



**Department of Energy**  
Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

98-SCD-010

JAN 27 1998

The Honorable John T. Conway  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, N.W., Suite 700  
Washington, D.C. 20004

Dear Mr. Chairman:

TRANSMITTAL OF THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB)  
RECOMMENDATION 93-5 IMPLEMENTATION PLAN (IP) QUARTERLY REPORT FOR OCTOBER  
THROUGH DECEMBER 1997

The DNFSB 93-5 Quarterly Report for October through December 1997 is attached. This quarterly report addresses issues and milestones as presented in the Recommendation 93-5 IP, Revision 1.

The U.S. Department of Energy, Richland Operations Office staff completed several significant technical achievements during this quarter. The Notice of Construction (NOC) to support Rotary Mode Core Sampling (RMCS) in SX Tank Farm was submitted to the State of Washington Department of Health on October 17, 1997. The NOC was approved and RMCS operation resumed on a high priority, flammable gas watchlist tank (Tank 241-SX-101) on December 4, 1997.

Three DNFSB milestones: 1) 5.4.3.6b, "Letter reporting completion of Tank C-106 retrieval safety assessment"; 2) 5.6.3.1e, "Letter reporting verification of headspace homogeneity and evaluation of variations in headspace vapor concentrations in passively ventilated tanks with changing atmospheric temperatures"; and 3) 5.6.3.1f, "Standard inventory estimates for all tanks" were completed and submitted during this quarter.

A Tier I review on the Revised Organic Solvent Topical Report has been completed. Further review by the Chemical Reaction Sub-Tank Advisory Panel and a Tier II review are anticipated to be completed by the end of March 1998. This topical report will provide the basis for closing the Organic Solvent Safety Issue.

If you have any questions, please contact me, or your staff may contact Jackson Kinzer, Assistant Manager for the Office of Tank Waste Remediation System, on (509) 376-7591.

Sincerely,

A handwritten signature in black ink, appearing to read "John D. Wagoner".

John D. Wagoner  
Manager

SCD:WSL

Attachment

cc w/attach:

J. M. Owendoff, EM-2  
C. A. Peabody, EM-4  
R. E. Erickson, EM-38  
K. T. Lang, EM-38  
M. B. Whitaker, S-3.1

**ATTACHMENT**

**DNFSB 93-5 QUARTERLY REPORT  
October 1 to December 31, 1997**

**Consisting of 17 Pages,  
Including this Cover Sheet**

## EXECUTIVE SUMMARY

The highlights for this quarter were resumption of Rotary Mode Core System (RMCS) operation during December 1997 in the SX Tank Farm, the reporting of three milestones to DNFSB as complete, and significant progress toward issuing the Organic Solvent Topical Report. The current issues discussed are the status of the two milestones related to the sampling of the High Priority Tanks (HPT), status of the High Heat Safety Issue milestones, and polychlorinated biphenyl (PCB) concerns at the 222-S Laboratory.

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**DNFSB 93-5 QUARTERLY REPORT, OCTOBER 1 TO DECEMBER 31, 1997**

**1 PURPOSE**

This quarterly report covers High Level Waste Tank Characterization activities at the Hanford Site related to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-5 during the period October 1 to December 31, 1997. The Recommendation dealt with insufficient technical information to ensure safe storage, operation, retrieval, and disposal of the Hanford high-level tank wastes in both single and double-shell tanks. An Implementation Plan responding to Recommendation 93-5 was transmitted to the DNFSB by the Secretary of Energy in January 1994. The plan was accepted by the DNFSB on March 25, 1994. On June 17, 1996, Revision 1 to the Implementation Plan was submitted to the DNFSB. Revision 1 was accepted by the DNFSB on September 4, 1996 with comments.

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2 QUARTERLY HIGHLIGHTS

2.1 Milestones Submitted

2.1.1 5.4.3.6b, Letter reporting completion of tank C-106 retrieval safety assessment, October 3, 1997.

2.1.2 5.6.3.1e, Letter reporting verification of headspace homogeneity and evaluation of variations in headspace vapor concentrations in passively ventilated tanks with changing atmospheric temperatures, October 22, 1997.

2.1.3 5.6.3.1f, Standard inventory estimates for all tanks, October 31, 1997.

2.2 Resumption of Rotary Core Drilling - Rotary Mode Core System (RMCS) operation was resumed in December 1997. The Washington State Department of Health (DOH) has approved a modification to the SX Farm Exhauster air emissions permit, and this allowed commencement of RMCS operations in the SX Farm. The RMCS portable exhauster stack has been designated a Washington Administrative Code (WAC) "major stack" by DOH. This designation places additional stack monitoring requirements on the portable exhauster that requires modifications for compliance. Design and material procurement for these modifications have been completed and the modifications are in progress.

2.3 Organic Solvent Topical Report - A revision to the Organic Solvent topical report has been completed by the contractor and is in review by the Department of Energy (DOE). A Tier I review has been completed. Further reviews by the Chemical Reaction SubTAP and a Tier II review are anticipated to be completed during the January to March 1998 quarter. When approved, this topical report will provide the basis for closing the Organic Solvent Safety Issue.

2.4 Tank C-202 Special Grab Sample - A grab sample was obtained from Tank C-202 using a sample bottle with small metal tabs over the opening that allowed material into the sampler, but not out. This innovative sample device was necessary because of the small volume and fluffy consistency of the tank waste. Analysis of material from this tank and from tank C-201 is critical to resolution of the organic complexant Unreviewed Safety Question.

2.5 Tanks Sampled - During this quarter four tanks were core sampled, six tanks were grab sampled, ten tanks were Type 4 vapor sampled, monthly vapor grab samples at the Standard Hydrogen Monitoring System (SHMS) cabinet, and one tank was auger sampled.

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3 CURRENT ISSUES

- 3.1 HPT Milestones Completion Delayed - Delays in rotary core sampling, discussed in previous quarterly reports, have made completion of the High Priority Tank sampling required to complete Milestones 5.5.6.1a, "Letter reporting completion of *Tank Waste Characterization Basis* (Brown et al. 1995, 1996) High Priority Tanks sampling and analysis for the Disposal Program," due March 1998, and 5.6.3.1g, "Letter reporting completion of *Tank Waste Characterization Basis* (Brown et al. 1995, 1996) High Priority Tanks sampling and analysis," also due March 1998, more difficult. Although not all HPTs have been sampled, many Non-HPT tanks were sampled and provided the same information expected from the HPTs. A document is being prepared that demonstrates that the information needs to be satisfied by HPT sampling, outlined in the Recommendation 93-5 Implementation Plan, have been obtained. This document will be submitted in March 1998 to document completion of these two milestones. This alternate approach has been discussed with DNFSB staff members.
- 3.2 High Heat Safety Issue Milestones - The final design and construction of the retrieval and transfer systems for Tank C-106 was delayed until approval of the Safety Assessment to eliminate the risk of potential rework resulting from safety assessment changes. This rebaselining of the project will delay commencement of C-106 retrieval until September 1998. Resolution of the High Heat Safety Issue (after retrieval of C-106) is now estimated to be completed in September 1999.
- 3.3 PCB Concerns at 222-S Laboratory - A concern exists that the liquid waste from the laboratory may contain PCBs. Transfers of 222-S laboratory process waste liquids have been suspended while this issue is reviewed. EPA has given approval to transfer the first tank of waste. However, a certification issue for the new transfer line from 222-S Laboratory to SY-102 is currently delaying the transfer. Storage capacity at the laboratory to retain liquids remains adequate (for the next 90 days) while this issue is being resolved.



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4 STATUS OF REVISION 1 MILESTONES OVERDUE, DUE WITHIN SIX MONTHS, OR COMPLETED DURING THE REPORTING QUARTER

4.1 Safe Storage of Tank Wastes and Safe Operation of Tank Farms

Commitment

Number

5.4.3.1 TWRS Manage Tank Waste Function Authorization Basis

Statement: Upgrade the Authorization Basis for the TWRS Manage Tank Waste Function

Responsible Manager: Assistant Manager, TWRS

Applicable facilities and programs: TWRS

Milestone deliverables/due dates:

d. **Approved FSAR.**

Due Date: June 1997

Status: Overdue. Delayed by Basis for Interim Operation (BIO) revision and implementation. The milestone estimated completion date (ECD) is September 1998.

5.4.3.5 Flammable Gas

Statement: Complete analytical evaluations and steady-state vapor samples to determine which flammable gas tanks require mitigative actions. Qualify saltwell pumping and rotary-mode core sampling for flammable gas environments.

Responsible Manager: Assistant Manager, TWRS

Applicable facilities and programs: TWRS

Milestone deliverables/due dates:

d. **Letter reporting qualification of Rotary Mode Core Sampling System for use in Flammable Gas Tanks.**

Due Date: September 1996

Status: Overdue. Adoption of the BIO flammable gas controls for the RMCS controls that are not unique to the RMCS has been approved by DOE/RL. This approval resolves those startup issues related to the authorization basis. Rotary core drilling was commenced during December in the SX Tank Farm following resolution of the SX Farm exhauster air permit issues with the Washington State Department of Health (DOH). Letter reporting qualification was issued January 7, 1998.

5.4.3.6 High Heat

Statement: Retrieve wastes from tank C-106

Responsible Manager: Assistant Manager, TWRS

Applicable facilities and programs: TWRS

Milestone deliverables/due dates:

b. **Letter reporting completion of tank C-106 retrieval safety assessment.**

Due Date: July 1997

Status: Complete. Letter report submitted to DNFSB on October 3, 1997

c. **Letter reporting initiation of tank C-106 waste retrieval.**

Due Date: October 1997

Status: Overdue. Equipment modifications were delayed until the safety assessment was approved. ECD is November 1998.

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- d. **Letter reporting completion of topical report to resolve the High Heat Safety Issue.**

Due Date: May 1998

Status: Behind schedule. ECD is December 1999.

4.2 Disposal Program Data Requirements

5.5.6.1 Disposal Program Characterization

**Statement:** Complete sampling and analysis of *Tank Waste Characterization Basis* (Brown et al. 1995) tanks for disposal.

**Responsible Manager:** Assistant Manager, TWRS

**Applicable Facilities and Programs:** TWRS

**Milestone deliverables/due date:**

- a. **Letter report completion of *Tank Waste Characterization Basis* (Brown et al. 1995) High Priority Tanks sampling and analysis for the Disposal Program.**

Due Date: March 1998

Status: Behind schedule. Delays in rotary core sampling have prevented sampling all HPTs. The information to satisfy this milestone has been obtained by sampling both HPTs and other tanks. A document evaluating that the information needed for this milestone has been obtained will be submitted in March 1998 to propose closure of this milestone.

4.3 Technical Basis for Characterization

5.6.3.1 Complete Tank Waste Characterization Basis Sampling and Analysis

**Statement:** Complete the sampling and analysis specified by the Tank Waste Characterization Basis (approximately 28 tanks) to provide the highest priority information requested by the programmatic DQOs.

**Responsible Manager:** Assistant Manager, TWRS

**Applicable facilities and programs:** TWRS

**Milestone deliverables/due dates:**

- e. **Letter reporting verification of headspace homogeneity and evaluation of variations in headspace vapor concentrations in passively ventilated tanks with changing atmospheric temperatures.**

Due Date: October 1997

Status: Complete. Letter report submitted to DNFSB on October 22, 1997.

- f. **Standard inventory estimates for all tanks.**

Due Date: November 1997

Status: Complete. Letter report submitted to DNFSB on October 31, 1997

- g. **Letter report completion of *Tank Waste Characterization Basis* (Brown et al. 1995) High Priority Tanks sampling and analysis.**

Due Date: March 1998

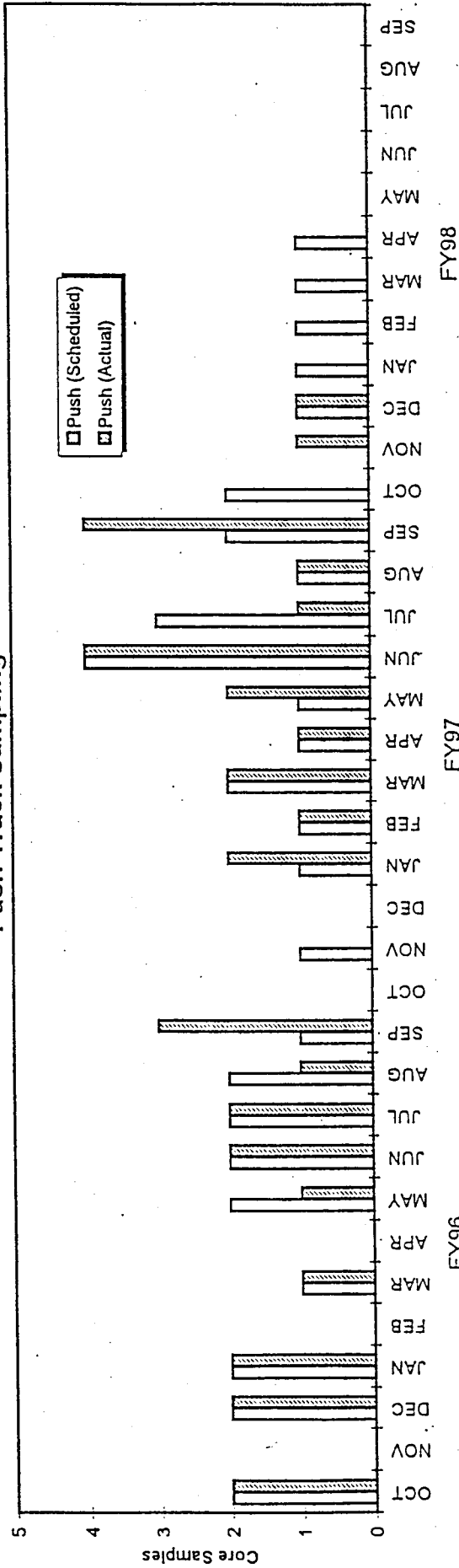
Status: Behind schedule. Delays in rotary core sampling have prevented sampling all HPTs. The information to satisfy this milestone has been obtained by sampling both HPTs and other tanks. A document evaluating that the information needed for this milestone has been



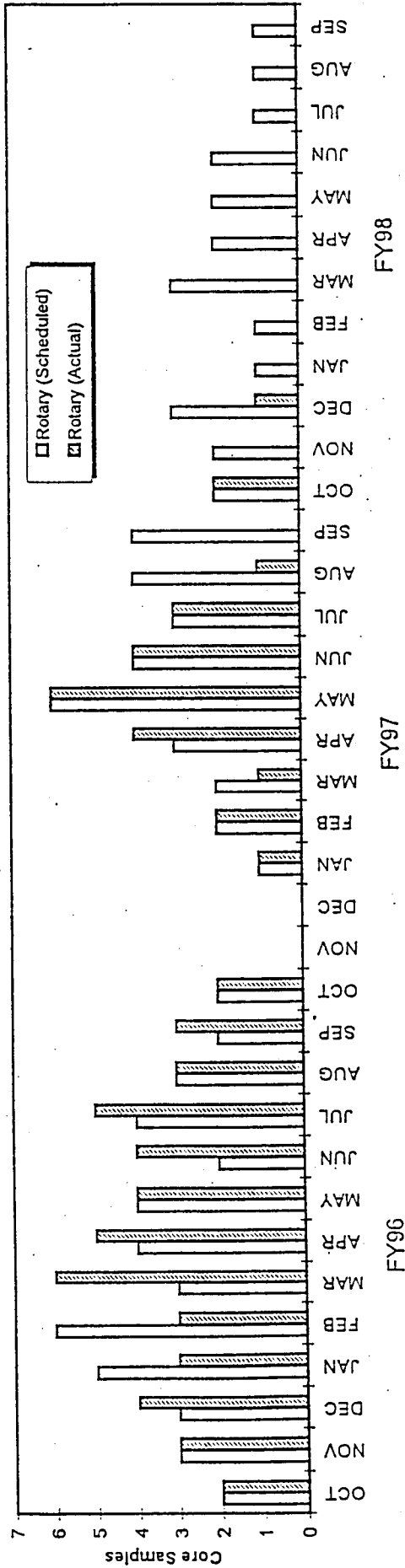
# Characterization

## Push and Rotary Sampling

### Push Truck Sampling



### Rotary Truck Sampling

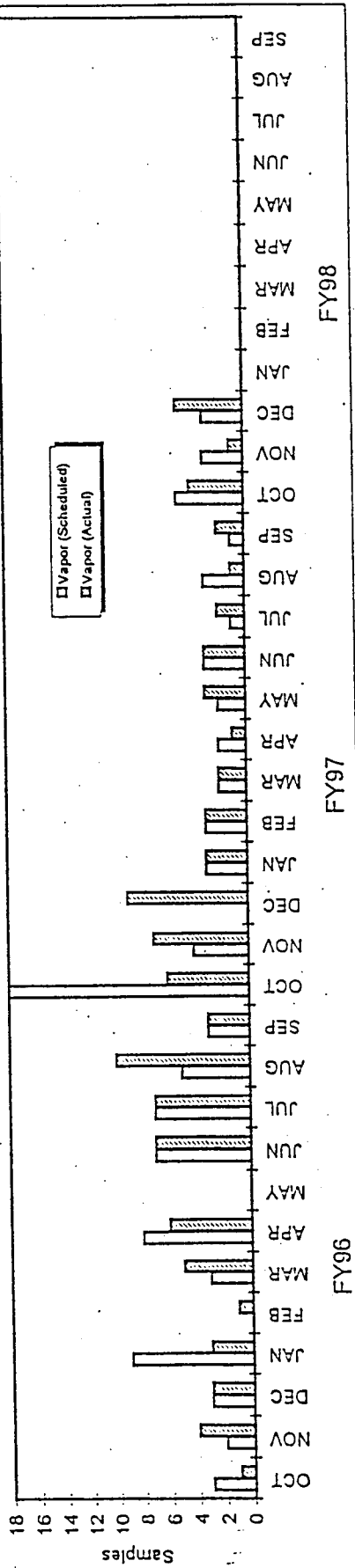


# Characterization

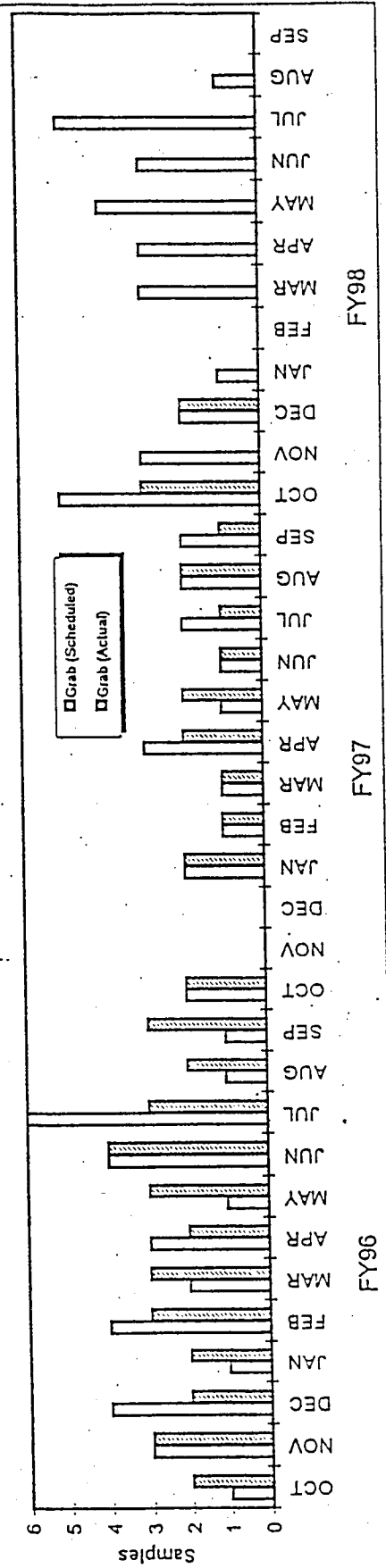
## Vapor and Grab Sampling



Vapor Sampling



Grab Sampling



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6.4 Sampling Schedule for Second Quarter FY 1998 (January through March 1998)

<u>TITLE</u>	<u>Early Start</u>	<u>Early Finish</u>
U-103 Vapor Tracer Gas Study	11/6/97	2/11/98
AX-101 Push Samples 2 Segments 15 High Priority	12/3/97	1/9/98
AW-106 Grab Sample	1/5/98	1/7/98
U-106 Vapor Tracer Gas Study	1/5/98	3/30/98
U-111 Vapor Tracer Study	1/5/98	3/30/98
U-102 Vapor Tracer Gas Study	1/5/98	3/30/98
Vapor SHMS Grab Samples	1/5/98	1/23/98
SX-101 Rotary Sample 1 Seg 9 High Priority	1/6/98	1/21/98
TX-104 Vapor Tracer Gas Study	1/8/98	2/11/98
AY-102 Grab Sample	1/14/98	1/16/98
AX-101 Vapor Tracer Gas Study	1/15/98	1/28/98
C-104 Vapor Tracer Gas Study	1/22/98	4/16/98
AW-102 Grab Sample	1/23/98	1/27/98
S-102 Push Samples 1 Seg 11	1/28/98	2/10/98
U-244 Vapor Tracer Gas Study	1/29/98	4/23/98
Vapor SHMS Grab Samples	2/2/98	2/20/98
S-302 Grab Sample Compatibility	2/3/98	2/5/98
TX-104 Rotary Samples 2 Segments 2	2/9/98	3/13/98
AN-102 Grab Sample 2 Privatization	2/12/98	2/18/98
SX-105 Rotary Samples 2 Segments 13	2/12/98	3/18/98
AY-101 Grab Sample- (Caustic Verification)	2/26/98	3/2/98
SX-102 Rotary Samples 2 Segments 11	2/27/98	4/1/98
Cone Penetrometer Cold Test	3/2/98	4/24/98
Vapor SHMS Grab Samples	3/2/98	3/20/98
SY-102 Grab Sample Compatibility	3/9/98	3/11/98
AW-105 Grab Sample	3/18/98	3/20/98
S-111 Push Sample 1 Seg 11	3/19/98	4/1/98
TX-118 Rotary Samples 2 Segment 6 High Priority	3/23/98	4/23/98
AP-103 Grab Sample	3/27/98	3/31/98

6.5 List of Tank Sampling and Analysis Plans Issued during the Quarter

<u>Tank</u>	<u>Number</u>	<u>Rev</u>	<u>Date</u>
AW-104	HNF-SD-WM-TSAP-139 (Push Mode)	0-A	10/08/97
AX-103	HNF-SD-WM-TSAP-142 (Push)	0-A	11/12/97
AX-104	HNF-SD-WM-TSAP-149 (Auger)	0	11/05/97
BY-109	HNF-SD-WM-TSAP-133 (Push Mode)	0-B	11/20/97
C-201	HNF-1521	0	10/23/97
SX-101	HNF-SD-WM-TSAP-143 (Rotary Mode)	1	12/18/97
SX-106	HNF-SD-WM-TSAP-148 (Push Mode)	0	10/06/97
		1	11/18/97
TX-104	HNF-SD-WM-TSAP-151 (Push Mode)	0	11/03/97

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<u>Tank</u>	<u>Number</u>	<u>Rev</u>	<u>Date</u>
*	HNF-SD-WM-TSAP-150 * Compatibility Grab Sampling and Analysis Plan for Fiscal Year 1998	0	10/23/97
*	WHC-SD-WM-TSAP-115 * Compatibility Grab Sampling and Analysis Plan for Fiscal Year 1997	0-K	11/26/97
*	HNF-SD-WM-TSAP-126 * Vapor Sampling and Analysis Plan	0-E	11/11/97

**6.6 List of Tank Characterization Reports Issued during the Quarter**

None

**6.7 List of Laboratory Analytical Reports Issued**

<u>Tank</u>	<u>Title</u>	<u>Number</u>	<u>Date</u>
AP-101	45-Day Safety Screening Report for Tank 241-AP-101, Grab Samples, 1AP-95-1, 1AP-95-2, 1AP-95-3, 1AP-95-4, 1AP-95-5 and 1AP-95-6	WHC-SD-WM-DP-161, Rev. 0	12/22/97
AP-103	Waste Compatibility Safety Issues and Final Results for Tank 241-AP-103 Grab Samples	HNF-SD-WM-DP-262, Rev. 0	10/3/97
AP-105	Tank 241-AP-105, Cores 208, 209 and 210 Analytical Results for the Final Report	HNF-SD-WM-DP-263, Rev. 0A	12/31/97
AP-105	Tank 241-AP-105, Cores 208, 209 and 210 Analytical Results for the Final Report	HNF-SD-WM-DP-263, Rev. 0	10/24/97
AP-106	Tank 241-AP-106, Grab Samples, 6AP-97-1, 6AP-97-2 and 6AP-97-3 Analytical Results for the Final Report	HNF-SD-WM-DP-270, Rev. 0	11/25/97
AP-107	Tank 241-AP-107, Grab Samples, 7AP-97-1, 7AP-97-2 and 7AP-97-3 Analytical Results for the Final Report	HNF-SD-WM-DP-276, Rev. 0	12/22/97
AP-108	Tank 241-AP108, Grab Samples, 8AP-97-1, 8AP-97-2, 8AP-97-3, 8AP-97-4 and 8AP-97-5 Analytical Results for the Final Report	HNF-SD-WM-DP-274, Rev. 0	12/9/97
AW-104	Tank 241-AW-104, Cores 204 and 206 Analytical Results for the Final Report	HNF-SD-WM-DP-264, Rev. 0	10/9/97
AX-101	Tank 241-AX-101, Grab Samples, 1AX-97-1 through 1AX-97-3 Analytical Results for the Final Report	HNF-SD-WM-DP-268, Rev. 0	11/14/97
B-107	Tank 241-B-107, Cores 217 and 218 Analytical Results for the Final Report	HNF-SD-WM-DP-269, Rev. 0	11/18/97
BY-108	60 Day Safety Screening and Ferrocyanide Results for Tank 241-BY-108	WHC-SD-WM-DP-145, Rev. 0	10/23/97
BY-109	Tank 241-BY-109, Cores 201 and 203 Analytical Results for the Final Report	HNF-SD-WM-DP-259, Rev. 0	11/20/97
T-105	Tank 241-T-105, Cores 205 and 207 Analytical Results for the Final Report	HNF-SD-WM-DP-265, Rev. 0	10/21/97
T-109	Final Report for Tank 241-T-109, Auger Samples 95-AUG-040 and 95-AUG-041	WHC-DS-WM-DP-144, Rev. 1	12/7/97

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<u>Tank</u>	<u>Title</u>	<u>Number</u>	<u>Date</u>
T-110	Waste Compatibility Safety Issues and Final Results for Tank 241-T-110 Push Mode Samples	HNF-SD-WM-DP-238, Rev. 0B	10/14/97
U-103	Tank 241-U-103, Cores 175, 176 and 182 Analytical Results for the Final Report	HNF-SD-WM-DP-230, Rev. 0A	12/2/97
U-112	Tank 241-U-112, Cores 219 and 220 Analytical Results for the Final Report	HNF-SD-WM-DP-271, Rev. 0	11/4/97

6.8 Table of DNFSB 93-5 Implementation Plan Revision 1 Commitments Status

<u>Number</u>	<u>Description</u>	<u>Due Date</u>	<u>Submitted to DNFSB</u>
5.4.3.1a	Comprehensive Source Terms Report	6/30/96	6/30/96
5.4.3.1b	Report on Lightning Evaluation	8/31/96	8/30/96
5.4.3.1c	Approved BIO	12/31/96	12/30/96
5.4.3.1d	Approved FSAR.	6/30/97	
5.4.3.2a	Topical Report on Resolution of Ferrocyanide Safety Issue.	1/31/97	9/23/96
5.4.3.3a	Supporting Technical Document on Organic Complexant Safety Issue	12/31/96	6/27/97
5.4.3.3b	Confirm Safe Storage Criteria, and Organic Solubility and Aging Effects on Fuel Content	11/30/98	
5.4.3.4a	Safety Assessment Covering Pool and Entrained Organic Solvent Fires	10/31/96	10/21/96
5.4.3.4b	Organic Speciation of Core Samples for BY-108 and BY-110, and Auger Samples for C-102.	10/31/96	10/31/96
5.4.3.4c	Supporting Technical Document for Organic Solvent Safety Issue.	12/31/96	12/23/96
5.4.3.4d	Vapor Sampling of all SSTs.	12/31/99	
5.4.3.4e	Adequate Vent Path in All SSTs Suspected of Containing Organic Solvents	4/30/00	
5.4.3.4f	Letter Reporting Completion of Vapor Sampling of All DSTs.	12/31/00	
5.4.3.5a	Analyses to Determine If Additional Tanks Have Potential to Exceed 25% of the LFL.	6/30/96	6/28/96
5.4.3.5b	Gas Monitoring Instrumentation Upgrade Needs for Additional Tanks with the Potential to Exceed 25% of the LFL.	8/31/96	8/19/96
5.4.3.5c	Safety Assessment for Rotary Mode Core Sampling in Flammable Gas Tanks	9/30/96	9/27/96
5.4.3.5d	Qualification of Rotary Mode Core Sampling System for Use in Flammable Gas Tanks.	9/30/96	
5.4.3.5e	Safety Assessment for Saltwell Pumping in Flammable Gas Tanks	10/31/96	10/31/96
5.4.3.5f	Letter Reporting Completion of AN Tank Farm Ventilation Upgrade.	11/30/96	1/30/97
5.4.3.5g	Flammable Gas Safety Screening of Remaining Passively Ventilated SSTs	11/30/96	11/12/96
5.4.3.5h	Supporting Technical Document on Flammable Gas Safety Issue.	12/31/96	1/30/97
5.4.3.5i	External Equipment Spark Sources in Flammable Gas Tanks	12/31/96	12/24/96
5.4.3.5j	Voidmeter and Viscometer Readings in Tanks AN-103, AN-104, and AN-105.	12/31/96	12/18/96
5.4.3.5k	Retained Gas Sampling in Tanks AW-101, AN-103, AN-104, AN-105, and A-101.	3/31/97	3/28/97
5.4.3.5l	Refinement of Flammable Gas Generation/Retention Models	5/31/97	5/27/97
5.4.3.6a	C-106 Supernatant Sampling and Analysis.	10/31/96	10/30/96
5.4.3.6b	C-106 Retrieval Safety Assessment.	7/31/97	10/3/97
5.4.3.6c	Initiation of Tank C-106 Waste Retrieval.	10/31/97	

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<u>Number</u>	<u>Description</u>	<u>Due Date</u>	<u>Submitted to DNFSB</u>
5.4.3.6d	Topical Report to Resolve the High Heat Safety Issue.	5/31/98	
5.4.3.7a	Topical Report to Resolve the Criticality Safety Issue.	12/31/96	12/18/96
5.5.6.1a	Completion of High Priority Tanks Sampling and Analysis for the Disposal Program	3/31/98	
5.6.3.1a	Comparison Between Truck and Cart Vapor Sampling Systems.	9/30/96	9/27/96
5.6.3.1b	Implementation of FTIR Moisture Analysis Capability in 222-S Laboratory.	11/30/96	11/19/96
5.6.3.1c	Proposed Content and Format of Tank-by-Tank Safety Status Evaluation	1/31/97	1/30/97
5.6.3.1d	Updated HTCEs	6/30/97	6/6/97
5.6.3.1e	Verification of Headspace Homogeneity	10/31/97	10/22/97
5.6.3.1f	Standard Inventory Estimates for All Tanks.	11/30/97	10/31/97
5.6.3.1g	Completion of High Priority Tanks Sampling and Analysis.	3/31/98	
5.6.3.1h	Tank-by-Tank Safety Status Evaluation.	7/31/98	
5.6.3.1i	Update Tank Content Models	12/31/98	
5.6.3.1j	Completion of Core Sampling of All Tanks	12/31/02	