DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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February 4, 2005

Mr. Paul M. Golan
Acting Assistant Secretary for
Environmental Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0113

Dear Mr. Golan:

Enclosed is a report detailing observations of members of the staff of the Defense Nuclear Facilities Safety Board (Board) concerning fire protection for the Hanford Waste Treatment Plant. These observations were developed through document reviews and discussions with representatives of the Office of River Protection (ORP) and Bechtel National Incorporated (BNI) on November 16–18 and December 20–23, 2004.

In general, ORP and BNI personnel recognize the need for follow-up actions that would address the issues noted by the Board's staff. A detailed discussion of these issues is provided in the enclosed report, which is forwarded for your information and use as appropriate.

Sincerely,

John T. Conway
Chairman

c: Mr. Roy J. Schepens
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

January 13, 2005

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: C. March

SUBJECT: Review of Fire Protection, Hanford Waste Treatment Plant

This report documents a review of fire protection for the Waste Treatment Plant (WTP) at the Hanford Site, conducted November 16–18, 2004, and follow-on teleconferences conducted on December 20 and 23, 2004. Members of the staff of the Defense Nuclear Facilities Safety Board (Board) discussions with personnel from the Department of Energy's (DOE's) Office of River Protection (ORP) and Bechtel National Incorporated (BNI) to conduct this review.

Purpose. The purpose of the staff's site visit was to review the current state of fire protection at WTP facilities and receive an update on the status of open fire protection issues. During the visit, the Board's staff observed the initial fire protection system installations and discussed the status of the pending structural steel fire resistance coatings with the installation contractor. The staff also reviewed the Preliminary Fire Hazards Analyzes (PFHA), International Building Code Evaluations, and Life Safety Code Evaluations, as well as the status of other specific fire protection issues.

Observations. The following issues were discussed during the staff's visit and will require follow-on action as noted.

Status of Design of Structural Fire Resistance Coatings—BNI has prepared preliminary design drawings identifying the structural steel requiring fire resistance ratings, based on the requirements of the International Building Code (IBC), 2000 edition, and DOE Standard 1066-97, *Fire Protection Design Criteria*. Three types of coatings (intumescent, high-density cementitious, and low-density cementitious) and rated walls will be used in various areas, depending on cost and the impact resistance needed for the coatings.

All of the primary structural steel for the Pre-Treat Facility will be protected in accordance with the requirements of the IBC, given the size and building code hazard classification of the building. Much of the primary steel in the high-level waste and low-activity waste vitrification facilities will be protected according to the requirements for fire area separations in DOE Standard 1066-97; exceptions are the roof and isolated areas of the other floors, where no fire area separations are required. The excepted areas are allowed since the IBC requires no steel ratings after application of IBC Section 503.1.2, given the size and building code hazard classification of the building. Some isolated primary steel in the Analytical

Laboratory Facility (LAB) will be protected in accordance with the requirements for fire area separations in DOE Standard 1066-97. Other areas of the LAB will not be protected since the IBC requires no steel ratings for these areas given the size and building code hazard classification of the building.

BNI has provided drawings showing the extent of the structural steel fire resistance ratings based on BNI's qualitative analysis. The staff's preliminary review of the areas that will not require structural steel protection revealed that the lack of protection for many of these areas is justified. BNI has agreed to furnish additional documentation on the basis for exempting specific areas from protection. The Board's staff is continuing to review the drawings provided by BNI.

Status of Installation of Structural Steel Fire Resistance Coatings—BNI recently contracted with Clayton Coatings, Incorporated to install the structural steel fire resistance coatings. The contractor is mobilizing and outfitting a temporary building where intumescent coatings will be shop applied to the steel requiring intumescent coatings prior to erection. The contractor is also preparing to start coating of the erected steel. When asked about the ability to install the coatings on the already erected steel, representatives of Clayton Coatings explained that there were no areas in which the required coatings could not be applied, although some areas could be difficult given the equipment already installed.

Discussions with Hanford Fire Department—The Hanford Fire Department (HFD) provides fire suppression services for WTP. The firefighters conduct frequent familiarization tours of WTP to remain aware of changing conditions. The current HFD Baseline Needs Assessment (BNA) recommends construction of a new fire station near WTP to provide adequate long-term response for the site, anticipating future closings of HFD facilities as the Hanford Site undergoes decommissioning and demolition work. This new fire station is not planned as part of the WTP project. While existing response requirements are being met, future reductions may challenge the HFD's ability to respond promptly to emergencies at WTP. Given the location and nature of the hazards involved, mutual aid from nearby municipal fire departments would be of little value. The HFD is planning to update the BNA in 2005 and will revisit the need for a new fire station. The staff will continue to follow the implementation of the BNA's recommendations.

Other Discussions—ORP and BNI addressed a series of questions resulting from the staff's review of the Preliminary Fire Hazards Analyzes, the International Building Code Evaluations, and the Life Safety Code Evaluations. All the staff's questions were addressed during the review. Two questions remain open and will require further information from DOE and BNI:

- The staff questioned BNI's building code hazard classification of ceric nitrate (used in decontamination of the high-level waste glass canisters) as a less hazardous Class 1 oxidizer instead of a more conservative Class 2. Based on the research conducted by Hughes Associates, Incorporated after the fire at the Rocky Flats Environmental

Technology Site in May 2003, the Board's staff believed this material might qualify as a Class 2 oxidizer. Subsequent to the staff's visit, BNI provided additional information on the classification of the ceric nitrate. Based on this information and discussions during a teleconference held on December 20, 2004, the staff now agrees that the ceric nitrate in solution with 0.5 molar nitric acid, as stored and used in decontamination of the high-level waste canisters, is properly classified as a Class 1 oxidizer. In accordance with the Rocky Flats fire investigation, however, the PFHA needs to be updated to reflect the hazard that can result from contact of the 0.5 molar ceric nitrate solution with organic materials and to incorporate appropriate safety controls.

- The WTP PFHAs state that all electrical cabling is required to meet the flame-testing requirements of Institute of Electrical and Electronics Engineers (IEEE) Standard 383-1971, *Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations*, and IEEE Standard 1202-1991, *Standard for Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies*, as well as Underwriters Laboratory (UL) standards, as applicable. During the visit, BNI informed the staff that some specialty tray cables for WTP may not be compliant with the requirements of these two IEEE standards, although they will at least be UL listed for cable tray use. All important-to-safety cabling will be rated in accordance with the two IEEE standards. During a conference call on December 23, 2004, BNI confirmed that specifications for all non-important-to-safety tray cables will require IEEE Standard 1202 qualification.