UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 28, 2015

MEMORANDUM TO: Anthony Hsia, Deputy Director
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

FROM: Matthew Gordon, Risk Analyst **/RA/ M. Rahimi for**
Criticality, Shielding and Risk Assessment Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

SUBJECT: SUMMARY OF JANUARY 15, 2015, CATEGORY 3 PUBLIC MEETING ON DEFENSE IN DEPTH FOR DRY CASK STORAGE SYSTEMS

Background

On January 15, 2015, a Category 3 public meeting was held in Rockville, Maryland, as part of the Division of Spent Fuel Management's effort to risk-inform dry cask storage systems (DCSS). The meeting was noticed on December 22, 2015 [ML15006A117]. Staff representatives from the Nuclear Energy Institute (NEI), and members of the public were present. The list of meeting attendees, including those participating via telephone, is provided as the Enclosure.

Discussion

Staff presented background and description of defense-in-depth (DiD), and then proposed a definition of defense in depth for dry cask storage system [ML14356A580]. For interim dry storage DiD consists of element(s) within multiple, independent layers of defense to achieve the three principle functions of a DCSS. The three safety functions are: 1) Maintain sub-criticality; 2) Prevent radiation exposure from exceeding regulatory limits and 3) Prevent release of radioactive materials from exceeding regulatory limits. Engineered, programmatic, and mitigating controls form the three layers of DiD for interim dry storage. After providing the proposed DiD, the staff showed a simplified example of how DiD may be described for maintaining sub-criticality for a DCSS. A preliminary, qualitative framework for risk assessment was also presented. At the conclusion of the presentation, staff provided metrics which had been considered for risk-informing spent fuel activities.

There was significant discussion about the applicability of the cancer fatality as a metric for probabilistic risk analysis (PRA) result. Some felt the risk of latent cancer fatalities cited in the PRAs were too low to be of practical value. John Kessler of the Electric Power Research Institute (EPRI) maintained, although the risks are extraordinarily low, the pilot PRAs did consider uncertainties and demonstrate DCSS are several orders of magnitude safer than operating reactors.

There was general agreement the proposed definition for defense in depth was acceptable. Questions on the proposed definition of DiD were raised, specifically: 1) Is it necessary for the definition of DiD to include the three safety functions. 2) Should the definition of DiD be expanded to include decay heat removal. 3) Would it be more concise to remove the sub-criticality safety function, since preventing criticality is covered by the other two safety functions of minimize direction radiation and maintain confinement. 4) Are the safety functions listed in the proposed definition for DiD actually safety goals.

Mary Drouin from the Office of Nuclear Regulatory Research, presented a historical perspective on DiD [ML14356A580]. She emphasized the need for consistent, well-defined, and agreed upon terminology. Her presentation included a large number of references, dating to the earliest discussion on reactor DiD documented in WASH-740, “Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants”. Although there are many descriptions of DiD, there is general agreement within the nuclear community the purpose of DiD is to compensate for uncertainty and to protect the public from harm by preventing and mitigating accidents. Historically, DiD has been comprised of multiple layers and involves specific principles (or measures involving design, operational or programmatic features) in each layer of defense.

Kris Cummings from NEI also presented DiD and PRA metrics for DCSS [ML14356A580]. NEI agreed with the recommendation in Section 4.7 of NUREG-2150 to adopt Option B, a targeted application of a risk management framework to selected guidance and rule changes. Specifically, NEI felt risk-informing efforts should target the certificates of compliance (CoC) Technical Specifications, as the level of detail in the Technical Specifications does not commensurate with the associated risk when compared to the Technical Specifications for an operating reactor. Additionally, NEI believed the level of detail for the shielding analyses of a DCSS is excessive, considering the conservatisms in the analysis combined with radiation monitoring. In general, NEI believes the review process should recognize different aspects of DiD which are part of the design and operation of DCSS. NEI supports use of the latent cancer and prompt fatality metric for DCSS operations and felt that extending the use of these metrics from reactors to DCSS ensures a sense of consistent goals and ready comparison throughout the industry.

TAC No. A10114

Enclosure: Meeting Attendees

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Meeting Attendees

January 15, 2015 8:30 a.m. – 12:00 p.m. (Eastern Daylight Time)
Location: U.S. Nuclear Regulatory Commission (NRC)
Three White Flint North Building, Room 13A28
11601 Landsdown Street
North Bethesda, MD 20852

Name	Organization
William Burton	NRC
Bill Brach	Talisman
Mike Callahan	GSI
Charles Haughucy	Talisman
Damaris Marcano	NRC
Patti Silva	NRC
Kimberly Manzione	Holtec International
Mike Moran	SCE
Marie Joseph	SCE
Mike Call	NRC
David Pstrok	NRC
Marlone Davis	NRC
Donald Chung	NRC
John Goshea	NRC
Mark Richter	NEI
Rod McAllen	NEI
Kris Cummings	NEI
Mary Drouin	NRC
Anthony Hsia	NRC
Mark Lombard	NRC
Matthew Gordon	NRC
Merah Rahimi	NRC
Dennis Damon	NRC
Brian Wagner	NRC

Enclosure