HLWYM HEmails

From: Sheena Whaley
Sent: Thursday, October 19, 2006 2:23 PM
To: Marissa Bailey; Robert Johnson
Cc: Ali Simpkins; Oleg Povetko; Andrew Barto; Dennis Galvin
Subject: Criticality pre-closure key messages
Attachments: Preclosure Criticality Key messages - Draft 2006-10-19.wpd

Marissa,
I changed the key messages to re-word the second bullet and add a bullet on burnup credit.

I talked to OGC (Marion) and she feels that due to the wording of 63.112(e)(6) that a criticality for pre-closure is required to be beyond Cat 2. However, to more clearly cite the regulations, I changed it and discussed the change with Marion who said that the change was ok.

She also had an issue with us using the term criticality event sequence so I changed that.

The burnup credit bullet may need a little work, but I wanted to make it clear that we want to be involved early and often on the burnup credit issue. I think we still need to do a letter if allowed because the only issue isn't the lack of data. There are many issues.

If it's not busy here tomorrow, I'll try to run down to the LSN and look at the latest crit report.

Sheena

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Subject: Criticality pre-closure key messages
Sent Date: 10/19/2006 2:22:49 PM
Received Date: 10/19/2006 2:23:05 PM
From: Sheena Whaley

Created By: Sheena.Whaley@nrc.gov

Recipients:
"Ali Simpkins" <asimpkins@cnwra.swri.edu>
Tracking Status: None
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Tracking Status: None
"Andrew Barto" <Andrew.Barto@nrc.gov>
Tracking Status: None
"Dennis Galvin" <Dennis.Galvin@nrc.gov>
Tracking Status: None
"Marissa Bailey" <Marissa.Bailey@nrc.gov>
Tracking Status: None
"Robert Johnson" <Robert.Johnson@nrc.gov>
Tracking Status: None

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Files	**Size**	**Date & Time**
MESSAGE	868	10/19/2006 2:23:05 PM
Preclosure Criticality Key messages - Draft 2006-10-19.wpd	23896	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Predecisional Draft Key Messages for Preclosure Criticality Event Sequences
Revision 0

- 10 CFR 63 identifies several requirements which are applicable to the analysis of preclosure criticality event sequences: (1) a description and discussion of the design, including the relationship of the design bases to the design criteria (63.21 (c)(3), 63.112 (f)); (2) the identification and systematic analysis of potential event sequences (63.112 (b)); and, (3) an analysis of means to prevent and control criticality to identify potential items important to safety (63.112 (e)(6)). Regulatory Guide 3.71, Nuclear Criticality Safety Standards for Fuels and Material Facilities, provides useful guidance in demonstrating compliance with these and other regulatory requirements with respect to criticality safety. Existing criticality safety guidance for fuel cycle facilities and transportation and storage systems is considered generally acceptable provided it is adapted to the unique preclosure safety analysis (PCSA) requirements of 10 CFR 63.

- The preclosure safety analysisshould demonstrate that a criticality is prevented and controlled consistent with 10 CFR 63.112 (e)(6) and the NRC strategic outcome of no inadvertent criticality events.In evaluating potential event sequences, the potential for fuel misloads, damaged fuel, optimum moderation, reflection, and nuclear characteristics of the fuel resulting in the maximum reactivity of the system should be considered. Each of these conditions may be credible depending on the fuel handling processes to be used and the fuel that may be handled at the Geologic Repository Operations Area (GROA).

- A technical basis for the administrative margin used in the preclosure criticality analyses should be provided. The choice of the administrative margin and the statistical treatment of biases and uncertainties are integrally related in determining an acceptable upper subcritical limit. The NRC has generally found using an 0.05 administrative margin and evaluating all biases and uncertainties at a 95 percent confidence level acceptable for Commercial Spent Nuclear Fuel (CSNF). The criteria might also be applied to Category 1 and Category 2 event sequences with a sufficient technical basis. In general, consistent with a risk-informed approach to regulation, smaller administrative margins would require more substantial technical justification.

- Qualification and acceptance testing of neutron absorbing materials should be commensurate with their reliability and performance credited in the PCSA. Requirements on the quality of the raw neutron absorbing materials used and the handling, fabrication, and test activities may need to be imposed if neutron absorbing components are identified as important to safety. Qualification tests are typically used for a given set of materials and manufacturing processes to demonstrate acceptability and durability of the resulting neutron absorber product over the licensed service life. A qualification plan should be developed for neutron absorbing materials not currently approved for licensed activities.

- If burnup credit is used to demonstrate compliance with the pre-closure criticality safety requirements of Part 63, then the NRC wants to interact with the DOE as soon as DOE's burnup credit strategy is under development. Existing NRC guidance only provides for partial burnup credit due in part to the lack of relevant experimental data necessary to adequately validate isotopic criticality calculations. The analysis should also address uncertainty in any data used to justify burnup credit.

- As DOE preclosure criticality related methodologies, designs, and analyses are

developed, the NRC is interested in interacting with DOE to understand how DOE methods and approaches address preclosure criticality related 10 CFR 63 requirements. Potential preclosure criticality event sequences are directly related to the design of the GROA and the transport, aging, and disposal canister. As the criticality design progresses from the conceptual state, additional information and interactions would assist the NRC in remaining prepared to review the most relevant preclosure criticality issues. NRC is also interested in understanding how DOE preclosure and postclosure criticality activities are being integrated.

If you have any questions about this matter, please contact Sheena Whaley of my staff, at (301) 415-7965.