



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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November 9, 2021

MEMORANDUM TO: Steven Lynch, Acting Chief  
Advanced Reactor Policy Branch  
Division of Advanced Reactors and Non-Power  
Production and Utilization Facilities  
Office of Nuclear Reactor Regulation

FROM: Prosanta Chowdhury, Project Manager  
Advanced Reactor Policy Branch  
Division of Advanced Reactors and Non-Power  
Production and Utilization Facilities  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF SEPTEMBER 29, 2021, PERIODIC ADVANCED  
REACTOR STAKEHOLDER PUBLIC MEETING

*Prosanta Chowdhury* Signed by Chowdhury, P  
on 11/09/21

On September 29, 2021, the U.S. Nuclear Regulatory Commission (NRC) staff held an information meeting with a question and answer session with stakeholders to discuss advanced reactor topics including:

- Draft White Paper on Licensing Strategies for Micro-Reactors;
- Idaho National Laboratory Report, INL-EXTEXT-21 -61847, "Regulatory Research Planning for Micro Micro-Reactor Development;"
- Summary of Technical Reports on Transportation and Storage of Advanced Reactor Fuel;
- Draft White Paper, ARCAP Guidance for Fire Protection (Operations);
- NRC and Canadian Nuclear Safety Commission Joint Report: Technology Inclusive and Risk-Informed Reviews for Advanced Reactors;
- Update on Draft NUREG-2246, "Fuel Qualification for Advanced Reactors;"
- Update on White Paper for Scalable Human Factors Engineering and Flexible Staffing for Advanced Reactors; and
- Draft Regulatory Guide to Endorse American Society of Mechanical Engineers (ASME) Code Section XI, Division 2, Reliability and Integrity Management (RIM) Programs for Non-Light Water Reactors.

The meeting notice is available in the NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML21257A351, and the presentation slides are available at

ADAMS Accession No. ML21274A076. The Enclosure to this summary provides the attendees for the meeting as captured by Microsoft Teams.

For each topic listed above, the NRC staff provided information and allotted time for stakeholder comments and questions. Stakeholders provided feedback on several of the topics and asked clarifying questions. NRC staff stated that the feedback was appreciated.

The NRC staff provided an overview of the Advanced Reactor Integrated Schedule of Activities on the NRC's public website at <https://www.nrc.gov/reactors/new-reactors/advanced/details#advSumISRA>. The NRC staff specifically noted the activities that have recently been completed, updated, or added since the August 26, 2021, advanced reactor stakeholder meeting.

The NRC staff gave an overview of the recently published draft white paper on micro-reactor licensing approaches/strategies within existing regulations (ADAMS Accession No. ML21235A418). One stakeholder questioned whether micro-reactors are a subset of advanced non-light-water reactor designs, as stated in the "BACKGROUND" section of the paper, or whether the approaches in the paper could be applied to LWRs. In response, the NRC staff stated that the approaches in the paper could be applied to LWRs and that it would be appropriate to remove "non-light-water" from the statement. Another question was if the biggest policy issue identified in the white paper is the operational programs issue and whether it will be brought up to the Commission. The NRC staff stated the operational programs policy issue is important, but there are also other important policy issues discussed in the white paper involving manufacturing licenses (e.g., starting up reactors in a factory). The NRC staff also responded that policy issues are being considered as part of the Part 53 rulemaking. The NRC staff could also issue separate SECY papers on specific topics. One stakeholder asked if radioactive waste after the end-of-life of a reactor is considered in the environmental review. The NRC staff confirmed that these impacts are considered in the review. A revised draft of the paper will be published.

The Idaho National Laboratory (INL) summarized its report INL-EXTEXT-21 -61847, "Regulatory Research Planning for Micro Micro-Reactor Development", and discussed regulatory and licensing challenges involving microreactors. A limited-scope Regulatory Research Development Plan (RRDP) has been developed to link important advanced non-light-water nuclear microreactor technology research and development activities sponsored by the Department of Energy's Office of Nuclear Energy with regulatory requirements and critical licensing needs likely to impact the deployment of a domestic commercial microreactor fleet. INL and Oak Ridge National Laboratory (ORNL) staff continue to seek new and updated needs to support the development and deployment of microreactors. The U.S. Nuclear Industry Council (USNIC) commented that gaps remained between Title 10 of the *Code of Federal Regulations* (10 CFR) Parts 71, 50 and 52 and that these need to be addressed.

The NRC staff presented a summary of technical reports on transportation and storage of advanced reactor fuels, including a systematic assessment process for these fuels. The process surveyed the state of knowledge, identified information needs, determined the approach to address needs, and initiated the appropriate action. Key messages included: the sufficiency of the current regulatory framework for applications for advanced reactor fuels, the potential for enhancement in certain topic areas for higher quality applications and efficient, effective reviews, the wide variability in potential designs, and the importance of preapplication meetings.

On its draft white paper, “Advanced Reactor Content of Application (ARCAP) Guidance for Fire Protection (Operations),” the NRC staff stated that the purpose of this ARCAP white paper guidance document (Internal Staff Guidance or ISG) was to facilitate the review of advanced reactor applications that use a risk-informed, performance-based approach to develop their fire protection programs. The guidance in this ARCAP white paper ISG can be applied to any non-LWR, SMR or stationary micro-reactor applying for an operating license (OL) or combined license (COL) under 10 CFR Parts 50 or 52. The NRC staff noted that the white paper guidance was developed considering the 10 CFR Part 53 rulemaking that is underway. As the 10 CFR Part 53 requirements are developed, this ISG will be supplemented, as necessary, to provide guidance for developing fire protection programs to reflect any differences in requirements between 10 CFR Parts 50/52 and 10 CFR Part 53.

The NRC staff and Canadian Nuclear Safety Commission (CNSC) staff provided an overview of joint NRC-CNSC report on technology inclusive and risk-informed reviews for advanced reactors. Since the initiation of a Memorandum of Cooperation (MOC) in August 2019, the NRC and CNSC completed a joint report comparing the technology-inclusive, risk-informed NRC and CNSC review approaches for advanced reactors. Specifically, the review focused on the Licensing Modernization Project (LMP) process endorsed by NRC in Regulatory Guide (RG) 1.233, “Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light-Water Reactors.” Key messages and observations from the report were noted, including: both the Canadian and U.S. regulatory approaches effectively protect the health and safety of the public and the environment during nuclear power plant operation; both approaches include some degree of technology-inclusive, risk-informed, performance-based review; although consistent at a high level, NRC’s LMP approach uses PRA more extensively while CNSC’s approach considers other factors in decision making (operating experience, regulatory authority input, etc.). One stakeholder commented that the regulatory process should be simplified for vendors applying for licenses in both countries. Another stakeholder asked if Canada has voluntary consensus standards, and if there will be harmonization between U.S. and Canada on this matter. CNSC responded by saying Canada accepts ASME codes that are used in the U.S., however, Canada does not have a regulatory process for endorsement similar to the NRC regulatory guide process.

The NRC staff provided an update on draft NUREG-2246, “Fuel Qualification for Advanced Reactors.” NUREG-2246 provides a framework for evaluating a nuclear fuel design and attempts to enable a transparent, efficient, and thorough safety review. It is informed by the NRC staff experience gained from licensing solid fuel reactor designs (particularly LWR designs), advanced reactor fuel testing performed to-date, and the accelerated fuel qualification (AFQ) considerations and focused on areas where irradiated fuel tests have been required. The NRC staff primarily focused on responding to NEI comments on this document. The NRC staff discussed on-going work with the national labs to exercise the NUREG-2246 framework for metal fuel and tristructural isotropic (TRISO) fuel forms, and provided updates on on-going work associated with molten salt reactor fuel qualification guidance. A Full Committee meeting of the Advisory Committee on Reactor Safeguards (ACRS) is tentatively scheduled for November 2021; the final NUREG-2246 is expected to be issued in January or February of 2022.

The NRC staff provided an update on a white paper for scalable human factors engineering (HFE) and flexible staffing reviews for advanced reactors. The NRC staff contracted Brookhaven National Laboratory (BNL) to develop a technical basis and method for scaling the scope and depth of HFE reviews for advanced reactors. The method enables the NRC staff to readily adjust the focus and level of HFE review based upon risk / safety insights and the unique

characteristics of the facility design and operation. The NRC staff is currently using the BNL research to draft guidance for development of application-specific HFE review plans. Concurrently, the NRC staff is also developing guidance appropriate for the review of the wide range of staffing plans that the NRC staff anticipates receiving in conjunction with advanced reactor license applications. Although the guidance does not presume the need for an exemption request, it will build upon the technical guidance in NUREG-1791, Guidance for Assessing Exemption Requests from the Nuclear Power Plant Licensed Operator Staffing Requirements Specified in 10 CFR 50.54(m).

The NRC staff made a presentation on its draft regulatory guide DG-1383, "Acceptability of ASME Code, Section XI, Division 2, 'Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Power Plants' for Non-Light Water Reactors." The objectives of this NRC staff presentation included the following: alert stakeholders that DG1383 is publicly available for comment; provide an overview of the NRC staff's review of ASME Code, Section XI, Division 2; familiarize stakeholders with ASME Code, Section XI, Division 2 (RIM); present the unique regulatory aspects of preservice and inservice inspection programs for advanced reactors; identify the conditions the NRC staff has recommended in DG-1383 on the use of ASME Code, Section XI, Division 2; and communicate plans for the public comment period and development of the final regulatory guide (RG). The NRC staff discussed the structure of DG-1383 (future RG 1.246) covering the following: purpose, applicability (non-LWRs), regulations and related guidance; background and bases for NRC staff positions; and staff regulatory guidance with 15 conditions. The NRC staff briefly discussed each of the 15 conditions.

Members of the public were in attendance and the NRC did not receive public meeting feedback forms. To see information regarding previously held periodic advanced reactor stakeholder public meetings, please visit the NRC's public website at <https://www.nrc.gov/reactors/new-reactors/advanced/details.html#stakeholder>. The next advanced reactor stakeholder meeting is currently scheduled for November 10, 2021.

Please direct any inquiries to me at 301-415-1647 or via e-mail at [Prosanta.Chowdhury@nrc.gov](mailto:Prosanta.Chowdhury@nrc.gov).

Enclosure:  
Attendance List

SUBJECT: SUMMARY OF SEPTEMBER 29, 2021, PERIODIC ADVANCED REACTOR  
STAKEHOLDER PUBLIC MEETING DATED: NOVEMBER 9, 2021

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**ADAMS Accession No.:**

Meeting Notice ML21257A351

Meeting Summary ML21301A054

Presentation Slides ML21274A076

NRC-001

OFFICE	NRR/DANU/UARP/PM	NRR/DANU/UARP/BC	NRR/DANU/UARP/PM
NAME	PChowdhury	SLynch	PChowdhury
DATE	10/28 /2021	11/03/2021	11/09 /2021

**OFFICIAL RECORD COPY**

September 29, 2021, Periodic Advanced Reactor Stakeholder Public  
Meeting Attendance List

<b>Name</b>	<b>Organization</b>
Adams, Ben	NRC
Ahn, Hosung	NRC
Armstrong, Kenneth	NRC
Ashcraft, Joseph	NRC
Barnhurst, Daniel	NRC
Beall, Bob	NRC
Beasley, Benjamin	NRC
Burg, Rob	NRC
Burt, Julie	NRC
Bussey, Scott	NRC
Carlson, Jesse	NRC
Carmichael, Benjamin M.	NRC
Chen, Ben	NRC
Cheng, Lap-Yan	NRC
Chereskin, Alexander	NRC
Chisholm, Brandon M.	NRC
Chowdhury, Prosanta	NRC
Cook, Stephen	NRC
Costa, Arlon	NRC
Courtenay, Christopher C	NRC
Cowdrey, Christian	NRC
Cabbage, Amy	NRC
de Vos, Marcel	NRC
Desaulniers, David	NRC
Dolley, Steven	NRC
Doyle, Dan	NRC
Drzewiecki, Timothy	NRC
Eaton, Sarah	NRC
Eckert, Timothy	NRC
Erwin, Kenneth	NRC
Fleger, Stephen	NRC
Folk, Kevin	NRC
Gascot Lozada, Ramon	NRC
Giacinto, Joseph	NRC
Glowacki, Brian	NRC
Goodman, Dave	NRC
Grabaskas, Dave	NRC
Grady, Anne-Marie	NRC
Grant, Eddie	NRC
Gresh, Katie	NRC
Hall, Robert	NRC

<b>Name</b>	<b>Organization</b>
Hammelman, James	NRC
Hansing, Nicholas	NRC
Helton, Shana	NRC
Hoellman, Jordan	NRC
Hope, Frank	NRC
Hughes Green, Niav	NRC
Iqbal, Naeem	NRC
Ivanova, Addie	NRC
Jung, Ian	NRC
Lupold, Timothy	NRC
Lynch, Steven	NRC
Madni, Imtiaz	NRC
Magruder, Stewart	NRC
Maier, Bill	NRC
Mazza, Jan	NRC
Muniz, Adrian	NRC
Munson, Clifford	NRC
Nakanishi, Tony	NRC
O'Banion (Watford), Margaret	NRC
Oesterle, Eric	NRC
Palmrose, Donald	NRC
Phan, Hanh	NRC
Philpott, Stephen	NRC
Reckley, William	NRC
Roche-Rivera, Robert	NRC
Schaaf, Robert	NRC
Scheetz, Maurin	NRC
Sebrosky, Joseph	NRC
Segala, John	NRC
Siwy, Alexandra	NRC
Smith - NRR, Brian	NRC
Smith, Maxwell	NRC
Stutzke, Martin	NRC
Sutton, Mallecia	NRC
Taneja, Dinesh	NRC
Taylor, Robert	NRC
Travis, Boyce	NRC
Uribe, Juan	NRC
Valliere, Nanette	NRC
Van Wert, Christopher	NRC
Vechioli Feliciano, Lucieann	NRC
Vettori, Robert	NRC
Vrahoretis, Susan	NRC

<b>Name</b>	<b>Organization</b>
Walker, Shakur	NRC
White, Bernie	NRC
Widmayer, Derek	NRC
Williams, Donna	NRC
Willingham, Laura	NRC
Xu, Jim	NRC
Ani, Suzanne	NRC
Audrain, Margaret	NRC
Boyce, Tom	NRC
Keefe, Maxine	NRC
Khan, Maryam	NRC
Lin, Bruce	NRC
Moulton, Charles	NRC
Orenak, Michael	NRC
Pickett, David	NRC
Pires, Jose	NRC
Regan, Christopher	NRC
Rubenstein, James	NRC
Seymour, Jesse	NRC
Torres, Ricardo	NRC
Tuttle, Glenn	NRC
Wagner, Katie	NRC
Morin, Chantal	CNSC (Canada)
Jason A. Christensen	INL
Jim C. Kinsey	INL
Thomas Hicks	INL
Christopher S. Lohse	Stakeholder
Curtis L. Smith	Stakeholder
Daniel LaBrier	Stakeholder
David Kaiser	Stakeholder
Ingrid Nordby	Stakeholder
James Tompkins	Stakeholder
Adam Stein	Stakeholder
Adams, George Robert	Stakeholder
Afzali, Amir	Stakeholder
Akkurt, Hatice	Stakeholder
Amberge, Kyle	Stakeholder
Andy Zach	Stakeholder
AUSTGEN, Kati	Stakeholder
Bobby Janecka	Stakeholder
Brody Burks	Stakeholder
Bryan Evers	Stakeholder
c morin	Stakeholder

<b>Name</b>	<b>Organization</b>
Caleb Brooks	Stakeholder
Charlotte Geiger	Stakeholder
Cyril Draffin	Stakeholder
David Holcomb	Stakeholder
Delaney Simmons	Stakeholder
Eu Jun Lin Grace	Stakeholder
Ewa Muzikova	Stakeholder
Farrah Court	Stakeholder
Farshid Shahrokhi	Stakeholder
Frank Akstulewicz	Stakeholder
George Flanagan	Stakeholder
HOLTZMAN, Benjamin	Stakeholder
Ian Gifford	Stakeholder
James Vollmer	Stakeholder
John H. Jackson	Stakeholder
Jon Facemire	Stakeholder
Junaid Razvi	Stakeholder
Karr, Marty	Stakeholder
Kuan-Ting Chen	Stakeholder
Kucukboyaci, Vefa	Stakeholder
Kurt Harris	Stakeholder
Larry Nelson	Stakeholder
Lauren Hughes	Stakeholder
Lee Dougherty	Stakeholder
Leigh Ford	Stakeholder
Mark A Giles (Services - 6)	Stakeholder
Mark Richter	Stakeholder
Mary Neumayr	Stakeholder
Michelle Byman	Stakeholder
mike Mike keller Keller	Stakeholder
Mike Orihuela - EPRI	Stakeholder
Miller, Douglass	Stakeholder
Naraine, Matthew	Stakeholder
Narasimha Prasad Kadambi	Stakeholder
Natcher, Allison A (DEC)	Stakeholder
Nemec, Richard	Stakeholder
NICHOL, Marcus	Stakeholder
Nicole Schlichting - Kairos	Stakeholder
Niko McMurray (ClearPath)	Stakeholder
O'NEILL, Martin	Stakeholder
Oswaldo Pensado	Stakeholder
Paese, Richard M	Stakeholder
Patrick, Wesley	Stakeholder

<b>Name</b>	<b>Organization</b>
Paul Loza	Stakeholder
Poore III, Willis	Stakeholder
Raymond Wang (X-energy)	Stakeholder
Redd, Jason P.	Stakeholder
Reigel, Glenn	Stakeholder
Ricardo Torres	Stakeholder
Rickard, Melanie	Stakeholder
Rod Adams	Stakeholder
Rod McCullum	Stakeholder
Sam Miller	Stakeholder
Saulsbury, Bo	Stakeholder
Schilthelm, Steve W	Stakeholder
Schoedel, Anthony J	Stakeholder
Sean Morrell (NuScale)	Stakeholder
Sigmon, Chet Austin	Stakeholder
Sleigh, Michael	Stakeholder
Sloma-DeLosier, Tanya N	Stakeholder
Sofu, Tanju	Stakeholder
Sola Talabi	Stakeholder
Spalding, Amanda J	Stakeholder
Staci Wheeler	Stakeholder
Steve Rhyne	Stakeholder
Steve Vaughn (X-energy)	Stakeholder
Steven Kraft	Stakeholder
Svetlana Lawrence	Stakeholder
Tamilia, Adam	Stakeholder
Tammy Morin	Stakeholder
Tara Neider	Stakeholder
Tina Taylor	Stakeholder
Todd M. Anselmi	Stakeholder
Tom Braudt	Stakeholder
Tom Roberts	Stakeholder
Van-Derpoel, Lynn	Stakeholder
Wick III, Paul	Stakeholder
William Maverick Winslow Army	Stakeholder
Yiming Pan	Stakeholder
Zach, Andrew (EPW)	Stakeholder

\* Attendance list based on Microsoft Teams Participant list. List does not include individuals that connected via phone.