

2025 NRC Standards Forum

“Progress, Activities, and Engagement of the Advanced Reactor Codes and Standards Collaborative”

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Washington D.C.
September 25, 2025



Advanced Reactor
Codes and Standards
Collaborative

ARCSC Presentation Objectives

Brief History

ARCSC Formation, Objectives, Roadmap Process, Activities

Charter and Goals

Activities/Engagement/Actions

Needs Assessment Survey Progress

ARCSC 2025 ^{4th} Annual Public Workshop

Closing Remarks

Brief History: Advanced Reactor Codes and Standards Collaborative (ARCSC) - What is ARCSC?

- (Early 2022) Primary Objectives:

Create an Industry Nuclear Standards Collaborative - a “centralized industry led team” - to ensure coordination and collaboration among standards development organizations (SDOs) to support reactor designers, regulators, other stakeholders to develop codes, standards and/or guidelines to support advanced reactor designs.

Develop interrogatories, agendas, other actions necessary to facilitate strategies and action plans that support development of codes, standards and foster licensing, design, construction, operation of advanced reactors.

- (Today 2025) Collaborative's intent still is to parallel the focus of NRC's Standards Forums:

“... aims to identify standards needs for the nuclear industry that are not currently being addressed by SDOs such as ASTM, ASME, AISC, ANS, IEEE, etc.”

ARCSC Formation, Objectives, Roadmap Process, Activities



EPRI and NEI Support ARCSC Formation

- Need for ARCSC came out of the EPRI/NEI North American Advanced Reactors Roadmap (NAARR) to enable and expedite commercialization of advanced reactors.
- ANS, ASME, and CSA Group are founding members of ARCSC with support from NEI and EPRI.
- ARCSC has grown considerably to include additional SDOs, industry organizations, advanced reactor developers, regulators, national labs, international organizations, etc.
- ARCSC membership includes ~60 members and observers.
- Additional advanced reactor developers, interested parties welcomed.





ARCSC current representative membership includes the following SDOs, national labs, industry organizations, and companies:

American Nuclear Society	Idaho National Laboratory	Energy Northwest
American Society of Mechanical Engineers	Canadian Nuclear Safety Commission	International Society of Automation/ International Electrotechnical Commission
American Society of Civil Engineers	CANDU Owners Group	Moltex Clean Energy
American Institute of Steel Construction	Terrestrial Energy	U.S. Nuclear Regulatory Commission
CSA Group	Deep Fission	Institute of Nuclear Power Operations
Institute of Electrical and Electronics Engineers	X-energy	U. S. Department of Energy (pursuing representative)
Electric Power Research Institute	TerraPower	World Nuclear Association
Nuclear Energy Institute	Westinghouse eVinci	Exponent
Sargent & Lundy LLC	General Electric	International Organization for Standardization / Technical Committee 85, Nuclear energy, nuclear technologies, and radiological protection
Paragon Energy Solutions	US Nuclear Technical Advisory Group	

ARCSC Charter and Goals



Share information
on AR standards
development among
SDOs and stakeholders



Identify needs:
gather stakeholder input;
identify gaps being
addressed by SDOs; assess
remaining gaps and identify
actions and resources
needed



**Inform and
complement**
relevant international &
national efforts (e.g., IAEA
NHSI, WNA CORDEL)



Input to Roadmap
Implementation Board to
align actions
with NEI/EPRI North
American Advanced
Reactor Roadmap

Objectives

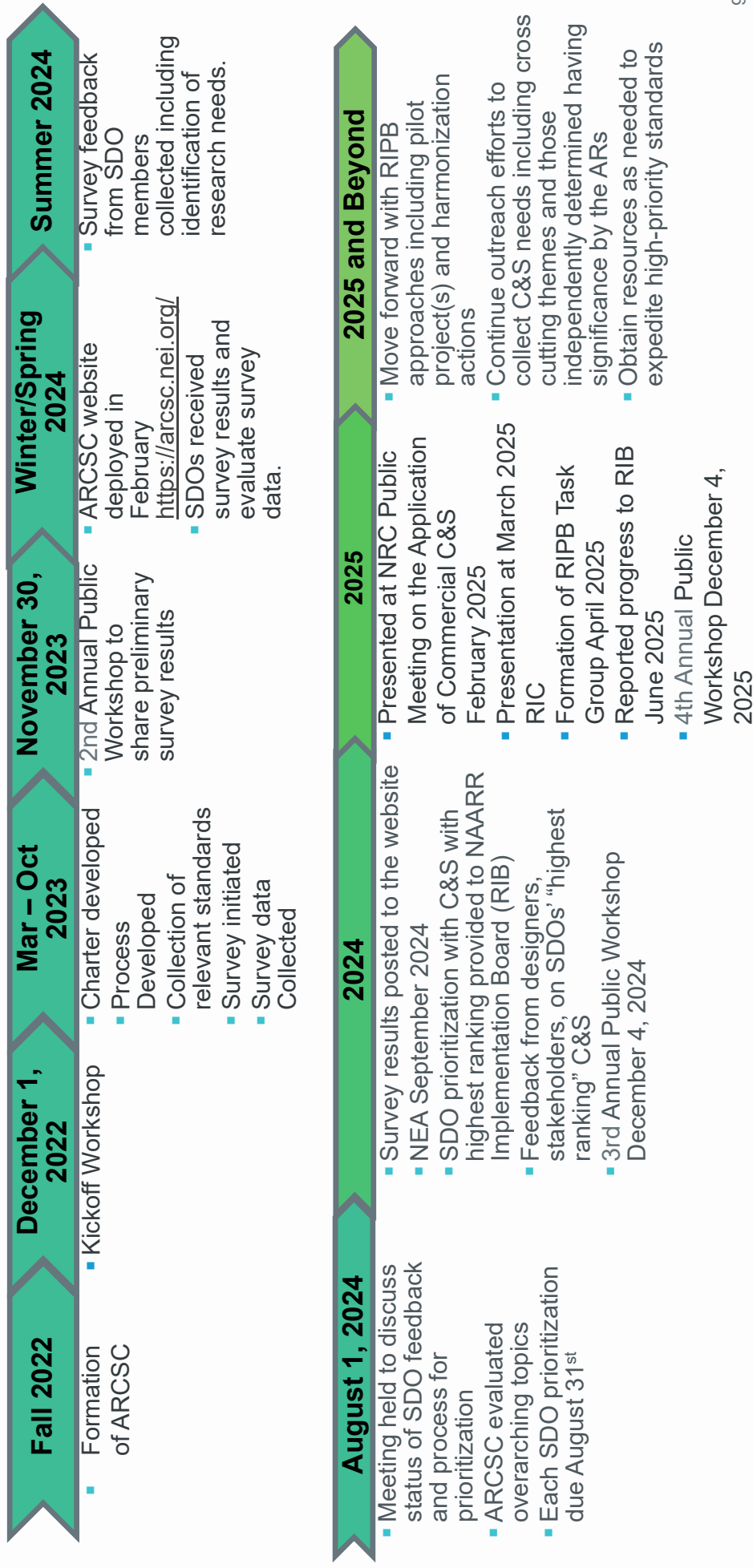
Mission: To ensure the development, alignment and timely availability of U.S., Canadian and international codes and standards needed to support large-scale advanced reactor deployment.

Activities/Engagement/Actions

- **NAARR CS-01: Identify gaps in current standards and timelines for completion of advanced reactor codes & standards (C&S) (Completed)**
 - Survey #1 October – November 2023: Gap Assessment Survey
 - Survey #2 October – November 2024: Advanced Reactor Developer Validation of Survey #1 Evaluation
- **NAARR CS-02: Demonstrate risk-informed and performance-based (RIPB) approach (Ongoing)**
 - NRC's perspective on RIPB methods including SECY-98-144
 - RIPB philosophy from the Canadian regulator's perspective
 - SDOs examples of RIPB use in standards
 - Formation of RIPB Task Group, April 2025
- **Harmonization of Current Initiatives / Opportunities**

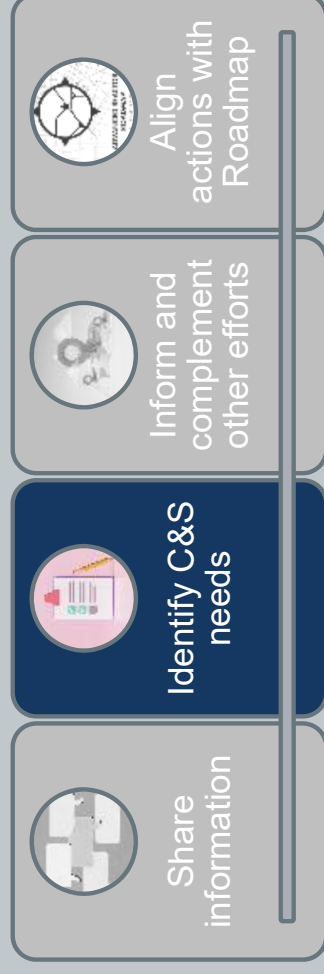


ARCSC Activities to Date



Needs Assessment Survey Progress: Update

CS-01: Identify gaps in and
timelines for advanced
reactor C&S



ANS Update on Identified High-Priority Standards



- ANS-2.26-202x, *Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design* [revision of ANSI/ANS-2.26-2004 (R2021)]

STATUS: Draft being revised for applicability of commercial reactors. Working group approval of draft anticipated late summer 2026.

- ANS-6.4-202x, *Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants* [revision of ANSI/ANS-6.4-2006 (R2021)]
STATUS: Working group approval of draft anticipated September/October 2025
- ANS-54.8-202x, *Liquid Metal Fire Protection* (proposed revision of ANSI/ANS-54.8-2025 to include RIPB methods)
STATUS: Stage 1 completed/issued 9/2/25. Working group approval of Stage 2 draft optimistically anticipated by end of year; balloting to begin early 2026

CSA Group Update on Identified High-Priority Gaps



■ Pressure boundary

- A supplement to CSA N285.0, *General requirements for pressure-retaining systems and components in CANDU nuclear power plants*, is in development.
- The supplement is intended to provide technology neutral requirements that will align within fit the framework of existing Canadian standard and regulatory requirements.
- The supplement is planned for publication by March 2026.

■ Functional containment

- A workshop was held in February 2025 to discuss the gap in standards, including CSA N290.3, for containment system requirements for non-water-cooled advanced reactors.
- The workshop summary report is available at <https://community.csagroup.org/docs/DOC-191957>.
- The workshop discussions are informing ongoing consideration of fit of the topic of functional containment and potential development of preliminary provisions within the CSA standards framework.

ARCSC Current & Future Actions



Share
information



Identify C&S
needs



Inform and
complement
other efforts



Align
actions with
Roadmap

ARCSC Current & Future Actions



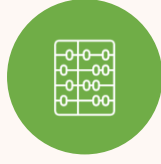
Evaluate the need for actions on non-nuclear, commercial standards and the appropriateness for ARCSC to address. This includes topical areas not evaluated as part of ARCSC's gap assessment.



Support the industry in the use of RIPB methods



Broaden the ARCSC membership to better engage the advanced reactor community



Seek resources and funding to expedite standards development



Encourage the advanced reactor community to actively participate on SDO writing committees



Evaluate how/if ARCSC can support harmonization of codes and standards.

ARCSC 4th Annual Public Workshop

Proposed Agenda

- ARCSC Progress to Date
- EPRI/NEI North American Advanced Reactor Roadmap (NAARR) Rev. 1, September 2025. The Roadmap is available at [EPRI-NEI NAARR Sept 2025.PDF](#).

- New Action Items:

Technical Readiness – SUPPLY CHAIN

- **ACTION Priority 2:** Commercialize advanced manufacturing capabilities. **Need Date:** 2023–2030

Technical Readiness – CODES & STANDARDS

- **ACTION Priority 1:** Identify gaps in and timelines for advanced reactor C&S. **Need Date:** 2024 gap identified (complete), 2025 for timeline and assigned resources
- **ACTION Priority 2:** Demonstrate RIPB classification approaches: Develop and execute at least one pilot project that applies RIPB methods in development of a new advanced reactor standard jointly with U.S. and Canadian SDOs. **Need Date: 2025**

- **Breakout Sessions**

- RIPB industry needs
- Right sizing quality requirements for civil structures

Take-aways

- ARCSC continues to leave a footprint in the C&S industry since its inception in 2022.
- The results from gap analysis performed on standards in 2023 by the SDOs and validated by the reactor designers in 2024 were invaluable in identifying those industry standards having the need for highest priority.
- RIPB approaches have been determined to have benefits for improved safety, increased efficiency, and enhanced innovation in the nuclear industry.
- Use of commercial standards in the nuclear industry continues to gain ground as suppliers holding a certified NQA-1 program continue to decrease.
- The NRC continues to work more closely with the industry in many areas to become more efficient and cost effective but even more so in C&S.

Closing Remarks & Questions



Thank you!

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