

June 29, 2017

MEMORANDUM TO: John P. Segala, Chief
Advanced Reactor and Policy Branch
Division of Safety Systems, Risk Assessment and Advanced
Reactors
Office of New Reactors

FROM: William D. Reckley, Senior Project Manager **/RA/**
Advanced Reactor and Policy Branch
Division of Safety Systems, Risk Assessment and Advanced
Reactors
Office of New Reactors

SUBJECT: SUMMARY OF JUNE 22, 2017, PUBLIC MEETING
TO DISCUSS REGULATORY IMPROVEMENTS FOR
ADVANCED REACTORS

On June 22, 2017, the U.S. Nuclear Regulatory Commission (NRC) held a Category 2 public meeting with stakeholders, Department of Energy (DOE), Nuclear Infrastructure Council (NIC), Nuclear Innovation Alliance (NIA), and Nuclear Energy Institute (NEI), to discuss ongoing initiatives within the industry and NRC related to the development and licensing of non-light water reactors (Agencywide Documents Access and Management System [ADAMS] Accession No. ML17163A139). Enclosure 1 contains a list of meeting attendees and participants who joined via webinar. The slides and meeting handouts are available in ADAMS Accession No. ML17177A244.

The staff supported a discussion of an updated table of policy issues categorizing them as either actively being worked, open but not actively being worked, or as having no current plans to undertake activities without input from stakeholders. The updated table reflecting the categorization and policy issue descriptions was made publicly available to support the meeting (ADAMS Accession No. ML17144A383). The discussions related to several of the policy issues are summarized below:

- The staff noted that a white paper on the possible use of prototype testing to support licensing of advanced reactors was recently made available to the public (ADAMS Accession No. ML17025A353). The prototype reactor paper will be discussed at the next periodic stakeholder meeting, tentatively scheduled for August 3, 2017.
- The potential technical or policy issues related to the use of higher enriched low enriched uranium in some advanced reactor designs is expected to be addressed in a white paper being prepared by NEI, and is also on the agenda for the August 2017 public meeting.

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- The technical and potential policy issues related to materials qualification will be addressed during the NRC's Standards Forum scheduled for September 26, 2017. The periodic public meeting on regulatory improvements to address advanced reactors was moved to September 28, 2017, to support stakeholder participation in both meetings.
- The NRC staff stated that they planned to provide feedback on an NEI white paper proposing alternate approaches to physical security requirements for advanced reactors (ADAMS Accession No. ML17026A474) in early July and the topic would likely be addressed at a separate public meeting dedicated to that topic.
- Meeting participants suggested and the NRC staff agreed that the item on key component and system design issues (e.g., safety classification) should be grouped with other issues being addressed by interactions between the NRC staff and the industry's Licensing Modernization Project (LMP).
- Policy issues related to liability insurance and the NRC's periodic assessment and report to Congress on the Price-Anderson Act will be discussed at the periodic public meeting currently scheduled for November 2, 2017. American Nuclear Insurers have tentatively agreed to have representatives participate in that meeting.

The NRC staff provided feedback on a paper prepared by NIA on possible applications for NRC issuance of a Standard Design Approval (SDA) and the ability to request approval of a major portion of a plant design (ADAMS Accession No. ML17128A507). The staff noted that the white paper provided good discussions of the topics and the various factors that potential applicants should consider in evaluating including an SDA in their regulatory engagement plan. The white paper will be referenced in a revision of the NRC staff's regulatory roadmap document. Future activities related to SDAs or related topics will consider more detailed discussions of boundary conditions and interfacing systems, integration of various guidance with activities being pursued by the LMP, guidance for applications for construction permits, and the NRC's safety focused review guidance.

The NRC staff discussed its feedback on the LMP white paper on licensing basis event selection (ADAMS Accession No. ML17104A254). The feedback consisted of several high level comments (ADAMS Accession No. ML17145A573), a draft table to show relationship between analyzed events and other topics and regulations (ADAMS Accession No. ML17145A570) and a redline/strikeout version of the white paper with NRC questions and comments (ADAMS Accession No. ML17145A574). The staff's high level comments included suggestions to:

- recharacterize the frequency-consequence figure as not defining specific acceptance criteria but instead being a tool to focus attention on safety significant events and plant features;
- describe relationship between events and regulatory programs;
- assess framework for technology inclusiveness;
- reconsider integrated performance measures other than NRC's safety goals;
- expand discussion of analyses and design requirements for external events; and
- describe role of mechanistic source terms within the analysis approaches.

Dr. Karl Fleming representing the LMP provided a response to the NRC staff's comments and questions. The LMP presentation (ADAMS Accession No. ML17177A244) describes changes being considered for a revision to the licensing basis event white paper in response to the staff's comments. The proposed changes to the white paper will include recharacterizing the frequency-consequence figure to emphasize its use in identifying and addressing the most risk significant events. The LMP will also prepare a table or other tool to help summarize key elements of the framework, including the analysis of external events. A future white paper will also include performance requirements for structures, systems, and components (SSCs), including barriers. Discussion of mechanistic source terms and several other topics will continue as the NRC staff interacts on additional LMP white papers and within the standards development organizations (SDOs) working to develop consensus standards for advanced reactor technologies.

Dr. Fleming provided an overview of the LMP white paper on an approach for use of probabilistic risk assessment (PRA) for advanced reactor technologies (ADAMS Accession No. ML17158B543). The NRC staff are reviewing the paper and plan to provide comments and questions in July 2017. The paper will be a topic for a future public meeting. A key element of the white paper and future activities related to advanced reactors is the current status of the American Society of Mechanical Engineers (ASME) and American Nuclear Society (ANS) PRA Standard for advanced non-light water reactor designs. The NRC staff are developing a plan for participation in the writing of the next revision of the standard and subsequent NRC review of the standard for possible endorsement.

Mr. Ed Wallace of the LMP provided a brief discussion of an LMP white paper being prepared to describe approaches to ensuring adequate defense-in-depth measures are incorporated into the design, construction, and operation of advanced reactors. The NRC staff acknowledged the importance of the NRC's defense-in-depth philosophy and its use in the design of advanced reactors while cautioning that the Commission decided against a broader agency policy statement or specific criteria for assessing defense in depth [see "Staff Requirements – SECY-15-0168 – Recommendations on Issues Related to Implementation of a Risk Management Regulatory Framework," dated March 9, 2016 (ADAMS Accession No. ML16069A370)].

Mr. Philip Moor of High Bridge Energy Development provided a summary of a project to license and construct two multi-purpose sodium-cooled fast reactors via a public/private partnership. The proposal is to construct two PRISM reactors developed by General Electric Hitachi Nuclear Energy (aka GE Hitachi Nuclear Energy) to serve as test reactors and also provide electricity to the grid. The staff observed that the project might provide insights helpful in resolving generic policy issues, such as those related to fuel qualification, even though they had not yet submitted a regulatory engagement plan to define specific interactions and timelines associated with the project.

The next in the series of working-group public meetings on regulatory improvements for advanced reactors is scheduled for August 3, 2017. The agenda for the August meeting will include discussions of:

- Fuel Qualification
- Fuel Enrichments
- Prototype Testing Guidance
- Regulatory Engagement Plan Guidance

Enclosure(s):

1. List of attendees

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***via e-mail**

NRO-002

OFFICE	NRO/DSRA/ARPB:PM	NRO/DSRA/ARPB:LA*
NAME	WReckley	ARedden
DATE	06 / 28/ 2017	06 /29/ 2017

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Public Meeting to Discuss Regulatory Improvements for Advanced Reactors
 June 22, 2017
 Attendance List

Attendance List – Attended at least part of meeting in person		
	Name	Organization
	Marcia Carpentier	NRC/OGC
	Mark Caruso	NRC/NRO
	Patrick Castleman	NRC/OCM
	Arlon Costa	NRC/NRO
	Jim Hammelman	NRC/NMSS
	Michelle Hart	NRC/NRO
	Tara Inverso	NRC/OEDO
	Robert Krsek	NRC/OCM
	Steven Lynch	NRC/NRR
	Jan Mazza	NRC/NRO
	Malcom Patterson	NRC/NRO
	Hanh Phan	NRC/NRO
	Bill Reckley	NRC/NRO
	John Segala	NRC/NRO
	Maxine Segarnick	NRC/OGC
	Courtney St. Peters	NRC/NRO
	Martin Stutzke	NRC/NRO
	Lucieann Vechioli	NRC/NRO
	Joe Williams	NRC/NRO
	Farshid Shahrokhi	Areva
	Robert Bari	BNL
	N. Prasad Kadambi	Consultant
	Trevor Cook	DOE
	Steve Frantz	Morgan Lewis
	Dimitri Lutchenkov	MPR Assoc
	David Matthews	NEC
	Kati Austgen	NEI
	Mike Tschiltz	NEI
	Ed Wallace	Southern Company
	Peter Hastings	Southern Company
	Karl Fleming	Southern Company

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Name	Organization	
Jeff	Sharkey	Southern Nuclear
Amir	Afzali	Southern Nuclear
Jason	Reed	Southern Nuclear
Wendolyn	Holland	Transatomic
Pillip	Moor	USNIC/High Bridge
Charles	Hess	USNIC/High Bridge
Jeff	Merrifield	USNIC/Pillsbury
Alex	Huning	X-Energy
Edward	Burns	X-Energy
Attendance List – Registrants for Webinar		
John	Bolin	General Atomics
Derick	Botha	NuScale
Matthew	Bucknor	ANL
Allyson	Byk	ASME
Brandon	Chisholm	ORNL
Caroline	Cochran	Oklo
Timothy	Crook	Transatomic Power
Amy	Cubbage	NRC/NRO
Suzanne	Dennis	NRC/RES
Ashley	Finan	Nuclear Innovation Alliance
George	Flanagan	ORNL
Pete	Gaillard	Terrapower
Lauren	Gibson	NRC/OCM
Dave	Grabaskas	ANL
Askin	Guler	ORNL
Troy	Haskin	
Jerald	Head	GE
Mark	Holbrook	INL
Marvin	Lewis	
Jericho	Locke	

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Attendance List – Registrants for Webinar		
Name		Organization
Dimitri	Lutchenkov	MPR
W	Moe	INL
Rebecca	Moses	ORNL
Mike	Muhlheim	ORNL
Neil	Numark	Numark Associates
Malcolm	Patterson	NRC/NRO
Mike	Poore	ORNL
Alexandra	Popova	Oklo
Junaid	Razvi	General Atomics
Gary	Ruf	PSEG
Steve	Smith	Transatomic Power
Amanda	Spalding	Westinghouse
Craig	Welling	DOE
Dale	Wuokko	Global Energy
Staci	Wheeler	Alpha Tech Research Corp