Department of Energy
Washington, DC 20585
November 30, 2000

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

Dear Mr. Chairman:

This responds to your August 29, 2000, letter, about Hanford high-level waste storage tank integrity. The enclosure identifies actions that address issues described in your August 4, 2000, staff report.

The Department concurs in the need for sustained close attention to preserve existing high-level waste storage tanks through chemistry control and upkeep of essential systems such as tank annulus ventilation systems. We have considered your suggestion that designating high-level waste tanks as "safety class" might improve the rigor of that effort. We have discussed the matter with your staff and reviewed your technical report DNFSB/TECH-28, *Safety Basis Expectations for Existing Department of Energy Defense Nuclear Facilities and Activities*. As a result, we agree to implement a Technical Safety Requirements mechanism for tank waste chemistry controls as part of the environmental protection program, which is part of the Integrated Safety Management System for the Hanford Tank Farms.

The Department has in place a systematic method for assuring long-term safety of Hanford tank waste storage through the period of this mission. There remain uncertainties in the duration of that period, in the need for replacement tanks or additional tanks, and in the projected ability of our program to preserve existing tank integrity for the extended but uncertain period of that mission. We continue to evaluate and reduce those uncertainties, but we concurrently intend to maintain existing tanks to minimize hazards and costs of long-term safe storage.

If you have any questions, please contact me or have your staff contact Mr. Mark Frei of my staff at (202) 586-0370.

Sincerely,

Carolyn L. Huntoon

Carolyn L. Huntoon
Assistant Secretary for
Environmental Management

Enclosure

Department of Energy
Corrective Action Plan
DNFSB Letter of August 29, 2000
High Level Waste Tank Integrity Program

Context of issues and actions:

The Defense Nuclear Facilities Safety Board conducted a review of the Hanford Tank Farms tank integrity program within the context of safety of storage for high level waste in tanks. The Board staff prepared a report to the Board, which was forwarded to the Department of Energy on August 29, 2000. In their forwarding letter, the Board requested "a reply that identifies the actions that will be taken to address the issues identified in the enclosed staff report." In addition, the Board acknowledged that the Department is "developing an effective approach to deciding on the need to construct new High Level Waste tanks at Hanford." However, they cautioned that "sustained close attention is needed to preserve the integrity of existing tanks through chemistry control and upkeep of essential systems," specifically of double shell tank annulus ventilation systems. This document identifies the set of actions requested by the Board.

The Board's concern relates to the Department's plan for the use of existing tanks to safely store waste until it can be processed for disposal. Their staff report documented a discrepancy between the period of safe storage and projections of existing tank service life for the double shell tanks. Tank service life projections are based upon measured and analyzed corrosion rates. The letter also acknowledged that a process was in place to address this uncertainty by construction of additional tanks if needed. During briefings by site personnel, the Board staff expressed insight to the sensitivity of both the costs of construction and the public and regulatory concerns that new tanks might enable unnecessary extension of the storage mission. The discrepancy was between tank use until 2028 (based upon a Department documented expectation) and documented corrosion rate projections that one existing tank might no longer be useable as early as only 2017 and that additional storage tanks might be needed as early as 2010. The site's analysis is revised annually. Projections of these uncertainties are intentionally conservative in order to prompt a timely decision whether to commence a construction program. Concurrently the Department is revising its integrated plans to enable a more accurate determination of the completion date for the storage mission.

Management of Tank Chemistry and Tank Annulus Ventilation Maintenance:

The Board's letter focused attention on tank waste chemistry controls and tank annulus ventilation systems. The staff report documents problems with both which had been known to exist for several years. The Board's concern included simply correcting chemistry conditions which did not meet established chemistry specification. The staff report acknowledged that correction might mean either changing specifications or altering chemistry. This reflects technical briefings which suggested that either action might be adequate to preserve tanks in specific cases. But the Board apparently also was concerned that more timely and formal management mechanisms were needed to decide and document related actions, and then implement them. The Board's letter suggested that, "the lack of rigor associated with these efforts may stem from the fact that the HLW tanks at Hanford are not functionally classified as

safety class equipment." The Department's directives define "safety class" equipments and the set of management mechanisms which are to be invoked to assure their functionality in meeting safety requirements. The Board's suggested approach appears to relate to their efforts to help the Department improve its safety authorization bases through suggestions which the Board subsequently published in their October 2000 technical report DNFSB/TECH-28, Safety Basis Expectations for Existing Department of Energy defense Nuclear Facilities and Activities. In a larger sense, these suggestions address improvements in the implementation of the Department's programs for Integrated Safety Management Systems, which had been initiated by a Board recommendation in 1995.

In order to facilitate and emphasize better management of our tank integrity program in support of both safety and environmental protection, the work scope and responsible organization are being structured as a project, and existing project management mechanisms consistent with Integrated Safety Management are being invoked to formally define, plan, control, fund, and monitor program performance against formally established requirements. A program plan is being prepared which will address management methods, such as:

1. program requirements (such as chemistry specifications, environmental regulatory compliance and analyses requirements),
2. work planning, scheduling and funding needs (such as for equipment maintenance, chemistry sampling and inspections, ultrasonic assessments of inner liner confinement structure, visual inspections of outer and inner walls, etc.),
3. data analysis and decision processes and criteria,
4. mechanisms and plans for incorporating improvements to technical and analytical methods and equipment, updating expectations based on performance results,
5. contingency plans such as corrective action response if requirements are not met or tanks leak,
6. responsible organizations and people

The Department reviewed its determination whether the tanks should be designated safety class equipments as described in DOE order 5480.22 and 5480.23. It concluded that designation as safety class equipment was not consistent with the required DOE directives. Use of a nuclear safety control mechanism called Technical Safety Requirements (as described in these directives) to address the concern for proper management of chemistry control is appropriate as described in the TECH-28 report.

It may be possible that the use of a Technical Safety Requirement is also appropriate for management of the maintenance of the annulus ventilation systems. That may depend upon whether a planned evaluation of the corrosion detected in one tank determines that the corrosion is significant and can be attributed to postulated prolonged disuse of this equipment. In addition, it may be appropriate to modify an existing Technical Safety Requirement which addresses detection of leaks into the annulus, because some analysis indicates that a continuous air monitor in an operable annulus ventilation system provides the most sensitive available means of leak detection. An engineering evaluation is scheduled to resolve the appropriate technical and management needs.

Correction of Specific Tanks' Chemistry:

Four tanks are known to have waste chemistries which are outside established specifications. Corrective actions below commit to adjusting the chemistry by hydroxide additions. There is no clear evidence that waste chemistry, which has been out of specification for several years, resulted in accelerated tank corrosion. However, it is agreed that the established requirements are appropriate and should be enforced.

Tank Annulus Ventilation Operability:

The three tank annulus ventilation systems now inoperable will be restored to operation as committed below. There are several reasons for operation, including the use of the ventilation effluent monitoring for radiation as potentially the most sensitive of several means of leak detection. (Ventilation flow is filtered to remove any radioactive particles.) Based upon tank monitoring to date, leaks are expected to be precursors to larger structural problems. So leak detection and response provide potentially important measures which might compensate for inaccessibility to directly measure all portions of the tanks' inner liners for degradation.

Tank Integrity and Corrosion Monitoring Problems:

The Board staff also identified problems with the monitoring of corrosion and structural integrity of Double Shell Tanks' inner and outer walls. In part these problems relate to the formality of planning, scheduling documenting and evaluating periodic or situational surveys. Briefings to the Board staff had described technical limitations with the monitoring of specific tanks, the adequacy of the robotic technical devices to do so under specific circumstances for portions of specific tanks, and the ability to accurately project results. The apparent concern with accuracy of those projections is that long term effects may decide short term priority for actions such as restoring annulus ventilation or altering tank waste chemistry. Short term actions typically require revision to baseline funding plans and attendant tradeoffs which defer other work schedules and relative priorities. Several commitments below address specific concerns documented in the Board staff report.

The table below identifies specific committed actions which respond to the concerns identified in the Board's letter and their staff's technical report.

Issue	Action	Completion Date	Responsible Manager	Reference Document
1. Sustained Close Attention Needed, for:	1.1 Increase assigned priority for funding & execution	Jan 2001	D. Bryson	Baseline Change
	1.2 Projectize work scope and responsible organization	Jan 2001	D. Bryson	Program Plan
A. Chemistry Control	1.a.1 Implement Technical Safety Requirement	Mar 2001	A. Sidpara	Tank Farm TSRs

Issue	Action	Completion Date	Responsible Manager	Reference Document
B. Maintenance of Essential Systems	1.b.1 Perform & Document Engineering Evaluation of Annulus Ventilation effect on corrosion	Feb 2001	D. Bryson	Engineering Evaluation Report
	1.b.2 Decide whether TSR control and/or operating procedure are needed based on engineering evaluation	Mar 2001	A. Sidpara	
2. Projected tank useful life may not support waste storage through 2028 milestone	2.1 Review and revise storage volume projections as retrieval and processing schedules are improved and tank corrosion monitoring information updated	Annually as ongoing, next report due Mar 2001	D. Bryson	Operational Waste Volume Projection
	2.2 Decide whether additional actions are needed to assure safe storage long term	Within 30 days of DOE approval of projections	A. Sidpara	
3. Implement or revise tank chemistry controls	3.1 Adjust chemistry within specification for 4 DSTs	Oct 2001	D. Bryson	
	3.2 Establish chemistry monitoring requirements for corrosion control	Sep 2001	D. Bryson	
	3.3 Revise Operating Procedures to require Corrective plan for out of specification conditions within 30 days of discovery	Nov 2000	D. Bryson	OSD-T-151-00017, Operating Specifications
	3.4 Implement TSR to incorporate tank chemistry controls for limiting corrosion	Mar 2001	A. Sidpara	Tank Farm TSRs
4. Lack of annulus ventilation is likely causing excessive corrosion	4.1 Maintain annulus ventilation systems and restore to operation	Oct 2001	D. Bryson	
5. UT robotic crawler unable to evaluate tank AY-101 because of scale outside of liner	5.1 Modify crawler to remove scale	Completed	D. Bryson	
	5.2 Reexamine AY-101 after removing scale	Sep 2001	D. Bryson	AY-101 Tank Integrity Assessment Report

Issue	Action	Completion Date	Responsible Manager	Reference Document
6. Improve tank liner useful life projections, including AN-105	6.1 Schedule recurring UTs to enable corrosion rate and useful life projections	AN-105 Sep 2002	D. Bryson	Tank Integrity Assessment Reports & Tank Integrity Program Baseline Changes
7. Documentation of integrity of secondary shells of DSTs limited	7.1 Document secondary shell integrity actions and results	Include in Tank Integrity Assessment Reports	D. Bryson	Tank Integrity Assessment Reports
	7.2 Develop secondary shell integrity requirements in program plan	Jan 2001	D. Bryson	Tank Integrity Program Plan