

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 29, 1996

**MEMORANDUM**  
**FOR:** G.W. Cunningham, Technical Director  
**COPIES:** Board Members  
**FROM:** Donald J. Wille  
**SUBJECT:** Hanford Site - Review the Status of the Spent Nuclear Fuel Project Trip Report (April 15-17, 1996)

1. **Purpose:** This report documents a review of the status of the Spent Nuclear Fuel Project at the Hanford Site by Defense Nuclear Facilities Safety Board's (Board) technical staff, Donald J. Wille, Kent Fortenberry, and Lisa Stiles on April 15-16, 1996. On April 17, 1996, D. Wille and L. Stiles toured the K-Basins and the construction site for the Canister Storage Building (CSB).
2. **Summary:** The Spent Nuclear Fuel Project is currently on schedule to meet the milestone dates in the Implementation Plan for Board Recommendation 94-1 concerning N-Reactor spent fuel. The aggressive schedule for design and construction of the various subprojects has led to a phased approach for submittal of each of the related safety analysis reports (SAR). This approach is described in the Integrated Safety Management Plan, Rev. 1, issued in March 1996. The Department of Energy/Richland Field Office's (DOE-RL) review, approval, and issuance of a safety evaluation for each submittal are required to proceed to the next phase of design and construction. This revision of the Plan responds to the methodology and guidance of Board Recommendation 95-2, Safety Management, and will be reviewed by the Board's staff.

The pursuit of the Nuclear Regulatory Commission (NRC) regulatory equivalency is currently leading the project to consider application of different system safety classification approaches to the CSB design. The NRC equivalency would only apply to the facility mode of operation after the spent fuel is conditioned and sealed for interim storage. The contractor and DOE-RL have not approved this approach, which is unique and may lead to some confusion.

During the tour of the K-Basins, the facilities were in a "field day" status to improve housekeeping. Significant collection of waste to be removed was noted. At the CSB construction site, rebar and concrete forms for walls were being installed. The start of pouring of concrete was dependent upon acceptable strength of a test mix of concrete from the supplier. The test mix passed testing on 4/23/96.

3. **Background:** The Spent Nuclear Fuel Project at Hanford was established to provide the facilities and equipment needed to begin removing the N-Reactor spent fuel from the K-Basins by the end of 1997 and to complete removal by the end of 1999. Interim storage of the conditioned spent fuel will be in the new CSB. Removal of the sludge

and debris from the K-Basins will be complete by November 30, 2000. These dates are consistent with the commitment dates in the Implementation Plan for Board Recommendation 94-1.

#### 4. **Discussion**

**Spent Nuclear Fuel Project** - The stabilization of the N-Reactor spent fuel and interim storage of the fuel away from the Columbia River will be accomplished by five interrelated subprojects as follows:

- a. **K-Basins** - Modification of the facility and operations will permit spent fuel retrieval, cleaning, and repackaging in Multi-Canister Overpacks (MCO).
- b. **Transportation** - The MCO will be loaded into a cask and onto a transporter for on-site movement between facilities.
- c. **Cold Vacuum Drying** - A new facility next to the K-Basins will drain and remove water from the MCO.
- d. **Canister Storage Building** - This new facility will provide temporary, monitored storage of drained and dried MCOs and interim storage of conditioned MCOs until shipment to a repository.
- e. **Hot Conditioning System** - This facility will be adjacent to the CSB for hot conditioning of the spent fuel and sealing of the MCO for interim storage.

**Safety Analysis Approach** - The Spent Nuclear Fuel Project recently issued Revision 1 of the Integrated Safety Management Plan that provides a phased approach to the submittal of the SAR for each of the subprojects to meet the accelerated design and construction schedules. Safety-related information provided at each phase of the subproject would be sufficient for DOE to approve start of the next phase, e.g., design, construction, and equipment purchase. The collected and updated information for each subproject would be issued as a SAR for DOE's evaluation and approval, and provide the basis for authorization of facility startup. Approval of the start of construction of the CSB in April was based on numerous reports and documents, including a Preliminary Safety Evaluation and DOE's review comments. The approval was provided only for the substructure portion of the facility (vault), and subsequent approvals will be needed for construction of the deck at grade level and the superstructure. The phased approaches minimize the project risk by identifying all assumptions and issues open at each phase and provide a means for resolution, such as the fuel and sludge characterization program.

**Regulatory Equivalency** - As part of the Integrated Safety Management Plan, the project has established design criteria that provide equivalency to NRC requirements for independent spent fuel storage facilities based on 10 CFR 72. The safety analysis group at Westinghouse Hanford Company (WHC) reviewed several recent NRC approvals of license applications for dry spent fuel storage facilities. It determined that NRC required structures, systems, and components (SSC) to be Important to Safety if the SSC is required to prevent any measurable radiation release at a distance of 100 meters from the facility following a design basis accident. Important to Safety is considered by WHC to be safety class in DOE terminology. Postulated accidents for the CSB may require a safety class ventilation system with high efficiency particulate air filters if this approach is applied to handling and staging of the MCO prior to the

hot conditioning and sealing of the MCOs for interim storage. The safety analysis group has proposed that the NRC equivalency requirement in this instance be applied only to the facility mode for handling and storing MCOs after conditioning and sealing, and that DOE requirements for safety class and safety significant classification per DOE STD-3009 be applied to the facility mode of operation when handling and storing pre-conditioned MCOs. WHC management and DOE have not yet approved this interpretation and approach.

***K-Basins Activities*** - Fuel and sludge samples from the K-Basins will be characterized to establish the basis for spent fuel conditioning process parameters and to determine the acceptability for various disposal methods for the sludge. Samples of the sludge from K-East Basin were being collected during the Board's staff visit. The debris removal process has started for some 2000 excess canisters in the K-East Basin by developing a high pressure washing station to remove sludge and loose corrosion from the inside and outside surfaces of the canisters. The removed material is collected in a separate pit for later disposal with other sludge in the basin. The cleaned canisters are loaded two canisters to a 55 gallon drum and crushed to a height less than 3 inches for disposal in an appropriate landfill.

5. **Future Staff Actions:** The Board's staff plans to review the following:
  - a. Spent Nuclear Fuel Project Integrated Safety Management Plan, WHC-SD-SNF-012, Rev.1, March 1996.
  - b. Documentation supporting the approval to start construction of the vault portion of the CSB.