

**Department of Energy**

Washington, DC 20585

May 24, 1996

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DNF SAFETY BOARD

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

Dear Mr. Chairman:

This letter is in response to your letter dated December 15, 1995, which summarizes the Defense Nuclear Facilities Safety Board's (Board) staff observations from a review of the design criteria for the Spent Nuclear Fuel Project's Canister Storage Building (CSB) at Hanford. The December 15, 1995, letter also identified the Board's concern that the evolutionary process of defining design criteria could contribute to an inadvertent compromise on safety requirements and noted the importance of resolving design criteria issues early in the design process.

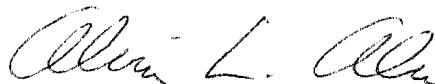
The U.S. Department of Energy (DOE) agrees with the Board on the importance of resolving design criteria issues for the CSB early in the design process. DOE understands the associated risks and is carefully managing the design evolution and is aggressively working to resolve these issues in a timely manner without compromise to CSB safety requirements. DOE has engaged in productive discussions with the Board's staff and is actively working these issues to resolution. Seismic, safeguards and security, and other design criteria documentation is currently being reviewed by the Board's staff. As you may know, we did not receive funding from Congress to start detailed design of the CSB until seven weeks into Fiscal Year 1996. The project schedule for constructing the CSB has always been extremely tight, and the seven-week funding delay has the potential of impacting the start date for fuel removal. However, at this time we are not slipping our December 1997 start date.

Enclosed are current dispositions of the specific Board staff observations identified in your letter. Forwarded to your staff under separate correspondence was the Spent Nuclear Fuel Project Seismic Design Criteria Nuclear Regulatory Commission Equivalency Report (WHC-SD-SNF-DB-004), Rev 2, January 1996, which is discussed in the dispositions to the Board's staff observations.



The Board's staff have had continued involvement in design criteria discussions since they were briefed on the technical status and approach for resolving generic Hanford Site seismic issues at a meeting in Chicago, Illinois, on December 15, 1995. If any additional briefings would be helpful, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Alvin L. Alm".

Alvin L. Alm  
Assistant Secretary for  
Environmental Management

Enclosures

ENCLOSURE

RESPONSES TO BOARD STAFF OBSERVATIONS  
ON CANISTER STORAGE BUILDING DESIGN CRITERIA

This enclosure provides current dispositions to the Board's staff observations identified in a November 20, 1995, Board memorandum from A. H. Hadjian to G. W. Cunningham. This memorandum was attached to a December 15, 1995, letter from the Honorable John T. Conway to Mr. Thomas P. Grumbly. Additionally, the document, Spent Nuclear Fuel Project Seismic Design Criteria Nuclear Regulatory Commission Equivalency Report, (WHC-SD-SNF-DB-004, Rev. 2) prepared for the DOE Spent Nuclear Fuel Project Division by Westinghouse Hanford Company (WHC) in December also addresses many of the Board's staff observations.

Notwithstanding specific observations, the Board's staff has indicated that they encountered difficulty in understanding how Nuclear Regulatory Commission (NRC) equivalency is to be achieved for the Spent Nuclear Fuels Project (SNFP) and more specifically the Canister Storage Building (CSB). The DOE policy on NRC equivalency for the CSB is documented in an August 1995 memorandum from Thomas P. Grumbly as, "The K-Basin Spent Nuclear Fuel Project will achieve nuclear safety equivalence to comparable Nuclear Regulatory Commission (NRC)-licensed facilities. This will be accomplished by applying requirements from comparable licensed facilities and by adopting appropriate features of the NRC licensing process, in addition to applicable DOE Orders and requirements." The DOE is not seeking endorsement from the NRC in implementing our regulatory policy.

In developing the policy, the Department recognized the need to provide for independent functions similar to the role performed by the NRC for the commercial nuclear industry. To fulfill this need, the SNFP instituted two oversight groups titled the Regulatory Requirements Team (RRT) and the Independent Review Panel (IRP). The RRT, comprised of technical personnel from Westinghouse Hanford Company, DOE-Headquarters and the Richland Operations Office, is chartered to resolve technical issues evolving from the application of NRC nuclear safety equivalency requirements to the SNFP. Additionally, the IRP, which is mandated by the NRC equivalency policy, judges when NRC equivalency has been adequately achieved. The IRP functions autonomously of the SNFP staff and the RRT and reports directly to the Manager of RL. The IRP is comprised of senior technical subject matter personnel having applicable Nuclear Regulatory Commission expertise. The results of review activities conducted by the RRT and IRP, and the bases for decisions, are documented in available reports.

Regarding the CSB seismic design criteria, DOE believes that adherence to DOE Order 5480.28 produces a design with an adequate level of seismic risk protection. Furthermore, the latest WHC seismic report is an example of the implementation of NRC nuclear safety equivalency policy with respect to the CSB seismic design requirements and has extensive review by both the RRT and IRP.

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Current dispositions of specific Board staff observations:

Issue a.1: Confusion exists relative to the performance categorization and hence the seismic design level (e.g., even though it is claimed that the facility is designed to 0.35g [which might be associated with PC4] with NUREG-0098 spectra, handouts during the meeting indicate a 0.23g spectrum associated with PC3).

Response: Subsequent to the Board staff visit on October 19, 1995, the performance categorization and seismic design level for the CSB has been clarified. The CSB has been classified according to the Natural Phenomena Hazards Performance Criteria outlined in DOE Order 5480.28 as PC-3. The seismic design for PC-3 specifies a 2,000 year return period which, based on the probabilistic seismic hazard assessment of the Hanford Site, equates to about a 0.23g peak horizontal ground motion at the CSB site. The CSB was designed to a Newmark and Hall median horizontal design spectra "anchored" at 0.35g, equating to about a 5,000 year return period. The vertical spectrum has been developed from the horizontal spectrum using draft American Society of Civil Engineers (ASCE) standards. The design criteria for all structures, systems, and components in the CSB that are identified as Safety Class (SC) 1 will meet this same 0.35g seismic design criteria. Therefore, the 0.35g seismic design response spectra applied to the CSB conservatively envelopes the PC-3 response spectra over the entire range of frequencies for both horizontal and vertical response spectra.

Issue a.2: The site seismic hazard report (probabilistic) and the recently developed letter report (deterministic), both by Geomatrix, have not been reviewed and evaluated by the Board's staff and outside experts.

Response: The Geomatrix reports, Probabilistic Seismic Hazards Analysis - DOE Hanford Site, WHC-SD-W236A-TI-002, 1994, and Seismic Design Spectra 200 West and East Areas - DOE Hanford Site, WHC-SD-W236A-TI-016, 1994, and the Geomatrix deterministic assessment letter report have been forwarded to and discussed with the Board staff at the December 15, 1995, meeting. Revision 1 of Geomatrix report, has been issued and a copy of the revised report forwarded to the DNFSB.

Issue a.3: A longer design life is being considered than the currently specified design criteria of a 75-year life for the structure and a 40-year life for systems and components.

Response: The CSB structure, systems, and components are being designed for a 40-year design life. If the service life of the facility is extended beyond 40 years, then an appropriate analysis will be performed.

Issue a.4: The Yakima Ridge has not been considered in evaluating the seismic hazard even though it is parallel with and between Gable Mountain and Rattlesnake Mountain folds and plunges beneath the site.

Response: The Yakima Ridge has been considered in the evaluation and was discussed at the December 15, 1995, meeting in Chicago, Illinois. (See response to issue a.2)

Item b: Tornado design criteria, as defined in site Criteria 4-1, are not consistent with the most recent probabilistic tornado hazard defined for the site area. It also is not clear how the precipitation requirements of DOE Standard 1020 are being addressed, or how volcanic effects are being considered in design.

Response: The tornado design criteria, as defined in the site criteria (SDC 4.1, Revision 12) are consistent with the most recent probabilistic tornado hazard studies for the site as defined by UCRL-53526 and NUREG/CR-4492. No tornado criteria is applicable at the Hanford Site using either UCRL-15910 or DOE Order 5480.28 guidance. The tornado design criteria used at the Fast Flux Test Facility (FFTF) reactor, an NRC reviewed and licensable reactor, were included in the SDC 4.1 for FFTF only. However, for the design of the CSB, tornado criteria are being applied. The 200 mph maximum tornado and the pressure drop of 0.90 psi at 0.3 psi/sec shown in Table 2-1 of NRC's NUREG-1503 (Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design, July 1994) are being used in the design of the CSB. In addition, Missile Spectrum II (per Section 3.5.1.4 of NRC's NUREG-0800, Standard Review Plan) but modified for lower horizontal impact velocities will be used as the design basis tornado missile spectrum for the CSB. The revised tornado design criteria and tornado missile spectrum are consistent with the NRC's Safety Evaluation of Washington Public Power Supply System (WPPSS) Nuclear Project No. 2 [as transmitted in a letter from Clifford (NRC) to Parrish (WPPSS) on January 24, 1996].

The Performance Goals for flooding due to local precipitation will be met by using the mean flood hazard annual probabilities in DOE Standard 1020 for defining precipitation. Since the CSB has been classified as a PC-3 facility (refer to response for Issue a.1, above), the associated mean flood hazard annual probability is  $1 \times 10^{-4}$ . The precipitation values for these probabilities will be estimated based on *Hydrometeorological Report No. 57* (1994) and on Hanford Site meteorological data. Recent USGS probabilistic based volcanic hazard studies will be used as the design basis for ashfall criteria.

Issue c: Although the principles of defense-in-depth are specified, the current design criteria are not clear on the requirement for double confinement of the fuel (i.e., primary and secondary confinement are not specified). Facility configurations and hence designs cannot be finalized without this issue being resolved.

Response: Double confinement of the SNF at the CSB vault is achieved as follows: primary confinement is achieved by the Multi-Canister Overpack (MCO); and secondary confinement is provided by the vault tube. The MCO components essential for criticality control and those providing fuel containment will be designed as Safety Class 1; the vault tube and the operating floor down to the CSB foundation will all be designed as Safety Class 1 structure. The MCO Handling Machine (MHM) provides secondary confinement for the SNF prior to emplacement in the vault tube. The MHM has been determined to be a Safety Class 2 component.

Issue d: It is not clear to what extent security and safeguards requirements as they affect design have been considered to date (e.g., explosion, malevolent vehicle or small aircraft crash). The current design criteria simply require that security and safeguards measures be incorporated. However, these measures have not yet been defined and could severely impact both the configuration and the design of the building.

Response: Since the CSB is a Hazard Category 2 facility, a preliminary assessment of safeguards criteria per DOE orders, specifically the requirements of DOE Order 5632.1C, and impending rules was completed in October 1995 and is incorporated into the facility requirements. An evaluation of alternatives to satisfy the requirements is on-going and the approach will be finalized prior to issuing the design of the CSB operating deck.

A Vulnerability Assessment Phase I was completed in January 1996. Preliminary concerns have been identified and the CSB design modified accordingly. Phase II Vulnerability Assessment was initiated in February 1996, and has been issued in draft April 4, 1996. The assessment will be finalized by the end of April. Issues raised by this assessment affecting the design of the operating deck or the substructure will be resolved and incorporated into the design documents by May 1996, prior to construction of these items.

This approach is consistent with DOE policy as stated in DOE Order 5632.1C where safeguards criteria will continue to be factored into the facility design as DOE continues with this phased approach.