National Nuclear Security Administration

Department of Energy
National Nuclear Security Administration
Washington, DC 20585

JUN 1 6 2011

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004

Dear Mr. Chairman:

This letter is in response to your April 20, 2011, letter concerning the Safety Posture of the Y-12 National Security Complex. A report and briefing were requested in your letter addressing the technical bases for: (1) determining that the toxicological and chemical hazards in a defense nuclear facility need not be considered in designating safety significant structures, systems, and components (SSC); and (2) the Y-12 Site Office (YSO) guidance to the contractor to investigate the possibility of re-evaluating the safety designation of Highly Enriched Uranium Materials Facility (HEUMF) controls for a design basis fire. On May 17, 2011, I informed you that I needed an additional 30 days to complete the report, and the Defense Nuclear Facilities Safety Board (Board) was briefed by National Nuclear Security Administration (NNSA) personnel on May 18, 2011.

During the briefing to the Board, NNSA stated that the current requirement is to evaluate hazardous material as defined in DOE-STD-3009, including material with a Health Hazard Rating of 3 or 4 per National Fire Protection Association 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, in a Documented Safety Analysis (DSA). NNSA has reiterated this guidance in the most recent Technical Bulletin, and YSO safety analysis for the Uranium Processing Facility (UPF) and HEUMF will comply with this guidance. The briefing also provided an opportunity for a candid discussion on the basis for YSO's direction to the contractor to investigate the possibility of reevaluating the safety control set for the design basis fire as part of the next annual HEUMF DSA revision. We are committed to ensuring that HEUMF has an adequate safety control set. As the analysis progresses, we plan to share information with you and your staff and solicit feedback prior to reaching a decision. Since the concerns of addressing toxicological and chemical hazards were resolved at the briefing, the requested enclosed report is limited to a brief summary.

If you have any questions, please contact James McConnell, Assistant Deputy Administrator for Nuclear Safety, Nuclear Operations, and Governance Reform, at (202) 586-4379.

Sincerely,

DONALD L. COOK
Deputy Administrator
for Defense Programs

Enclosure

cc: M. Campagnone, HS-1.1
T. Sherry, YSO

DOE F 1325.8
(10/00)

United States Government **Department of Energy**

National Nuclear Security Administration
COR-Y12-6/14/2011-72964

memorandum

DATE: **June 14, 2011**
REPLY TO
ATTN OF: Y12-50:Karne

SUBJECT: **RESPONSE TO DEFENSE NUCLEAR FACILITIES SAFETY BOARD REQUEST CONCERNING THE Y-12 SAFETY POSTURE**

TO: Dr. Donald L. Cook, Deputy Administrator for Defense Programs, NA-10, FORS

On April 20, 2011, the Defense Nuclear Facilities Safety Board (Board) issued a letter with a 30 day reporting requirement for a report and brief addressing the Y-12 Site Office (YSO) effort to reevaluate the classification of controls at the Highly Enriched Uranium Material Facility (HEUMF).

During the Board visit on May 17-18, a briefing addressing the issues was provided to the Board. The toxicological issue was resolved and agreement was reached that YSO would update and engage staff as the safety designation of HEUMF Secondary Confinement System (SCS) was reevaluated during the annual update of the HEUMF Documented Safety Analysis currently due October 2011.

The attached documents include a report developed by YSO with input from Babcock and Wilcox Technical Services Y-12, LLC that provides the technical bases for reevaluation of the safety system designation of the HEUMF safety controls to verify they are appropriately classified. The SCS is the only HEUMF safety control being reevaluated.

If you have any questions concerning this letter or report, please contact me at (865) 576-0752 or your staff may contact Narsaiah Karne at (865) 574-6955.

for Theodore D. Sherry
Manager
Y-12 Site Office

Attachments

cc w/attachments:
Don Nichols, NA-1, FORS
James McConnell, NA-17, FORS
Andrew Delapaz, NA-171, GTN
Amanda Anderson, HS-1.1, FORS
Wayne Andrews, 301BCR, MS8009, DNFSB
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cc w/o attachments:
Tom Vereb, Y12-10, YSO
Mary Hitson, Y12-20, YSO
Donat Pierre, Y12-40, YSO
Ken Ivey, Y12-50, YSO
Jim LaForest, Y12-60, YSO

Attachment

REPORT ADDRESSING THE PATH FORWARD FOR EVALUATING CLASSIFICATION OF THE HIGHLY ENRICHED URANIUM FACILITY SECONDARY CONFINEMENT SYSTEM AND ANALYSIS OF TOXICOLOGICAL HAZARDS

Prepared by:
National Nuclear Security Administration
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1.0 Purpose

The purpose of this report is to address the issues identified in the April 20, 2011, letter from the Defense Nuclear Facilities Safety Board (Board) to the National Nuclear Security Administration (NNSA). This report provides a response addressing each of these items and is consistent with the briefing provided to the Defense Board on May 18, 2011. The issues identified by the Board are as follows:

- the technical basis for directing the Y-12 contractor to consider downgrading safety-related controls for the HEUMF, and the safety benefits expected to be gained by this action;
- the technical basis for determining that toxicological and chemical hazards in a defense nuclear facility need not be considered in the designation of safety-significant structures, systems, or components during the development of safety basis documents; and
- The basis for deviating from the requirements of 10 CFR Part 830 and excluding some toxicological hazards from being analyzed during the safety basis development process for the Uranium Processing Facility (UPF) project.

2.0 References

DOE-STD-3009-94, *DOE Standard Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analysis*

DOE-STD-1189-2008, *Integration of Safety into the Design Process*

SER-9720-82-R1, *Safety Evaluation Report for the Highly Enriched Uranium Material Facility*, September 2010

Letter from Robert L. Smolen, Deputy Administrator for Defense Programs to the Honorable A .J. Eggenberger, Chairman, DNFSB, May 15, 2008

Y74-48-006, *System Functional Classification and Natural Phenomena Performance Criteria*

NNSA Technical Bulletin (draft), 2011-1, May 2011

3.0 Discussion

The Board requested additional information on the technical bases for: 1) re-evaluation of the safety system designation of the Highly Enriched Uranium Material Facility (HEUMF) safety controls to verify they are appropriately classified. The Secondary Confinement System (SCS) is the only HEUMF safety control being re-evaluated, and 2) the basis for evaluation of toxicological and chemical hazards and compliance with 10 CFR 830.

3.1 HEUMF Secondary Confinement System

The Secondary Confinement System has been designated as safety significant (SS) since the Preliminary Documented Safety Analysis (PDSA) was approved in 2004. The PDSA stated in Section 4.4.2: "Although the accident analysis process does not consider the secondary confinement system in the determination of the mitigated consequences of a design basis fire, the secondary confinement system (SCS) is designated with a functional classification of Safety-Significant." This designation was carried forward into the Documented Safety Analysis (DSA) and Technical Safety Requirements (TSR) that were approved in 2008. The accident analysis credited many other safety significant criteria for preventing or mitigating the design basis fire. The Safety Class structures, systems and components (SSCs) include facility structure, storage racks, rackable can storage boxes, and drum tray skids. Safety Significant (SS) SSCs include fire barriers, fire water distribution, and fire water sprinkler system.

In 2006, the existing version of the contractor's procedure, Y74-48-006, stated that: "[A]n SSC **may be** designated as SS if it provides a safety function to reduce estimated unmitigated radiological consequences that are greater than or equal to 5-rem Total Estimated Dose Equivalent (TEDE) at distances greater than or equal to 100 m from the facility." With the issuance of DOE-STD-1189 in 2008, the procedure was revised to require SS designation when the collocated worker dose was greater than 100-rem.

For HEUMF, the original calculations for mitigated and unmitigated consequences were performed using a different computer code (i.e., HGSYSTEM/WAKE) and different parameters than were used in the first annual update. In the DSA update, the contractor used the toolbox code, MACCS2, and the parameters specified in the May 15, 2008, letter from NNSA to the Board. The dispersion coefficient (χ/Q) for the collocated worker is based upon the default value provided in DOE-STD-1189. A summary of the parameter and results from the HEUMF DSA is listed in Figure 1.

Based upon this evolving information, the off-site and collocated consequences did not change appreciably, even considering an increase in the design basis fire (two fork lift trucks instead of one). The recommendation to consider the possibility of reevaluating the safety designation of HEUMF SCS was not made until this new analysis in the annual update (the highest exposure to the collocated worker during a design basis fire was 17 rem) was reviewed and approved by YSO. After the review of the HEUMF DSA and TSR, YSO requested that Babcock and Wilcox Technical Services Y-12, LLC, (B&W Y-12) revaluate the classification of controls based upon the low doses. The reevaluation is focusing on the SCS classification. The contractor is expected to provide the safety analysis and evaluation supporting any potential change in safety classification of the HEUMF SCS during the next annual safety basis update cycle. The evaluation and updated analysis will comply with DOE requirements and provide a basis for a final decision. We will provide the Board Staff with information as the re-evaluation progresses and will solicit their advice before any decision is made.

3.2 Technical Basis for Evaluating Toxicological and Chemical Hazards and Compliance with 10 CFR 830

B & W Y-12 will evaluate the effects of toxicological and chemical hazards in safety basis documents. The evaluation will meet the requirements in 10 CFR 830 and DOE-STD-3009 or DOE-STD-1189. In NNSA Technical Bulletin 2011-1, this issue is included in a Q&A format. The answer given is that "...hazardous materials as defined in the standard (DOE-STD-3009) including material rated with a Health Hazard rating of 3 or 4 in NFPA 704 must be evaluated in a DSA that is written to comply with DOE-STD-3009."

The contactor will analyze the potential releases or effects of these materials through the hazard and, as appropriate, the accident analysis. The Safety Design Strategy for the Uranium Processing Facility (UPF) will be revised. The contractor will analyze the toxicological consequences in the Preliminary Safety Design Report and the PDSA. Also, B & W Y-12 will revise the HEUMF DSA to analyze toxicological consequences similar to UPF. YSO will review and approve both analyses.

Parameter	**Rev 1**
Computer Code	MACCS 2
ARF	E-03
Damage Ratio	0.5/0.1
MAR	14640 Kg (0.5 DR)
	14400 Kg (0.1 DR)
DCF Public (CTA Guidance)	ICRP 72
DCF Collocated (CTA Guidance)	ICRP 68
Breathing Rate (CTA Guidance)	3.30E-04 m^3/s
χ/Q –collocated (STD-1189)	3.50E-03 s/m^3
χ/Q – public	1.37E-04 s/m^3
Lift Trucks	2
Dose (TEDE)	
Collocated	17 Rem
Public	<1 Rem

Figure 1 HEUMF Consequence Calculation