 Btu/hr) (see Table 2-1). This is well below the 20,500-W (70,000-Btu/hr) operating specification limit for double-shell tanks (Harris 1994).

Table 2-1. Tank 241-AP-107 Radionuclide Inventory and Projected Heat Load.

Radionuclide	Projected Inventory (Ci)	Decay Heat Generation Rate (W/Ci)	Decay Heat Generation (W)
^{137}Cs	1,195	0.00472	5.64
$^{89/90}\text{Sr}$	12.5	0.00669	0.08
^{99}Tc	0.20	5.01E-04	0
Total Watts			5.72

2.3 SUMMARY

Most tank contents were transferred in May and June 1995, leaving only 83 kL (22 kgal) of waste. The analytical results of grab samples taken January and February 1995 from all analyses addressing potential safety issues showed no primary analyte exceeded safety decision threshold limits (see Table 2-2).

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