Department of Energy
Office of River Protection
P.O. Box 550
Richland, Washington 99352

99-PDD-055

JUL 2 9 1999

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 APRIL 1999 THROUGH JUNE 1999.

References:

(1) ORP letter from R. T. French to J. T. Conway, "Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-5 Implementation Plan (IP), Revision 1, Milestone 5.4.3.1d , Approved Final Safety Analysis Report (FSAR)," 99-TSD-028, dated April 6, 1999.

(2) Fluor Daniel Hanford, Inc. (FDH) letter from A. M. Umek to Carol L. Sohn, DOE RL, "Transmittal of Organic Solvent Topical Report, HNF-4240," FDH-9951845 R 1, dated March 31, 1999.

(3) ORP letter from R. T. French to J. T. Conway, DNFSB, "Completion of Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-5 Implementation Plan (IP), Revision 1, Milestone 5.4.3.4d, 'Letter Reporting Completion of Vapor Sampling of all Single Shell Tanks (SST),' 5.4.3.4e, 'Letter Reporting Adequate Vent Path in all SST Suspected of Containing Organic Solvents,' and 5.4.3.4f, 'Letter Reporting Completion of Vapor Sampling of All Double Shell Tanks (DST)," 99-PDD-023, dated April 15, 1999.

(4) ORP letter from R. T. French to J. T. Conway, DNFSB, "Defense Nuclear Facilities Safety Board (DNFSB), Recommendation 93-5 Implementation Plan (IP), Revision 1, Milestone 5.6.3.1j, Letter Reporting Completion of Core Sampling of all Tanks," 99-PDD-052, dated July 8, 1999.

The Quarterly Report for April 1999 through June 1999 is attached. This Quarterly Report addresses issues and milestones as presented in Recommendation 93-5 IP, Revision 1.

The Office of River Protection (ORP) staff has completed several significant technical achievements during this reporting period. The Final Safety Analysis Report (FSAR) , Reference (1), approved by U.S. Department of Energy, Richland Operations Office (DOE-RL) was submitted to the DNFSB on April 6, 1999. A topical report, Reference (2), provided the basis for proposing closure of three DNFSB milestones, Reference (3).

Waste sluicing operations from Tank 241-C-106 to Tank 241-AY-102 were resumed during the period April 23, 1999 to June 3, 1999. Approximately 46 inches of sludge were removed. The Tank Heat Generation Rate has been reduced to a level that can be safely dissipated by the ventilation system without regular water additions. Removal of the remaining sludge from Tank 241-C-106 is scheduled for July 1999 and August 1999.

DOE and ORP have reviewed the updated Unreviewed Safety Question (USQ) determination for Tank 241-SY-101 and safety controls for activities to mitigate the increasing hazards. Revision of the USQ was approved but the supplemental controls were not approved as supplied. A description of new controls to mitigate the increasing hazard of flammable gas accumulation and crust were provided to FDH. The concept of using mechanical agitation to release the trapped gas in the crust was proven. A plan is underway to transfer waste from Tank 241-SY-101. A Mechanical Mitigation Arm (MMA) was inserted into Tank 241-SY-101 on May 20, 1999, and again on May 26, 1999. A total of 290 cubic feet of gas was released from Tank 241-AY-101.

On July 8, 1999, a report, Reference (4), summarizing the progress made by ORP in the core sampling of 177 High-Level Waste (HLW) tanks at Hanford was submitted to the DNFSB. This report provides the basis for proposing closure by DNFSB Milestone 5.6.3.1.j, "Letter Reporting Completion of Core Sampling of all Tanks."

Sincerely,

Richard T. French

Richard T. French, Manager
Office of River Protection

PDD: WSL

Attachment

cc: See page 3

cc w/attach:
C. L. Huntoon, EM-1
C. A. Peabody, EM-4
R. E. Lightner, EM-38
K. T. Lang, EM-38
M. B. Whitaker, S-3.1
A. F. Shattuck, FDH
M. A. Payne, LMHC (w/o attach)
W. E. Ross, LMHC (w/o attach)

DNFSB 93-5 QUARTERLY REPORT, APRIL 1 TO JUNE 30, 1999

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DNFSB 93-5 QUARTERLY REPORT, APRIL 1 TO JUNE 30, 1999

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 April 1 to June 30, 1999. 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 (IP) 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 IP was submitted to the DNFSB. Revision 1, was accepted by the DNFSB on September 4, 1996, with comments.

2. QUARTERLY HIGHLIGHTS

2.1. Milestone(s) Submitted

2.2.1. 5.4.3.1d, "Approved Final Safety Analysis Report (FSAR)," forwarded on April 6, 1999.
2.2.2. 5.4.3.4d, "Letter Reporting Completion of Vapor Sampling of All Single Shell Tanks (SST)," dated April 15, 1999.
2.2.3. 5.4.3.4e, "Letter Reporting Adequate Vent Path in All SST Suspected of Containing Organic Solvents," dated April 15, 1999.
2.2.4. 5.4.3.4f, "Letter Reporting Completion of Vapor Sampling of All Double Shell Tanks (DST), dated April 15, 1999.

2.2. Waste Sample Shipments to BNFL

No sample shipments to BNFL Inc. (BNFL) were planned for this quarter. The next shipment is planned for January 2000 from Tank 241-AN-104. Planning has started for the return of testing residues from BNFL to Hanford for disposal, which is expected to begin in July 1999.

2.3. Tank Samples

Samples accomplished this quarter were: four core samples, five grab samples, three vapor samples, and the monthly vapor grab samples at the Standard Hydrogen Monitoring System (SHMS) cabinets.

2.4. Tank TX-113 Stuck Drill String

During rotary core sampling of Tank 241-TX-113 in February 1999, the sampling operation was stopped when negative downforce was encountered. The sample truck was unable to remove the drill string from the waste because it was stuck, so the truck was removed away from the tank with the drill string and final sampler still in the waste. At that time, it was suspected that the drill string had become entangled with a foreign object such as a manual tape. On June 10, 1999, a hydraulic jack was used to manually remove the drill string from the waste. After some initial resistance, the drill string came free. A video camera was deployed in the tank during this operation to attempt to determine what had caused the drill string to become stuck however no foreign objects were seen. The sample truck was re-deployed on the riser, and the sampler and drill string were recovered without further incident.

2.5. Tank 241-Z-361 Activities

Tank 241-Z-361 was vented on April 29, 1999, and a vapor sample from the tank was obtained on May 7, 1999. A camera was inserted into Tank 241-Z-361 on May 12, 1999 for a video inspection of the interior of the tank. This video inspection revealed the existence of unexpected pipes, believed to be approximately 3 7/8 inch diameter aluminum drywells, installed in several of the tank risers. On June 22, 1999, Riser G was opened and a zip cord was lowered into the aluminum pipe in that riser. The zip cord examination showed that there is approximately 12 inches of water in the bottom of that pipe. Opening and zip cord examination of two other risers with aluminum pipes in them is scheduled for July 1999.

2.6. Milestone 5.6.3.1j Core Sample All Tanks

A report, "Technical Basis for the Determination that Current Characterization Data and Processes are Sufficient to Ensure Safe Storage and to Design Waste Disposal Facilities," HNF-4232, Revision 0, dated June 23, 1999 was submitted to DNFSB on July 8, 1999. This report summarizes the progress made by the U. S. Department of Energy (DOE), Office of River Protection (ORP) of core sampling the 177 High-Level Waste (HLW) Tanks at Hanford, and provides the basis for proposing closure of DNFSB Milestone 5.6.3.1j, "Letter Reporting Completion of Core Sampling of All Tanks."

3. CURRENT ISSUES

3.1. High Heat Safety Issue Milestone

Waste sluicing operations from Tank 241-C-106 to Tank 241-AY-102, initiated in November 1998, were suspended shortly after commencing when the ventilation system exceeded the 50-parts-per-million volatile organic compounds (VOC) level specified in the Washington Department of Ecology permit. Following repair of a pipe jumper leak, a successful process test was conducted on March 7, 1999 to gather vapor emissions information. This information allowed establishing sluicing procedural limits that brought the vapor emissions within the requirement of the vapor emissions permit. Another sluicing campaign was conducted on March 28, 1999.

Sluicing Campaign 2 was conducted in multiple intervals between April 23, 1999 and June 3, 1999, resulting in the cumulative removal of approximately 46 inches of sludge from Tank 241-C-106. The tank heat generation rate has now been reduced to a level that can be safely dissipated by the ventilation system without regular water additions. Additional sluicing campaigns to remove the remaining sludge from Tank 241-C-106 are scheduled to be conducted in July and August 1999.

3.2. Tank SY-101 Level Rise

Results from the sampling activities using the void fraction instrument and retained gas core sampler have shown that the crust has a high gas content. Core samples have been obtained and laboratory tests and analysis are in progress to support future waste transfer and tank dilution activities. A detailed project plan for remediation of the surface level rise was submitted to ORP in February 1999. A revision to the Unreviewed Safety Question (USQ) on surface level rise has been prepared, along with supplemental Tank 241-SY-101 controls. ORP approved the revised USQ and description of new controls to mitigate the increasing hazard of flammable gas accumulation and crust was provided to Fluor Daniel Hanford, Inc. (FDH) on April 27, 1999.

A Mechanical Mitigation Arm (MMA) was inserted into Tank 241-SY-101 on May 20, 1999, to determine whether gas could be released from the crust by mechanical agitation. It is estimated that approximately 120 cubic feet of gas was released during this operation, and it was evident from the difficulty in rotating the MMA that the crust was much stiffer than had been expected. A second deployment of the MMA was completed on May 26, 1999, and approximately 170 cubic feet of gas was released during this operation. The concentrations of flammable gases in the tank exhaust increased for a few weeks after deployment of the MMA.

A presentation to the DNFSB staff on the status of the 241-SY-101 project was conducted in Washington DC on May 5, 1999 and with DNFSB staff from June 29 through July 1, 1999.

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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
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, AMSR
Applicable facilities and programs: ORP
Milestone deliverables/due dates:

d. Approved FSAR.
Due Date: June 1997
Status: Complete. A letter reporting this completion was sent on April 6, 1999.

5.4.3.1 Organic Solvents
Statement: Use vapor samples to identify organic solvent tanks
Responsible Manager: Assistant Manager, AMSR
Applicable facilities and programs: ORP
Milestone deliverables/due dates:

d. Letter reporting completion of vapor sampling of all SSTs.
Due Date: December 1999
Status: Complete. Letter was sent on April 15, 1999, transmitting the Organic Solvent Topical Report to the DNFSB. This Topical Report shows that solvents are present in Hanford Tanks and that the current controls are adequate to ensure that the radiological and toxicogical accident consequences are within risk evaluation guidelines, meeting the intent of this milestone.

e. Letter reporting adequate vent path in all SSTs suspected of containing organic solvents.
Due Date: April 2000
Status: Complete. Letter was sent on April 15, 1999, transmitting the Organic Solvent Topical Report to the DNFSB. This Topical Report shows that solvents are present in Hanford Tanks and that the current controls are adequate to ensure that the radiological and toxicogical accident consequences are within risk evaluation guidelines, meeting the intent of this milestone.

f. Letter reporting completion of vapor sampling of all DSTs.
Due Date: December 2000
Status: Complete. Letter was sent on April 15, 1999, transmitting the Organic Solvent Topical Report to the DNFSB. This Topical Report shows that solvents are present in Hanford Tanks and that the current controls are adequate to ensure that the radiological and toxicological accident consequences are within risk evaluation guidelines, meeting the intent of this milestone.

5.4.3.6 High Heat
Statement: Retrieve wastes from Tank 241-C-106
Responsible Manager: Assistant Manager, AMSR
Applicable facilities and programs: ORP
Milestone deliverables/due dates:

d. Letter reporting completion of topical report to resolve the High Heat Safety Issue.
Due Date: May 1998
Status: Overdue. Estimated completion date of December 1999 was previously communicated to DNFSB. Current estimated completion date is September 1999.

5. APPENDICES

5.1. Tanks Sampled during Third Quarter FY 1999 (April through June 1999)

Sample	Actual Start	Actual Finish
241-SY-101 Push Sample 1 Segments 15	10/12/98	4/14/99
241-TX-118 Rotary Samples 2 Segments 8	4/21/99	6/2/99
241-TX-113 Rotary Samples 1 Segments 11	4/6/99	4/22/99
241-AY-102 Grab Sample 241-C-106 Retrieval	4/1/99	4/1/99
241-AY-102 Grab Sample 241-C-106 Retrieval	5/6/99	5/6/99
241-AY-102 Grab Sample 241-C-106 Retrieval	6/15/99	6/16/99
241-AP-107 Grab Sample Compatibility	5/18/99	5/18/99
241-U-102 Grab Sample Compatibility (SW)	5/26/99	5/26/99
241-AY-102 Vapor SHMS Sample 241-C-106 Retrieval	4/13/99	4/13/99
241-Z-361 Vapor Sample	5/7/99	5/7/99
241-AY-102 Vapor SHMS Sample 241-C-106 Retrieval	6/18/99	6/18/99
Vapor SHMS Samples – Apr	4/14/99	4/15/99
Vapor SHMS Samples – May	5/14/99	5/21/99
Vapor SHMS Samples - Jun	6/17/99	6/18/99

5.2. Sampling Schedule for Fourth Quarter FY 1999 (July through September 1999)

Sample	Early Start	Early Finish
241-AZ-102 Push Sample 2 Segments 17	6/1/99	7/2/99
241-AW-103 Push Sample 1 Segments 10	7/6/99	8/6/99
241-AZ-101 Push Sample 2 Segments 18	7/12/99	8/12/99
241-Z-361 Push Sample 2 Segments 6	8/11/99	9/22/99
241-AW-104 Grab Sample Compatibility	7/6/99	7/8/99
241-AY-102 Grab Sample 241-C-106 Retrieval	7/13/99	7/13/99
241-AP-107 Grab Sample Evaporator	7/20/99	7/22/99
241-SY-102 Grab Sample Compatibility	7/27/99	7/29/99
241-AY-102 Grab Sample 241-C-106 Retrieval	8/10/99	8/10/99
241-S-111 Grab Sample Compatibility (SW)	8/17/99	8/19/99
241-S-109 Grab Sample Compatibility (SW)	8/24/99	8/26/99
241-AP-108 Grab Sample Operation Compatibility	9/8/99	9/10/99
Vapor SHMS Samples – Jul	7/1/99	7/22/99
Vapor SHMS Samples – Aug	8/2/99	8/20/99
Vapor SHMS Samples – Sep	9/1/99	9/22/99
241-AY-102 Vapor SHMS Sample 241-C-106 Retrieval	7/20/99	7/20/99
ER311 Vapor Sniff Sample	9/13/99	9/13/99
241-S-304 Vapor Sniff Sample	9/20/99	9/20/99
241-AZ-101 Vapor Sample (Airlift Circulator Test)	9/15/99	9/16/99
241-AZ-102 Vapor Sample (Airlift Circulator Test)	9/22/99	9/23/99

5.3. Tank Sampling and Analysis Plans Issued During the Quarter

Tank	Number	Rev	Date
241-AZ-102	HNF-4577	O	6/4/99
241-AZ-102	HNF-4577	O-A	6/15/99
241-AY-102	HNF-2958 (Grab Sampling & Analysis Plan for Waste Retrieval Sluicing System)	0-C	6/15/99
241-AP-107	HNF-3528 (Compatibility Grab Sampling and Analysis Plan for Fiscal Year 1999)	0-A	5/4/99
Various	HNF-3528 (Compatibility Grab Sampling and Analysis Plan for Fiscal Year 1999)	0-B	5/11/99

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5.4. Tank Characterization Reports Issued During the Quarter

Tank	Number	Rev	Date
241-S-102	HNF-SD-WM-ER-611	1	5/12/99
241-SX-105	N/A (Electronic Report)	N/A	5/19/99
241-S-111	N/A (Electronic Report)	N/A	6/4/99
241-U-109	N/A (Electronic Report)	N/A	6/24/99

5.5. Laboratory Analysis Reports Issued During the Quarter

Tank	Title	Number	Date
241-AW-102	Tank 241-AW-102 Grab Samples in Support of 242-A Evaporator Campaign 99-1, Analytical Results for the Final Report	HNF-1665	4/30/99
241-U-103	Compatibility Results for the 60-Day Report for Tank 241-U-103 Grab Samples	WMH-9953421	5/19/99
241-SY-101	Safety Screening Analyses Results for the 45-Day Report Tank 241-SY-101	WMH-9953403	5/20/99
241-AY-102	Interim Data Summary Results for Tank 241-AY-102 Sluicing Grab Samples, Phase 2.1.2	WMH-9953434	5/20/99
241-AP-107	Format II Report on Tank 241-AP-107 Waste Compatibility Grab Samples Taken in May 1999	WMH-9953970	6/10/99
241-U-103	Tank 241-U-103, Grab Samples 3U-99-1, 3U-99-2 and 3U-99-3 Analytical Results for the Final Report	HNF-1668	6/16/99
241-U-102	Compatibility Analyses Results for the 30-Day Report for Tank 241-U-102 Grab Samples	WMH-9953338	6/23/99
241-AP-107	Tank 241-AP-107, Grab Samples, 7AP-99-1, 7AP-99-2, 7AP-99-3 and 7AP-99-4 Analytical Results for the Final Report	HNF-1672	6/29/99

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

Number	Description	Due Date	Reported to DNFSB
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	4/6/99
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	11/25/98
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 241-BY-108 and 241-BY-110, and Auger Samples for 241-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	4/15/99
5.4.3.4e	Adequate Vent Path in All SSTs Suspected of Containing Organic Solvents	4/30/00	4/15/99
5.4.3.4f	Letter Reporting Completion of Vapor Sampling of All DSTs	12/31/00	4/15/99
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	1/7/98
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	Void meter and Viscometer Readings in Tanks 241-AN-103, 241-AN-104, and 241-AN-105	12/31/96	12/18/96
5.4.3.5k	Retained Gas Sampling in Tanks 241-AW-101, 241-AN-103, 241-AN-104, 241-AN-105, and 241-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	241-C-106 Supernatant Sampling and Analysis	10/31/96	10/30/96
5.4.3.6b	241-C-106 Retrieval Safety Assessment	7/31/97	10/3/97

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Number	Description	Due Date	Reported to DNFSB
5.4.3.6c	Initiation of Tank 241-C-106 Waste Retrieval	10/31/97	11/25/98
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	3/27/98
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	3/27/98
5.6.3.1h	Tank-by-Tank Safety Status Evaluation	7/31/98	7/22/98
5.6.3.1i	Update Tank Content Models	12/31/98	12/28/98
5.6.3.1j	Completion of Core Sampling of All Tanks	12/31/02	7/8/99