



Strategic Programmatic Overview of the Operating and New Reactor Business Lines

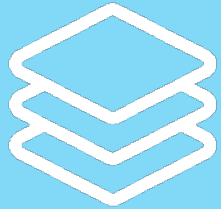


Introduction

Darrell Roberts

**Deputy Executive Director for Reactor
and Preparedness Programs, Office of
the Executive Director for Operations**

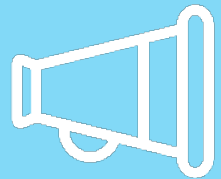
Operating Reactor Business Line



Andrea Veil, Strategic Priorities and Successes for the Operating Reactor Business Line



Zack Hollcraft, Continuously Improving the Reactor Oversight Process



Jamie Heisserer, Regional Resilience during COVID-19 and Inspection Program Perspectives



Shilp Vasavada, Leveraging Risk Insights to Modernize Regulatory Activities

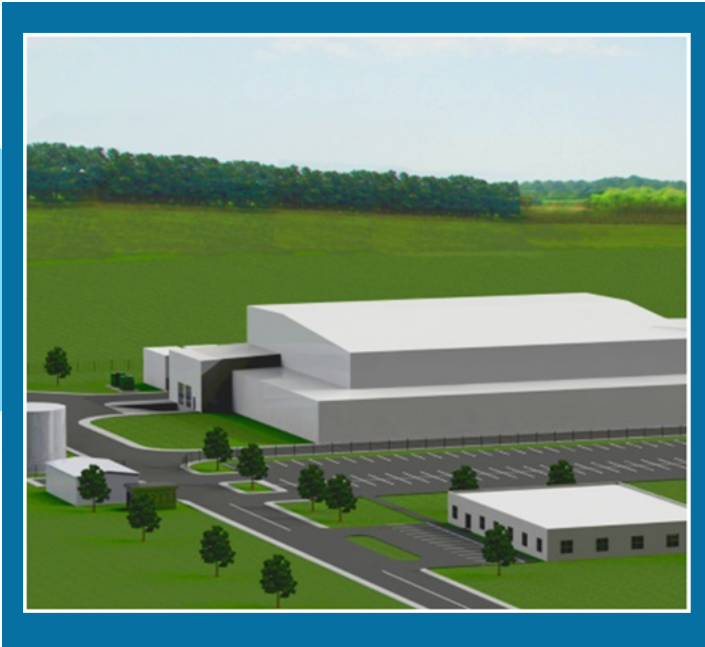


Strategic Priorities and Successes for the Operating Reactor Business Line

Andrea Veil

**Director, Office of Nuclear
Reactor Regulation**

Safe, Efficient, and Reliable Licensing and Oversight of the Nation's Non-Power Reactors



SHINE Medical
Technologies, LLC



National Institute
of Standards and
Technology

Pandemic Lessons Learned Leads to Long Term Program Improvements

- Follow on lessons learned effort
- Applying lessons learned in coordination and communications



NRC Senior Resident Inspector Matt Fannon provides virtual tour of Robinson nuclear power plant

Continuous Enhancements of Robust Reactor Oversight Process

01 Reactor Oversight Process Enhancement Efforts

02 Risk Insights in the Reactor Oversight Process

03 Counterfeit Fraudulent and Suspect Items

Subsequent License Renewal Continues



Turkey Point Nuclear Plant Units 3 and 4

- **Implementing Commission Direction**
- **Safety Review Unaffected**

Continuing Innovation

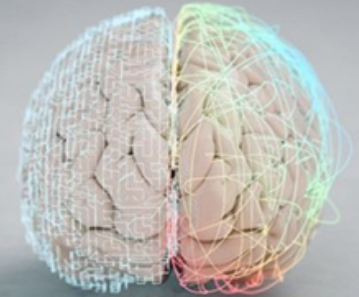
Risk Informed
Decision Making



MAP
MISSION ANALYTICS PORTAL

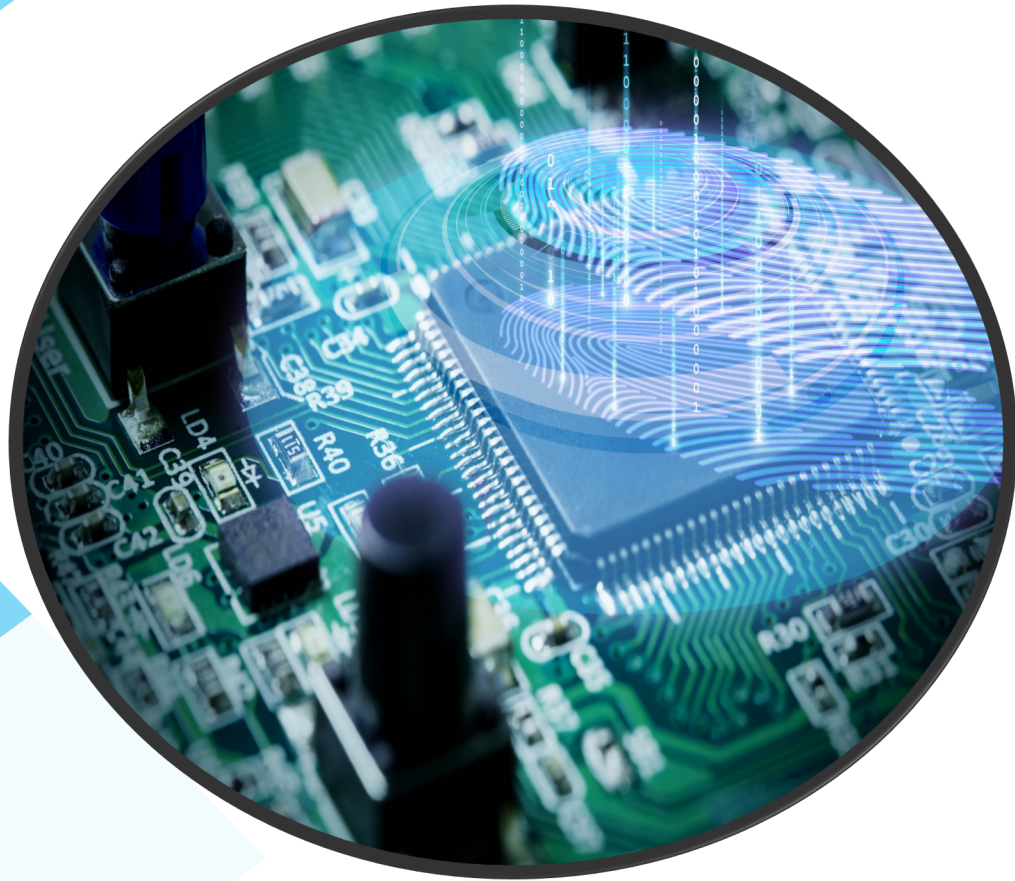


MAP-X
MISSION ANALYTICS PORTAL - EXTERNAL

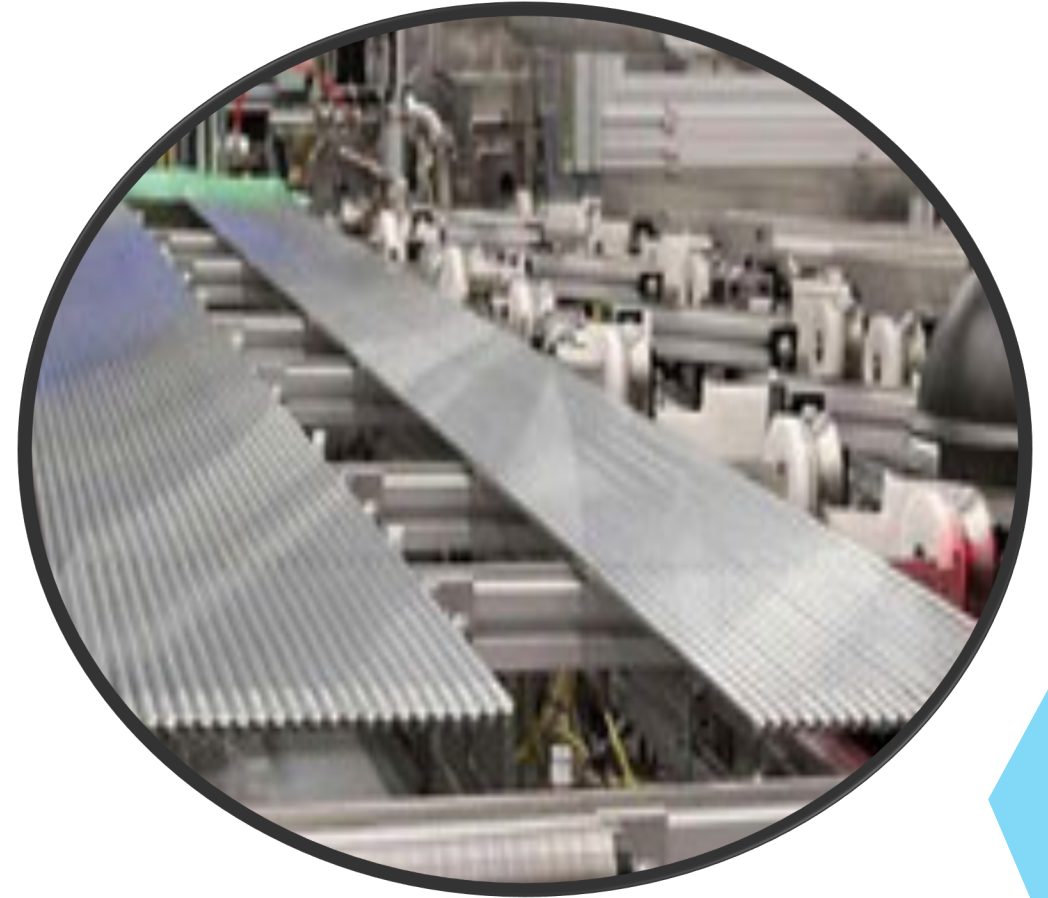


ARTIFICIAL INTELLIGENCE

Making the Safe Use of Nuclear Technology Possible



Digital I&C



Accident Tolerant Fuel



Continuously Improving the Reactor Oversight Process

Zack Hollcraft

**Senior Reactor Operations
Engineer, Division of Reactor
Oversight, NRR**

Reactor Oversight Process (ROP) Enhancement



Engineering
Inspection Program

Problem
Identification and
Resolution

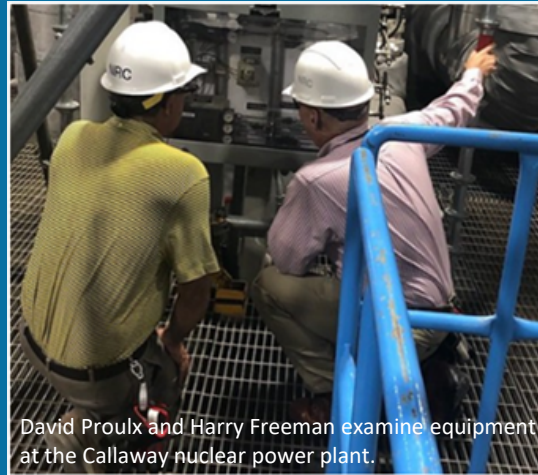


Figure 1: Reactor Oversight Process Action Matrix

History Response n (Column 2)	Degraded Performance Column (Column 3)	Multiple/Repetitive Degraded Cornerstone Column (Column 4)
White inputs in a ic performance	One degraded cornerstone (3 or more White inputs or 1 Yellow input), or 3 White inputs in any strategic performance area;	Repetitive degraded cornerstone, Multiple degraded cornerstones, Multiple Yellow inputs. One Red input;
Cornerstone objectives with minimal degradation in safety performance	Cornerstone objectives met with moderate degradation in safety performance	Cornerstone objective with longstanding issue significant degradation safety performance
Chief or Division r meets with e	Regional Administrator or designee meets with senior licensee management.	EDO/DEDO or design meets with senior licen management
Licensee causal evaluation and corrective action with oversight	Licensee cumulative causal evaluation with NRC oversight	Licensee performance improvement plan with oversight
Baseline and supplemental	Baseline and supplemental	Baseline and supplement

Changes to the
ROP Action
Matrix

Changes to the Emergency
Preparedness Cornerstone

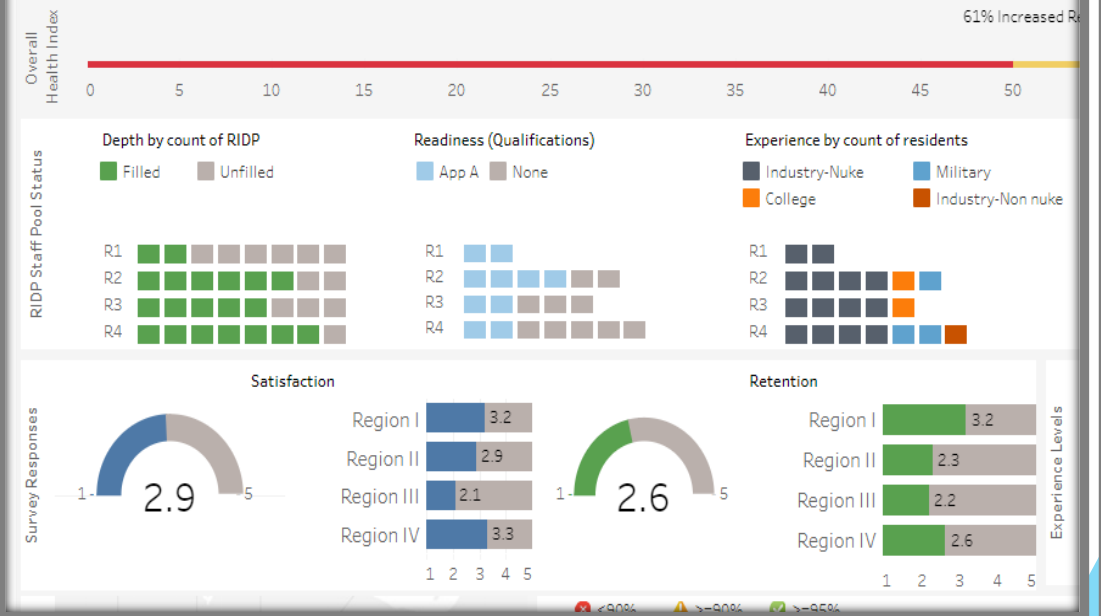


Maintaining a Healthy Resident Inspector Program



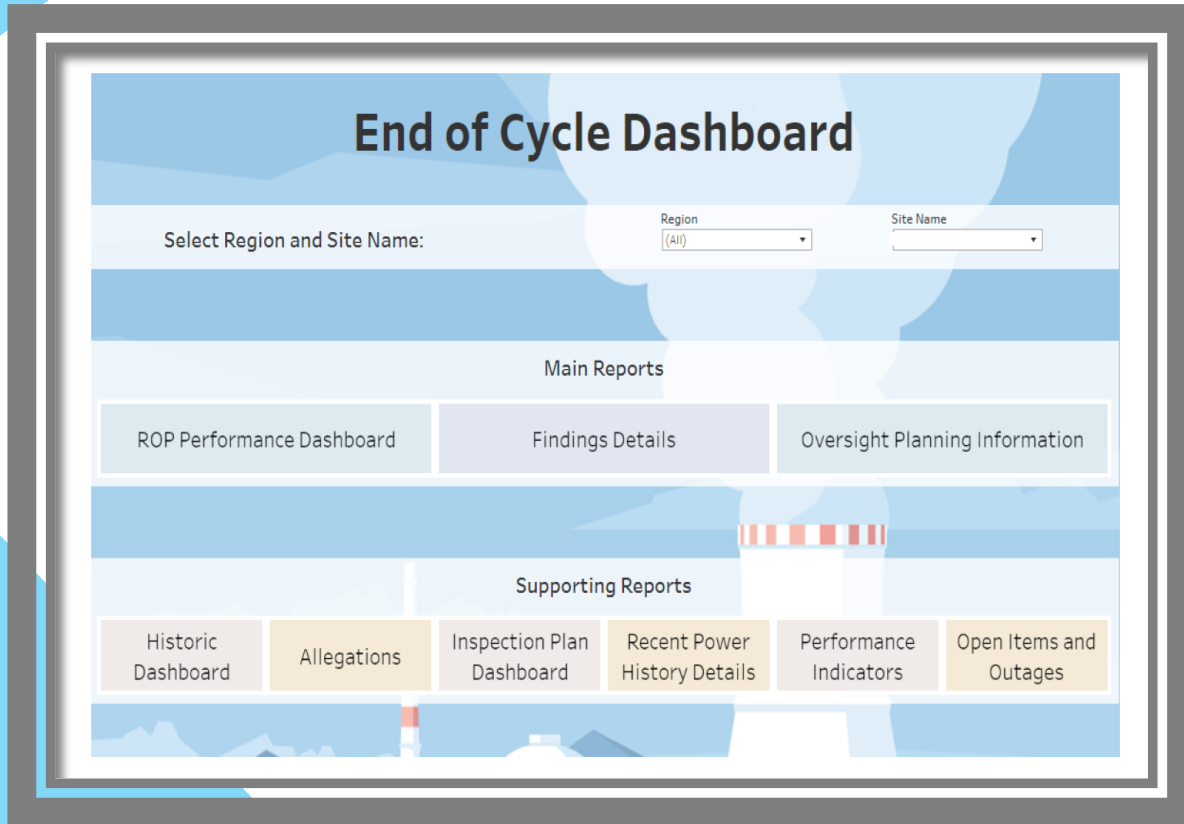
Recognizing the Importance of Resident Inspectors

Resident Inspection Program Health Monitoring Dashboard

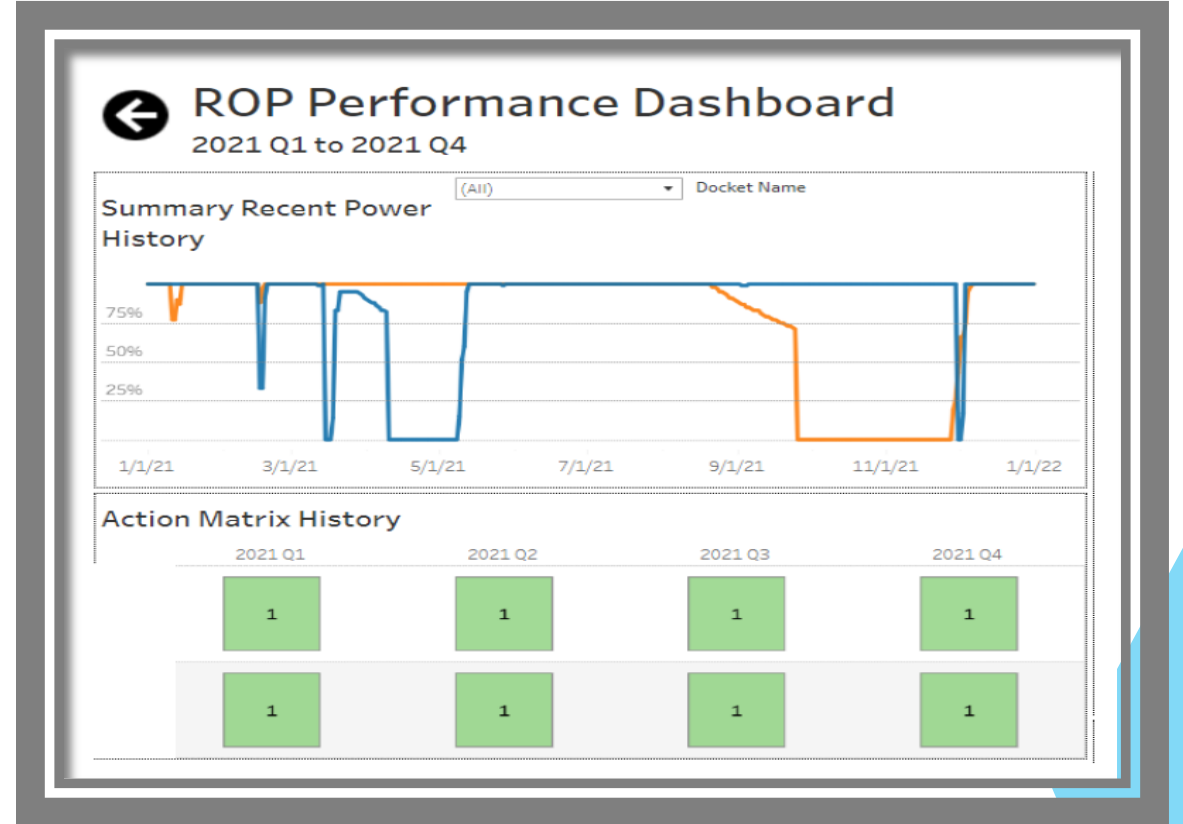


Resident Health Dashboard and Standing Committee

New Means for End of Cycle Assessments

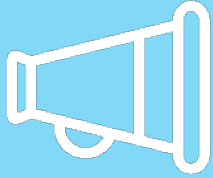


Reducing preparation time through ease of use



Modernized Data Visualization

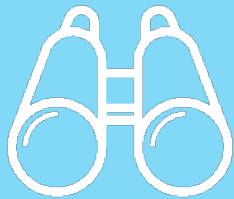
Enhancing Data Access



Event Notification via the Mission Analytics Portal – External (MAP-X)



Enhanced Public Search Tools for Event Notifications and Part 21 Reports



Upgrading the existing Licensee Event Report Search Tool



Improving internal operating experience document search capabilities



Regional Resilience & Perspectives

Jamie Heisserer

**Deputy Director, Division of Operating
Reactor Licensing, NRR**

**(recently Deputy Director, Division of
Reactor Projects, Region III)**

Regional Resilience in the Inspection Program

Senior Resident Inspector Paul Zurawski inspects emergency diesel generator at DC Cook



Ray Torres (Perry), John Robbins (Region III), Dan Bacon (Region II), and Randy Baker (Region III) discuss the Perry initial license exam



Senior Resident Inspector (Braidwood) Dan Kimble and Kevin Barclay (Regional Inspector) on the Davis-Besse Special Inspection Team

Regional Resilience in the Inspection Program



Regional Inspector Edison Fernandez on the Palisades in-service inspection



Resident Inspector Courtney St. Peters and Region III branch chief Billy Dickson tour Palisades before shutdown



Senior Resident Inspector Chuck Norton, Jamie Heisserer, and Resident Inspector Tom McGowan tour Monticello

Focus on Our People



Increased hiring



Training of new staff



Increased teamwork and interconnectivity



Leveraging Risk Insights to Modernize Regulatory Activities

Shilp Vasavada

**Acting Branch Chief, Division of Risk
Assessment, NRR**

**Senior Reliability and Risk Analyst,
Division of Risk Assessment, NRR**

Sustaining and Expanding the Use of Risk Insights

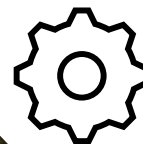
- ✓ Safety + flexibility + efficiency
- ✓ Consistent with Principles of Good Regulation and the *Be riskSMART* framework
- ✓ Enablers:



Investing in Our People



Improving Our Processes



Enhancing Our Risk Tools

Investing in Our People



Dedicated Efforts to Promote Risk-Informed Mindset



Empowering Staff to Make Risk-Informed Decisions



Positive Change Management Activities

Improving Our Processes



Leveraging Technology to Support Operational Flexibility

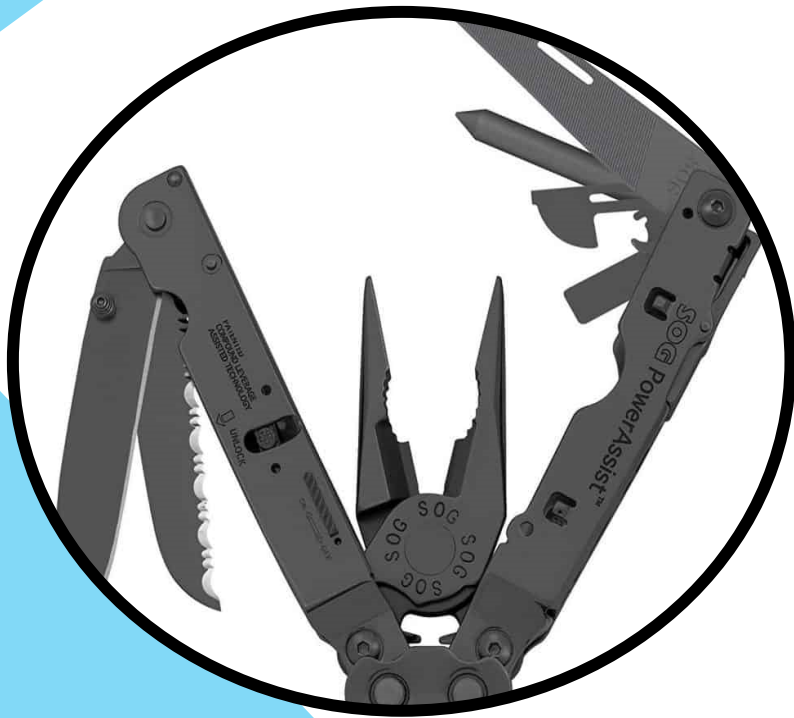


Updating Processes and Procedures



Proactively Expanding the Use of Risk Insights to New Areas

Enhancing Our Risk Tools



Enhance Available Risk Tools to Support Expanded Use of Risk Insights



Distill Qualitative and Quantitative Risk Insights



Increase Accessibility and Usability of Risk Tools



Closing Remarks

Darrell Roberts

**Deputy Executive Director for Reactor
and Preparedness Programs, Office of
the Executive Director for Operations**

Acronyms

AI	Artificial Intelligence
ATF	Accident Tolerant Fuel
CETI	Comprehensive Engineering Team Inspection
CFSI	Counterfeit Fraudulent and Suspect Items
FEI	Focused Engineering Inspection
I&C	Instrumentation and Controls
NRAN	Nuclear Regulator Apprenticeship Network
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
MAP	Missions Analytics Portal
MAP-X	Missions Analytics Portal - External
OIG	Office of the Inspector General
PI&R	Problem Identification and Resolution
ROP	Reactor Oversight Process
RIPE	Risk Informed Process for Evaluations
SPAR	Standardized Plant Analysis Risk
VLSSIR	Very Low Safety Significance Issue Resolution Process

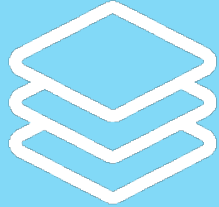


Introduction

Darrell Roberts

**Deputy Executive Director for Reactor
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New Reactor Business Line



Andrea Veil, Strategic Priorities and Successes for the
New Reactor Business Line



Brian Kemker, Applying Lessons Learned from
Construction and Transition to Operations at Vogtle



Michelle Hayes, New and Advanced Reactor
Preparedness



Hossein Esmaili, Research Support for Near-Term
Licensing of New and Advanced Reactors



Strategic Priorities and Successes for the New Reactor Business Line

Andrea Veil

**Director, Office of Nuclear
Reactor Regulation**

Robust Pre-application Activities to Support Future Licensing



- **Pre-application reviews underway with potential new and advanced reactor applicants**
- **Pre-application activities support focused, risk-informed safety reviews**

Developing Risk-Informed, Technology-Inclusive, Performance-Based Guidance and Rules



Streamlining guidance documents to prepare for future new and advanced reactor applications



Significant progress in the Part 53 and Part 50 and 52 alignment rulemaking to prepare for future new and advanced reactor licensing

Strong Coordination with State, Local, Federal and International Partners



STATE & LOCAL GOVERNMENTS





Vogtle Unit 3

July 2022

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Vogtle Unit 4 Containment

July 2022

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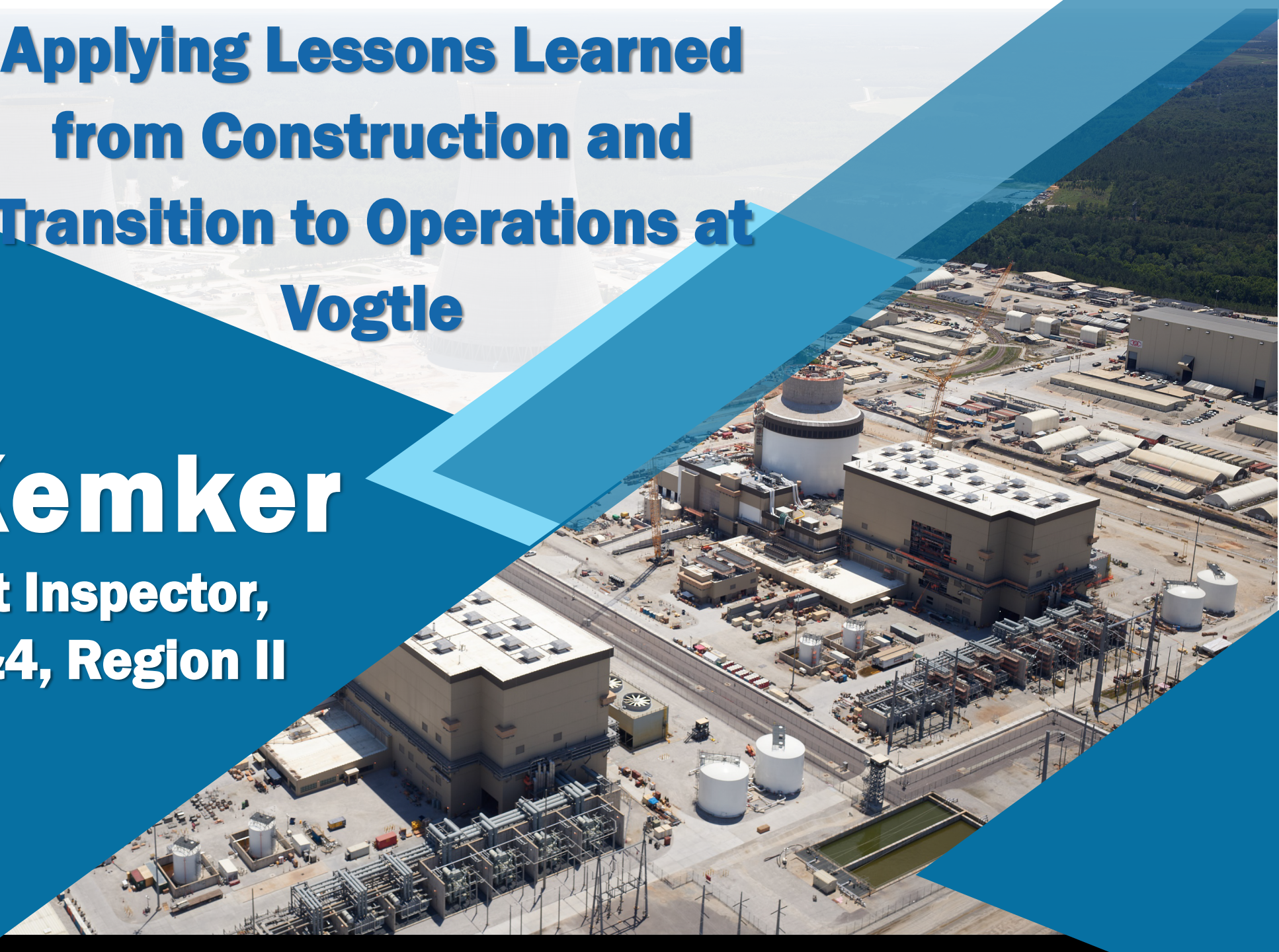
- Vogtle Unit 3 10 CFR 52.103(g) finding marks a significant regulatory milestone.
- Continue oversight as Unit 3 moves to operation and Unit 4 continues construction.



Applying Lessons Learned from Construction and Transition to Operations at Vogtle

Brian Kemker

Senior Resident Inspector,
Vogtle Units 3&4, Region II



Successful Transition of Vogtle Unit 3 and Continued Oversight of Vogtle Unit 4

- First of a kind:
10 CFR 52.103(g)
- Unit 3 Start-up Testing and
Commercial Operations
- Unit 4 Construction and
Testing Inspections



The NRC is Ready...



DCO inspectors (Robert Mathis, Denise Terry-Ward and José Vasquez) during the Vogtle Unit 3 Supplemental Inspection.

**Licensing and
Inspection Staff**



Victor Hall, Omar Lopez-Santiago and Russ Felts with the framed 10 CFR 52.103(g) finding for Vogtle 3

**Vogtle Readiness
Group**

Ensuring Strong Construction Expertise



**The NRC is
implementing multiple
strategies to ensure
we maintain the
expertise for the
future.**

Senior Resident Inspector Brian Kemker and Joylynn Quinones-Navarro viewing the Uni 3 reactor vessel integrated head package.

Tradition of Continuous Learning

- **Implementation of Lessons Learned**
- **Impact on Future Construction Programs**

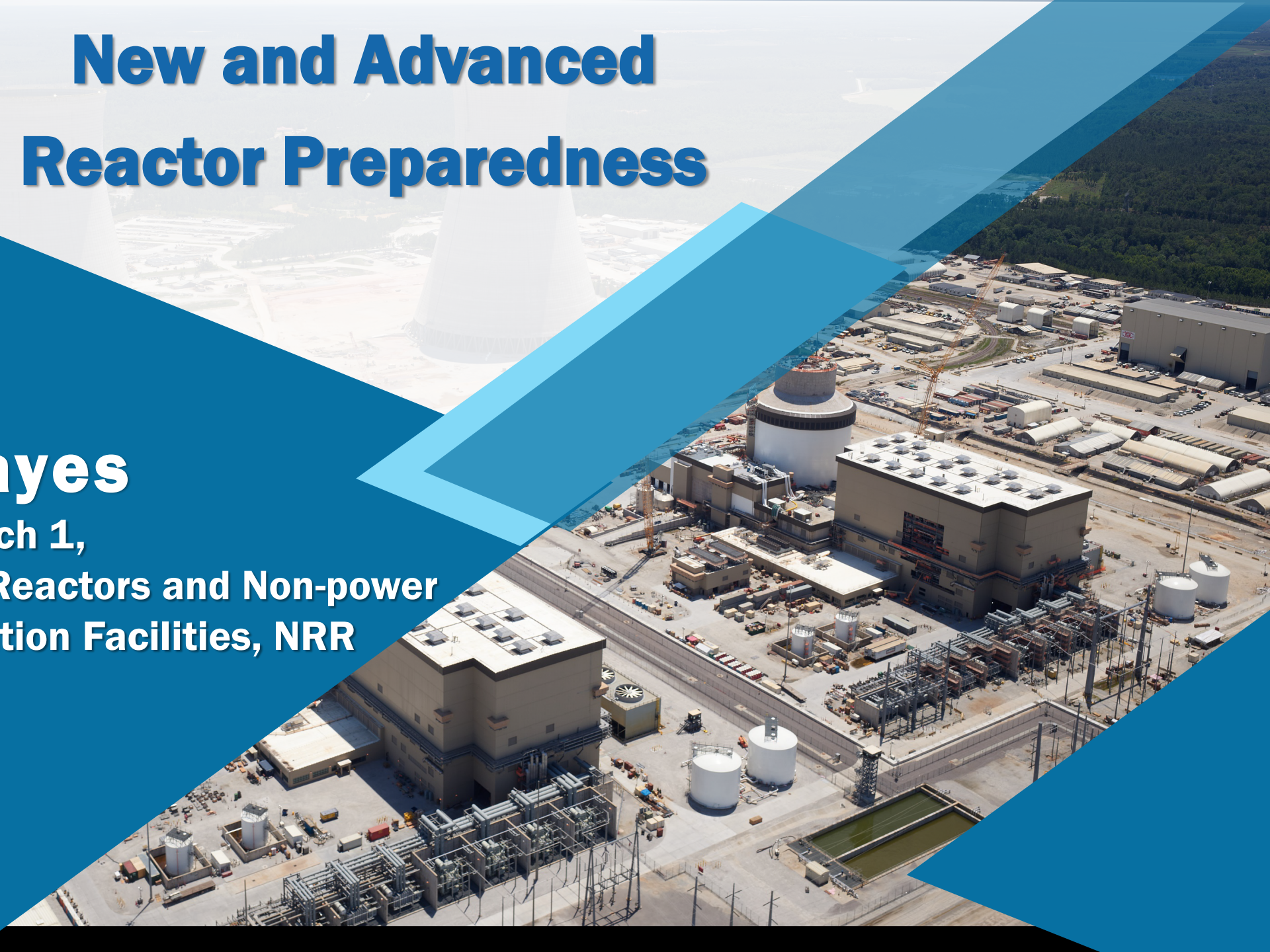




New and Advanced Reactor Preparedness

Michelle Hayes

**Chief, Technical Branch 1,
Division of Advanced Reactors and Non-power
Production and Utilization Facilities, NRR**



Safely Regulating Advanced Reactor Technologies



License Reviews

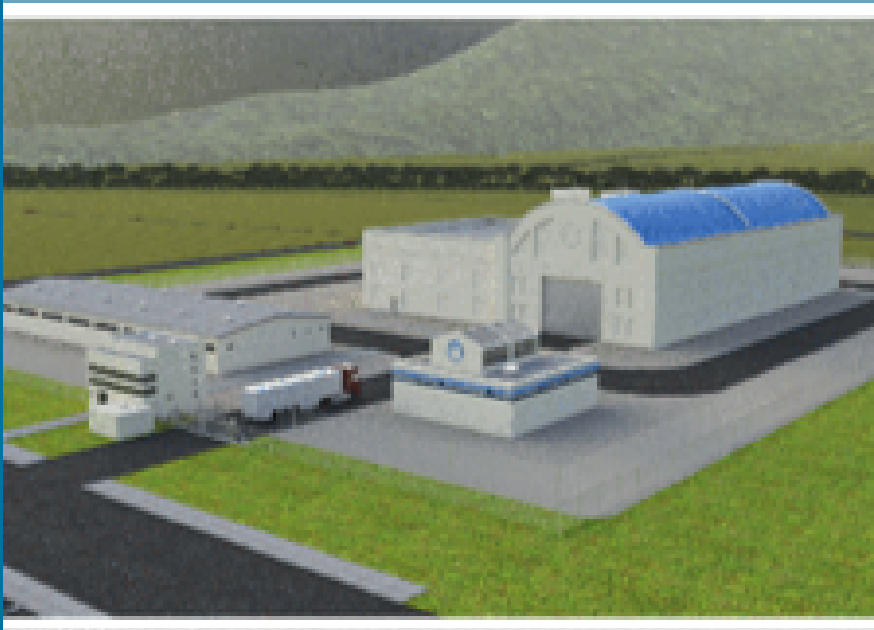


Yvotte Brits (X-energy LLC) and Chris Miller (NRC)

Pre-Application Engagements

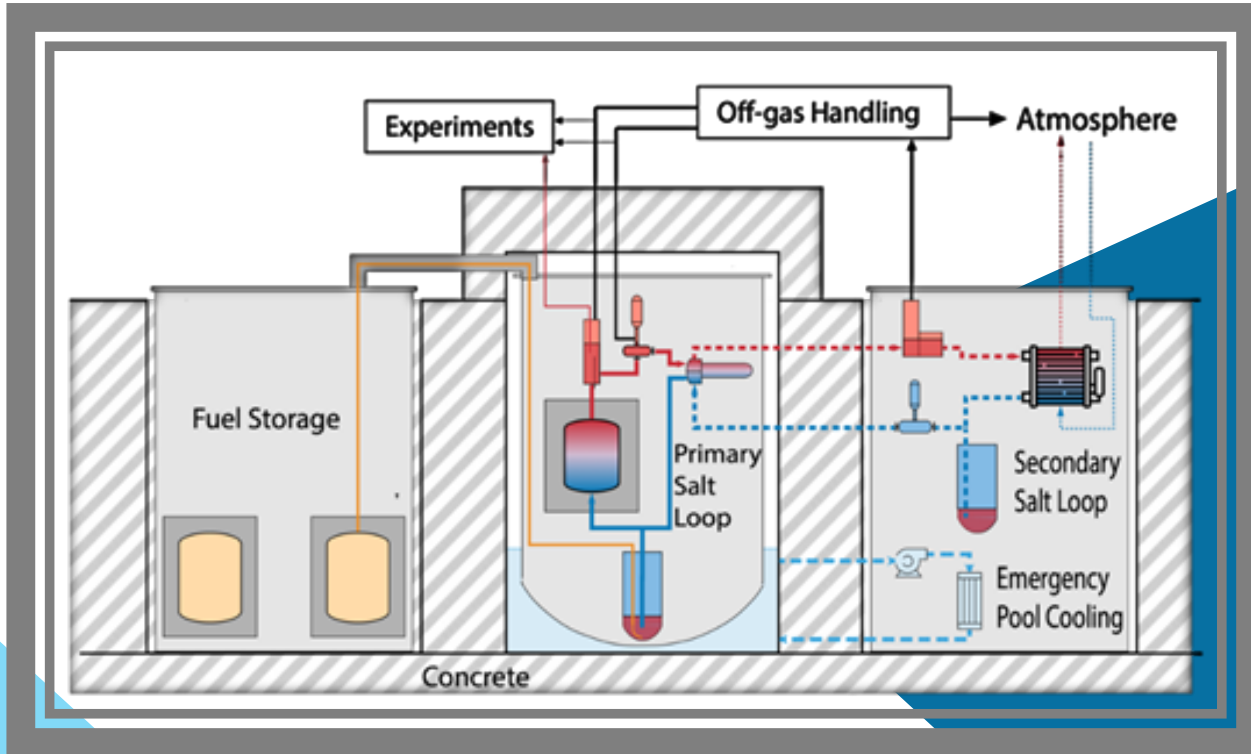


Communication



Preparing for an Expanding Workload

Transforming New and Advanced Reactor Reviews



Sketch of Abilene Christian University non-power molten salt reactor

- Developing Key Rulemakings
- Recommending Policy Changes
- Formulating New Guidance and Revising Previous Guidance

Partnering to Strengthen Readiness



Throughout the
NRC



Across
Government and
Industry



With International
Communities



Research Support for Near-Term Licensing of New and Advanced Reactors

Hossein Esmaili

**Chief, Fuel & Source Term Code
Development Branch, Division of Systems
Analysis, Office of Nuclear Regulatory
Research**

Strategic & Future Looking Research



State-of-Practice Computational Tools

Development of Tools and Data to Understand the New Technologies and Demonstrate NRC Readiness and Capabilities

System & Accident Progression Analysis

Materials, Chemistry & Component integrity

Forward Looking Programs

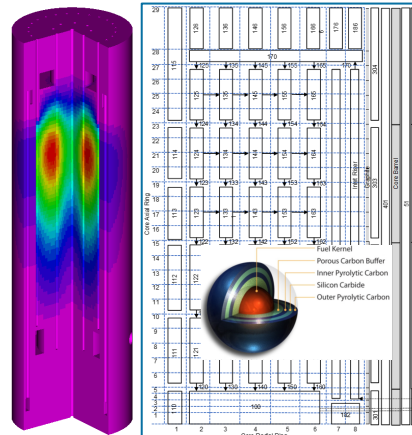
Developed Efficient Strategy and Plan

Developed Reference Plant Models

Developed Expertise & Show Readiness

NRC Integrated Action Plan (IAP) Strategy 2: Modernizing our Tools

<p>NRC Non-Light Water Reactor (Non-LWR) Vision and Strategy, Volume 1 – Core Code Suite for Non-LWR Plant System Analysis</p> <p>Volume 1 ML20030A176</p>	<p>NRC Non-Light Water Reactor (Non-LWR) Vision and Strategy, Volume 2 – Fuel Performance Analysis for Non-LWR</p> <p>Volume 2 ML20030A177</p>	<p>NRC Non-Light Water Reactor (Non-LWR) Vision and Strategy, Volume 3 – Computer Code Development Plan, Severe Accident Progression, Source Term, and Consequence Analysis</p> <p>Volume 3 ML20030A178</p>	<p>NRC Non-Light Water Reactor (Non-LWR) Vision and Strategy, Volume 4 – Licensing and Siting Dose Assessment Codes</p> <p>Volume 4 ML21085A484</p>	<p>NRC Non-Light Water Reactor (Non-LWR) Vision and Strategy, Volume 5 – Radionuclide Characterization, Criticality, Shielding, and Transport in the Nuclear Fuel Cycle</p> <p>Volume 5 ML21088A047</p>
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Public Workshops: SCALE/MELCOR Non-LWR Source Term Demonstration Project

2021	2022
<p><i>Heat pipe Reactor</i></p> <p><i>Gas cooled Reactor</i></p> <p><i>Molten Salt Cooled Reactor</i></p>	<p><i>Molten Salt Fueled Reactor</i></p> <p><i>Sodium Cooled Fast Reactor</i></p>

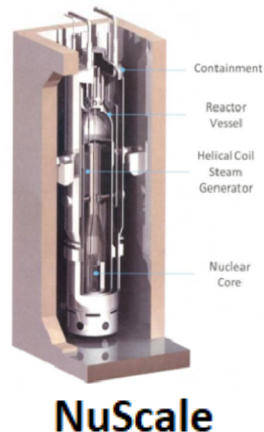
Application of Tools to Support Licensing

Perform Risk & Confirmatory Evaluations

System Analysis for LWR
SMRs and non-LWRs

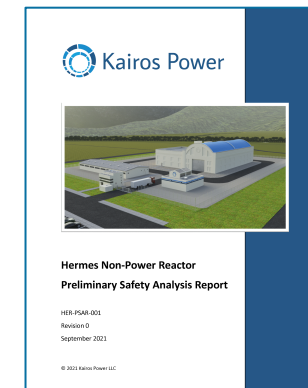
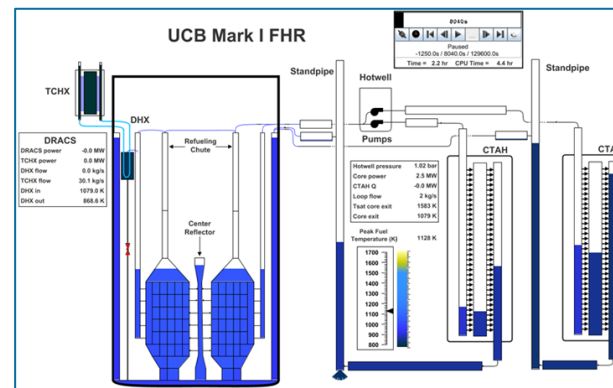
Probabilistic Risk Assessment
& Regulatory Guide

Risk-informed Seismic
Design



Modify Reference Plant Model

Support Hermes Review





Closing Remarks

Darrell Roberts

**Deputy Executive Director for Reactor
and Preparedness Programs, Office of
the Executive Director for Operations**

Acronyms

ACRS	Advisory Committee on Reactor Safeguards
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
CNSC	Canadian Nuclear Safety Commission
DOE	U.S. Department of Energy
EPRI	Electric Power Research Institute
IAEA	International Atomic Energy Agency
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
LWR	Light Water Reactor
NEA	Nuclear Energy Agency
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NSIR	Office of Nuclear Security and Incident Response
SMR	Small Modular Reactor
SPAR	Standardized Plant Analysis Risk