



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

October 6, 2023

MEMORANDUM TO: Meena Khanna, Deputy Director  
Division of Risk Assessment  
Office of Nuclear Reactor Regulation

FROM: Jenn Whitman, Chief /RA/  
PRA Licensing Branch B  
Division of Risk Assessment  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF SEPTEMBER 12, 2023, NRC RISK FORUM  
PUBLIC MEETING, "CURRENT AND FUTURE RISK-INFORMED  
ACTIVITIES FROM ACROSS OPERATING, NEW, AND  
ADVANCED REACTORS BUSINESS LINES"

On September 12, 2023, the U.S. Nuclear Regulatory Commission (NRC) staff held its first ever public all-day intergovernmental NRC Risk Forum. This was an information meeting with a question-and-answer session encouraging stakeholder dialogue with industry representatives, representatives of other Federal agencies, and NRC staff on risk-informed decision making (RIDM) topics. There were five different sessions, each with a diverse group of speakers:

- Risk-Informed Initiative Success Stories and Path Forward
- Managing Uncertainty: The Role of Safety Margins and Performance Monitoring
- Developing and Maintaining Risk-Informed Decision Making as Part of Your Organizational Culture
- Risk informing Licensing Basis Events Across Operating, New and Advanced Reactors
- Common Cause Failure Analysis of Digital Systems

The [meeting notice](#) is available in the NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML23255A076, and the [presentation slides](#) are available at Accession No. ML23254A388. The enclosure to this summary provides the attendees for the meeting as captured by Microsoft Teams (MS Teams), and the sign-in sheet in the meeting room.

During each session listed above, the NRC staff and representatives of industry and other federal agencies gave presentations, engaged in panel discussions, and responded to stakeholder comments and questions. Stakeholders provided feedback on several topics and asked clarifying questions. NRC staff stated that the feedback was appreciated. No follow-up actions were identified.

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301-415-1186

Andrea Kock, NRC Deputy Office Director for Engineering, Office of Nuclear Reactor Regulation (NRR), delivered opening remarks expressing gratitude in the diversity of panel members including internal and external stakeholders and representatives from the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA) for their attendance in the forum. It was expressed that the purpose of the forum was to foster an environment of collaborative knowledge exchange and innovative thinking. In addition, it was mentioned that the forum was an effort to advance the state of risk-informed thinking, specifically, to discuss successes in leveraging RIDM across the operating reactor, new reactor, and advanced reactor business lines.

Tom Basso, Senior Director of Engineering and Risk, Nuclear Energy Institute (NEI), provided opening remarks on behalf of NEI. Mr. Basso highlighted how the industry has demonstrated that risk-informed approaches have provided a better safety focus while also enabling efficiencies in operations, testing and maintenance. He encouraged continuing open dialogue and exchange of ideas on novel risk-informed initiatives. He emphasized the importance of continued briefings and training to ensure that everyone has the same understanding of how these risk-informed methods are being used. He closed by looking forward to the day's presentations, discussions, and interactions on how the industry can judiciously advance existing applications and approaches for the operating fleet and adapt them for the next generation of nuclear designs.

During the first session of the day, Shilp Vasavada, Chief of NRC's Probabilistic Risk Assessment (PRA) Licensing Branch C, walked through four examples of successes where the NRC has applied RIDM in both new and operating reactors. Next, Matthew Cox, Licensing Manager and Nuclear Regulatory Affairs Department Leader at Arizona Public Service, discussed their success using the risk-informed process for evaluations to receive an exemption that allowed them to remove the diverse auxiliary feed water actuation system from the Palo Verde licensing basis. Then, Chris Hope, Deputy Director (Acting), Office of Safety Standards, FAA Flight Standards Service, walked attendees through how the FAA worked to enable safe coexistence of aircraft radio altimeters and 5G C-Band deployment in the United States. Additionally, Suzanne Loyd, Senior Manager, Constellation Risk Management, provided some specific examples of benefits achieved using risk-informed programs including: the surveillance frequency control program, the mitigating systems performance indicator, the maintenance rule, risk-informed completion times, and 10 CFR 50.69 [Title 10 of the *Code of Federal Regulations* (10 CFR) 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors"]. Lastly, Julio Lara, NRC Director, Division of Operating Reactor Safety, Region III, highlighted the regional role and successes in risk-informed oversight.

The second session began with NRC's Sunil Weerakkody, Senior Level Advisor, PRA, Division of Risk Assessment in NRR. He covered the various kinds of uncertainty and how these different uncertainties are addressed in various NRC processes. Next, NASA's Matt Forsbacka, Director of Mission Assurance Standards and Capabilities Division, Office of Safety and Mission Assurance, discussed the performance of the process executed on the ground for robotic launches. Then, Fernando Ferrante, Program Manager, Risk and Safety Management at the Electric Power Research Institute (EPRI), discussed reframing defense-in-depth and safety margin within an RIDM framework. Lastly, Jennifer Varnedoe, Lead Engineer, Duke Energy, identified the many flavors of uncertainty and how they might be managed and considered in risk-informed decision making at a nuclear power plant.

The third session was a guided discussion about developing and maintaining risk-informed decision making as part of an organizational culture. The speakers were risk leaders from their respective organizations and included: Mirela Gavrilas, Director of the Office of Nuclear Security and Incident Response at NRC; Cheryl Gayheart, Director of Risk Informed Engineering & Safety Analysis at Southern Nuclear; Homayoon Dezfuli, Risk Management Program Manager at NASA; and Mark Steinbicker, Acting Director of the Office of Safety Standards, Flight Standards Service at FAA. The discussion, facilitated by NRC's Brett Klukan, Regional Counsel in the Office of the Administrator in Region I, led to several questions and comments from stakeholders in the audience, including a request for additional opportunities to engage on this topic. Throughout the discussion, attendees learned that the nuclear industry, NASA, and FAA are all facing similar challenges as the NRC with respect to incorporating RIDM across their organizations.

The fourth session focused on how RIDM has been and could be applied to the licensing of nuclear power plants. First, N. Prasad Kadambi, Chair of the Risk-Informed, Performance-based Principles and Policy Committee for the American Nuclear Society (ANS), provided an overview of ANS 30.3-2022, "Light Water Reactor Risk-Informed, Performance-Based Design," and the value of its formal decision-making structure. Next, NRC's Marty Stutzke, Senior Technical Advisor for PRA, Division of Advanced Reactors and Non-Power Production and Utilization Facilities in NRR, provided an overview of the Licensing Modernization Project Methodology. Then, NRC's Mihaela Biro, Senior Reliability and Risk Analyst, Division of Risk Assessment (DRA) in NRR, discussed the different licensing basis events under Parts 50 and 52 and how the NRC has adjusted throughout history based on lessons learned from events and the availability of new technologies. Additionally, Ben Holtzman, Director of New Nuclear at NEI, provided an overview of why the development of a risk-informed licensing process, that can be used regardless of the technology details, is paramount to enable the widespread deployment of new nuclear reactors. Finally, NRC's Chris VanWert, Senior Technical Advisor for Reactor Fuel in the Division of Safety Systems in NRR, provided an overview of the Reactor Accident Analysis Modernization efforts.

The fifth and final session was focused on the common cause failure of digital systems. NRC's Samir Darbali, Electronics Engineer, Division of Engineering and External Hazards in NRR, kicked off the session with an overview and status of NRC's approach to risk-informed the policy for addressing digital instrumentation and control common cause failures. Next, Matt Gibson, a Technical Executive at EPRI, discussed the motivations for, development of, and envisioned use of their Engineering Framework for Digital Systems. Then, Alan Campbell, a Technical Advisor at NEI, provided a discussion of industry drivers for pursuing and advocating for a new expanded policy that includes risk insights for digital systems. He also provided an overview of how NEI 20-07, Revision E, "Guidance for Addressing Software Common Cause Failure in High Safety-Significant Safety-Related Digital I&C [instrumentation and controls] Systems," leverages the work done by EPRI to provide a complete approach to addressing common cause failure of digital systems. Lastly, Han Bao, Nuclear Research Scientist, Department of Digital Reactor Technology and Developments at the Idaho National Laboratory, and Primary Investigator and Technical Lead of the Light Water Reactor Sustainability Program "Digital Instrumentation and Control Risk Assessment," provided an overview of the Digital I&C Risk Assessment Framework. This was developed as an integrated risk-informed tool to support vendors and utilities with optimization of design solutions from economical perspectives given the constraints of meeting risk-informed safety requirements.

Meena Khanna, NRC's Deputy Director, Division of Risk Assessment in NRR, closed out the day by thanking the speakers for sharing their diverse knowledge and experiences, the

L. Fields

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audience for raising challenging questions and providing examples and approaches for identifying, assessing, and mitigating risks and the NRC Risk Forum coordinators: Jennifer Whitman, John Hanna, and Leslie Fields for making the day a great success.

Please direct any inquires to Leslie Fields at 301-415-6202 or via email at [leslie.fields@nrc.gov](mailto:leslie.fields@nrc.gov).

Enclosure:  
Attendance List

**NRC 2023 Risk Forum Public Meeting Attendance List  
September 12, 2023\***

<u>Name</u>	<u>Organization</u>	<u>Name</u>	<u>Organization</u>
Leslie Fields	U.S. Nuclear Regulatory Commission (NRC)	Matt Forsbacka	NASA
Jenn Whitman	NRC	Homayoon Dezfuli	NASA
John Hanna	NRC	Donald Helton	NASA
Meena Khanna	NRC	Matt Gibson	EPRI
Michael Franovich	NRC	John Weglian	EPRI
Andrea Kock	NRC	Fernando Ferrante	EPRI
Sunil Weerakkody	NRC	Jennifer Varnedoe	Duke Energy
Aaron Kwok	NRC	Robert Rishel	Duke Energy
Adakou Foli	NRC	Heather Szews	Duke Energy
Aditya Savara	NRC	Chris Hope	FAA
Ahsan Sallman	NRC	Mark Steinbicker	FAA
Alan Kuritzky	NRC	Prasad Kadambi	ANS
Alba Vega Perez	NRC	Han Bao	Idaho National Laboratory
Alex Collier	NRC	Svetlano Lawrence	Idaho National Laboratory
Alexander Schwab	NRC	Todd Anselmi	Idaho National Laboratory
Alexis Sotomayor- Rivera	NRC	Thomas Basso	NEI
Alina Schiller	NRC	Victoria Anderson	NEI
Alissa Neuhausen	NRC	Ben Holtzman	NEI
Alysia Bone	NRC	Alan Campbell	NEI
Amir Mobasheran	NRC	Andrew Mauer	NEI
Amitava Ghosh	NRC	Cheryl Gayheart	Southern Nuclear
Anders Gilbertson	NRC	Mark Reid	Entergy
Andrea Keim	NRC	Randall Fortier	Entergy
Andrea Russell	NRC	Timothy Sande	Enercon
Andrea Torres	NRC	Bob Post	Enercon
Andrew Mihalik	NRC	Katherine Gil	APS
Andy Hon	NRC	Mathew Cox	APS
Angelo Stubbs	NRC	Rob Burg	EPM
Anne-Marie Grady	NRC	Greg Kvamme	Xcel Energy
Antonios Zoulis	NRC	Amir Afzali	Nuclear Consulting Group
April Pulvirenti	NRC	Suzanne Loyd	Constellation
Austin Chandler	NRC	Jeffrey Stone	Constellation
Ben Adams	NRC	Bradley Dolan	TVA
Bernard Litkett	NRC	Gary DeMoss	PSEG Nuclear
Billy Gleaves	NRC	Rowen Price	Third Way
Blake Purnell	NRC	Keith Vincent	NextEra Energy
Bo Pham	NRC	Michael Linegang	FAA

<u>Name</u>	<u>Organization</u>	<u>Name</u>	<u>Organization</u>
Bob Pascarelli	NRC	Stephanie Sunderbruch	FAA
Brandon Wise	NRC	Wego Wang	FAA
Brent Ballard	NRC	George Romanski	FAA
Brett Klukan	NRC	Brennen Roberts	FAA
Brian Wagner	NRC	Bruce Morgen	EPM
Bruce Lin	NRC	Ryan Maitland	ONR
Cale Young	NRC	Dave Graboskas	Argonne National Laboratory
Calvin Cheung	NRC	Drew Richards	South Texas Project
Carey Bickett	NRC	Jim Andrachek	Westinghouse
Carla Roque-Cruz	NRC	Dennis Shumaker	PSEG Nuclear
Carlos Gonzalez	NRC	Hilary Lane	NEI
Carol Moyer	NRC	Frances Pimentel	NEI
Carolyn Lauron	NRC	Stew Yuen	NEI
Carrie Safford	NRC	Dewey Olinski	Westinghouse
Charles Moulton	NRC	Damian Mirizio	Westinghouse
Ching Ng	NRC	Ashley Harper,	Westinghouse
Chris Bajwa	NRC	Richard Rolland III	Westinghouse
Chris Van Wert	NRC	Ilana Schimmel	Westinghouse
Christian Araguas	NRC	Amanda Spalding	Westinghouse
Christopher Hunter	NRC	Zefeng Yu	Westinghouse
Christopher Tyree	NRC	Joshua Beckton	Westinghouse
Christopher VanWert	NRC	Daniel Kearnaghan	TVA
Clair Song	NRC	Leo Shanley	Jensen Hughes
Clinton Ashley	NRC	David Passehl	Jensen Hughes
Clinton Hobbs	NRC	Pat Schroeder	ANS
Cory Parker	NRC	Michael Powell	APS
Courtney Banks	NRC	Kristopher Cummings	Nuscale
Dale Yeilding	NRC	Daniel Vincent	AEP
Dan Beacon	NRC	Bob Kalinowski	AEP
Dan Frumkin	NRC	Glenn Chatterton	AEP
Dan Widrevitz	NRC	Theresa Willson	AEP
Dana Harrison	NRC	Charlene Chotalal	Dominion Energy
Daniel Forsyth	NRC	Brian Mount	Dominion Energy
Daniel Ju	NRC	Mary H Miller	Dominion Energy
Daniel King	NRC	Portwood, Brett	FAA
Dante Johnson	NRC	Wang Wego	FAA
Dariusz Szwarc	NRC	Stephanie Sunderbruch	FAA
David Alford	NRC	Chance Tara	Waterford 3
David Beaulieu	NRC	David Vu	Eergy
David Dijamco	NRC	Jeffrey Suter	Eergy

<u>Name</u>	<u>Organization</u>	<u>Name</u>	<u>Organization</u>
David Garmon	NRC	Paul Nguyen	Eergy
David Gennardo	NRC	Robert Youngblood	Idaho National Laboratory
David Rahn	NRC	Denise	*Not provided via MS Teams
David Rudland	NRC	Douglas Rapp	Energy Harbor
David Werkheiser	NRC	Edwin Lyman	Union of Concerned Scientists
Dawnmathews Kalathiveettil	NRC	Ali Azarm	Information Systems Laboratories
De Wu	NRC	Steven Pope	Information Systems Laboratories
Dennis Galvin	NRC	Bob Post	Enercon
Derek Scully	NRC	Tim Sande	Enercon
Dinesh Taneja	NRC	Burg, Rob	Engineering Planning and Management
Dong Zheng	NRC	Chen, Ben	Argonne National Laboratory
Doris Chyu	NRC	Jeanne Johnston	Southern Company
Drew Childs	NRC	Enrique Meléndez	MS Outlook: Consejo de Seguridad Nuclear
Duane White	NRC	John Richards	EPRI
Ed Miller	NRC	Mark Wishart	EPRI
Edward Stutzcage	NRC	Robert Rishel	Duke Energy
Eliezer Goldfeiz	NRC	Gary DeMoss	PSEG Nuclear
Eric Palmer	NRC	Jason Strickland	Xcel Energy
Francheska Colon-Gonzalez	NRC	Jayne Ritter	Xcel Energy
Fred Forsaty	NRC	Greg Kvamme	Xcel Energy
Geoffrey Wertz	NRC	Greg Hudson	*Not provided via MS Teams
George Thomas	NRC	Neil Herman	BWXT
Gerardo Martinez-Guridi	NRC	Patrick Griffith	Entergy GGNS
Gilberto Blas Rodriguez	NRC	Randall Fortier	Entergy
Gokul Vasudevamurthy	NRC	Keith Vincent	FPL
Gordon Curran	NRC	Justin Hiller	Ameren
Greg Galletti	NRC	Rachelle Johnson	Constellation Nuclear
Gregory Suber	NRC	Roy Linthicum	Constellation Nuclear
Guita Irani	NRC	Patricia Pringle	Constellation Nuclear
Gurjendra Bedi	NRC	Christopher Seip	Constellation Nuclear
Gwynne Eatmon	NRC	Jeffrey Stone	Constellation Nuclear
Hang Vu	NRC	Philip Tarpinian Jr	Constellation Nuclear
Hanh Phan	NRC	Kristin Kaspar	South Texas Project
Hanry Wagage	NRC	Drew Richards	South Texas Project

<u>Name</u>	<u>Organization</u>	<u>Name</u>	<u>Organization</u>
Hossein Nourbakhsh	NRC	Rani Franovich	Nuclear ROSE Consulting
Hosung Ahn	NRC	Andrew Layne,	Energy-Northwest
Hsiang Yuan Ho	NRC	Laura Bruschi	*Not provided via MS Teams
Ian Tseng	NRC	Mike Montecalvo	Terra Power
India Banks	NRC	Mark Reid	ANO
Ismael Garcia	NRC	Matthew Marzano	EPW
Jacob Davis	NRC	Stephen Nelson	Nebraska Public Power District
James Kim	NRC	Nick Trumbull	Public
James O'Driscoll	NRC	Rob	Public
James Shea	NRC	Ross	Public
Jared Nadel	NRC	Sonoyama	Public
Jason Carneal	NRC	sujinjung	Public
Jason Drake	NRC	Tom Gurdziel	Public
Jason Paige	NRC	Greg Hudson	Public
Jason Tokey	NRC	JAC	Public
Jay Robinson	NRC	Jan Grobbelaar	Public
Jeff Circle	NRC	Kenneth Kolaczyk	NRC
Jeff Smith	NRC	Kevin Coyne	NRC
Jeffery Wood	NRC	Kevin Hsueh	NRC
Jennifer Majano	NRC	Kevin McCormick	NRC
Jeremy Smith	NRC	Kevin Quinlan	NRC
Jeremy Tapp	NRC	Khadijah West	NRC
Jigar Patel	NRC	Latonia Enos-Sylla	NRC
Jim Shea	NRC	Laura Kozak	NRC
Jim Steckel	NRC	Laurel Bauer	NRC
Jinsuo Nie	NRC	Leah Parks	NRC
Jo Ambrosini	NRC	Logan Crevelt	NRC
John Budzynski	NRC	Loren Howe	NRC
John Conly	NRC	Luis Cruz Rosado	NRC
John Hughey	NRC	Lundy Pressley	NRC
John Lane	NRC	Lydiana Alvarado	NRC
John Parillo	NRC	Mahmoud Jardaneh	NRC
John Robbins	NRC	Malcolm Patterson	NRC
John Segala	NRC	Paul Rades	NRC
John Tsao	NRC	Perry Buckberg	NRC
Jonathan Evans	NRC	Philip McKenna	NRC
Jonathan Marcano Lozada	NRC	Qin Pan	NRC
Jordan Glisan	NRC	Rebecca Ober	NRC
Jose Pires	NRC	Rebecca Riggs	NRC
Joseph Ashcraft	NRC	Rebecca Sigmon	NRC



<u>Name</u>	<u>Organization</u>	<u>Name</u>	<u>Organization</u>
Joseph Donoghue	NRC	Reed Anzalone	NRC
Joseph Lokos	NRC	Reinaldo Rodriguez	NRC
Josh Smith	NRC	Rhea Flanders	NRC
Joshua Havertape	NRC	Omar Khan	NRC
Joshua Miller	NRC	On Yee	NRC
Julio Lara	NRC	Patrick Finney	NRC
Kaihwa Hsu	NRC	Patrick Koch	NRC
Kamal Manoly	NRC	Paul Bollwerk	NRC
Kayla Gamin	NRC	Steven Levitus	NRC
Kayleh Hartage	NRC	Stewart Bailey	NRC
Keith Boring	NRC	Thomas Byrd	NRC
Keith Tetter	NRC	Thinh Dinh	NRC
Mallecia Sutton	NRC	Richard Guzman	NRC
Manny Sayoc	NRC	Richard Skokowski	NRC
Marilyn Diaz Maldonado	NRC	Rob Atienza	NRC
Mark Blumberg	NRC	Rob Krsek	NRC
Martin Stutzke	NRC	Robert Davis	NRC
Matthew Gordon	NRC	Robert Elliott	NRC
Matthew Hamm	NRC	Roger Kalikian	NRC
Matthew Hiser	NRC	Rosalynn Wang	NRC
Matthew Humberstone	NRC	Russell Felts	NRC
Matthew Leech	NRC	Ryan Nolan	NRC
Melissa Walker	NRC	Sam Bina	NRC
Michael Mahoney	NRC	Sam Escobar Veras	NRC
Michael Markley	NRC	Samir Darbali	NRC
Michael Marshall	NRC	Samson Lee	NRC
Michael Waters	NRC	Sandra Caesar	NRC
Michelle Gonzalez	NRC	Sandra Szuchman	NRC
Michelle Hart	NRC	Santosh Bhatt	NRC
Michelle Hayes	NRC	Scott Tonsfeldt	NRC
Michelle Kichline	NRC	Shanlai Lu	NRC
Mihaela Biro	NRC	Shao Lai	NRC
Mike Call	NRC	Sharon Green	NRC
Mike Mazaika	NRC	Shilp Vasavada	NRC
Milton Valentin	NRC	Shivani Mehta	NRC
Ming Li	NRC	Stacey Rosenberg	NRC
Mirela Gavrilas	NRC	Stephanie Garza	NRC
Naeem Iqbal	NRC	Stephen Cumblidge	NRC
Nageswara Karipineni	NRC	Steve Smith	NRC
Nanette Valliere	NRC	Steve Wyman	NRC
Nathan Denney	NRC	Steven Alferink	NRC

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Nicholas Hansing	NRC	Thomas Scarbrough	NRC
Nicholas Taylor	NRC	Tim Burkhardt	NRC
Norbert Carte	NRC	Tim McCartin	NRC
Noushin Amini	NRC	Tina Ghosh	NRC
Olivia Liang	NRC	Tom Boyce	NRC
Sujit Samaddar	NRC	Tonna Weaver	NRC
Summer Sun	NRC	Tuan Le	NRC
Sunwoo Park	NRC	Vijay K Goel	NRC
Susan Cooper	NRC	Y. James Chang	NRC
Terri Spicher	NRC	Yuken Wong	NRC
Terri McLaughlin	NRC	Zack Hollcraft	NRC
Thang Thawn	NRC		

\*\*Attendance list based on Microsoft Teams Participant list and in-room sign-in sheet. This list does not include individuals that connected via phone.

SUBJECT: SUMMARY OF SEPTEMBER 12, 2023, NRC RISK FORUM PUBLIC MEETING, "CURRENT AND FUTURE RISK-INFORMED ACTIVITIES FROM ACROSS OPERATING, NEW, AND ADVANCED REACTORS BUSINESS LINES", DATED OCTOBER 6, 2023

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DATE	10/2/2023	10/4/2023	10/3/2023	10/6/2023

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