

ENGINEERING CHANGE NOTICE

0050773

1. ECN 653817

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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. Juergen H. Rasmussen, Data Assessment and Interpretation, R2-12, 373-1128	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-B-110	7. Bldg./Sys./Fac. No. 241-B-110	8. Approval Designator N/A	
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-SD-WM-ER-368, Rev. 1-B	10. Related ECN No(s). ECNs: 635435, 635526, 649882	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 <hr/> Design Authority/Cog. Engineer Signature & Date	12d. Restored to Original Condition (Temp. or Standby ECN only) N/A <hr/> 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.  
 Replace pages:  
 2-1, 2-2, 5-1, and 5-2

13b. Design Baseline Document?  Yes  No

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)  
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# Tank Characterization Report for Single-Shell Tank 241-B-110

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

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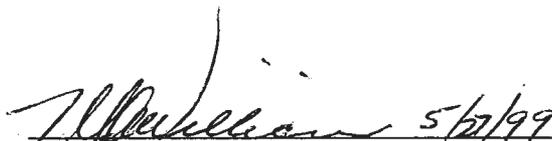
Key Words: Waste Characterization, Single-Shell Tank, SST, Tank 241-B-110, Tank B-110, B-110, B Farm, Tank Characterization Report, TCR, Waste Inventory, TPA Milestone M-44

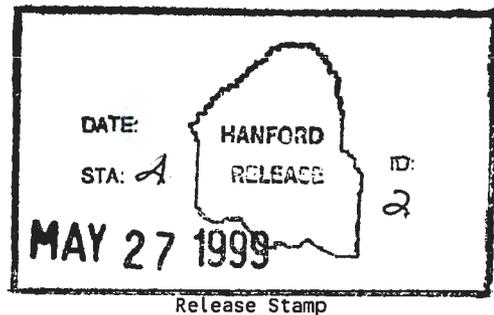
Abstract: N/A

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## 2.0 RESPONSE TO TECHNICAL ISSUES

The following technical issues have been identified for tank 241-B-110 (Brown et al. 1996). The issues are as follows:

- **Safety Screening:** Does the waste pose or contribute to any recognized potential safety problems?
- **Vapor Screening:** 1) Are there flammable gases in the tank headspace above the 25 percent lower flammability limit (LFL)? 2) Does an organic solvent pool exist in the waste that may cause an organic solvent pool fire or ignition of organic solvents entrained in the waste solid?

In addition to the above issues, tank 241-B-110 was selected (Brown 1996) to be under the scope of Pretreatment (process testing sludge) Studies.

Data from the analysis of seven core samples retrieved in 1989, tank headspace flammability measurements taken in 1996, and historical information provide the means to respond to the safety screening issue.

Procedures used in the 1989 sampling and analyses effort are documented in the *Waste Characterization Plan for the Hanford Site Single-Shell Tanks* (Winters et al. 1990). Because the 1989 sampling of the tank 241-B-110 predated DQOs, a specific tank characterization plan or tank sampling and analysis plan was not prepared.

### 2.1 SAFETY SCREENING

The *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995) documents the requirements for screening waste and headspace in a tank for potential safety problems. These potential safety problems are exothermic conditions in the waste, criticality conditions in the waste, and flammable gases in the tank headspace.

The following sections address these safety problems and examine results from the August 1989 sample analysis of tank 241-B-110 with the current data requirements documented in the safety screening DQO. The safety screening DQO was not in effect during the time tank 241-B-110 was sampled and analyzed (see Appendix B). However, the sampling and analyses were sufficient to satisfy the safety screening requirements (Reynolds et al. 1999).

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### 2.1.1 Exothermic Conditions (Energetics in the waste)

The first requirement of the safety screening DQO (Dukelow et al. 1995) was to ensure the concentration of exothermic constituents (organic or ferrocyanide) in tank 241-B-110 was too low to cause a safety hazard. The current safety screening DQO requires that the waste sample profile be tested for energetics every half segment (24 cm or 9.5 in.) to determine whether the energetics exceed the safety threshold limit. The threshold limit for energetics is 480 J/g of sample on a dry weight basis.

No exothermic reactions were observed in any composite samples during the differential scanning calorimetry (DSC) analyses. Because the current safety screening DQO was not in effect when tank 241-B-110 samples were analyzed, the samples were not analyzed for energetics in half segments. However, sampling and analyses were sufficient to satisfy safety screening (Reynolds et al. 1999).

Samples from the first segment were not used in making composite samples because of incomplete recovery of the first segment. No separate DSC analyses were done in first segments.

### 2.1.2 Criticality

Criticality screening is performed by measuring total alpha activity and assuming that all detected alpha is from  $^{239}\text{Pu}$ . The safety threshold limit given in the safety screening DQO is 1 gram of  $^{239}\text{Pu}$  per liter of waste. Using the bulk density (1.35 g/ml) of waste in tank 241-B-110, 1 g of  $^{239}\text{Pu}$  per liter is equal to a total alpha activity of 46  $\mu\text{Ci/g}$ . Composites and some segments were analyzed for total alpha activity. Total alpha detected in all samples was well below the threshold limit. From composite analyses, the overall tank mean for total alpha activity was 0.155  $\mu\text{Ci/g}$  (equal to 0.0034 g of  $^{239}\text{Pu}$  per liter). From segment analyses, the overall tank mean for total alpha activity was 0.160  $\mu\text{Ci/g}$  (equal to 0.0035 g of  $^{239}\text{Pu}$  per liter). Therefore, criticality is not an issue for this tank.

### 2.1.3 Flammable Gas

The third potential safety problem in the tank is the presence of flammable gas in the tank headspace. Headspace gas measurements were taken in the field in April 1996. Results indicated no flammable gas was in the headspace (0 percent of the LFL).

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