

April 20, 2011

MEMORANDUM TO: Larry Campbell, Chief
Mixed Oxide and
Uranium Deconversion Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

FROM: Cinthya Román, Chemical Engineer */RA/*
Mixed Oxide and
Uranium Deconversion Branch
Division of Fuel Cycle Safety
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SUBJECT: APRIL 11, 2011, MEETING SUMMARY: PUBLIC MEETING TO
DISCUSS THE PROPOSED APPROACH FOR THE USE OF
FEATURES TO MEET THE REGULATORY REQUIREMENTS
OF 10 CFR PART 70

On April 11, 2011, staff from the Office of Nuclear Material Safety and Safeguards (NMSS) conducted a public meeting with representatives of the Nuclear Energy Institute, fuel cycle licensees and applicants. During this meeting the staff discussed it's thoughts on the use of bounding assumptions and design features for risk assessment in the licensees' integrated safety analysis. No regulatory commitments were made during the meeting. The meeting summary is enclosed for your use and contains no proprietary or classified information.

Enclosures:

1. Meeting Summary
2. Attendance List
3. NRC Handouts (presentation slides)

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DISTRIBUTION:

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C. Haney	D. Dorman	J. Kinneman
M. Bailey	C. Hair	

ML111040199

OFFICE	FCSS/MODB	FCSS/MODB	FCSS/MODB
NAME	CRoman	KMorrissey	LCampbell (for KJM)
DATE	4/ 14 /11	4/ 14 /11	4/ 20 /11

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Summary of Public Meeting on Design Features

Date & Time: April 11, 2011, 1:00 P.M.-5:00 P.M. (EDT)

Place: U.S. Nuclear Regulatory Commission (NRC)
Executive Boulevard Building
6003 Executive Boulevard
EBB-01E15
Rockville, MD 20852

Attendees: See Enclosure 2

Purpose: The purpose of this meeting was to discuss the use of Design Features by licensees to meet the regulatory requirements of 10 CFR Part 70.

Discussion:

Mr. John Kinneman, Director of the Division of Fuel Cycle Safety and Safeguards (FCSS), and Marissa Bailey, Deputy Director of FCSS began the meeting by providing opening remarks stating that they appreciated the cooperation between the U.S. Nuclear Regulatory Commission (NRC) and the Nuclear Energy Institute (NEI). M. Bailey discussed the meeting purpose and her expectations for the meeting. M. Bailey also stated that the proposed approach for the use and management of design features has not been fully vetted with the NRC's Office of the General Counsel (OGC) and therefore does not represent the final NRC position. Ms. Janet Schlueter, Director of Fuel and Materials Safety Nuclear Generation Division of NEI, provided opening remarks on behalf of the industry and discussed her expectations for the meeting. The meeting was facilitated by Ms. Janet Kotra.

NRC staff provided some background regarding the regulatory requirements in Title 10 of the *Code of Federal Regulations* Part 70 (10 CFR Part 70), "Domestic Licensing of Special Nuclear Material". Specifically, the staff discussed the performance requirements established in 10 CFR 70.61(b) and 70.61(c) which require that the risk of each credible high-consequence and intermediate-consequence event be limited. In addition, 10 CFR 70.61(d) requires that the risk of nuclear criticality accidents be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical. Those events considered "credible" must then be demonstrated to meet the standard of being "highly unlikely" for high-consequence events and "unlikely" for intermediate-consequence events. §70.61(e) also requires that each engineered or administrative control or control system necessary to comply with the performance requirements of §70.61 shall be designated as an item relied on for safety (IROFS). The staff explained that the terms "credible", "highly unlikely", "unlikely", "engineer controls", "administrative controls", and "control systems" are not explicitly defined in the regulations. The term "design features" is not defined in the regulations and is not mentioned in 10 CFR 70.61 but some licensees are using that term, and the properties and assumptions associated with their definitions, to determine that a particular event is not credible. Not having a formal definition for design features and the implementation for their use has caused some discrepancies between the NRC staff and the industry.

The staff proposed definitions for the terms “engineered controls”, “active engineered controls”, “passive engineered controls”, and “design features”. An engineered control was defined as an active or passive device used to control, maintain or monitor a process variable (e.g. temperature, flow, pressure, composition, pH). An active engineered control is a physical device that uses active sensors, electrical components, or moving parts to maintain safe process condition. Process variables and/or the intrinsic properties of the substance are usually measured to maintain a safe process condition. A passive engineered control was defined as a device that used only fixed physical design features to control a process parameter without any required human action (e.g. restricting flow orifices). The proposed definition for design feature is a passive safety item used to reduce the likelihood of a particular hazard through the fundamental conceptual design choices made for the facility. The safety function of a design feature is accomplished by a fundamental property of the design (e.g. construction of material, geometry, etc) which assures that a particular potential hazard cannot become a safety concern in any way (e.g. a tank designed to prevent leaks, the particular hazard prevented is loss of confinement by leaks, and the important design characteristic is the material of construction).

Staff and licensees agreed that it is very important to understand what constitutes a process variable in order to understand the difference between a passive engineered control and a design feature. In this context a process variable is a dynamic process parameter (parameter that changes with time). Some examples include changes in temperature, pressure, concentration, flow rate, etc. The staff explained that a design feature doesn’t control or manipulate a process variable like an engineer control does. Typically, a design feature is a rigid structure or component used for safe containment or as a barrier. It’s safety function depends solely on the design of the feature (e.g. material of construction, dimensions). For example, a tank can be used to hold a maximum total volume, but the tank doesn’t have the capacity to control the amount of volume at a particular time in the tank.

Staff also stated that a design feature may be used to demonstrate that a particular event is not credible if the safety function of the design feature has no credible or an insignificant failure mechanism. This determination is not included in the current guidance provided in NUREG-1520, Revision 01, therefore the staff anticipates that if an acceptable use of design feature is adopted, the SRP would have to be modified to include this guidance. A member from the industry suggested that we also look at ANS 8.1, “Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors”, to be consistent with the credible definition used in that standard. The staff stated that the standard did not actually provide a definition but rather made only reference to the term credible. The staff stated that if the design feature has a credible, not insignificant failure mechanism or it might need to be designated as an IROFS. Some members of the industry disagree with that statement. They believe that design features can also be used to designate an event as “highly unlikely” without designating the features as an IROFS.

The staff also discussed the regulatory requirements that would apply to design features. Regulations in §70.22 (a)(7) require that a license application shall contain a description of

equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property. Given that design features are used by the licensee to protect health and minimize danger to life and property the staff believes that the licensee should describe design features in the application or the ISA Summary. Several members of the industry disagree with this statement and stated that they believe that information regarding design features should be in their hazard analysis or process safety information, but not in the license documentation submitted to NRC. They said that if they have to describe design features in their license application or in the ISA summary they would have to re-write their ISA summary. The staff believes that in order to verify that the facility (including design features) is adequate to protect health and public safety the information should be submitted to the NRC to make a safety determination. One representative of the industry indicated that the NRC can make a safety determination through inspection activities. NRC staff indicated that design features are subject to similar inspection requirements as other structures, systems, and components.

Staff also discussed reportability requirements established in §70.50(b)(2) and how they would apply to design features. Some industry individuals believe that reportability requirements shouldn't be applied to design features, but agreed that if the performance requirements were exceeded, and was related to a design feature, it would be reported. However the staff believes, that if design features are used to make sure that the likelihood of an event has acceptable risk, they should be subject to the reportability requirements in §70.50.

The staff indicated that if design features are used to demonstrate that an event is not credible the NRC might impose license conditions to prevent the removal of design features without an equivalent replacement (with the same safety function and the same insignificant likelihood of failure). To support their position on design features, licensees indicated that their configuration management program incorporates the processes needed to provide assurance that changes are properly evaluated for safety purposes whether items are IROFS or not. The NRC staff is not convinced, or lacks supporting evidence, that configuration management provides the level of assurance and process attributes needed to recognize safety implications due to changes, modifications, or removal of safety related items not identified as IROFS.

Staff also indicated that management measures should be applied to design features to maintain a high degree of reliability. There were no objections from the industry regarding the use of management measures for design features.

Licensees assert that the NRC staff has not recognized that the ISA process starts with bounding assumptions and information on the design being evaluated by the ISA process. The staff does recognize that the ISA process needs to define the conditions and assumptions of the design being evaluated but feels that within this process certain items need to be recognized, in a defined way, for the safety functions performed by these items and that these functions need to be maintained to assure that the safety functions will be performed.

Members from the industry indicated that in the past NRC has reviewed and approved several ISAs without any problem. However, staff replied that NRC reviewed and approved the licensee's methodology and that the inspection of the licensee's implementation of the methodology was now being performed. Also, staff believes that if the licensee wants to take credit for the use of design features and bounding assumptions to conclude that an event is not credible, they need to clearly indicate this process in their ISA methodology.

Staff also discussed the similarities of staff's proposed approach and certain text contained in the NEI's January 22, 2010, letter to the NRC. After much discussion, NEI indicated that the information in its January 22, 2010, letter was somewhat outdated and that based on discussions during the April 11 meeting, NEI would revisit its request to the NRC (as stated in its January 22, 2010, letter). NRC staff will wait for a letter from NEI before more work is performed regarding this issue.

Action Items: None

Regulatory Commitments: No regulatory commitments were made during the meeting.

Public Meeting on Design Features
 Attendance List
 April 11, 2011

Name	Organization
Brandon Hanson	URENCO
David Spangler	BWXT
Barry Cole	BWXT
Doug Yates	MOX
Jennifer Wheeler	NFS
Bob Link	AREVA
Scott Murray	GNF
Dallas Gardner	Enercon
Julius Bryant	GLE
Gerry Couture	Westinghouse
Janet Schlueter	NEI
Andrew Mauer	NEI
Charlie Vaughan	NEI
Larry Parscale	Enercon
John Miller	International Isotopes
Terry Sensue	USEC
Greg Corziner	USEC
Jeff Kimball	DAFSB
Molly Backman	OGC/NRC
Nicholas W. Brown	NFS
John Kinneman	FCSS/NRC
Charlie Vaughan	NEI
Calvin Manning (phone)	AREVA
Murphy Carl Michael (phone)	AREVA
Kevin Morrissey	FCSS/NRC
Marissa Bailey	FCSS/NRC
Larry Campbell	FCSS/NRC
Jonathan DeGange	NRO/NRC
Soly Soto	FCSS/NRC
Jonathan Marcano	FCSS/NRC
Cinthya Román	FCSS/NRC