

Department of Energy

Washington, DC 20585

September 20, 1999

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 is in response to your letter dated July 8, 1999, which transmitted your staff's issue report dated June 15, 1999. The Department remains committed to meeting the November 2000 fuel movement date and a swift, safe completion of the Hanford Spent Nuclear Fuel Project (SNFP). This was reemphasized recently in Revision 1 of the Implementation Plan for the Remediation of Nuclear Materials in the Defense Nuclear Facilities Complex (Recommendation 94-1) which was conditionally accepted by the Defense Nuclear Facilities Safety Board on January 28, 1999. The response to your staff's issue report is summarized in the enclosure.

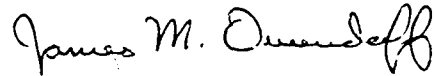
An independent team of experts conducted an extensive review of the SNFP during the month of May 1999 to evaluate whether the project has a sound technical, cost, and schedule basis (copy enclosed). The Review Team concluded that a strong and effective management team is in place, that considerable progress has been made in baseline management and project controls, and that the cost baseline is achievable. There are, however, significant schedule risks. Our assessment is that the contributing issues are within the control of the project management team and a concerted effort is being made to resolve them expeditiously in order to meet the November 2000 fuel movement date.

I am encouraged that the SNFP is in constant communication with your staff through weekly teleconferences, periodic video conferences, and meetings at the site. This close communication should ensure that your staff is kept intimately informed not only on project accomplishments but also on current and emerging technical issues and their resolutions. This form of communication benefitted SNFP.



The Department appreciates the Defense Nuclear Facilities Safety Board's continued interest in the Hanford Spent Nuclear Fuel Project. We will continue to keep your staff informed of the Project status. If you have any further questions, please contact me or have a member of your staff contact Randall Kaltreider of my staff at 301-903-4259.

Sincerely,



per Carolyn L. Huntoon
Assistant Secretary for
Environmental Management

Enclosure

cc:

M. Whitaker, S-3.1

ENCLOSURE

TOPIC: South Loadout Pit Cask Drop

Issue: An independent review of the Cask Drop calculations determined that an unrestrained drop of the Multi-Canister Overpack (MCO) cask into the SLOP would damage the floor-to-wall joint, resulting in unacceptable high basin water leakage rates.

Status:

Initial Approach: An expedited review of possible solutions to this problem led to two parallel paths: (1) conduct a probabilistic risk assessment to ascertain whether a cask drop would or would not be a credible occurrence and (2) modify the design of the Cask Loadout System Immersion Pail Structure to mitigate the consequences of a drop through a combination of hydraulic damping and impact absorption. DOE directed the contractor to proceed with the modified design option.

The conceptual design of the modified Immersion Pail System (IPS) has been completed and the definitive design is expected to be completed by end September 1999. The modified design will resolve all the technical issues identified by the DNFSB staff.

Current Position: Recognizing that the design modification, if implemented, would consume almost all the schedule contingencies that were built into the baseline, the Spent Nuclear Fuel (SNF) Project was considering, as an alternate, a risk-based approach. The contractor has evaluated the potential initiating events associated with the drop scenario and has proposed corrective actions and emergency response measures that would allow acceptance of the risk. These include:

- install approximately 5 inches of crushable foam in the bottom of the load out pit to mitigate low drops;
- complete a fault tree analysis and make additional improvements in defense-in-depth features, procedures, training, conduct of operations, etc. in order to minimize the probability of a drop; and
- ensure a standby emergency plan and capability are in place to stop any potential leakage immediately following a drop.

The contractor is planning to contract with the Navy Crane Center of Excellence to obtain advice on any additional preventive or mitigative measures that could be adopted.

The DOE has accepted the alternate proposal for the K-West Basin and is currently reviewing the path forward for the K-East Basin. The local and State regulators have been briefed and their concurrences have been received for the K-West Basin. This decision will restore part of the schedule contingency and strengthen the prospect of meeting the November 2000 start of fuel removal commitment.

Note: The modified IPS design will be completed as planned and maintained as a backup.

TOPIC: Safety Analysis Report (SAR) Preparation

Issue: The Safety Analysis Report development and approval have fallen behind schedule. The delay in resolving technical issues, completing the various analyses in a technically acceptable and timely manner, and other quality and process related issues have been some of the contributing factors. The current situation has been recognized as one that has the potential to impact the Project schedule. Additionally, the delays in safety analysis documentation could negatively impact procedure development, training, and operational readiness review preparations.

Background: The risks associated with the conversion of phased SARs to final SARs were long recognized. However, the Project pursued the phased SAR approach to support the "fast-track" classification of the SNF Project without enforcing appropriate risk management measures. Additionally, the process of conducting safety analysis and design/engineering in parallel contributed to inconsistencies between the SARs and design documentation for the Cold-Vacuum Drying Facility, Multi-Canister Overpacks and the Canister Storage Building. The lack of adequate quality checks as well as deficient interface with relevant documents caused other content related problems. The above conditions presented a significant challenge to the SAR developers and those organizations engaged in the review, comment resolution, and approval process.

Status: The Project has initiated a number of measures over the past six months to re-engineer the SAR development, review, and approval process. These include organizational realignments, process enhancements, and quality improvements.

Changes have been made in the contractor's organization as well as DOE-RL's SNF Project organization to assign dedicated positions with specific responsibilities that will be focused on bringing the SARs to a satisfactory closure. The contractor has brought in Westinghouse Safety Management Solutions (WSMS) to coordinate the SAR effort and provide assistance in the strengthening overall management in this area. WSMS has previously provided similar services to Savannah River and Hanford and has extensive experience in integration of engineering and design, and SAR development, review, and approval processes.

A senior management oversight board has been established to provide a mechanism for facilitating resolution of SNF Project issues. The SAR review expectations have been clearly established and communicated and the interface between the design team, the SAR development and review groups, operations, and project management have been significantly strengthened. The FSAR schedules have been revised by breaking the logic tie between the DOE-RL Safety Evaluation Reports (SERs) and procedure development and training. This will enhance the activities associated with procedure development, personnel training, and preparations for Operational Readiness Reviews/Assessments.

TOPIC: Quality Assurance Requirements for The MCO

Issue: Applicability of the Quality Assurance Document (QARD), RW-0333P, for the Hanford Spent Nuclear Fuel Project has not been fully established and, consequently, its implementation has been inconsistent. The QARD, developed by Office of Civilian Radioactive Waste Management (OCRWM), is intended to apply to disposal of DOE spent fuel and high-level waste in the proposed geological repository at Yucca Mountain. The procurement contract for the Multi-Canister Overpacks (MCOs) has recently been issued and the fabrication of the associated Fuel Baskets is expected to begin in a few months time. The question has been raised as to whether the QARD should be enforced for these procurement/fabrication activities and, if enforced, what benefit will be derived, and its impact on the Project cost and schedule.

Status: From the beginning of the Project, it has been an SNF Project policy to avoid actions that would prohibit possible final disposal of the Hanford SNF to a geological repository.

The MCOs are being procured to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III (N-Stamped). It has been verbally agreed to by OCRWM that the Quality Assurance requirements of the above referenced Standard are equivalent to the RW-0333P. This agreement is based on the understanding that the Project will implement appropriate measures to ensure that the selected supplier implements its Quality Assurance program.

The Project has proposed to adopt the Code of Federal Regulation 10 CFR 830.120, Quality Assurance, for the fabrication of the Baskets. The Office of Environmental Management (EM) and OCRWM have raised the question whether the Baskets perform a safety function and, if so, should they be governed by RW-0333P in order to comply with the Project policy as stated above. The Project believes that the assumptions for criticality control as reflected in the current analyses have significant built-in conservatism and a more realistic analysis would most likely demonstrate that even under the worst condition the Baskets do not serve a safety function. This approach is presently being discussed with EM and OCRWM and a decision whether a new analysis would be needed for resolving this issue is expected shortly. Every effort will be made to ensure that the November 2000 start of fuel removal date is not be impacted by the resolution of this issue.

**TOPIC: Defective Welds in Integrated Water Treatment System
(IWTS) Piping**

Issue: On May 27, 1999, the SNF Project identified a welding problem with the IWTS piping. Following this discovery, the ongoing installation activities associated with the IWTS were put on hold to determine the full extent of the problem.

Status: An extensive program was instituted to inspect all welds in the installed piping sections and in the piping sections that had not been installed. The noted imperfections were recorded on non-conformance reports and repairs were made where appropriate. An independent team of experts, in accordance with the provisions of applicable piping code (ASME B31.1), evaluated those imperfections which were not repaired and, determined them to be acceptable. The remaining installation activities were completed in time to meet the non-enforceable Tri-Party Agreement Milestone for completing construction of K-West IWTS by June 30, 1999.

Chem-Nuclear (CNSI), the prime vendor, is completing a root cause analysis associated with this finding. The welding was performed by Carolina Fabricators, a sub-vendor under CNSI.

The other equipment supplied by Chem-Nuclear (CNSI) was procured under ASME Section VIII (Vessels) program. The vessels, including the knockout pots, filter vessels, and settlers were inspected during fabrication by CNSI and Fluor Daniel Hanford (FDH) source inspectors. The inspection included welding procedures and processes, materials and dimensions, and verifications of welder certifications. Deficiencies noted during these inspections were documented and reworked, repaired, rejected, and/or accepted as is, in accordance with the supplier's or FDH corrective action program as applicable. Upon delivery to the site, receipt inspections were also performed on each vessel by FDH and site Acceptance Inspectors and found acceptable.

TOPIC: Fuel Retrieval System (FRS) Primary Cleaning Machine (PCM)

Issue: Delay in the delivery of the Primary Cleaning Machine (PCM) threatens the completion of the FRS installation at the K-West Basin. The PCM, a newly designed and one-of-a-kind equipment, was scheduled to be delivered to the site by April 30, 1999 to support a July 31, 1999 completion schedule for the construction and installation of the K-West Fuel Retrieval System. However, during the acceptance testing at the factory, the PCM wash basket split-bearing failed repeatedly as a result of excessive wear and galling.

Status: An independent team was assembled to analyze the original design and recommend modifications to resolve the problem. This team reviewed the existing PCM bearing design and test data, identified fundamental design problems, developed a modified split-bearing design (hybrid journal), and recommended a phased testing program to validate the redesign. These recommendations have been accepted and the original requirement to have a split shaft (a stainless steel screen drum) design, which contributed to the excessive wear and galling of the bearing, has been accommodated in the new wash basket and bearing design. The design changes reflect features of a fuel washing machine design that has been operating successfully at a Sellafield plant. Elements of the new design are as follows:

- DEVA metal surface in bearing cups (sintered metal with 6% graphite)
- Full journal at the drive peg to eliminate forces acting on basket halves and
- Split-journal inboard to allow a lower basket to be removed.

The PCM bearing design modifications and the factory acceptance testing were completed and the new PCM was delivered on August 30, 1999. The PCM will be installed in early September 1999, to support the September 27, 1999, revised schedule for completion of the FRS installation.

TOPIC: Design and Design Review

Issue: Following the recent issue associated with failure of the PCM, as originally designed, to pass the factory tests, a generic issue has been raised related to the quality of original design effort and the level of independent design review.

Status: Considering that all major equipment has been designed and delivered and installed or is in the process of being delivered and installed, the Project is formalizing plans for a phased start-up initiative which advances several FY00 and FY01 activities into an early FY00 time frame. The DNFSB members were briefed on this initiative during their trip to the site in July 1999. Among a number of significant benefits, this initiative is aimed at testing out equipment and processes under actual conditions which will allow early identification of problems, if any, and implementation of any modifications to support the Project schedule.

Additionally, a baseline change request for assessment of design verification was approved on July 14, 1999. The assessment will cover each sub-project under the Spent Nuclear Fuel Project and is intended to verify that all design reviews have been performed consistent with procurement requirements. Specifically, the assessment will address the following steps for each sub-project:

- verify that sub-project functions and requirements are satisfied;
- verify that design baseline documents are defined and under configuration management;
- review upper tier requirements and design verification documentation to assess the overall adequacy of the sub-project design verification activities; and
- perform reviews, as necessary, to provide confidence in the adequacy and technical quality of design and verification/validation activities.

The above assessments will be completed prior to the issue of the appropriate safety evaluation reports.

TOPIC: FRS Load Cells

Issue: During a review by the Board's staff of the FRS design, the Project was unable to provide justification for the deletion of load cells previously identified as necessary to verify scrap and fuel weights in the loaded baskets. This information may be needed to provide material accountability and to ensure that the reactive surface area is bounded by the safety analysis.

Status: The FRS Telescoping Stiff Back (TSB) Grapple System is utilized to transfer loaded fuel and scrap baskets from the K-Basins into MCO baskets. The design of this Grapple System has always included an integral load cell that is accurate to +/- 0.5%. In addition, calibrated test weights are provided in the process table to calibrate the load cell as required. The TSB grapple provides a local and remote read out for the load cell indication.

TOPIC: Other Design Issues

Issue:

(a) While the Cold Vacuum and Drying (CVD) sub-project indicated in February 1999 that it will upgrade the ventilation system fan and power supply to meet safety-significant requirements, the Project had not identified the installation location for the stand-by diesel generator as of May 1999.

(b) The CVD review team identified inconsistencies in the ventilation design and design documentation needed to support the issuance of air quality permits.

(c) The CVD review team identified the need to conduct reliability, availability, and maintainability analysis for the CVD to verify that the operational requirements for throughput during the processing campaign can be met.

Status:

(a) On May 26, 1999 the CVD project approved the Design Change Notice (DCN) that added the standby diesel generator to the facility design. This DCN was incorporated into the CVD FSAR prior to submittal to DOE for review and approval. The generator will be located approximately 100 feet northwest of the CVD building.

(b) The inconsistencies between the design of the ventilation system and the associated design documentation are being corrected. A Notice of Construction for the CVD was approved by the Washington State Department of Health (WDOH) and an update was submitted to the WDOH on June 15, 1999.

(c) The project has implemented the following measures to ensure that the reliability, availability and maintainability of the CVD facility are consistent with the throughput requirements:

- Although the CVD has a limited operating life requirement of three years, most of the equipment was designed with a lifetime of at least 10 years. In addition, component selection included buying reliable parts from qualified vendors with high quality industrial standards and good reputation. NQA-1 quality programs were also imposed, as required, on the off-site fabrication vendors.
- The operating environment of the CVD is relatively mild with low radiation doses anticipated. The facility was designed in a way that equipment can be easily removed and replaced.
- Where the process is critical or for items that need higher maintenance, redundancy is provided even if not required by the safety analysis.

In addition to the normal design, testing and validation process that any sub-project of the SNF Project goes through, the CVD has conducted a comprehensive (more than a year) testing program, First Article, of the process equipment. The First Article Testing program helped the

helped train operators, validated the assumptions on drying performance and the ones used by the thermal analysis models.

The spare parts list for CVD will be based on input from the First Article Testing lessons learned, the start-up testing program, Vendor's recommendations, and considerations affecting reliability, availability and maintainability found in previous Failure Mode Effects and Criticality Analyses including off-normal analyses conducted by the project with input from Engineering, Safety and Operations.

TOPIC: Funding for Rescheduled Activities & Overall Impact on Project

Issue: Project activities are increasingly being rescheduled to future dates, sometimes into the next fiscal year, using deviation notices to resolve technical issues and support other critical path activities. There is a concern that these activities may not be fully funded in the out years and may have a negative impact on the overall project schedule.

Status: Due to constraints in the FY 1999 SNF Project funding, some work activities have been moved into FY 00. A number of schedule and work adjustments had to be made also to resolve the technical issues that came up during the current fiscal year. These adjustments were made to ensure that the November 2000 start of fuel movement date is maintained. The contractor has made and continues to make considerable progress in the area of baseline management and project controls and it is fully expected that these rescheduled work activities will be conducted within the FY 00 budget.