U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Advanced Reactor Stakeholder Public Meeting

March 27, 2024

Microsoft Teams Meeting
Bridgeline: 301-576-2978
Conference ID: 281 020 73#

Time	Agenda	Speaker
10:00 am – 10:05 am	Opening Remarks	NRC
10:05 am – 10:15 am	NRC/Idaho National Laboratory (INL) Consensus Codes and Standard Collaboration Coordination Plan	NRC
10:15 am – 11:00 am	Department of Energy's Advanced Reactor Regulatory Development Program	Department of Energy/INL
11:00 pm – 11:30 am	Federal Consultations During the Environmental Review Process: Lessons Learned and Best Practices	NRC
11:30 am – 12:00 pm	United States and Canada Cooperation on SMR Design Reviews – Successes in Collaboration	NRC
12:00 pm – 1:00 pm	Lunch Break	All
1:00 pm – 1:45 pm	Nuclear Energy Institute (NEI) Input on Regulatory Priorities for New and Advanced Reactors	NEI
1:45 pm	Closing Remarks	NRC

Advanced Reactor Program Recent Highlights (Slide 1 of 4)

- License applications currently under review:
  - Kairos Hermes 2 construction permit (CP) application - draft safety evaluation completed March 6, 2024.
  - Abilene Christian University (ACU) CP application – Environmental Assessment and Finding of No Significant Impact issued on March 14, 2024 (89 FR 18678).

- A readiness assessment of TerraPower's preliminary CP application for the Kemmerer Power Station Unit 1 (Kemmerer Unit 1) was completed February 22, 2024. The corresponding readiness assessment report was issued March 19, 2024 (ML24060A227). The Kemmerer Unit 1 facility, utilizing the Natrium sodium fast reactor technology, would be constructed near Kemmerer, Wyoming, under the U.S. Department of Energy's Advanced Reactor Demonstration Program (ARDP) demonstration pathway.

Advanced Reactor Program Recent Highlights (Slide 2 of 4)

- NRC staff continue to conduct pre-application meetings with prospective applicants such as X Energy, LLC (X-energy), Westinghouse Electric Company, and Terrestrial Energy USA, Inc. and issue pre-application documents such as topical report safety evaluations, for example:
  - Pre-application Readiness Assessment Report for X-energy's Xe-100 Preliminary Safety Analysis Report issued February 7, 2024 (ML24011A071)
  - Public Outreach Meeting for the forthcoming construction permit application for deployment of X-energy's Xe-100 design at the Dow Chemical site in Calhoun County, TX held on February 15 in Port Lavaca, TX
  - Final safety evaluation issued on March 7, 2024, to University of Illinois at Urbana-Champaign for its topical report on accident analysis identification and safety classification methodology (ML24039A164)

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Advanced Reactor Recent Highlights (Slide 3 of 4)

- SECY-24-0020: Advanced Reactor Program Status – released March 12, 2024
- SECY-24-0008: Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory – released February 8, 2024
- ARCAP/TICAP: Final versions of the ten NRC guidance documents were made publicly available on March 25, 2024
  - ARCAP ISG documents are available via ADAMS Package No. ML24073A229
  - TICAP RG (RG 1.253, Rev. 0) is available under ADAMS No. ML23269A222
- Regulatory Guide (RG 4.7, Rev. 4), "General Site Suitability Criteria for Nuclear Power Stations"
  - Publication on February 22, 2024 (ML23348A082)
  - A *Federal Register* notice was issued February 29, 2024 (89 FR 14743)
  - Staff response to public comments published on Feb. 22 (ML23324A007)

Advanced Reactor Recent Highlights (Slide 4 of 4)

- On March 12, 2024, the Canadian Nuclear Safety Commission (CNSC), the United Kingdom Office of Nuclear Regulation (ONR), and the USNRC, signed a Memorandum of Cooperation to increase collaboration on technical reviews of advanced reactor and small modular reactor technologies.

- A *Federal Register* notice was issued February 16, 2024 (89 FR 12383), regarding the final issuance of DANU-interim staff guidance (ISG) 2023-01, "Material Compatibility for non-Light Water Reactors" (ML23188A178).

- More information regarding the NRC's Advanced Reactor Program is available at the Integrated Review Schedule Dashboard and on web pages for individual projects, which can be accessed via the main Advanced Reactors web page.

New & Advanced Reactors: Codes & Standards Workshop Announcement

- Public Workshop on Codes and Standards for New and Advanced Reactors
  - Will be held on April 4, 2024, from 9 AM to 5 PM ET
  - Hybrid meeting and use Microsoft Teams

- Objective is to share of technical expertise and knowledge to identify opportunities to enhance aspects of the NRC's codes and standards program that could increase the efficiency of NRC's licensing and oversight of new and advanced reactors

- Joint project between the NRC and Idaho National Laboratories
  - Background information can be found in the Coordination Plan

- Registration is required on NRC's public website at: https://www.nrc.gov/public-involve/conference-symposia/new-adv-codes-standards.html.
  - Registration for virtual and in-person (for US citizens) participation will be open through April 4th.

New & Advanced Reactors: Codes & Standards Workshop

Agenda:

Thursday, April 4, 2024	
Time	**Topic**
Opening Theme: Purpose for meeting	
9:00 – 9:30 am	Welcome and Introductions
9:30 – 10:15 am	Opening Remarks: NRC Chair and INL Director
10:15 – 10:25 am	Break
Morning Theme: What codes & standards are needed to foster efficiencies (and their timeline)?	
10:25 – 10:40 am	Summary of DOE-NE Codes and Standards Activities
10:40 – 10:55 am	DOE Laboratory Studies on Adv Rx Needs
10:55 – 11:20 am	Advanced Reactor Codes and Standards Collaborative (including Roadmap)
11:20 – 11:45 am	Discussion
11:45 am – 1:15 pm	Lunch Break
Afternoon Theme: How can NRC's codes and standards program be enhanced?	
1:15 – 1:30 pm	NRC support to standards orgs and preparations for future reactors.
1:30 – 1:45 pm	CNSC support to standards orgs and preparations for future reactors.
1:45 – 2:00 pm	DOE NRIC's role preparing for future reactors
2:00 – 2:45 pm	Codes and Standards Organizations activities to prepare for future reactors
2:45 – 3:00 pm	Break
3:00 – 4:00 pm	Reactor Vendor Perspectives
4:00 – 4:45 pm	Discussion on the NRC Action Plan
4:45 – 5:00 pm	Path Forward and Closing Remarks

Desired Outcomes:

- Near-term actions for development or endorsement of specific codes and standards;
- New or novel approaches to the development of regulatory guidance, aligned with the agency's Principles of Good Regulation;
- An NRC action plan with milestones and dates for implementation of proposed changes to improve the effectiveness and efficiency of the NRC's codes and standards program.

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Overview of DOE Regulatory Development

Advanced Non-Water Technologies

Jason Christensen, INL

March 27, 2024

Overview of Regulatory Development Structure

- Regulatory Development is one part of the DOE's Advanced Reactor Demonstration Program
  - Advanced Reactor Demonstration Projects (funded via DOE's OCED)
  - Risk Reduction for Future Demonstrations
  - National Reactor Innovation Center
  - Regulatory Development
  - Advanced Reactor Safeguards

- Regulatory Development has four major components:
  - Regulatory Framework Modernization
  - Fast Reactor Regulatory Development R&D
  - Molten Salt Reactor Regulatory Development R&D
  - Gas Reactor Regulatory Development R&D

Regulatory Framework Modernization Program Goals and Objectives

- This portion of DOE's Advanced Reactor Demonstration Program (ARDP) directly engages and supports the industry and Nuclear Regulatory Commission (NRC) in addressing and resolving key regulatory framework issues that directly impact the "critical path" to advanced reactor demonstration and deployment
- This area focuses on risk-informing and adapting ("modernizing") the regulatory framework for commercial reactor facilities, including:
  - Developing adaptations of light water reactor (LWR) based regulations for advanced non-LWRs
  - Establishing risk-informed performance-based NRC license application content and review criteria guidance
  - Establishing risk-informed regulatory approaches for key parts of the plant operations phase
- Identified scope also includes the establishment of key licensing technical requirements that have been identified by industry as areas of regulatory uncertainty when pursuing commercial facility deployments
- These program efforts are focused on achieving formal NRC endorsement or approval, where applicable, so that these areas of regulatory uncertainty are clearly resolved
- It's noted that the identification and prioritization of scope considers topics that may be of specific regulatory interest to DOE Advanced Reactor Demonstration Project awardees, and whose resolution would benefit both the awardees and the broader advanced reactor stakeholder community

Connections to DOE-NE Mission

DOE NE Mission: Advance nuclear energy science and technology to meet U.S. energy, environmental, and economic needs

Mission Goal # 2: Enable deployment of advanced nuclear reactors

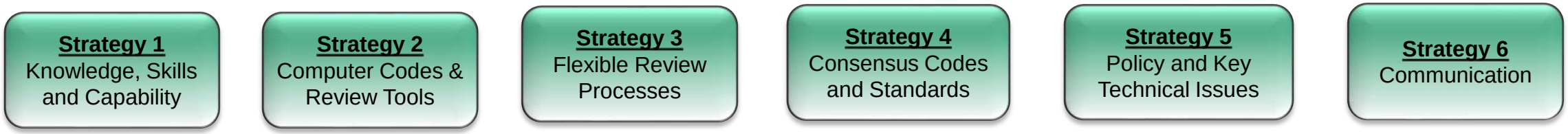
Objectives:

1. Reduce risk and time needed to deploy advanced nuclear technology
2. Develop reactors that expand market opportunities for nuclear energy
3. Support a diversity of designs that improve resource utilization

It's noted that every commercial deployment of an advanced reactor will require regulatory engagement by the developer and the facility's owner/operator(s)

NRC's Implementation Action Plan (IAP)

- The IAP is an NRC initiative originated in 2015 to establish a strategy to assure NRC readiness to effectively and efficiently review non-water reactors, including consideration of their fuel cycles and waste forms
  - NRC gathered industry inputs in 2015-2017 to identify and confirm readiness needs
  - The IAP was issued in 2017, with 6 major focus areas identified



- DOE-funded programs are focused on strategy areas 2, 3, 4, & 5, and include for example:
  - 2 NEAMS Program, ART Program, Microreactor Program
  - 3 Non-LWR design criteria, Licensing Modernization Project, TICAP/ARCAP
  - 4 ASME Section III Div. 5, Non-LWR PRA Standard, ANS 20.1
  - 5 Functional Containment, "right-sized" Emergency Planning, Microreactor policy issues

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Regulatory Framework Modernization Program

Advanced Non-Water Technologies

Regulatory Framework Modernization Program

- The Regulatory Framework Modernization part of the Regulatory Development subprogram coordinates with the industry and Nuclear Regulatory Commission (NRC) to address and resolve key regulatory framework issues that directly impact the “critical path” to advanced reactor demonstration and deployment

- This area focuses on risk-informing and adapting (“modernizing”) the regulatory framework for commercial reactor facilities, including:
  - Commission policy issue resolution,
  - Developing adaptations of light water reactor (LWR) based regulations for advanced non-LWRs
  - Establishing risk-informed performance-based NRC license application content and review criteria guidance
  - Establishing risk-informed regulatory approaches for key parts of the plant operations phase

- These program efforts are focused on achieving formal NRC endorsement or approval, where applicable, so that these areas of regulatory uncertainty are clearly resolved
- It’s noted that the identification and prioritization of scope considers topics that are specific regulatory challenges to ARDP Demonstration Project awardees, and whose resolution would benefit both the awardees and the broader advanced reactor stakeholder community

Examples & Outcomes of Completed Program Efforts

Regulatory Framework Modernization Program efforts have resulted in elimination of regulatory uncertainties in key areas supporting advanced reactor deployments. This involved the development of regulatory proposals, coordinated with industry, that have been formally approved or endorsed by NRC for industry use, such as:

- Licensing Modernization Project (LMP)
  - Established a risk-informed and performance-based approach to advanced reactor design and licensing
- Technology Inclusive Content of Application Project (TICAP) – NRC endorsement is pending
  - Provides guidance to both industry and NRC staff on LMP-based license application content expectations
  - Being utilized by the two DOE-ARDP awardees (TerraPower & X-energy) for commercial licensing
- Use of historical DOE experimental databases to support NRC licensing
  - NRC Safety Evaluation approving Argonne National Laboratory QA program to qualify certain EBR-II historical data
- Use of DOE R&D program results to support industry fuel qualification efforts
  - NRC Safety Evaluation of EPRI topical report that establishes an accepted foundation for TRISO particle fuel qualification

Examples of Current Framework Modernization Work

- Further Development of Risk-Informed and Performance-Based (RIPB) Approach
  - Developed Technology Inclusive Risk Informed Change Evaluation (TIRICE) guidance for non-LWRs to evaluate changes to the facility that meets the intent of the 10 CFR 50.59 regulation for those licensees that have used the Licensing Modernization Project approach
  - The Technology Inclusive Management of Safety Case (TIMaSC) project is looking at the full picture of the licensing basis for a plant with an LMP-based safety case provide for integration of the various activities associated with the risk-informed change management of a license.
- Risk-Informed and Performance-Based Emergency Planning
  - Developing a consensus technology-inclusive RIPB approach to establishing the plume exposure EPZ and associated emergency plan
- Hazards
  - Developing an approach for the assessment of low frequency external events as part of a RIPB licensing approach
- Liquid Fuel Qualification
  - Piloting the MSR-specific NUREG/CR-7299 approach to assess and identify any specific challenges with achieving liquid fuel qualification by addressing the key considerations reflected in NUREG-2246, Fuel Qualification for Advanced Reactors”
- Sodium Fast Reactor Fire Protection – Industry Standard
  - Assist with industry efforts to draft an updated version of ANSI/ANS Standard 54.8 - “Liquid Metal Fire Protection …”
- International Collaborations
  - Continued GIF-RSWG & IAEA participation focused primarily on development of advanced reactor safety design approaches and criteria

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Advanced Reactor Program R&D & Regulatory Connections

Advanced Non-Water Technologies

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Fast Reactor R&D

Fast Reactor Program

Ongoing research to support licensing:

- **Archival of rich U.S. fast reactor operation and testing legacy and data from other test facilities in modern web-accessible databases:**
  - EBR-II, FFTF, TREAT, and ZPR test databases
  - EBR-II and FFTF fuels irradiation and physics databases
  - Out-of-pile transient fuel testing database
  - Sodium component reliability database
- **Maintenance, quality assurance, continued development, and validation of fast reactor physics and systems/safety analysis software to support their use in fast reactor license applications**
  - Argonne Reactor Computation (ARC) suite: MC^2-3, DIF3D/Variant, REBUS, PERSENT, etc. and PyARC as the user interface and workflow management tool)
  - SAS4A/SASSYS-1, SRT (source term assessments), SPCA-ANL (sodium fire analysis)
- **Generating mechanical properties and sodium compatibility data to support ASME code case for Alloy 709 for structural material use**

Experimental Breeder Reactor-II (EBR-II)

3rd heat of Alloy 709 stainless steel

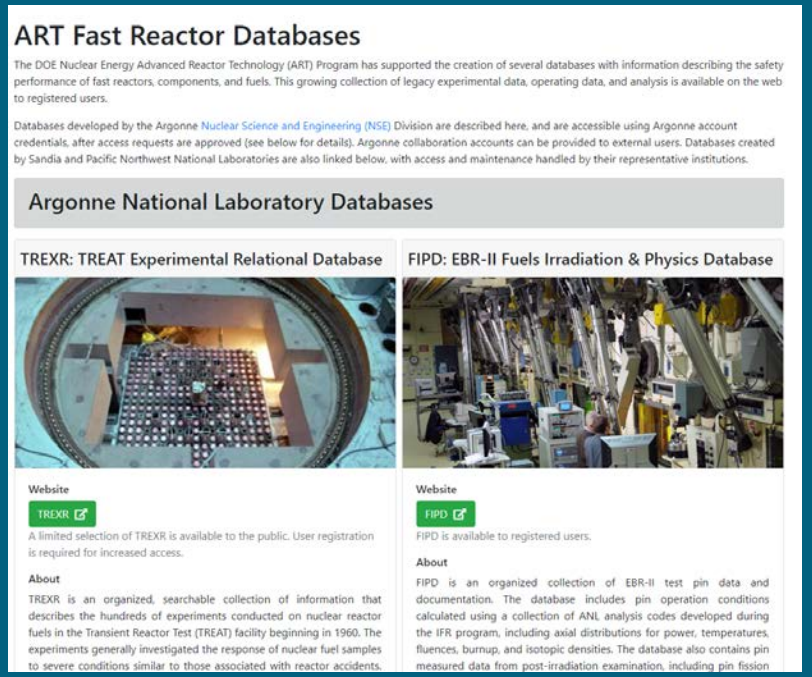
Fast Reactor Program

Current priorities in program's regulatory R&D:

- Extension of NRC approved FIPD quality assurance program plan (QAPP) to other fast reactor databases and their implementation to support their use in upcoming license applications
- Modern software quality assurance (SQA) practices to support commercial grade dedication of fast reactor software by the vendors
- Provision of software and database access is included in programmatic scope, but resources for user support, training, and expertise to help utilize the software and data are also needed

Recommend path forward:

- Given limited resources, QAPP and SQA implementation is currently limited to the highest priority databases and software, leading to differing levels of quality assurance
  - Direct industry support and other DOE grants (GAIN, TCF) are leveraged, when possible, to accelerate implementation
- Labs are open to refreshing the in-person "Fast Reactor Technology Training" conducted in the past for the NRC to help inform new staff



https://frdb.ne.anl.gov/

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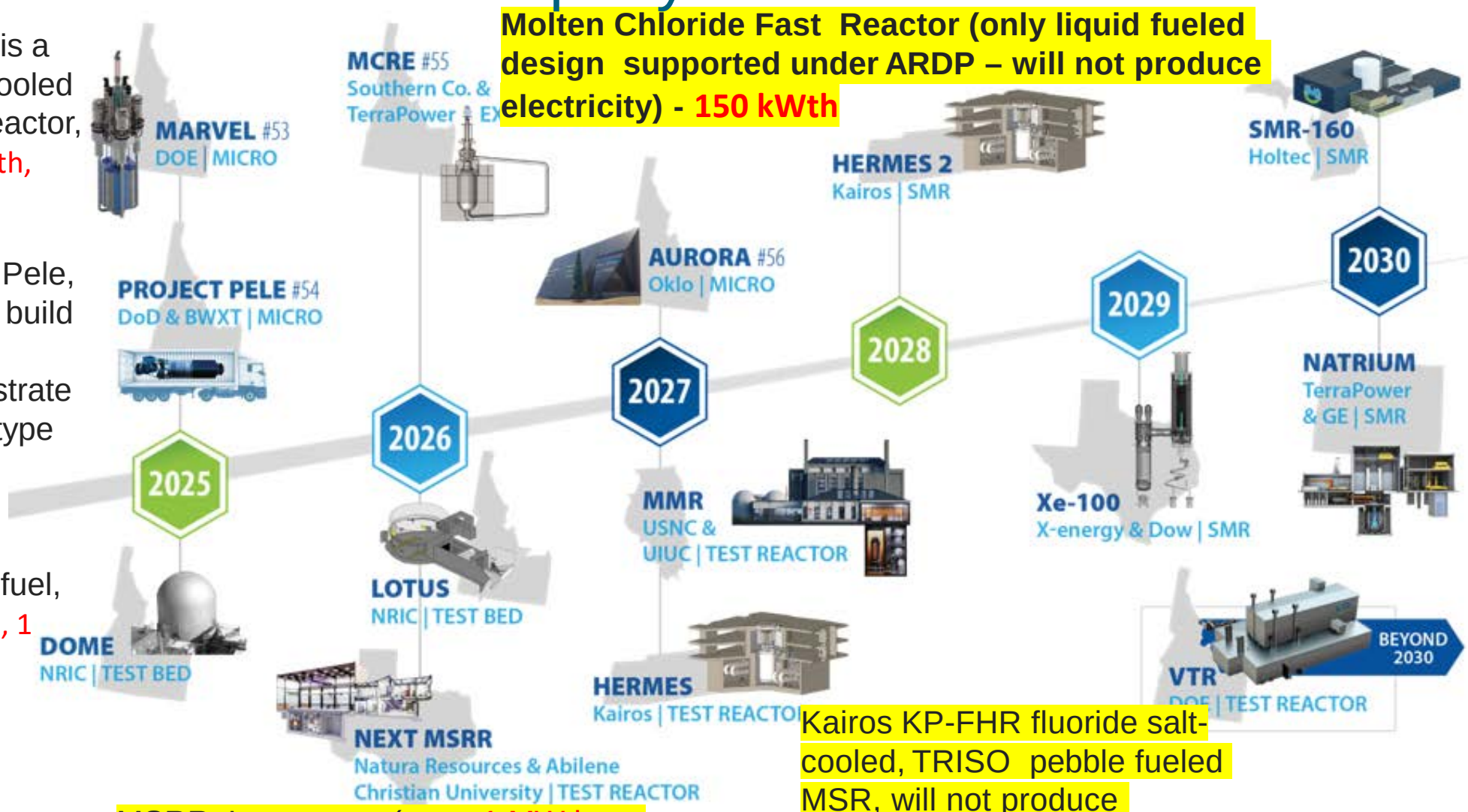
Molten Salt Reactor R&D

Accelerating Advanced Reactors Demonstration & Deployment in the U.S.

Marvel design is a Na-K cooled microreactor, 100 kWth, 20kWe

Project Pele, design, build and demonstrate a prototype mobile nuclear reactor, TRISO fuel, 5 MWth, 1 MWe



Molten Chloride Fast Reactor (only liquid fueled design supported under ARDP – will not produce electricity) - 150 kWth

MCFR Full commercial operation – 500-1200 MWe

Natrium – 840 MWth, 345 MWe (variable output (up to 500 MWe short-term with molten salt storage) – ARDP award

Kairos KP-FHR fluoride salt-cooled, TRISO pebble fueled MSR, will not produce electricity, 35 MWth

MSRR, Low power (up to 1 MWth, to support academic research)

Technical Areas of Strategic R&D in the US MSR Program

Argonne NATIONAL LABORATORY

Determination of the Thermophysical and Thermochemical Properties of Molten Salts – Experimentally and Computationally

Salt Chemistry

INL Idaho National Laboratory

Development of materials surveillance technology
Graphite/Salt Interaction
Materials/Salt Interaction

Advanced Materials

OAK RIDGE National Laboratory

Mission : Develop the technological foundations to enable MSRs for safe and economical operations while maintaining a high level of proliferation resistance.

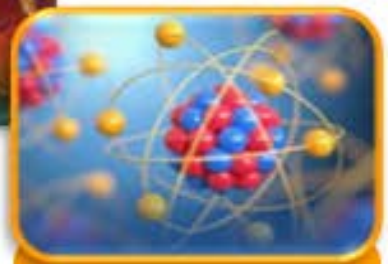
Mod & Sim

Technology Development

Los Alamos NATIONAL LABORATORY

Off Gas Management
Radionuclide Release Monitoring, Sensors & Instrumentation
LSTL & FASTR

Pacific Northwest NATIONAL LABORATORY



MSR Radioisotopes

Developing new technologies to separate radioisotopes of interest to the MSR community

Sandia National Laboratories

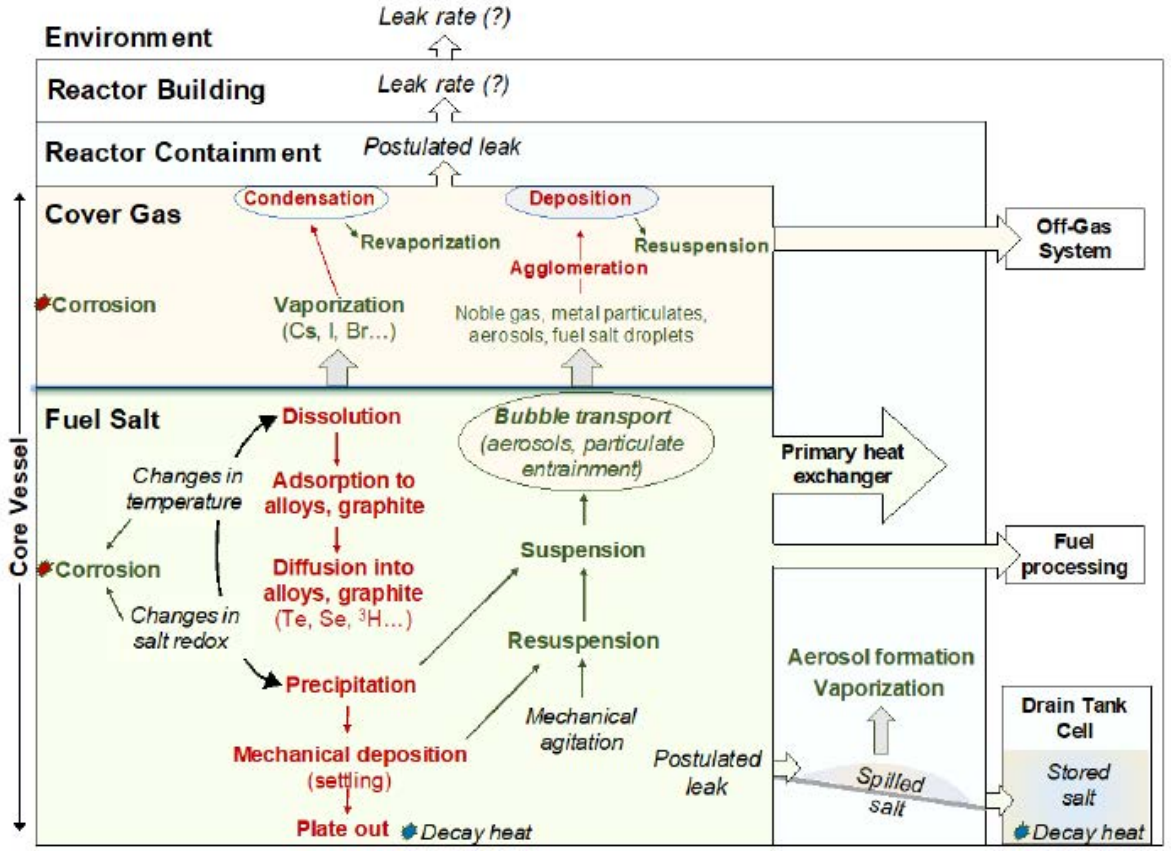
Resolve technical gaps related to mechanistic source term (MST) modeling and simulation tools.
Modeling radionuclide transport from a molten salt to different regions of an operating MSR plant

Molten Salt Reactor PROGRAM

Modeling Radionuclide Transport and Bulk Salt Behavior for Source Term Assessments

- Required thermochemical and thermophysical properties data
  - Viscosity
  - Thermal conductivity
  - Density
  - Heat capacities
  - Liquidus/solidus temperatures
  - Salt boiling temperatures
  - Volume expansion coefficients
  - Surface tension
  - Radiation emissivity

- Process contributions require experimental validation



Radionuclide transport and retention processes considered in source term models for generic MSR

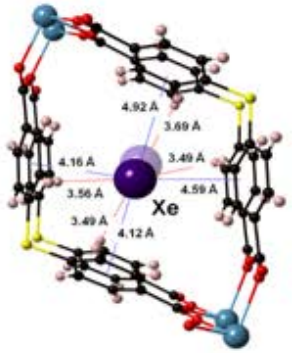
Courtesy Melissa Rose, MSR Developer Workshop, Oct 2020

Multi-faceted Approach to Investigation of Technologies for MSR off-Gas Systems

Component testing

- Large Scale Test Loop

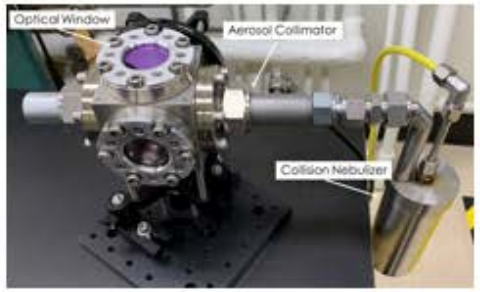
- Xe/Kr separation in MOF



Radionuclide identification/speciation

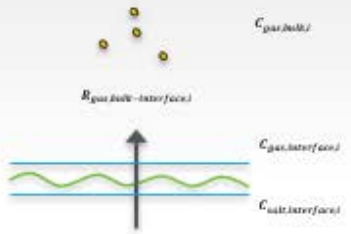
Raman

LIBS



Source term modeling

- Gas-liquid interface
- Provides source term to off-gas

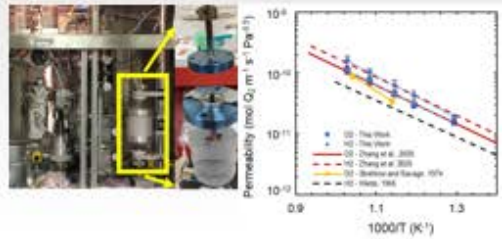


Removal Rate

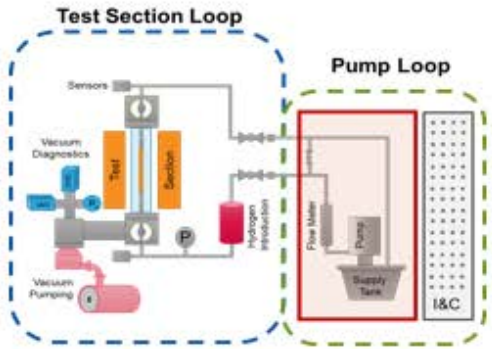
$$\frac{d(m_i)}{dt} = kA(C_{gas,interface,i} - C_{gas,bulk,i})$$

Tritium permeation

- Hydrogen isotope permeability in Hastelloy N



- Tritium transport salt loop



Sensors/ salt chemistry

- Salt composition
- Redox state
- Salt level

Particulate Monitoring

Automated Salt Sampling

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Gas Cooled Reactor R&D

Gas Cooled Reactor Program

Summary of current R&D activities that support industry regulatory engagements

TRISO Fuel

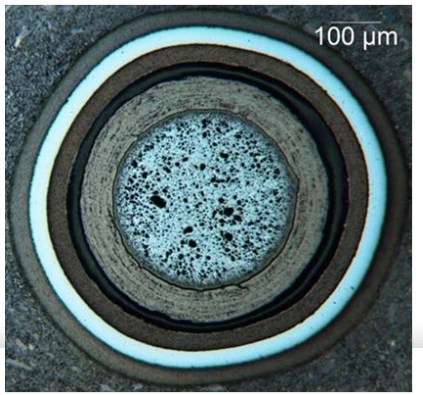
- Return on 20-year & $300M+ DOE-NE Investment:
  - The June 2023 joint report by the Canadian Nuclear Safety Commission (CNSC) and the US Nuclear Regulatory Commission (NRC) establishes a common regulatory position on TRISO fuel qualification.
  - It reflects a major accomplishment, largely funded by a series of DOE projects (NGNP QA Program, AGR Program) in close coordination with industry (DOE-EPRI topical report), NRC (QA Program), and NRC's cooperation with CNSC.
  - This significantly reduces North American regulatory uncertainty for TRISO-fueled reactors.

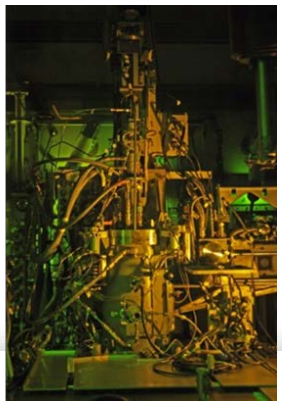
- Main focus in FY24-27 is on completion of AGR-5/6/7 PIE, safety and oxidation testing in FACS and AMIX, and compilation of AGR datasets in NDMAS database for use by reactor designers.
- FY25+: Develop strategy on how to best support non-AGR coated fuel forms (larger kernels, SiC matrix, UN, etc.).

U.S. NRC—CNSC Memorandum of Cooperation

FINAL REPORT
concerning
Tristructural Isotropic (TRISO) Fuel Qualification

June 2023





https://art.inl.gov/ndmas/SitePages/Home.aspx

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Gas Cooled Reactor Program

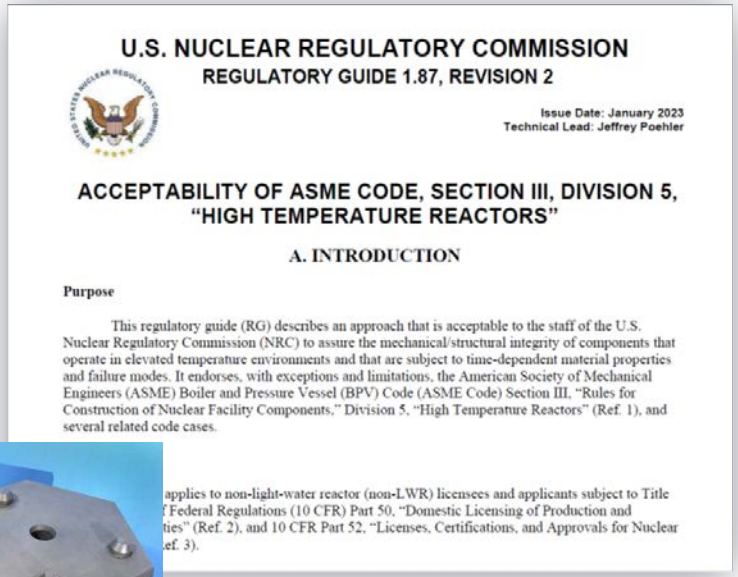
Metallics and Graphite

- Qualify and incorporate Alloy 709 into the ASME Code as high temperature construction material for SFR, HTGR and MSR applications
- Complete high-dose graphite (HDG) experiments to provide baseline vs. irradiation performance data.
- Develop and implement high temperature design methodology needed for advanced reactor designs into the ASME Code. Data is being collected in NDMAS and GIF Handbook databases.

Improve High Temperature Design Methodology for Advanced Reactors

Provide Support to Reduce Regulatory Risks for Advanced Reactor Developers

Qualify Next-Gen Construction Materials for Material Insertions in Commercial Advanced Reactors and for FOAK Advanced Reactor Applications for Mid-Term Deployment



U.S. NUCLEAR REGULATORY COMMISSION
REGULATORY GUIDE 1.87, REVISION 2

Issue Date: January 2023
Technical Lead: Jeffrey Poehler

ACCEPTABILITY OF ASME CODE, SECTION III, DIVISION 5, "HIGH TEMPERATURE REACTORS"

A. INTRODUCTION

Purpose

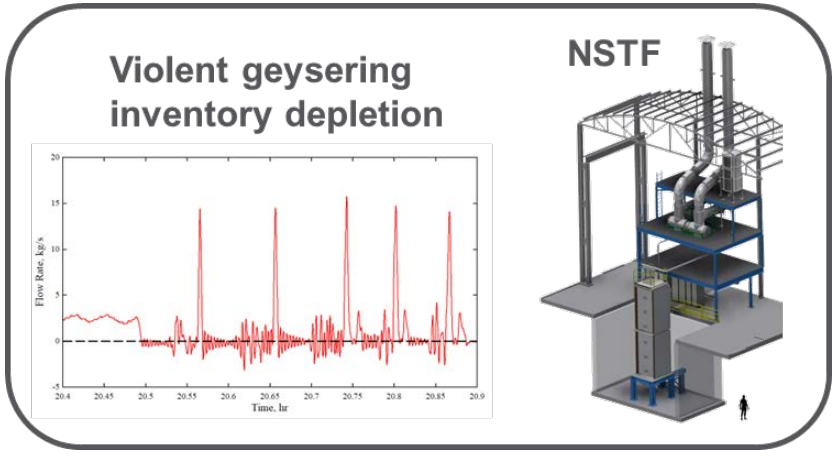
This regulatory guide (RG) describes an approach that is acceptable to the staff of the U.S. Nuclear Regulatory Commission (NRC) to assure the mechanical/structural integrity of components that operate in elevated temperature environments and that are subject to time-dependent material properties and failure modes. It endorses, with exceptions and limitations, the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code (ASME Code) Section III, "Rules for Construction of Nuclear Facility Components," Division 5, "High Temperature Reactors" (Ref. 1), and several related code cases.

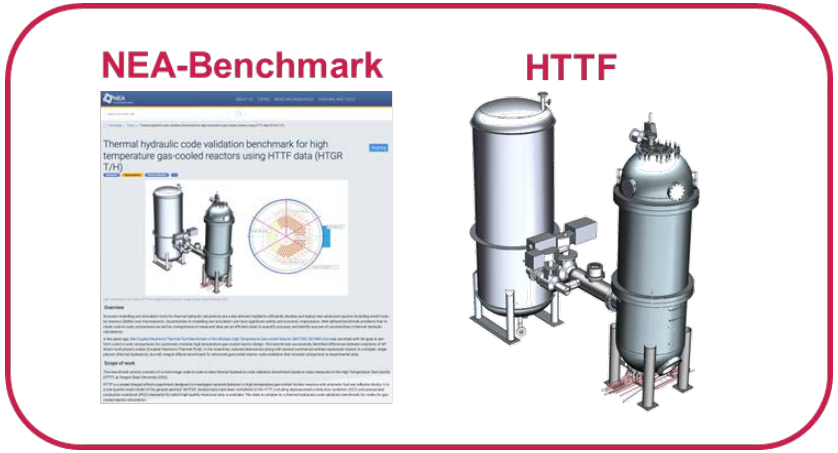
applies to non-light-water reactor (non-LWR) licensees and applicants subject to Title Federal Regulations (10 CFR) Part 50, "Domestic Licensing of Production and ties" (Ref. 2), and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear ef. 3).

Gas Cooled Reactor Program

HTGR Core Simulation and Methods Development + V&V

- We utilize the new codes developed in the DOE-NE NEAMS program (e.g., Griffin, Pronghorn, Bison) to perform various verification and validation benchmarks
- Current efforts include the NEA HTTR LOFC and HTTF benchmarks
- FY25+: Assess potential for creating non-nuclear pebble bed test facility at ANL as successor to NSTF.
- International collaborations provide valuable data: (Coordinated Research Projects (IAEA), bi-lateral agreements (Civil Nuclear Working Group (CNWG) with JAEA), Generation-IV Forum (GIF)
- *Example:* HTR-PM first start-up core physics benchmark shared by China within GIF VHTR Computation Methods Validation and Benchmarks (CMVB) activity.
- *Outcome:* Validated high-fidelity codes that industry and NRC can use for comparisons against legacy tools for safety, margin and uncertainty assessments
- FY25+: Complete NEA HTTF and HTTR LOFC Benchmarks and start GIF CMVB validation
- NSTF at ANL: current water-based RCCS testing will end in FY25. Assessing future use of this facility (pebble bed or micro-reactor validation data support) ?





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Stakeholder Engagement & Coordination

Regulatory Engagement Considerations

- **DOE program outputs have a number of connections to industry regulatory engagements – close coordination is critical:**
  - Currently ongoing NRC licensing reviews (Kairos-Hermes 2, Abilene Christian-NEXT)
  - Design and commercial license application development is underway (incl. DOE ARDP awardees)
  - NRC pre-application interactions by various industry advanced reactor technology stakeholders is underway

- **General types of regulatory engagement directly supported by DOE NE-5 programs:**
  - Completion of R&D that provides experimental results, data, and validated methods that are reflected in DOE national laboratory reports (OSTI) that can be directly referenced by industry stakeholders in support of their license applications and associated regulatory interactions

  - Completion of R&D and development of associated industry proposals that are submitted to NRC for formal endorsement, and can then be utilized by multiple industry stakeholders without additional “up-front” regulatory approach evaluation

U.S. DEPARTMENT OF ENERGY | Office of NUCLEAR ENERGY

Questions?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Federal Consultations in the Environmental Review Process: Lessons Learned and Best Practices

Michelle Rome, Branch Chief
Environmental Technical Branch 1, Environmental Center of Expertise
Office of Nuclear Material and Safety Safeguards
U.S. Nuclear Regulatory Commission

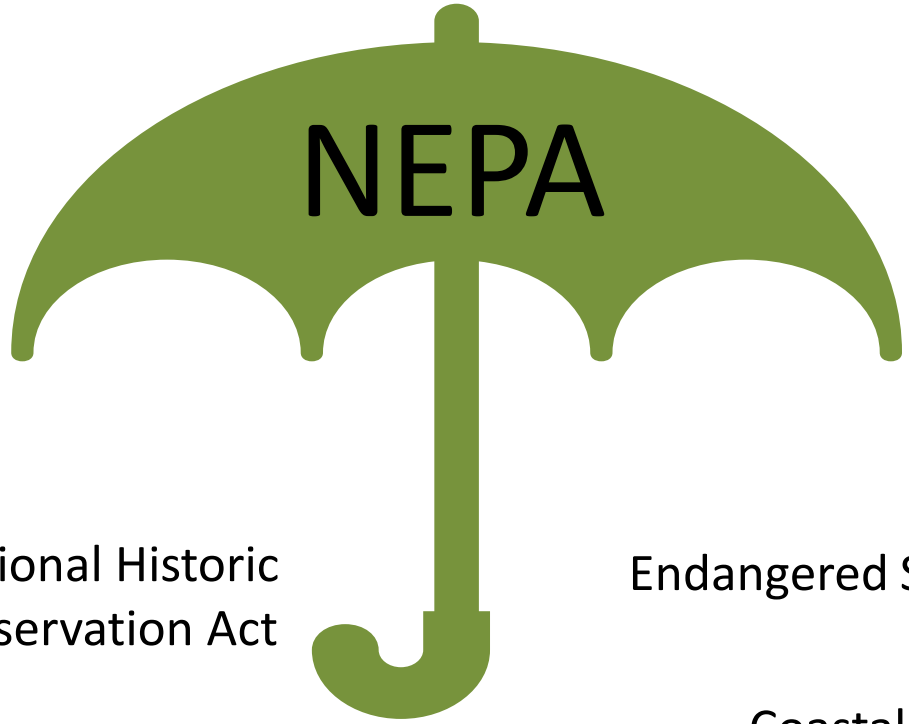
Environmental Center of Expertise

Environmental Reviews for Advanced Reactors

National Environmental Policy Act

- NRC Implementing Regulations in 10 CFR Part 51
- Amended through the Fiscal Responsibility Act in June 2023
  - New page and time limit requirements
  - Additional streamlining opportunities
  - The staff formed a working group and is assessing options to:
    - reduce time and resources, while balancing meaningful public engagement, and
    - codify new requirements and remove any inconsistencies.

National Environmental Policy Act (NEPA): The "Umbrella Act" and other Federal Consultations



National Historic Preservation Act

Clean Water Act

Clean Air Act

Marine Mammal Protection Act

Endangered Species Act

Coastal Zone Management Act

Environmental Justice (E.O. 12898)

Magnuson Stevens Act

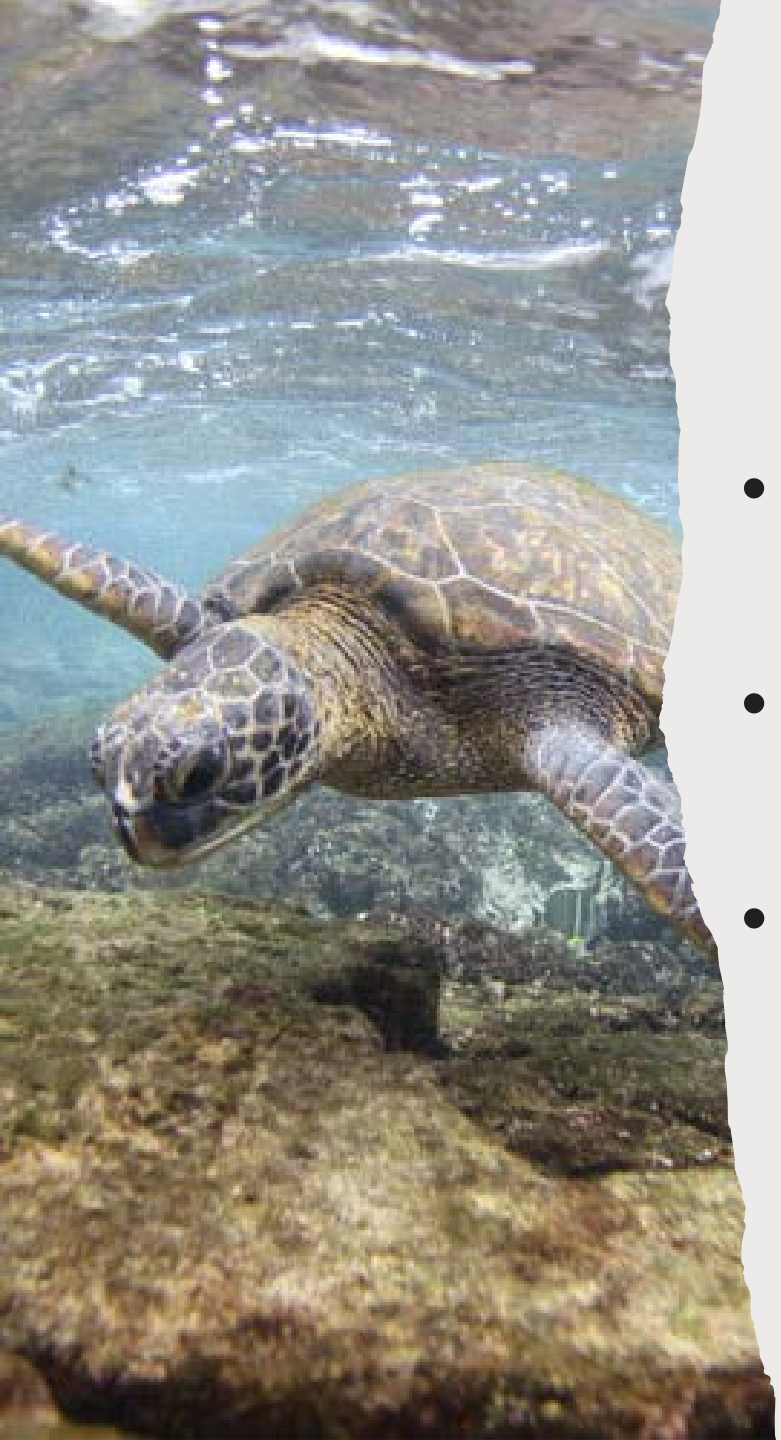
Why are other Federal Consultations important to consider?

Requires close coordination:
Applicant data NRC-lead with other Federal agencies and consultation with Federally recognized Tribes

Role of other Federal agencies:
Data completeness, timelines, and effect determinations

Risk mitigation:
If lessons learned and best practices are not incorporated, could pose schedule risks.

Early coordination is key!



Today's Focus

- National Historic Preservation Act
  - Section 106 Consultation
- Endangered Species Act
  - Section 7 Consultation
- But please don't forget other requirements listed earlier (see Regulatory Guide 4.2, Revision 3)

Section 106 of the National Historic Preservation Act: Overview

Purpose

- Identify historic properties,
- Assess adverse impacts, and
- Resolve or mitigate adverse impacts.

Who is involved?

- State/Tribal Historic Preservation Office
- Tribes with ancestral or historical times to the project area
- Advisory Council on Historic Preservation
- Interested parties including the public

Consulting Parties

Individuals and organizations with a legal or economic interest in the project or their concern with the effects on historic properties.
[36 CFR § 800.2(c)(5)]

Section 106 Review Process

36 CFR § 800.3-7

CONSULTATION

INITIATE the process

- Determine undertaking
- Coordinate with other reviews
- Identify SHPO/THPO, Indian tribes/NHOs, and other parties
- Plan to involve the public

Undertaking with potential to affect historic properties?

NO

YES

IDENTIFY historic properties

- Determine APE and scope of effort
- Make reasonable and good faith effort to identify
- Determine National Register eligibility
- Consult SHPO/THPO, Indian tribes/NHOs, and other parties
- Involve the public

Historic properties present or affected?

NO

YES

ASSESS adverse effects

- Apply Criteria of Adverse Effects
- Consult SHPO/THPO, Indian tribes/NHOs, and other parties
- Involve the public

Historic properties adversely affected?

NO

YES

RESOLVE adverse effects

- Develop and consider alternatives or modifications to avoid, minimize, or mitigate adverse effects
- Notify the ACHP
- Consult SHPO/THPO, Indian tribes/NHOs, and other parties
- Involve the public

AGREEMENT or Council Comment

PROCEED

Section 106: Best Practices for NRC

Early and frequent coordination with Tribes and SHPOs

Incorporate lessons learned from completed Section 106 consultations

Implementation of process and operational changes

- Organizational realignment for ECOE-wide project-management and incorporation of lessons learned
- Increased capacity and greater agility to meet workload surges and develop increased capacity in priority areas
- Continue building stronger working relationships with Tribes and SHPOs

Section 106: Best Practices for Applicants

- Early and often coordination with NRC during pre-application phase
  - Ensure consistent understanding of data needs, which may be informed by NRC's consultation with SHPO/THPO, Tribes, and other interested parties.
  - Awareness that tribal and cultural resources may still exist on brownfield sites. Include Secretary of Interior qualified professionals on your team.
  - Conduct fieldwork and reports prior to application submittal.

Section 106: Best Practices for Applicants (cont.)

- Early and often coordination with Tribes, SHPOs, and Affected Communities
  - Who are the Tribal communities affected by the proposed project? What are their concerns?
  - What are the best approaches for meaningful engagement and building trust?
  - Some Tribes or SHPOs will only engage with Federal agencies.
  - Ultimately, Section 106 responsibilities remain with the NRC.

Section 7 of the Endangered Species Act: Overview

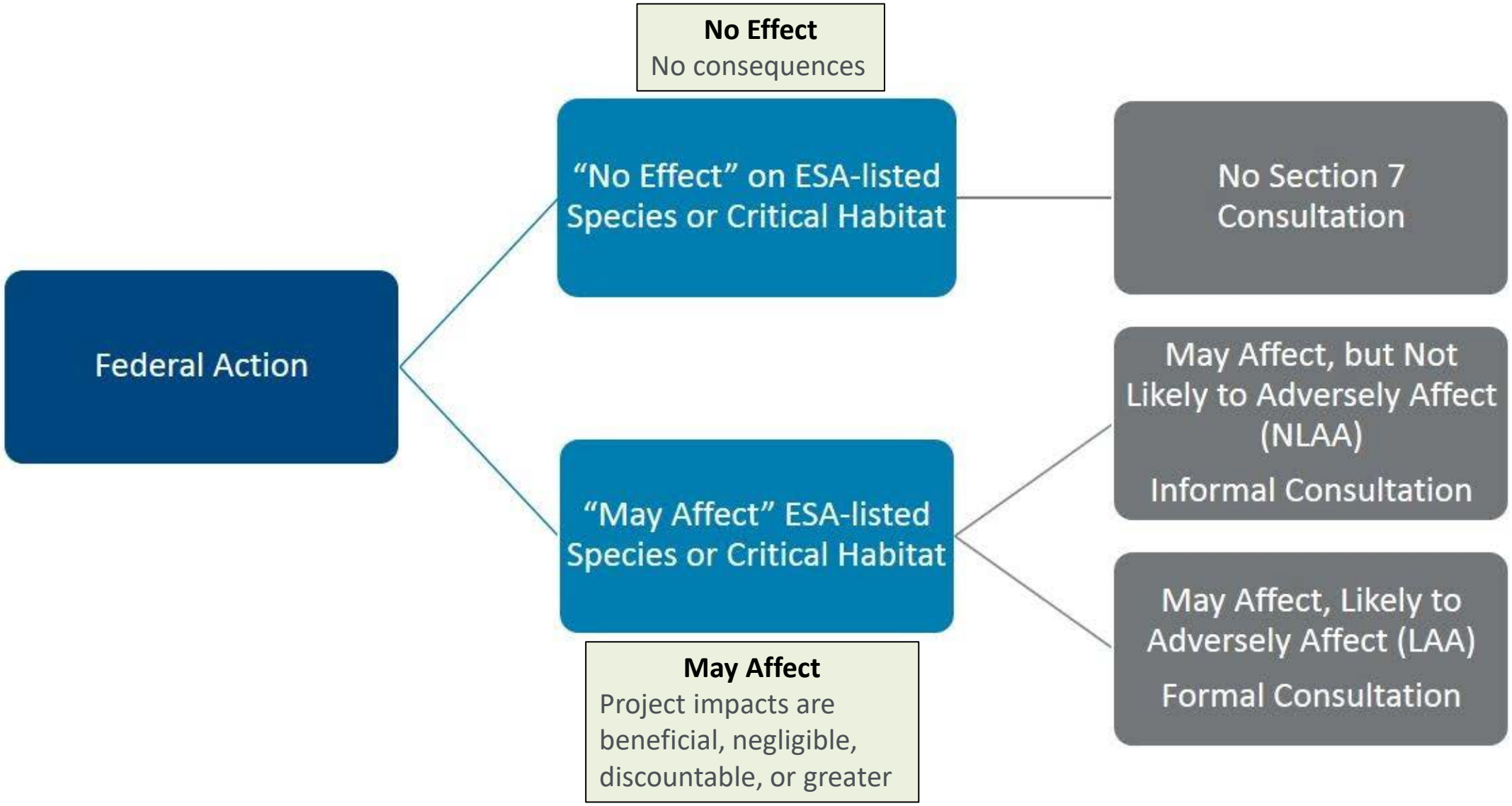
Purpose:

- To protect and recover imperiled species and the ecosystems upon which they depend

Requirements:

- Any actions that **may affect** a species listed under the Endangered Species Act or critical habitats.
- Ensure actions does not jeopardize the continued existence of listed species or crtical habitat

Endangered Species Act: What is the consultation process?



Endangered Species Act: Best Practices and Lessons Learned

Early and often coordination during pre-application

Ensure consistent understanding of data needs

- Data needs are often site and action-specific
- Understanding data needs may require Fish and Wildlife Service or National Marine Fisheries Service input
- Fish and Wildlife Service's Information for Planning and Consultation (IPAC) Tool

Consider multiple approaches for Section 7 consultation

- For example, combine with the NEPA process or parallel tracks

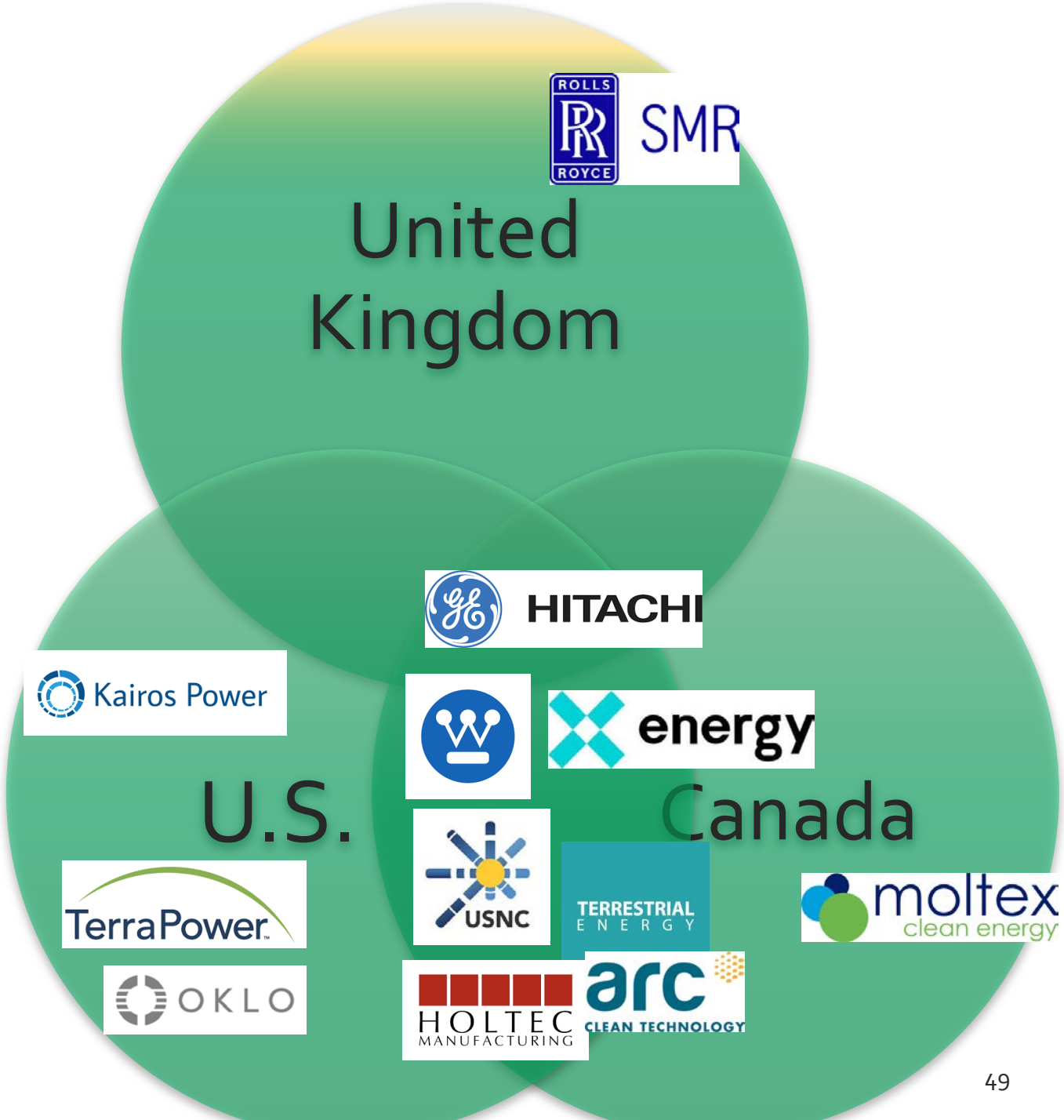
Questions?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

UNITED STATES AND CANADA COOPERATION ON SMR DESIGN REVIEWS – SUCCESSES IN COLLABORATION

March 27, 2024

WHY A MEMORANDUM OF COOPERATION?



HOW THE MOC WORKS

Pre-application interactions

Vendor design review

Generic design assessment

White paper
Topical report

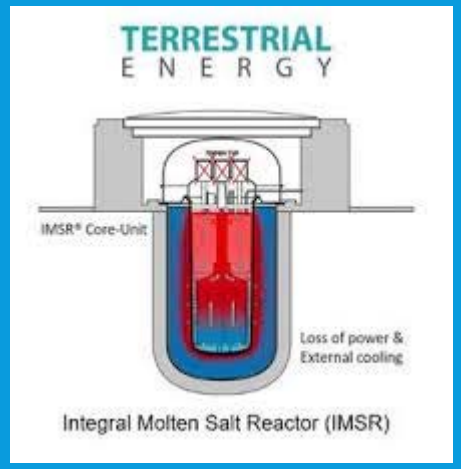
Joint report

Design certification
Construction permit
Combined license
Operating license

License to construct
License to operate

nuclear site license

DESIGNS UNDER COOPERATIVE REVIEWS



GENERIC TOPICS

U.S. NRC—CNSC Memorandum of Cooperation

FINAL REPORT
concerning
Tristructural Isotropic (TRISO) Fuel Qualification

June 2023

Approved by
Mohamed K. Shams

Dr. Mohammed K. Shams, Director
Division of Advanced Reactors and Non-Power Production and Utilization Facilities
United States Nuclear Regulatory Commission

Approved by
C. Ducros

Dr. Caroline Ducros, Director General
Directorate of Advanced Reactor Technologies
Canadian Nuclear Safety Commission

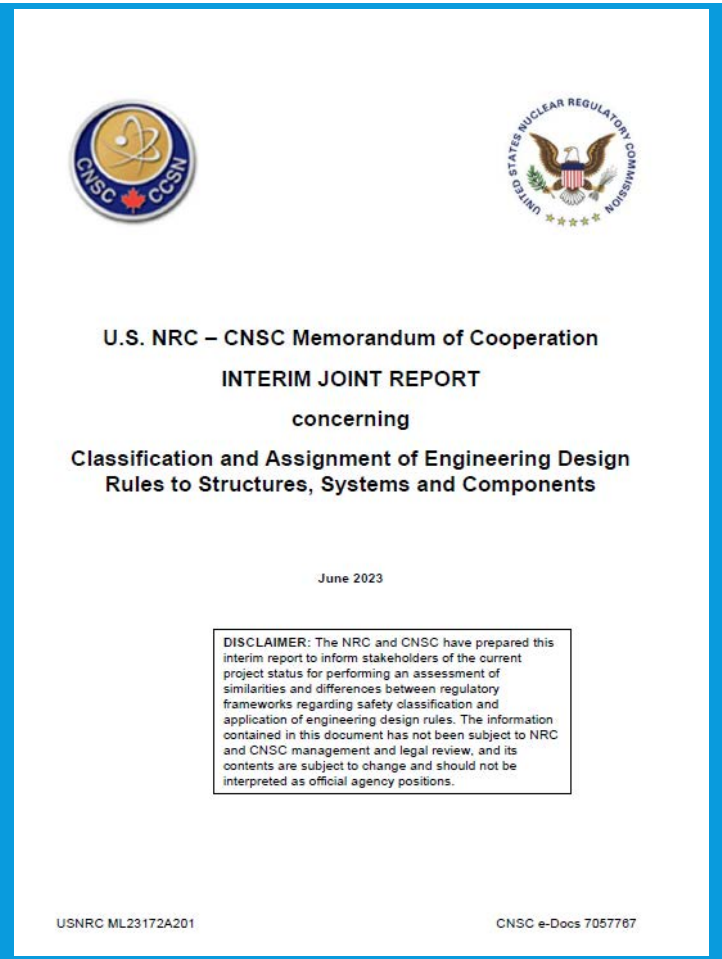
Melanie Rickard

Melanie Rickard, Director General
Directorate of Assessment and Analysis
Canadian Nuclear Safety Commission

DISCLAIMER: The NRC and the CNSC have prepared this final report to inform stakeholders of the current project status for performing a generic assessment of TRISO fuel. The information contained in this document has not been subject to NRC and CNSC management and legal review, and its contents are subject to change and should not be interpreted as official agency positions.

U.S. NRC ML23172A242 Page 1 of 31 CNSC e-Docs #7055295

Technology Inclusive and Risk-Informed Reviews for Advanced Reactors:
Comparing the US Licensing Modernization Project with the Canadian Regulatory Approach



U.S. NRC – CNSC Memorandum of Cooperation

INTERIM JOINT REPORT

concerning

Classification and Assignment of Engineering Design Rules to Structures, Systems and Components

June 2023

DISCLAIMER: The NRC and CNSC have prepared this interim report to inform stakeholders of the current project status for performing an assessment of similarities and differences between regulatory frameworks regarding safety classification and application of engineering design rules. The information contained in this document has not been subject to NRC and CNSC management and legal review, and its contents are subject to change and should not be interpreted as official agency positions.

USNRC ML23172A201 CNSC e-Docs 7057767

ORGANIZATION

Advanced Reactor and SMR Subcommittee

Strategic Working Group

Work Plan leads SMEs

Work Plan leads SMEs

Work Plan leads SMEs

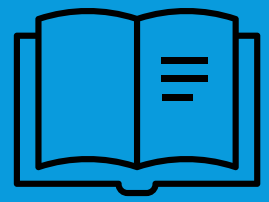
BEST PRACTICES

Strategic working group

Frequent meetings

communication

compatible schedules



Desk guides

balanced workload

training

QUESTIONS?

Advanced Reactor Stakeholder Public Meeting

Lunch Break

Meeting will resume at 1:00 pm EST

Microsoft Teams Meeting
Bridgeline: 301-576-2978
Conference ID: 281 020 73#

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Protecting People and the Environment

Advanced Reactor Stakeholder Public Meeting

Nuclear Energy Institute Input on Regulatory Priorities for New and Advanced Reactors

Marcus Nichol
Executive Director, New Nuclear
Nuclear Energy Institute

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Future Meeting Planning

- The next periodic stakeholder meeting is scheduled for May 23, 2024.

- If you have suggested topics, please contact Katie Wagner at Katie.Wagner@nrc.gov or Ossy Font at Ossy.Font@nrc.gov.

How Did We Do?

- Click link to NRC public meeting information:

  https://www.nrc.gov/pmns/mtg?do=details&Code=20240086

- Then, click link to NRC public feedback form: