94-0003108

Department of Energy

Washington, DC 20585

JUN 06 1994

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

Dear Mr. Conway:

Enclosed for your information is the Characterization Program Quarterly Report for Defense Nuclear Facilities Safety Board Recommendation 93-5 Implementation Plan. This quarterly report covers the period from January 1 through March 31, 1994. This quarterly report identifies several critical items which are currently behind schedule. These are deployment of the Rotary Mode Core Sampling truck; training and qualification of operators to operate the sampling truck; and improving sampling recoveries of the Push Mode Sampling truck. We are working with Westinghouse Hanford Company to minimize the impact of these delays on the 93-5 Implementation Plan schedule.

Your May 11, 1994, letter to me indicated that none of the 29 deliverables committed to in the 93-5 Implementation Plan due between January and March 1994 had been delivered to the Board. In fact, 26 of these deliverables have been provided to Board staff. The enclosed quarterly report lists the completed and outstanding items. We are scheduled to meet with the Board on June 9, 1994. During this meeting we plan to discuss how best to document completion of commitments while minimizing paperwork. We will also respond to the concerns expressed in your letter at that time.

We appreciate your continued interest and support for our high-level radioactive waste characterization efforts. If you have any questions about this report, or need any further information regarding implementation of Recommendation 93-5, please call me at 202-586-7710, or your staff may contact James Antizzo (301-903-7180) or Kenneth Lang (301-903-7453) of my staff.

Sincerely,

Thomas P. Grumbly
Assistant Secretary for
Environmental Management

Enclosure

CHARACTERIZATION PROGRAM QUARTERLY REPORT FOR PERIOD ENDING MARCH 31, 1994

EXECUTIVE SUMMARY

The Implementation Plan for Resolution of DNFSB Recommendation 93-5, was accepted by the Board on March 25, 1995. Between December 1993 (when the plan was submitted to DOE-HQ) and March 31, 1994, there have been 33 commitments. Of these, 22 have been submitted on or ahead of schedule, and 8 have been submitted late. In addition, one commitment, due after the March 31st date has been completed and submitted. Three are past due and WHC continues to work overtime to recover the schedule loss. Of the three, the key one is the deployment of the rotary truck, due March 31, 1994. It is approximately one month behind schedule due to equipment failures earlier this year. The extensive use of overtime and emergency procurement steps since the equipment failures occurred has prevented this key activity from experiencing any additional delays. The lack of availability of this truck is also in part the reason a second milestone (certification of rotary truck crew) is delayed; the staff are on board, but cannot complete certification due to the truck availability and its related procedures. Procedures were held up due to the operability testing delays as a result of aforementioned equipment failures. The third missed milestone is the Organic Data Quality Objective. A new dedicated staff has been applied and this milestone should be completed in April, 1994.

Even given the three missed activities, there have been significant improvements and changes due to the development and implementation of the recommendation. There has been a complete change in management of the Characterization Program, bringing experienced senior technical/programmatic managers. Substantial ramp-up of operational crews have occurred. The Characterization Program has made significant strides in improving the access of characterization data, and involving the customer organizations who need the characterization data. Financially, the program is striving to prudently incorporate all the recommended activities within the baseline, to the extent possible.

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QUARTERLY REPORT ON DEFENSE NUCLEAR FACILITIES SAFETY BOARD RECOMMENDATION 93-05 FOR THE PERIOD ENDING MARCH 31, 1994

1.0 INTRODUCTION

1.1 PURPOSE

This quarterly report provides a status of the activities underway at the Hanford site for characterizing waste in both single and double shell tanks, as requested by the Defense Nuclear Facilities Safety Board (DNFSB) in their Recommendation 93-05 (July 1993). In January 1994, a DNFSB *Implementation Plan* (DOE 1994) responding to Recommendation 93-05 was prepared and sent to the U.S. Department of Energy (DOE) for transmittal to the DNFSB. The plan was accepted by the DNFSB on March 25, 1994. All activities in the DNFSB *Implementation Plan* are planned, underway or completed, the status of each is described in Section 2.0 of this report.

1.2 QUARTERLY HIGHLIGHTS

- Finalized the Implementation Plan (DOE/RL 94-0001) responding to the Defense Nuclear Facilities Safety (DNFSB) Recommendation 93-05. The Implementation Plan received Westinghouse and Department of Energy - Richland Operations Management approval on January 12, 1994 and transmitted to the DNFSB on January 21, 1994 by DOE-HQ.

- Completed loading data from three high level waste tanks into the Tank Characterization Database (TCD). This was accomplished on January 13, 1994.

- Distributed a Tank Waste Remediation System (TWRS) Data Quality Objective (DQO) Strategy Document and a DQO Process Guidance Document to the WHC TWRS Program element managers on January 11, 1994.

- Initiated development of Instrument Cask Technology for utilization at tank top. This technology will allow immediate feedback to field sampling crews on sample recovery, sample matrices and radioactivity.

- Completed installation of the heated vapor sampling assembly in tank 241-C-103 and obtained a vapor sample through the new assembly. Work was performed without incident, specifically no injuries, occurrences, or other problems.

- Issued Procurement Specifications for PAS-1 Transfer Cask on January 20, 1994.

- Completed safety review of twelve existing Single-Shell Tank (SST) data packages. Discovered an exotherm in SST 241-B-202 and numerous low pH conditions in other tanks.

- Submitted to DOE the 241-C-106 High Heat DQO effort on January 19, 1994.
- Tank Characterization Database information was made accessible to off site personnel on January 28, 1994.
- Completed and reported the re-analysis of Single-Shell Tank 241-T-111 to confirm the previously reported exotherm and evaluate the potential safety concern.
- Issued a draft upgrade plan for the Idaho National Engineering Laboratory (INEL) on January 14, 1994.
- Completed the operational test procedure (OTP) for connecting the Surveillance Analysis Computer Systems (SACS) to the Tank Waste Information Network System (TWINS) on January 11, 1994.
- Version 1.0 of the Laboratory Information Management System was released at the 222-S Laboratory on January 31, 1994.
- Total Organic Carbon (TOC) equipment was installed and procedures signed-off completing the technology transfer of the Pacific National Laboratories TOC procedure to the 222-S Laboratory.
- Completed the Waste Status Transaction Record Summaries and the Tank Layering Models for the Northeast Quadrant.
- The acquisition of the third rotary mode sampling truck was expected to be performed through the standard off site procurement process. However, a search across the site located an available truck meeting Rotary Mode Core Sampling (RMCS) specifications. Efforts are now being expedited by Fleet Management to deliver the truck to Kaiser Construction by February 25, 1994, well ahead of the schedule due date.
- The Waste Status and Transaction Record Summary documents for the northeast and southwest quadrants of the Hanford Site have been received from Los Alamos National Laboratories (LANL).
- The TWRS capacity needs assessment was completed by loading projected TWRS characterization needs and on site capacities into the laboratory capacity and utilization model.
- The Safety Screening DQO document was issue as a supporting document on February 23, 1994.
- The Rotary Core Vapor Sampling DQO document was issue as a of the supporting document on February 25, 1994.
- The Advanced Hot Cell Analytical Technologies Project Management Plan was issued on February 25, 1994.

- An all day Characterization workshop was held in Richland, Washington to involve/inform customers and stakeholders. Workshop agenda included, presentations followed by a question and answer session. Open discussions involving Tank Advisory Panel and Tank Instrument Advisory Panel member provided an excellent exchange of information and suggestions.

- The Waste Compatibility DQO was issued on March 4, 1994, as a supporting document.

- The In-Tank Generic Vapor DQO effort was issued as a supporting document on March 7, 1994.

- The DQO for the Crust Burn Issue associated with Flammable Gas Tanks was issued on March 14, 1994.

- Obtained unscheduled supernatant samples from tanks 241-T-111 and 241-SY-102 in support of the emergency pumping of 241-T-111.

- Completed and issued the document "Environmental Requirements For Hanford Deployable, Cone Penetrometer Raman Spectroscopy Fiber Optical Probe."

- Received DOE-HQ approval of the Waste Tank Safety Environmental Assessment (DOE-EA-0915). The environmental assessment authorizes intrusive activities in tanks containing unreviewed safety questions.

- The DNFSB Implementation Plan for 93-5 DOE/RL (94-0001) was accepted by the Board in a letter dated March 25, 1994 by Chairman John Conway.

- The 222-S Laboratory completed the compatibility analysis on tank samples from 241-T-111 and 241-SY-102. This information/data is required to support the pumping of liquid waste from 241-T-111.

- Pacific Northwest Laboratory (PNL) completed bench top testing of the new rotary extruder and issued a letter report.

- The plan to upgrade LANL to support TWRS mission was completed ahead of schedule.

- The analysis of archived samples from 241-B-202 has been completed by the 325 Laboratory. The analysis was conducted to substantiate earlier reported total organic carbon data and evaluate the exothermic reactions.

- Approval of the rotary mode core sampling operations procedure has been completed. Operability Test Procedures have been completed for the truck and exhauster. The system integration test, which incorporates all other rotary mode core sampling support equipment, has also been completed.

- Both the WHC 222-S and PNL 325 laboratories passed the Environmental Protection Agency second quarter FY 1994 Blind Performance Evaluations with better than seventy-five percent results.

1.3 REPORT FORMAT

The quarterly reports progress of activities initiated in response to the DNFSB Recommendation 93-05 and are arranged in the same order as the DNFSB *Implementation Plan* (DOE 1994). To report on progress, each of the seven parts are identified, followed by paragraphs explaining the scope of work on each part or subpart of the plan. Subheadings for each task activity report the following items of progress:

- Progress During Reporting Period
- Planned Work for Subsequent Months
- Issues

In addition to the information provided in the bullets above, two tables have been prepared listing the DNFSB commitments for first and second quarter FY94 (Table 1) and the third quarter FY94 (Table 2). Included in the tables is shading to indicate which commitments are complete, as well as highlighted areas to identify which commitments are outstanding or have been completed early.

Table 1. Characterization Program DNFSB Commitments
1st and 2nd Quarter 1994

Table 1. CHARACTERIZATION PROGRAM
DNFSB COMMITMENTS - 1st and 2nd Quarter

TYPE	#	TITLE OF MDS	STATUS	DUE DATE	ACTIVITY MGR
DNFSB	3.1	Init. Construction of 2nd/3rd Rotary Mode trucks	Complete on 11/1/93	11/30/93	G. Stanton
DNFSB	1.21	Ferrocyanide Safety Issue DQO Report	Complete on 12/31/93	12/15/93	D. McCain
DNFSB	1.2	C-103 Dip Sample DQO	Complete on 8/31/93	12/16/93	D. McCain
DNFSB	1.21	C-106 High Heat DQO Final Report	Complete on 1/20/94	12/20/93	J. Mobley
DNFSB	1.21	Vapor Rotary Core DQO Final Draft Report	Complete on 2/14/94	1/20/94	D. McCain
DNFSB	1.13	Char. Functions/Reqmts in detailed Functional Anal	Complete on 1/20/94	1/31/94	C. DeFigh-Price
DNFSB	3.2	Review Char. Field Procedures Using DOE COps	Complete on 2/28/94	1/31/94	G. Stanton
DNFSB	6.6	Eval. 12 Validated Data Reports for Safety	Complete on 1/29/94	1/31/94	D. Bratzel
DNFSB	5.9	Plan to Upgrade INEL Lab	Complete on 1/31/94	1/31/94	D. Bratzel
DNFSB	1.21	Organic Safety Issue DQO Report (PNL)	Complete on 4/29/94	1/31/94	D. McCain
DNFSB	2.2	Safety Screening Module DQO Report	Complete on 2/23/94	1/31/94	D. McCain
DNFSB	1.21	C-103 Vapor DQO Draft Report	Complete on 1/31/94	1/31/94	D. McCain
DNFSB	1.7	Streamline DQO Process	Complete on 12/31/93	1/31/94	J. Mobley
DNFSB	6.4	Demonstrate Offsite Access to TCD/Input 3 HLW	Complete on 1/28/94	1/31/94	J. Mobley
DNFSB	6.3	Initial On-Line Capability (LABCORE-1)	Complete on 1/31/94	1/31/94	D. Forehand
DNFSB	4.2	DOE-RL to Submit a request for DOA to DOE-HQ	Complete on 1/10/94	1/31/94	DOE
DNFSB	4.1	Issue Approved Broad-based Envir. Assessment	Complete on 2/28/94	1/31/94	M. Payne
DNFSB	1.1	Enhance WHC Char. Program Mgmt Staff	Complete on 2/28/94	2/28/94	C. DeFigh-Price
DNFSB	1.8	Release TWRS Characterization QA Plan	Complete on 2/28/94	2/28/94	C. DeFigh-Price
DNFSB	3.3	Complete Qualification of First Push-mode Crew	Complete on 1/26/94	2/28/94	G. Stanton
DNFSB	3.5	Complete Training & Qual Reqmts for Sampling Cog	Complete on 2/24/94	2/28/94	G. Stanton
DNFSB	1.22	Update FY94 Field Schedule to Incorp. New Techn's	Complete on 2/3/94	2/28/94	G. Stanton
DNFSB	5.11	Dev. Min/Max Lab Capacity Strategy	Complete on 2/28/94	2/28/94	D. Bratzel
DNFSB	1.21	Waste Compatibility DQO Report	Complete on 3/4/94	2/28/94	D. McCain
DNFSB	1.21	In-tank Generic Vapor DQO Final	Complete on 3/7/94	3/03/94	D. McCain
DNFSB	5.10	Plan to Upgrade LANL Lab	Complete on 3/28/94	3/29/94	D. Bratzel
DNFSB	1.2	Reduce Number of Mgmt Layers in WHC TWRS	Complete on 3/24/94	3/31/94	C. DeFigh-Price
DNFSB	1.6	Define Responsibilities of Key WHC Managers/Char.	Complete on 3/31/94	3/31/94	C. DeFigh-Price
DNFSB	3.7	Complete Qual of First Rotary Mode Crews	Complete on 4/18/94	3/31/94	G. Stanton
DNFSB	3.4	Redeploy PM Core Sampling	Complete on 3/31/94	3/31/94	G. Stanton
DNFSB	5.5	Issue Results of Sampler Exchange Phase II	Complete on 3/31/94	3/31/94	D. Bratzel
DNFSB	5.3	Letter Assessing New Extruder	Complete on 3/28/94	3/31/94	D. Bratzel
DNFSB	3.6	Restore Rotary Mode Sampling (TPA)	Behind 6 weeks	3/31/94	G. Stanton

Table 2. Characterization Program DNFSB Commitments
3rd Quarter 1994

Table 2. CHARACTERIZATION PROGRAM
DNFSB COMMITMENTS - 3rd Quarter

TYPE	#	TITLE OF MDS	STATUS	DUE DATE	ACTIVITY MGR
DNFSB	6.1	Prepare a Customer Needs Analysis	Complete 6/2/94	4/29/94	C. DeFigh-Price
DNFSB	1.10	Issue Quarterly Progress Reports (DNFSB/DOE)	Complete 5/2/94	4/29/94	C. DeFigh-Price
DNFSB	1.4	Improve WHC Char Technical Staff Competencies	Complete on 4/29/94	4/29/94	C. DeFigh-Price
DNFSB	3.9	Detailed Plans for Acquiring/Training Add'l Crews	Complete on 4/29/94	4/29/94	G. Stanton
DNFSB	2.1	DQOs for all 6 Safety Issues	Behind 2 weeks	4/29/94	D. McCain
DNFSB	1.21	Hydrogen Generating DQO Final Report	Behind 2 weeks	4/29/94	D. McCain
DNFSB	4.3	Delegation of Authority for RL/Safety & Env'l	Plan submitted to HQ	4/29/94	DOE
DNFSB	1.12	Mgmt Staff Complete Systems Engineering Training	Complete on 2/15/94	5/31/94	C. DeFigh-Price
DNFSB	1.9	Plan for Blind Samples	On schedule	5/31/94	C. DeFigh-Price
DNFSB	6.2	Issue a Data Mgmt Improvement Plan	On schedule	5/31/94	D. McCain
DNFSB	3.15	EEA for In Situ Delivery System	On schedule	5/31/94	D. Forehand
DNFSB	1.3	Improve RL Oversight	On schedule	5/31/94	DOE
DNFSB	1.11	Field Schedule for Sampling All Activ's FY95-6	On schedule	6/30/94	G. Stanton
DNFSB	1.14	Char Portion of Initial Sys Eng Analysis Results	On schedule	6/30/94	C. DeFigh-Price
DNFSB	3.10	Qual of 2 Additional Crews/Push & Rotary Trucks	On schedule	6/30/94	G. Stanton
DNFSB	3.17	Review Procedures w/Outside Drilling Experts	On schedule	6/30/94	G. Stanton
DNFSB	5.6	Evaluate Lab Staff Training	On schedule	6/30/94	D. Bratzel
DNFSB	1.17	Historical Tank Content Estimate Reports/NE/SW	On schedule	6/30/94	C. DeFigh-Price

1.4 BACKGROUND

Decades of United States defense material production left a legacy of high-level liquid radioactive and chemical wastes at the Hanford Site. The present contents of the 149 single-shell tanks and the 28 double-shell tanks represent a diverse chemical processing and waste management history. Waste from three primary reprocessing flow sheets, a variety of materials recovery operations, and numerous waste management-oriented operations have led to both chemically and physically heterogeneous waste. This diversity in the stored waste, coupled with an incomplete record of tank waste operations and transfers, creates a complex challenge for waste characterization.

Characterization is a key part, but only a part, of the information needed to (1) resolve safety issues; (2) ensure safe interim storage; and (3) meet the Tank Waste Remediation Systems (TWRS) mission objective to disposing of the wastes stored in the Hanford Site single- and double-shell tanks. Other information which supports the TWRS mission is the analysis of historical data on waste sources, waste transfer and processing data, and waste tank monitoring and/or ongoing tank surveillance data. Where applicable, information from chemical and physical modeling of tank contents and waste simulant and other studies will be used to provide comprehensive information on the contents and expected behavior of the wastes.

DNFSB Recommendation 93-5 strongly criticized the overall direction and timeliness of the Characterization Program. Consequently, the DNFSB made the following recommendations.

- The Characterization Program should undergo a comprehensive reexamination and restructuring to accelerate schedules, strengthen technical management, and expedite analyses.

- The Characterization Program should be integrated into the TWRS systems engineering effort.

The DNFSB Recommendation 93-5 also addressed simplifying tank access protocols and strengthening the management and conduct of sampling.

2.0 DEFENSE NUCLEAR FACILITIES SAFETY BOARD IMPLEMENTATION PLAN TASK ACTIVITIES

The DNFSB *Implementation Plan* (DOE 1994) addresses each task activity established in response to the DNFSB Recommendation 93-05. In this report, each part of the recommendation is categorized into one of seven areas and then progress of Hanford Site activities relating to that part is described.

2.1 Strengthen Technical Management

A large number of specific management issues have been identified. These have been divided into three general areas: (1) improve program management; (2) integrate characterization and system engineering efforts; and (3) provide a sound technical focus.

2.1.1 Improve Program Management

Recognized past problems in the management area are (1) lack of perceived ownership of characterization needs by real owners; (2) staff core technical competencies, especially in the chemical processing, chemistry, and program management areas; (3) failure to establish and meet realistic schedules; (4) failure to make better use of off site expertise, equipment, and facilities; (5) poor packaging and dissemination of characterization data to support the various customer needs (covered in Section 3.6); (6) inadequate quality assurance; and (7) inadequate/ill defined roles and responsibilities.

2.1.2 Integrate Characterization and System Engineering Efforts

TWRS underwent a significant rebaselining, with the new baseline planning case being retrieval of all SSTs. As part of that rebaselining, TWRS is using systems engineering techniques to develop and manage the TWRS Program and to improve integration and basis for activities and schedules. TWRS is now in the process of training managers and key technical staff in the details of systems engineering, so that all members associated with planning activities will be using similar techniques and terminology.

In addition to the training, an organization was formed in TWRS to develop the overall TWRS systems engineering base documents. A small core staff, familiar with systems engineering techniques, was assembled. The remaining staff are matrixed from the program elements and are the best technical staff available who have an overall grasp of the particular program element. These staff will not only bring the best knowledge to the process, but will also be able to bring back to their functions the knowledge gained from the systems engineering process.

2.1.3 Provide Sound Technical Focus

A well-developed technical basis to support all sampling and analysis activities in the Tank Waste Remediation System Program does not exist. TWRS

Program will establish the technical basis upon which the program will make safety related, and other programmatic (retrieval, pretreatment and disposal) decisions. The individual TWRS Programs do not have a good understanding of: how much data are actually needed; how accurate the data must be; and how many samples must be collected to establish an acceptable level of risk for decision makers. The need to establish the technical basis upon which the TWRS Characterization Program will proceed is critical.

There are various approaches or strategies which could be employed to establish the technical basis for characterization of the high-level nuclear waste tanks in order to resolve safety issues, and meet the needs of other TWRS Programs. The use of the Environmental Protection Agency's Data Quality Objective (DQO) Process, historical analysis for tank grouping, and utilization of the sampling priority list will provide the foundation for establishing sound technical basis for sampling and analyses.

2.1.3.1 DQO Process

The DQO process was developed by the U.S. Environmental Protection Agency as the framework for developing the necessary justifications and to focus the characterization activity prior to sampling. Although this process is being led by the Characterization Program, each individual TWRS program element manager requesting a sampling and analysis event is responsible for the DQO effort.

The DQO process helps the TWRS program element managers to define precisely the question(s) they must answer. If the question is not precisely formulated, then the data required to answer the question is not focused. Data collection that is not focused results in collecting the wrong data, too little data, or too much data.

An important element in the DQO process is to establish the risk or the uncertainty that the data users are willing to accept in making a wrong decision. If the willingness in making a wrong decision is large, then the need for precise data decreases directly. This balancing of risk/ uncertainty takes place after the questions and answers are precisely stated so that there is no confusion as to what data are needed and how the data are to be used.

2.1.3.2 Tank Grouping

Tank grouping may represent an opportunity to simplify tank sampling. The number of chemical and physical possibilities represent an important opportunity to group like tanks together and possibly reduce the number of individual sampling events required to characterize the waste tanks, particularly with respect to disposal operations. Efforts are underway to use this historical data to group similar tanks based on chemical and physical factors.

Based on this grouping effort, the expectation is that if there are a reasonable number of similar tanks, then significant sampling economies can result.

2.1.3.3 Sampling Prioritization

Initially, the FY 1994 prioritization is based on input from the Waste Tank Safety Program (Gasper 1993), in which all tank safety concerns were evaluated and prioritized. The initial sampling schedule follows the Gasper priorities that were adjusted to reflect the difficulties inherent in gaining access to the flammable gas Watch List tanks as a result these tanks were placed later in the schedule than their priority would warrant. To ensure the optimal use of field sampling teams, while the core sampling truck is being repositioned, grab samples for operations and auger samples from shallow tanks that required data were interspersed in the prioritized sampling list. As experience is gained in sampling and a better appreciation of the time required to move coring equipment from tank farm to tank farm, the current prioritization list may be modified to incorporate sampling in a different order based on tank location, only if this does not seriously impair the timeliness to address important safety concerns.

- **Progress During Reporting Period.** WHC completed the restructuring of the Characterization Program management staff (commitment 1.1). WHC organizational charts and charters, were updated and issued to assure that the Characterization Program is properly defined, implemented, and controlled. In addition, the Program has gone to a Program Office concept with a small, centralized program staff of very senior level individuals who obtain technical, operational, and administrative support from various organizations within and outside of WHC. Resumes of the new staff were provided to DOE-RL. This structure has been implemented across the TWRS. Complementing this structure, a process engineering functional organization with strong chemical engineering and process design expertise has been formed to improve the overall technical strength in TWRS.

  Commitment 1.2 of the *Implementation Plan* called for reducing the number of management layers in WHC TWRS to improve lines of communication. A company-wide management reduction effort has been completed resulting in a significant flattening of the overall WHC organizational structure. Updated organizational charts, including the top level company organizational chart, were forwarded to DOE. WHC committed to continually evaluate and improve the organization to strengthen its technical management of the activities and to improve and streamline communications.

  Commitment 1.6 of the *Implementation Plan* required complete job descriptions and a memorandum of understanding between key WHC organizations to assure communication of responsibilities. Job descriptions representing the key positions both within the Characterization Program as well as key support organizations, were submitted to DOE. A charter for the Characterization Program which defines roles, responsibilities and interfaces was approved by the Vice President of WHC TWRS and issued. In addition, a

memorandum of understanding has been issued between PNL and WHC on technology development.

Commitment 1.7 of the *Implementation Plan* required the DQO process be streamlined by developing and issuing a guidance document and sample DQOs to customers to use in developing their DQOs. The document was to provide clear expectations and requirements for the data quality objective process. WHC issued an internal memo to all DQO developers listing reference documents (DQO Strategy and TWRS DQO Process Guidance) and samples of DQOs. In addition to the memo all reference materials were provided to the programs and DQO developers. A single point-of-contact was also identified in the Characterization Program Office to facilitate communications.

Commitment 1.8 of the *Implementation Plan* required the issuance of a TWRS Characterization Quality Assurance Program Plan. The QA plan was to cover all aspects of characterization activities including: sampling, analytical and technology development, equipment fabrication and laboratory operations. A TWRS Characterization Program Quality Assurance Program Plan, WHC-SD-WM-QAPP-025, was issued on February 28, 1994.

Commitment 1.13 of the *Implementation Plan* required the Characterization Program's functions and requirements be included in the detailed functional analysis report, to project functional level. Characterization functions, interfaces, and requirements were prepared and incorporated into the TWRS Systems Engineering effort and appear in the "TWRS Systems Engineering Work in Progress" document. This effort was completed on January 17, 1994. Further work continues to develop requirements, interfaces and architecture in support of the Characterization Program at lower levels of the Systems Engineering Architecture.

Commitment 1.21 of the *Implementation Plan* required completed, published documents, establishing data quality objectives for ten TWRS activities. Three other activities will require working drafts by the end of the fiscal year. Below is a brief listing of those DQOs completed to date.

Subject	Original Due Date	Document Released
Ferrocyanide Safety Issue	12-15-93	12-31-93
C-103 Vapor	01-31-94	02-28-94
C-103 Dip Sample	12-16-93	08-93
C-106 High Heat	12-20-93	01-20-94
Organic Safety Issue	01-31-94	04-29-94

Safety Screening	01-31-94	02-23-94
Waste Compatibility DQO	02-28-94	03-04-94
In-tank Generic Vapor	03-03-94	03-07-94
Vapor Rotary Core	01-20-94	02-25-94
Hydrogen Generating		
a. Crust Burn		Originally issued: 12-29/92/Revised 03-14-94
b. Core	04-29-94	Est. to be released 05-06-94

WHC is working on additional supporting documents that further define data quality objectives for activities requiring characterization support; i.e., storage, treatment, and disposal.

- **Planned Work For Subsequent Months.** The third quarter commitments, associated with strengthening technical management, are outlined in Table 2. More detail of the upcoming commitments can be found in the *Implementation Plan*.

- **Issues** The statistical basis for the DQOs continues to be a weak area. WHC, PNL and LANL staff are working to gather the necessary data to be able to strengthen the statistical portion of the DQOs. One key area of continued concern is riser ability to allow additional samples to be obtained to gather more information of tank variability. WHC and ICF-KH are working this issue, though the process started later than had been desired. WHC senior management are now involved and focusing on developing an improved strategy to maximize use of risers. The installation of a thermocouple in a FeCN tank was delayed as a result until this can be better worked. This affects sampling order. PNL and WHC statisticians have identified the type of information they need to proceed and WHC and LANL are working to gather the data. Meeting commitment dates early in the quarter was a problem; however WHC has made significant progress in terms of specified format/signatures and content to address much of the earlier problems with early DQOs. Specific signature requirements by DOE and the state have still not been defined (which organization and when).

  In the systems engineering area, other program elements are still not to the level in the system engineering work (at level 4; expect to need to get to level 6 or 7) to be able to show the necessary links to the Characterization Program. This is progressing, however at the schedule that was anticipated.

2.2 Accelerate Safety Related Characterization

There are two major data requirements in the near-term. The first involves confirming which tanks are safe, conditionally safe, and unsafe. Establishing which tanks fall into which group is based on the criteria established in a 1993 policy statement sent to the DNFSB entitled "Strategy for Safety Issue Resolution." The second major safety data requirement is to screen all the non-watch list tanks to establish which, if any, should be added to, or deleted from the Watch List.

This screening will consist of combining historical process knowledge and limited sampling and analysis. To date, the following parameters (moisture, energetics, total organic carbon, heat generations, fissile material, separable organic phases) have been identified for screening the tanks for safety concerns.

The emphasis in the near-term will be on sampling and analysis to support safety issues. However, in between safety sampling events, there will be opportunities to optimize characterization staff productivity by utilizing additional sampling technologies and obtaining samples from SSTs and DSTs.

- **Progress During Reporting Period.** Acceleration safety related characterization has primarily focused on establishing a technical basis for sampling and analysis. The selected means of determining sampling and analytical requirements is through the data quality objective process. The DQO process is initially being utilized to develop sampling and analytical requirements for the six safety issues with expectations of being applied to all characterization sampling and analytical activities. The six issues addressed are (1) high heat; (2) ferrocyanide; (3) organics; (4) tank vapor; (5) flammable gas; (6) criticality. Completion of the six safety DQOs will fulfill commitment 2.1 of the *Implementation Plan*. As of March 31, 1994, the high-heat, tank vapor criticality (via the safety screening) and ferrocyanide DQOs were released for use. The organic and flammable gas DQOs were in final review with the stakeholders.

  In addition to the six safety issue DQOs, a safety screening DQO was developed. The safety screening DQO will be applied to all characterization sampling including core, auger and grab samples. The safety screening DQO establishes a limited suite of analysis and criteria for accelerated determination of tank conditions (i.e. safe, conditionally safe, unsafe). The safety screening will be applied to watch-list and non watch-list tanks. Completion of this effort fulfill commitment 2.2 of the *Implementation Plan*.

  The broad-based Environmental Assessment, which covers sampling, routine maintenance, installation of select monitoring equipment,

etc. in watchlist tanks was approved by DOE-HQ. This reduces the future paperwork required to sample watchlist tanks.

- **Planned Work For Subsequent Months.** The last commitment in action 2.0 is the complete sampling and analysis of all watchlist tanks by October 1995. Work is in process for this.

- **Issues.** As the riser utilization evaluation is completed, it may affect the order of sampling watchlist tanks. In addition, it may be necessary to resample flammable gas tanks, once a 'gas tight' sampler is developed and tested (tentatively scheduled to be available January 1995)

2.3 Improve The Quality And Quantity Of Sampling

Acceleration of sampling will be achieved by acquiring more sampling equipment; training more crews; cross-training crews to work on push-mode or rotary-mode sampling trucks; auger sampling; grab sampling and vapor sampling; working multiple shifts instead of one; phasing sampling to meet programmatic needs; using bounding tanks so that decisions are based on worst-case assumptions; and conducting sampling activities by tank farm quadrants to minimize down-time between sampling events.

A planning basis has been assumed for core sampling to ensure adequate sampling capacity is available. Beginning in March 1994, the push-mode truck will be operated by one crew on days shift, with an additional crew trained for a second shift by June 30, 1994. In addition, the rotary-mode truck will come on line sometime in early June and will also have a second crew available for two shift operations by June 30, 1994.

2.3.1 Adequate Sampling Equipment and Staff

A new certification and training program for characterization operators was developed in late 1992. The upgraded package for characterization operators requires 18 weeks of classroom training, reviewing practical facts, and examination. This training program is designed to cross-train sampling crews in every sampling procedure needed to support the TWRS program. Each sampling crew shall be trained in sampling procedures to support rotary-mode, push-mode, auger, grab and vapor sampling.

Training for the person in charge of each crew was developed using a similar process. The training lasts approximately 24 weeks and includes fundamentals, tank farm systems, administrative requirements, practical factors, good sampling practices, laboratory interfaces, and examinations.

2.3.2 Meeting Flammable Gas and Vapor Sampling Requirements

Information on tank dome space vapors will be required prior to in-tank sampling to check for flammability for all rotary core sampling. Flammable gas meters will be used to show the atmosphere in flammable

gas tanks is safe prior to in-tank activities. For flammable gas Unreviewed Safety Questions (USQ) tanks, continuous head space gas monitoring for some period of time is required to determine if a flammability problem exists.

2.3.3 Issues And Contingency Plans

Adequate sampling capacity is necessary to achieve the aggressive sampling schedule slated for the next three years. Several issues have the potential for impeding this sampling schedule. They are:

- Push mode inadequate sample recovery
- Timely deployment of the first rotary mode sampling truck
- Timely deployment of the second and third rotary mode trucks
- Hiring, training and qualification of staff
- Transfer of tank access authorization from DOE-HQ to DOE-RL
- Unsuitable physical properties data from existing sampling systems

2.3.4 Push Mode Sample Recovery

The push mode core sampling system was placed in a stand-down in FY 1993 as a result of an inadequate sample recovery. Subsequently, engineering studies and the use of an outside panel of drilling, sampling, and characterization experts was assembled to bring industry expertise to the program.

2.3.5 Timely Deployment Of First Rotary Mode Sampling Truck

The first rotary mode core sampling truck is scheduled to be deployed after completion of the operational testing program (January 3, 1994) and the readiness review (March 31, 1994).

2.3.6 Timely Completion Of Second And Third Rotary Mode Sampling Trucks

Two additional rotary mode core sampling systems are scheduled to be deployed by the end of FY 1994.

2.3.7 Hiring, Training And Qualification Of Staff

Current staffing levels support one push mode crew with one rotary mode crew in training. TWRS Operations has committed to provide the identified dedicated crews and required support on a priority basis. A concern exists however, as to whether sufficient crews will be hired, trained, and qualified in time to support two-shift operation of the rotary mode unit.

2.3.8 Technology Development

Current sampling and analytical procedures are not suitable for obtaining some physical property data (e.g., moisture). Therefore, in-situ techniques using the cone penetrometer deployment system will be

evaluated to improve the reliability of this data. Various moisture monitoring sensors will be evaluated as part of this program.

Direct drill bit temperature monitoring could eliminate the need for forced nitrogen cooling of the "rotary" system and may enhance the sample recovery of the "push" system by removing the safety restriction that prevents the drill bit/drill string from rotating during push-mode sampling. A commitment to deploy a field useable prototype that incorporates a bottom of tank sensor in addition to direct temperature monitoring is provided.

2.3.9 Sampling Summary

Sampling capacity can be increased over the next 3 years by (1) resolving sample recovery issues and resuming push mode sampling; (2) implementing rotary mode core sampling; (3) providing two additional rotary mode sampling systems; (4) ensuring adequate staff on line; (5) streamlining tank access; and (6) providing augers and other equipment for alternate sampling techniques. These actions will increase capacity and provide added capability of other sampling methods and tools.

- **Progress During Reporting Period.** In an effort to improve the quality and quantity of sampling several areas have been targeted as key to success. They include: (1) adequate sampling equipment and staff; (2) meeting flammable gas and vapor sampling requirements; (3) issues and contingency plans; (4) push mode sample recovery; (5) timely deployment of the first rotary mode sampling truck; (6) timely completion of the second and third rotary mode sampling trucks; (7) hiring, training and qualification of staff; (8) technology development; (9) sampling summary. Each area listed above is vital to establishing and maintaining adequate resources to meet the commitments outlined in the *Implementation Plan*.

  Commitment 3.1 of the *Implementation Plan* requires that construction of the second and third rotary mode core sampling trucks be initiated by November 1993. This activity was completed with commitment of funds and vendor contract on November 1, 1993. Work was 26 days behind schedule, as of March 31, 1994; WHC and ICF-KH staff continue to evaluate options to regain the schedule. Funding as of March 31, 1994, is still not identified to complete the third rotary truck system. Efforts are underway to maximize current funding, and to determine, with TWRS Operations, what support equipment can be delayed by doubling up on existing equipment. Another issue which could impede the completion of the trucks is the inability to secure a facility for assembly. Currently, negotiations are in progress to use the building that is currently being used to store the first rotary mode truck. Use of this facility is critical for the efficient use of existing funds. If any of the foregoing threaten the completion of these trucks, WHC management is committed to increasing fiscal and personnel resources to meet the stated deliverable.

Commitment 3.2 of the *Implementation Plan* specifies a review of the characterization field procedures using DOE Conduct of Operations and Institute of Nuclear Power Operations good practices and revise as necessary. A thorough review was completed and the resolution of findings issued in a letter report on February 28, 1994. Those procedures identified as needing revision were immediately changed to reflect the appropriate guidelines.

Commitment 3.3 of the *Implementation Plan* required complete qualification of the push-mode crew. A standardized training program was established for supporting push-mode sampling. All current and new sampling personnel are required to fulfill the training requirements prior to field activities. All training and corresponding documentation was completed a month ahead of schedule. A letter was issued on January 26, 1994, identifying the number of staff and date they were qualified for service which fulfills this commitment.

Commitment 3.4 of the *Implementation Plan* addresses re-deployment of the push-mode core sampling system. A great deal of effort was expended to bring the push-mode system back on line. Internal and external drilling experts were consulted on means to improve sample recovery. Various sampling bits were designed and evaluated to determine performance against existing bits. Part of the effort was also spent on determining effects of sampler internal diameter and coatings on sample recovery. A plan was developed to systematically evaluate all the recent modifications. Upon completion of the testing and write up, a presentation was given to RL on the results and the proposed strategy on redeployment. A letter followed informing RL the push-mode system was deployment ready. RL issued a letter to the Characterization Program authorizing the redeployment of the system, completing this commitment.

Commitment 3.5 of the *Implementation Plan* requires the cognizant sampling engineers complete the training and qualification process. All training was reviewed to assure requirements were fulfilled, appropriate and up-to-date. A letter was issued documenting the cognizant engineers available for sampling activities on February 24, 1994.

Commitment 3.6 of the *Implementation Plan* addresses restoring rotary-mode sampling capability. This truck is two months behind schedule at this time. Efforts are underway to review all activities and holding due dates while compressing other activities. The primary uncontrollable factor that may impact the schedule is the weather. This can hinder completion of the Operational Testing Program. This activity is being aggressively addressed. However, acceleration potential is limited if staff training on the system has not been completed. Should delays occur, field sampling schedules will be adjusted, additional crews

trained, and extra shifts will be added in order to use all open dates to compensate for the delay.

Commitment 3.7 of the *Implementation Plan* addresses qualification of rotary mode and vapor, grab, and auger sampling crews. The vapor, grab, and auger crews were available in February 1994. The qualification of the rotary-mode crew was delayed to the unavailability of approved procedures to qualify against in the February/March time-period. The procedures had been delayed due to the earlier hardware problems with the rotary truck. The rotary-mode crew was qualified in early April, 1994.

- **Planned Work For Subsequent Months.** The third quarter commitments, associated with improving the quality and quantity of sampling, are outlined in Table 2. More detail of the upcoming commitments can be found in the *Implementation Plan.*

- **Issues** Unavailability of funding delayed the start of core bit monitor development. Work plans have been drafted and Sandia National Laboratories' staff are working closely with WHC staff to recover lost time and meet commitment 3.16 of the *Implementation Plan* by January 1995.

  Evaluation and deployment of a cone penetrometer system for in-situ measurements is a joint EM-30 and EM-50 activity. Reallocation of capital funding required delaying capital commitments until FY 1995. A phased approach to procurement was developed to accommodate the funding changes, but capital funds must be available very early in FY 1995 to meet the *Implementation Plan* commitment 3.13 date of June 1995.

  The lateness of the re-start of the rotary truck number one has a potential of deferring three cores planned to be taken in FY 1994 into FY 1995. The focus continues to be on getting this truck through the operational review as soon as possible.

2.4 Streamline Tank Access

To access USQ tanks for sampling activities, an adequate safety and environmental basis must be developed. Presently, these documents must be reviewed and approved. This process for tank access will be streamlined and shortened without compromising the necessary rigor. An Interim Safety Basis (ISB) document has been developed and approved to better define the safety envelope for most tank farm activities a revised Safety Basis has been developed based on on-going and comprehensive safety and hazard analysis.

A broad based Environmental Assessment is being prepared to handle those activities anticipated for the SSTs and DSTs over the next several years, including tank sampling. This Environmental Assessment is scheduled to be approved by December 31, 1993. Once the Environmental Assessment is approved, the access authorization time for most

activities will be shortened from approximately 10 months to less than 1 month.

- **Progress During Reporting Period.** Commitment 4.1 of the *Implementation Plan* requires DOE-HQ approval of a broad-based environmental assessment. Approval was obtained on February 25, 1994, and fulfills the commitment. DOE-RL has requested a delegation of authority from DOE-HQ to authorize specific work activities locally. Along with this, RL submitted a plan on how this would be implemented in January 1994.

- **Planned Work For Subsequent Months.** The third quarter commitments, associated with streamlining tank access, are outlined in Table 2. More detail of the upcoming commitments can be found in the *Implementation Plan*.

- **Issues.** Authorization from DOE-HQ to DOE-RL is behind schedule. Staff continue to work to define the details defining and supporting the specific authorization.

2.5 Improve The Quality And Quantity Of Analyses

Since the TWRS Program has not completely developed a sound technical basis for sampling and analyses, the bases for estimating laboratory support is not well defined. The current bases for estimating laboratory support is dependent on the TWRS Program sampling and analysis technical bases. Past experience and involvement in the DQO processes has provided a best estimate planning bases. Key areas of interest include: (1) core sampling rate; (2) brief list of safety analyses; (3) 45 days data reporting; (4) additional sampling for auger, vapor and grab samples; (5) utilization of multiple shifts; (6) off site high level analytical support; (7) capacity of off site analytical support.

- **Progress During Reporting Period.** The projected TWRS characterization needs and on site capacities have been loaded into the laboratory capacity and utilization model. The projected needs were identified by the WHC TWRS Characterization Program based on the available DQOs completed as well as projected DQO needs. Laboratory capacities have been determined for the WHC 222-S Laboratory, the PNL 325 Laboratory, as well as the two off-site laboratories being considered (INEL and LANL).

  Commitment 5.3 of the *Implementation Plan* was to issue a letter assessing the operability of the new extruder. The assessment was completed and the letter was issued as scheduled. However, the assessment by PNL identified both mandatory changes and optional improvements. WHC staff responded in a timely manner to correct all the items identified in the letter.

  Commitment 5.5 was to issue a report on the Sample Exchange, Phase II. This was completed and issued.

Commitments 5.9 and 5.10 of the *Implementation Plan* were to issue plans to upgrade INEL and LANL, respectively. Both plans were submitted on or ahead of schedule. Both laboratories could provide up to 10 Analytical Equivalent Units of support. The plans outline hardware, procedure and staffing requirements to be able to receive samples. Both sites would return unused samples to the Hanford Site. Casks are being procured separately (Commitment 5.8) to support the schedule. In the near term, type A shipments of samples can be made to either laboratory to assess readiness, for sample analysis exchange, etc.

Commitment 5.11 of the *Implementation Plan* was to complete a minimum/maximum laboratory capacity strategy. The strategy has been issued and includes schedules to bring off-site laboratory capacity on board. A summary of the strategy includes upgrade and utilization of the WHC 222-S and PNL 325 Laboratories for safety screening, safety resolution and compliance. Also, a recommendation has been made to DOE for use of the INEL Westinghouse Idaho Nuclear Company Laboratories for backup laboratory support.

- Planned Work For Subsequent Months. The third quarter commitments, associated with improve the quality and quantity of analyses, are outlined in Table 2. More detail of the upcoming commitments can be found in the *Implementation Plan*.

- Issues Completion of projected laboratory capacity and utilization is dependent upon finalization of DQOs and associated Tank Characterization Plans (TCPs) for waste disposal and regulatory compliance as well as finalization of TWRS projected sampling and characterization needs. Uncertainties regarding the minimum/maximum strategy and utilization of off-site laboratories include the outcome of the National Environmental Protection Agency determination and expediting Type B shipping cask certification. However, the most realistic projections are that one off-site laboratory would be sufficient. WHC has recommended that only one laboratory be funded. The DOE is considering the WHC recommendation. Funding for either off-site laboratory upgrade needs also has to be identified.

2.6 Improve Data Management

Without access to useable data in a timely manner, other improvements discussed earlier will have little value. Poor data management and slow flow of data is one of the major problems in the existing program.

The ultimate goal of the Characterization Program is to provide the necessary analytical information to its data users (e.g., TWRS program elements, DOE,

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