Advanced Reactor Oversight Process (AROP) Stakeholder Workshop Series

NRC Nuclear Regulatory Commission

Hosted by the
Office of the Chief Nuclear Reactor Inspector (CNRI)

October 28, 2026

Opening Remarks

Phil McKenna, Deputy Director

CNRI

Welcome

Meeting Introductions and Guidelines

Purpose and Desired Outcome

Share NRC's current approach for developing the AROP

Engage stakeholders including the public about AROP activities

Gather feedback for consideration during AROP development

*Please note that NRC guidance discussions are preliminary and are not meant to convey a final regulatory position.

Planned Workshop Session(s)

Session 1, October 28, 2026:

Introduction to AROP on-going activities and concepts

Future Session(s), Date(s) TBD:

Session 1 Topics

- Background
- AROP Concepts – Performance Monitoring
- Stakeholder Engagement Point
- AROP Development Timeline

Background

- NRC staff developed risk-informed, performance-based strategies and guidance for the oversight and inspection of microreactors as required by the ADVANCE[1] Act. (ML25329A275)

- The ADVANCE Act requires implementation of the guidance and strategies within 3 years from the enactment of the Act.

[1] Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy

Background

- NRC leadership expanded the scope of the ADVANCE Act tasking to include advanced reactor designs beyond microreactors.

- NRC working group assembled to implement the AROP high level strategies (ML26222A315).

Commission Expectations for New Reactors

The following Commission expectations for new reactors were summarized from commission staff requirement memos:

- Maintain the safety goal metrics for new reactors[1,2]
- New reactors with enhanced margins and safety features should have greater operational flexibility than current reactors [2]
- The significance determination process (SDP) will continue to place emphasis on the use of the existing quantitative measures of the change in plant risk for both operating and new reactors [3]

References:
[1]SRM-SECY-90-016, Evolutionary Light Water Reactor (LWR) Certification Issues and Their Relationship to Current Regulatory Requirements
[2]SRM-SECY-10-0121, Modifying the Risk-Informed Regulatory Guidance for New Reactors
[3]SRM-SECY-13-0137, Recommendations for Risk-Informing the Reactor Oversight Process for New Reactors

AROP Broad Technology Landscape

NON-LIGHT WATER REACTOR



- Low operating pressure
- Functional containment
- Few safety-related SSCs
- Few safety-related operator actions
- Passive safety systems
- Inherent reactivity control
- Online refueling (varies)
- Lower risk profiles

SMALL MODULAR REACTOR



- High operating coolant pressure
- Pressure boundary containment
- Passive safety systems
- Integral power modules
- Low risk profiles

MICROREACTOR



- Small source term
- Remote operations
- Transportable (varies)
- Offsite refueling
- No online maintenance

POTENTIAL TRANSPORTATION FOR MICROREACTORS



Deployed Microreactors considerations –

- Start-up testing and refueling at fabricating facility
- Transportation oversight by DOT/NMSS
- Remote operations at deployment site

Guiding Principles for AROP Development



AROP ACCOMMODATES:

- ✓ Varying source terms and power levels
- ✓ Diverse deployment strategies
- ✓ Multi-module and co-located facilities

Multiple licensing pathways (Parts 50, 52, 53, 57)

A graded, risk-informed oversight framework applicable across the advanced reactor fleet while maintaining a focus on safety significance.

Previous Industry Input

Industry stakeholders have suggested AROP should:

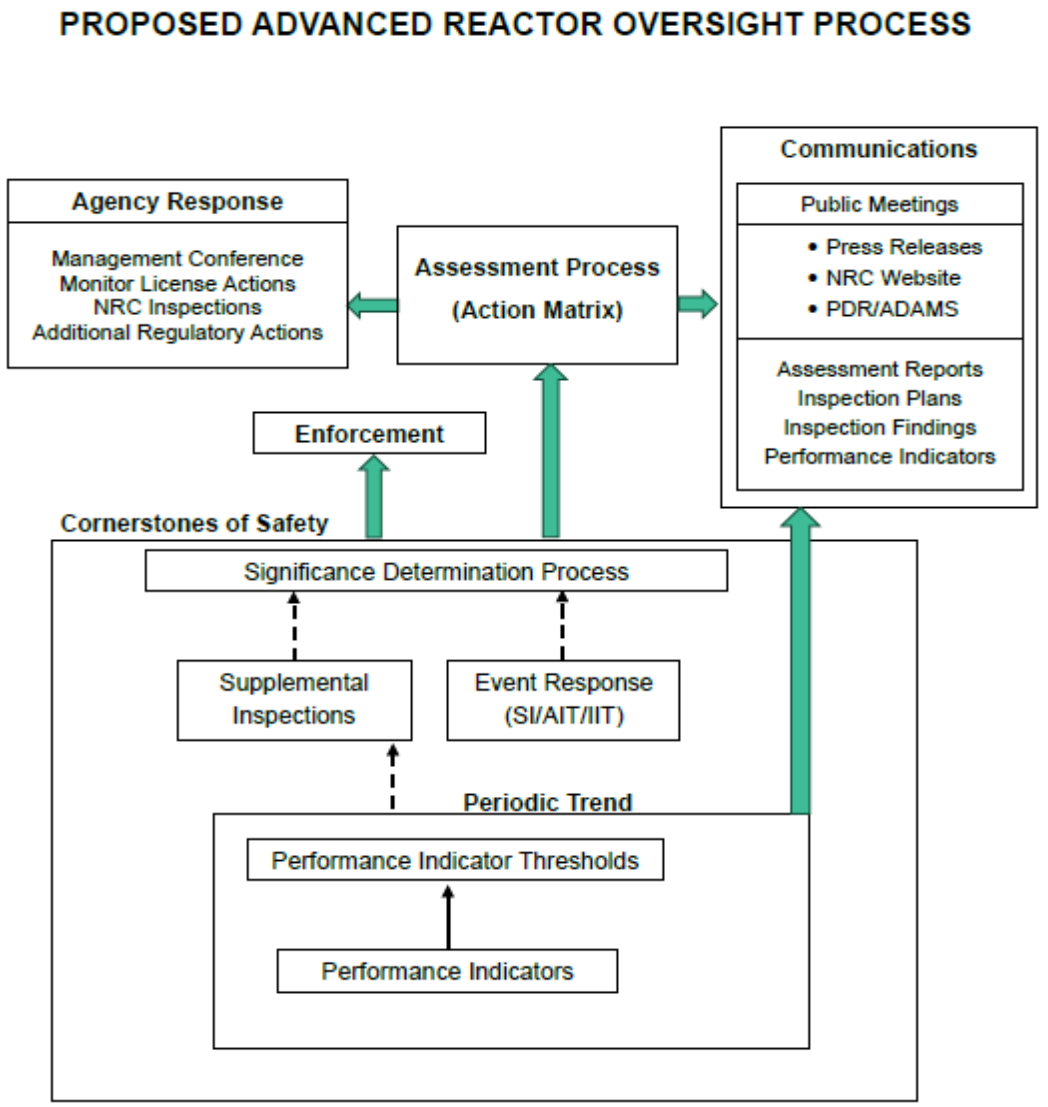
- Leverage RTR oversight concepts[1]
- Account for novel features such as factory pre-fabrication, simple designs and remote operations[1]
- Proposed simplified methodology for calculating risk metrics[2]
- Proposed technology-inclusive alternative to the traditional core damage frequency and large early release frequency approach[2]

[1] July 2024 – NEI proposal for Regulation of Rapid High-Volume Deployable Reactors and Other Advanced Reactors Appendix 23 (ML24213A337)
[2] July 2026 – NEI 25-11, Advanced Reactor Risk Metrics (ML26211A395)

Previous Industry Input

Industry stakeholders have suggested AROP should:

- Prioritize performance indicator evaluation over inspections[3]
- Perform targeted inspection when PIs cross established thresholds[3]
- Minimized routine on-site inspections if the PIs continues to demonstrate effective performance[3]



[3]June 2025 – NEI Recommendations on the Development of the Advanced Reactor Oversight Program (AROP) (ML25181A797)

Elements of an NRC Oversight Program

- Performance Monitoring

Inspections, performance indicators (PI) (quality PIs could result in less inspections), allegations, and operating experience

- Enforcement/SDP

Dispositioning issues of concern using safety/security significance

- Assessment

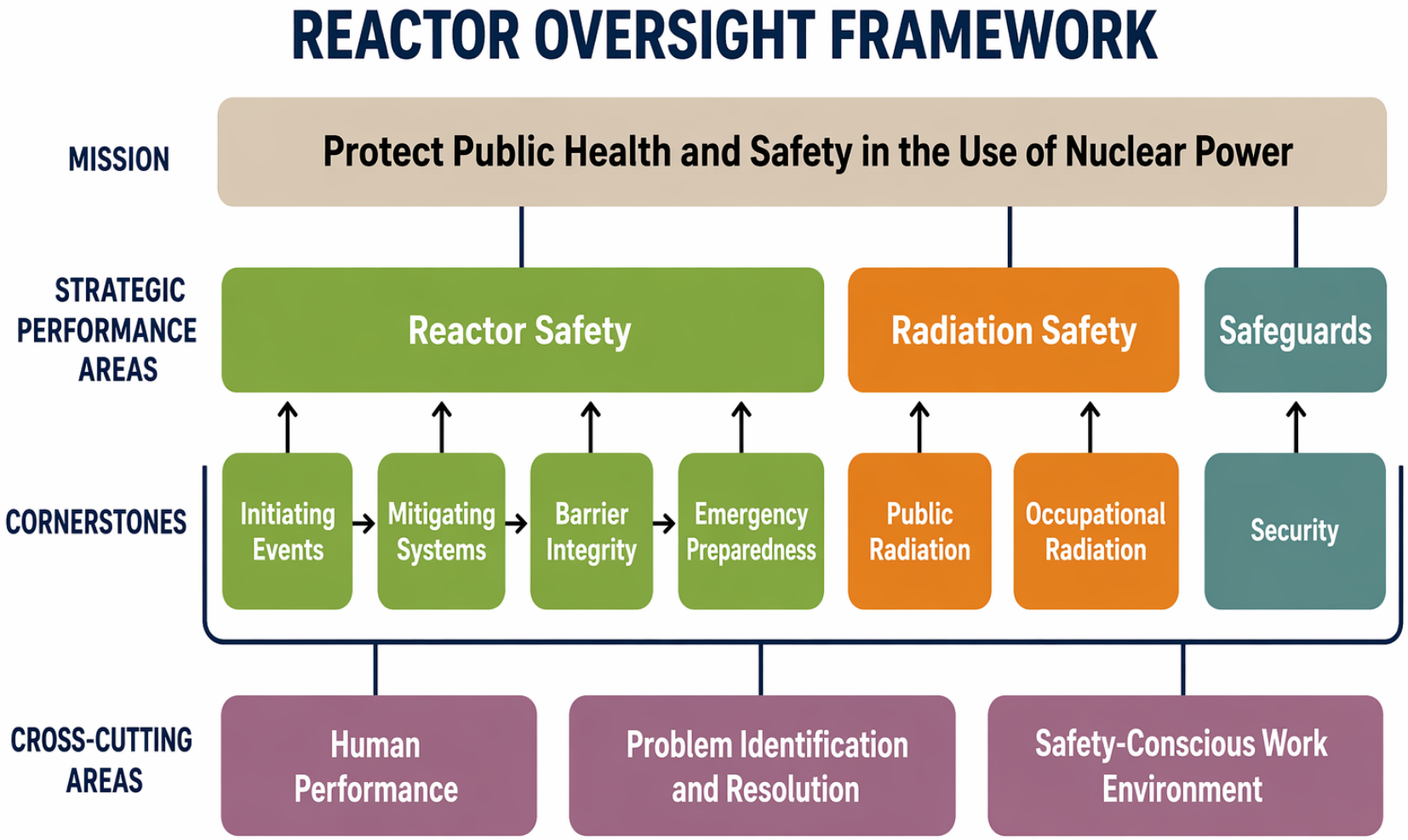
Characterizing performance and determining NRC response

AROP Concepts - Performance Monitoring

- The objective is to monitor performance in three broad areas:
  - Reactor safety (avoiding accidents and reducing the consequences of accidents if they occur)
  - Radiation safety for both plant workers and the public during routine operations
  - Protection of the plant against sabotage or other security threats

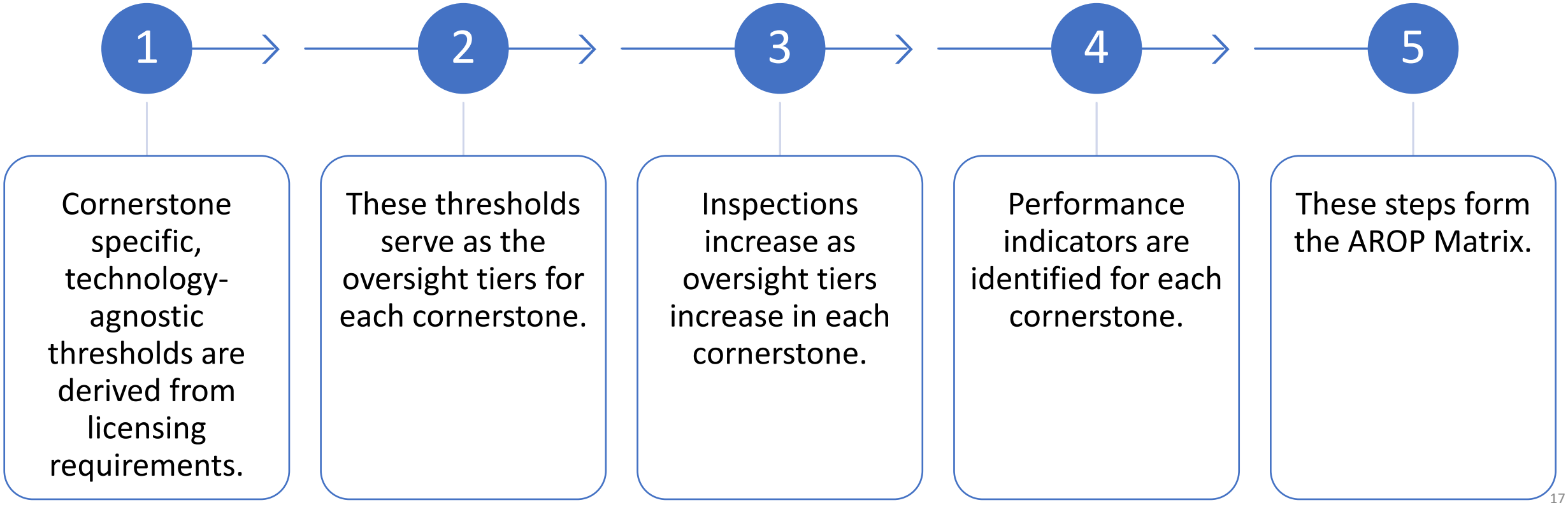
AROP Concepts

Leverage the existing ROP Framework



AROP Concepts

- AROP uses a graded approach to determine a facility's level of oversight



AROP Concepts - Matrix

Inspection increases as tiers increase

Cornerstones	Level of Oversight					
Reactor Operations		Thresholds			Thresholds	
Emergency Preparedness						
Public Radiation + Occupational Radiation						
Security						

Example: AROP EP Cornerstone Thresholds

EP Cornerstone	Tier I	Tier II	Tier III
Oversight Threshold	Alert	General Emergency	N/A
Level of Inspection	Minimum	Nominal	N/A
Performance Indicator	EP Performance Indicator(s)		

Example: Facility Level of Oversight

Cornerstones	Level of Oversight		
Reactor Operations	Tier I	**Tier II: Nominal; PIs**	Tier III
Emergency Preparedness	**Tier I: Minimum; PIs**	Tier II	N/A
Public Radiation + Occupational Radiation	Tier I	Tier II	**Tier III: Maximum; PIs**
Security	Tier I	**Tier II: Nominal; PIs**	Tier III

Stakeholder Engagement Point

Stakeholder Engagement

AROP Framework

- Discussion on leveraging the ROP Framework in the development of the AROP Framework

Oversight Thresholds

- Discussion on utilizing oversight tiers and what commensurate inspections (frequency and depth) for the tier thresholds
- Discussion on identifying oversight tier thresholds

Stakeholder Engagement

Performance Indicators

- What new or existing PIs are needed to reflect the risk profiles?
- Benefits to having design/technology specific PIs?
- Data reported more frequently than quarterly?
- PI verification inspection?
- How should PIs be used in oversight assessment?

Remote Plant Status and Information Sharing

- Provide plant status information for a facility with no resident inspectors
- Plan of the day report or CAP report, if available

AROP Development Timeline



Planned Workshop Session(s)

Session 1, October 28, 2026:

Introduction to NRC Advanced Reactor Oversight Process Framework

Future Session(s), Date(s) TBD:

AROP Points of Contact

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Closing Remarks

Feedback on this public meeting

NRC Nuclear Regulatory Commission

Acronyms

ADVANCE Act – Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy

AROP – Advanced Reactor Oversight Process

CFR – Code of Federal Regulations

CNRI – Chief Nuclear Reactor Inspector

DOCP – Division of Oversight and Compliance Programs

DOT – Department of Transportation

EP – Emergency Preparedness

LWR – Light Water Reactor

NEI – Nuclear Energy Institute

NMSS – Nuclear Material Safety and Safeguards

NRC – Nuclear Regulatory Commission

PI - Performance Indicators

RAB – Reactor Assessment Branch

ROP – Reactor Oversight Process

RTR – Research and Test Reactors

SDP – Significance Determination Process

SECY – NRC Commission Papers

SMR – Small Modular Reactor

SRM – Staff Requirements Memorandum

TBD – To Be Determined

End of Workshop #1