



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

July 10, 2023

MEMORANDUM TO: Carrie Safford, Deputy Director
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

FROM: Bernard White, Senior Project Manager
Storage and Transportation Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

A handwritten signature in black ink that reads "Bernard White".

Signed by White, Bernard
on 07/10/23

SUBJECT: SUMMARY OF MAY 3, 2023, MEETING WITH THE STRATEGIC
CAPABILITIES OFFICE ON THE RISK-INFORMED METHODOLOGY
FOR PROJECT PELE

Background

On May 3, 2023, a virtual meeting was held, between the Strategic Capabilities Office (SCO) within the Department of Defense and its contractor Pacific Northwest National Laboratory (PNNL) and the U.S. Nuclear Regulatory Commission (NRC) staff to discuss SCO's proposed responses to the NRC's request for additional information (RAI) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23087A108) on the risk-informed methodology (or the Methodology) for Project Pele (ML23066A201). The list of meeting attendees is provided as Enclosure 1. There were no handouts at the meeting.

Discussion

The discussion centered on PNNL providing its proposed responses to some of the questions in the NRC's RAI. PNNL proposed discussing questions in chapters 1 and 3, followed by a chapter 5 question on defense in depth and then a question in chapter 4.

In response to the first question in chapter 1, PNNL stated that it proposed using the risk-informed methodology only for accidents, not normal conditions of transport. The NRC stated that some of the conditions in the Methodology appeared to be identical to the normal conditions of transport listed in Title 10 of the *Code of Federal Regulations* (10 CFR) 71.71. PNNL indicated that it was not trying to duplicate the conditions of normal conditions of transport as it thought that the reactor would be able to meet the post-normal conditions of transport criteria for criticality safety, containment, and dose rates.

CONTACT: Bernard White, NMSS/DFM
(301) 415-6577

PNNL stated that some conditions, like cold and heat, were intended to be environments beyond normal conditions of transport, that could potentially lead to an accident. The NRC suggested that PNNL provide clarification in the Methodology.

There was a short discussion on terminology related to conditions that might not be considered normal conditions of transport and are not accidents either. It was suggested that these conditions may be considered anticipated occurrences, such as extreme heat and cold beyond 100 degrees Fahrenheit (°F) and -40°F that are in normal conditions of transport. In addition, the NRC stated that including normal conditions of transport conditions in the Methodology is acceptable if they are precursors to an accident, for example cold temperatures which lead to ice formation and a truck jackknife or tip over. PNNL stated that a consistent set of definitions for terminology would be helpful.

For the first question in section 3 of the RAI, the NRC stated that it understood that the guidance in document No. DOE-STD-3009-2014, "Preparation of Nonreactor Nuclear Facility Documented Safety Analysis," indicated that if the unmitigated offsite release led to an exposure of greater than 25 rem to a member of the public, then the release would have to be mitigated to get it below the 25 rem threshold. PNNL stated that for the Methodology, it was not attempting to mitigate doses greater than 25 rem to the public, if the probability of that accident were extremely unlikely (e.g., below a frequency of less than 1×10^{-6} per year.) Although, the report (Note (b) of Table 4-1) states "However, further analysis may be warranted if the consequences are expected to be exceptionally high (e.g., much greater than 25 rem TED to the MOI [maximally exposed offsite individual])" PNNL also clarified that guidance in DOE-STD-3009-2014 was only one consideration in the development of its proposed risk evaluation guidelines.

In its proposed response to question 2 in section 3 of the RAI, PNNL stated that it was not the intent of the Methodology to expect an applicant for package approval to show that it meets both the regulations in 10 CFR 71.51 for hypothetical accident conditions or an accident and the Methodology dose/probability plot. The NRC stated that it was looking for clarification on that point.

In its proposed response to question 2 in section 5 of the RAI PNNL stated that the NRC may have been looking at an older version of Specific Safety Guide No. SSG-26, "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material," published by the International Atomic Energy Agency (IAEA). PNNL stated that Revision 1 (2018 Edition) of SSG-26 modified the approach in the Q system for determining the A_1 and A_2 values. The NRC stated that it would relook at Revision 1 of SSG-26 to determine whether IAEA did change the methodology and whether it is consistent with the approach in the Methodology. Further, there was discussion on question 4.7, about whether the Q system included neutron emission from spent fuel beyond spontaneous fission from californium-252. PNNL stated that the exposure pathways used in the Q system to develop the A_1 and A_2 values determined by the IAEA working group included the dominant radiological dose that may result due to a transportation accident, which included transportation accidents involving shipment of spent fuel. PNNL said it performed a bounding estimate of the potential neutron dose from the irradiated fuel and determined that this dose is insignificant compared to the potential photon dose. PNNL said it would update the document to include this assessment.

The NRC provided clarification on its question 1 in section 5 of the RAI to state that it appeared to the NRC that the Methodology seemed to state that there is defense in depth in some places and there was not in other places but didn't provide an overall discussion of defense in depth. Further, the NRC stated that it understood that any quantification of defense in depth would be

provided by the package application, however it thought that an overall qualification of defense in depth and a discussion of how it should be discussed in the package application was appropriate. PNNL agreed and stated that the discussion could be enhanced and that robust uncertainty and sensitivity analyses in the package application could help support the defense in depth evaluation. In addition, the NRC stated that it understood that uncertainty would also be quantified by the package applicant but thought that the Methodology should include a discussion of what might be in a package application for uncertainty.

Finally, the discussion moved to criticality questions 4.5 and 4.6 in section 4 of the RAI. For these questions, PNNL clarified how it determined the frequency of 5.1×10^{-9} per year and stated that it would provide clarification on how it was determined. Also, PNNL stated that it would provide clarification on why PNNL stated that, given the conservatism in the calculation of the frequency of 2.1×10^{-6} , the actual frequency would be less than 5×10^{-7} . PNNL stated that it evaluated a drop of the package into a depth of 5 feet to fully submerge the core. The NRC stated that it wasn't clear whether the package would need to be fully flooded to achieve criticality.

PNNL clarified what it meant in response to questions 4.8, 4.9 and 4.10. PNNL stated that the reference to 10 CFR 50.71 in section 4.4.3.1.12 was a typographical error and should have referenced 10 CFR Part 71. In its proposed response to question 4.9 of the RAI, PNNL stated that the beyond design-basis events discussed in section 4.2.3.1 of the Methodology, were during reactor operations. Additionally, for its proposed response to question 4.10, PNNL stated that due to the conex box and mass of the reactor, any parts of the truck burning would be either too far from the package to cause issues or have insufficient heat, compared to the diesel fuel fire PNNL proposed in the Methodology. NRC suggested that PNNL address this in its RAI response for completeness.

In the discussion of question 4.13, the NRC stated that a member of the public could be closer to the package when an accident occurs and that calculating a total effective dose equivalent to a member of the public at 25 meters may not be conservative. PNNL stated that there could be mitigative measures that kept a member of the public from the package during transport to 25 meters or further. The NRC understood that the mitigative measures would be evaluated in the package application and that the Methodology should not limit the package application.

Docket No. 71-9396
EPID No. L-2022-NFN-0009

Enclosure:
Meeting Attendees

SUBJECT: SUMMARY OF MAY 3, 2023, MEETING WITH THE STRATEGIC CAPABILITIES OFFICE ON THE RISK-INFORMED METHODOLOGY FOR PROJECT PELE

DOCUMENT DATE: July 10, 2023

DISTRIBUTION:

NRC Meeting Attendees

K. Jamerson, NMSS

H. Lindsay, NMSS

S. Helton, NMSS

J. Zimmerman, NMSS

ADAMS Accession No.: ML23172A278

OFFICE	NMSS/DFM	NMSS/DFM	NMSS/DFM	NMSS/DFM
NAME	BWhite	WWheatley	YDiaz-Sanabria	BWhite
DATE	06/22/2023	06/22/2023	6/23/2023	7/10/2023

MEETING ATTENDEES

Meeting Title: MEETING WITH THE STRATEGIC CAPABILITIES OFFICE ON THE RISK-INFORMED METHODOLOGY FOR PROJECT PELE

Participants: Strategic Capabilities Office (SCO)/Pacific Northwest National Laboratory (PNNL) and the U.S. Nuclear Regulatory Commission (NRC)

Date: May 3, 2023

Location: Teleconference

NAME	AFFILIATION
Bernie White	NRC
Jon Woodfield	NRC
Andrew Barto	NRC
Christopher Bajwa	NRC
Daniel Forsyth	NRC
Jason Piotter	NRC
Jeremy Tapp	NRC
Juan Lopez	NRC
Loren Howe	NRC
Pierre Saverot	NRC
Stephen Philpott	NRC
Tim McCartin	NRC
Tom Boyce	NRC
Yaira Diaz-Sanabria	NRC
Travis Jones	NRC
Jeff Waksman	SCO
John Kurtz	SCO
John Mendenhall	SCO
Justin Branley	SCO
Harold Adkins	PNNL
Garill Coles	PNNL
Tracy Ikenberry	PNNL
Peter Lowry	PNNL
Steven Maheras	PNNL
Steve Short	PNNL
Members of the Public	
Annie Kammerer	
Jana Bergman	
Ed Ketusky	
Edwin Lyman	
Jeff England	
Mike McMahon	
Steve Schilthelm	