National Nuclear Security Administration

Department of Energy
National Nuclear Security Administration
Washington, DC 20585

May 15, 2008

The Honorable A. J. Eggenberger
Chairman, Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW
Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

I am responding to your letter to Thomas D'Agostino, dated January 17, 2008. One of the key goals of the revision and implementation of 10CFR 830 Documented Safety Analysis at the Y-12 National Security Complex was to ensure a conservative hierarchy of safety controls to prevent and mitigate the hazards in Y-12 nuclear facilities. I appreciate the Defense Nuclear Facilities Safety Board's (DNFSB) vital role in providing oversight of the methodology used in developing safety basis and your resultant follow-up on concerns with the values being used for several factors supporting safety analysis at Y-12. As noted in your letter, we have been working with your staff to clarify the appropriate use of airborne release fractions (ARF) for accident analysis at Y-12, and the development of a plan to apply this methodology to existing and new facilities at Y-12. You were briefed on these activities on April 29, 2008.

In a recent DNFSB staff review of the Uranium Processing Facilities (March 13), B&W Y-12, LLC (B&W Y-12), and the Y-12 Site Office (YSO) conducted discussions on the applicability and selection of ARF and respirable fractions (RF) for Non-reactor Nuclear Facilities in addition to other accident analysis factors. Feedback from the review was encouraging and progress was made in developing a path forward to address concerns with the Y-12 site's selection of ARF and RF values. Y-12 will use the bounding value for ARF and RF from DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Functions for Nonreactor Nuclear Facilities,* (i.e. 1E-3 and 1.0 respectively, for uranium) and will address the unique burning characteristics of bulk uranium metal by applying a damage ratio. Appropriate damage ratio selections will have a supported technical basis that could include using the data from the experiments cited in the handbook. In addition, Y-12 has drafted a nuclear safety research and development proposal to conduct new bulk uranium burn testing. Such testing, when conducted, could better define the technical basis of a Uranium ARF and allow updating site accident analysis parameters and potentially the Department of Energy handbook.

Based on the results of the briefing and the staff discussions, B&W Y-12 and YSO also came to agreements on several other parameters required to conservatively estimate accident consequences. The enclosure outlines the overall approach for the selection of other accident

analysis factors to be used at Y-12 for the development of nuclear facility Documented Safety Analyses.

I appreciate the efforts of your staff as we proceed to develop a path forward at Y-12 to clarify the use of bounding airborne release fractions and other parameters applied in accident analyses at Y-12.

If you have any questions, please contact Michael Thompson at (202) 586-6058.

Sincerely,

Robert L. Smolen
Deputy Administrator for Defense Programs

Enclosure:
Addendum

cc w/enclosure:
Jim McConnell, NA-10, FORS
Robert Smolen, NA-10, FORS
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SEPARATION

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Overall Approach for the Selection of Accident Analysis Factors

This enclosure outlines the overall approach for the selection of accident analysis factors to be used at Y-12 for the development of nuclear facility Documented Safety Analyses (DSAs) as discussed in the recent March DNFSB staff review of the Uranium Processing Facility. Feedback from the review was encouraging and resulted in the following preliminary conclusions on methodology for accident analysis:

- Dispersion modeling will be performed using the DOE Toolbox Code MACCS2.
- Urban surface roughness based on use of the Briggs-Urban Coefficients with a nominal surface roughness range of 50-100 cm, will continue to be used for existing facilities based on the technical supporting documents.
- Due to the footprint reduction envisioned with Y-12 modernization and to be conservative in early design stages of new nuclear facilities, we will utilize an appropriate Rural surface roughness.
- In accordance with existing DOE Guidance and DOE-STD-1189, UPF will utilize MACCS2 Code with Y-12 site meteorological data and dry deposition of 1 cm/s, and utilize POSTMAX to obtain a 95^{th} percentile directionally dependent cumulative distribution.
- ICRP-72 dose conversion factors and a breathing rate of 3.3E-4 m^3/s in accordance with existing DOE Guidance will be used for consequence modeling.
- Damage ratios other than unity will be applied, as appropriate, and will have a supported technical basis that could include using data from experiments cited in the handbook.

Utilization of these factors for existing nuclear facilities will be proposed as part of an overall path forward. The existing facilities may continue to use the previous analysis with inclusion of a formal sensitivity analysis in the respective DSAs. The sensitivity analysis will use the parameters as presented above. A decision on the impact to safety functional classification based on the sensitivity analysis will be made. Where a need for change in safety functional classification is demonstrated with the sensitivity analysis, the facility accident analysis will be updated using the parameters described above. Where no change in safety functional classification is demonstrated by the sensitivity analysis, the analysis may not be updated based on the expected life of the facility and the potential benefits to the facility compared to the cost of updating the analysis.