ADVANCE Act, Section 401 Advanced Methods Of Manufacturing And Construction For Nuclear Energy Projects

Angie Buford
ADVANCE Act, Section 401 – Project Lead

June 17, 2025

ADVANCE Act, TITLE IV – Section 401 Provisions:

(c) CONTENTS.—

(1) IN GENERAL.—The report shall:

(A) examine any unique licensing issues or requirements relating to the use, for nuclear energy projects, of
- (i) advanced manufacturing processes;
- (ii) advanced construction techniques; and
- (iii) rapid improvement or iterative innovation processes;

(B) examine
- (i) the requirements for nuclear-grade components in manufacturing and construction for nuclear energy projects;
- (ii) opportunities to use standard materials, parts, or components in manufacturing and construction for nuclear energy projects;
- (iii) opportunities to use standard materials that are in compliance with existing codes and standards to provide acceptable approaches to support or encapsulate new materials that do not yet have applicable codes and standards; and
- (iv) requirements relating to the transport of a fueled advanced nuclear reactor core from a manufacturing licensee to a licensee that holds a license to construct and operate a facility at a particular site;

ADVANCE Act, TITLE IV – Section 401 Provisions:

(c) CONTENTS.—

(1) IN GENERAL.—The report shall (continued):

(C) identify safety aspects of advanced manufacturing processes and advanced construction techniques that are not addressed by existing codes and standards, so that generic guidance may be updated or created, as necessary;

(D) identify options for addressing the issues, requirements, and opportunities examined under subparagraphs (A) and (B)—
(i) within the existing regulatory framework; or
(ii) through a new rulemaking;

(E) identify how addressing the issues, requirements, and opportunities examined under subparagraphs (A) and (B) will impact opportunities for domestic nuclear manufacturing and construction developers; and

(F) describe the extent to which Commission action is needed to implement any matter described in the report.

ADVANCE Act, Section 401 - NRC Report to Congress:

The NRC report to Congress (ML24292A171) builds on the actions taken and ongoing actions, to further identify potential future actions to address provisions/topics related to ADVANCE Act, Section 401. These actions are all captured in tables in Enclosure (1) of the report:

TABLE 1 – Completed Actions

TABLE 2 – Ongoing Actions

TABLE 3 – Potential New Actions

These tables are not intended to be exhaustive but highlight actions relevant to the report.

The potential future actions identified in Enclosure 1, Table 3 are expected to yield moderate efficiency gains to the NRC and external entities via improvements in application quality, establishing review criteria, and consistency of review. However, actions proposed in Table 3 will be subject to resource availability and prioritization; depending on:

(1) - NRC Regulatory Needs,

(2) - Technology Development, and

(3) - Stakeholder Interest

ENCLOSURE 1, TABLE 1 Completed NRC Program Actions	ADVANCE Act Section 401 Provision(s)	Impact	Timeframe
Issue Action Plan for Advanced Manufacturing Technologies	401(a)	Substantial impact to the NRC and external entities in facilitating enhanced readiness to review applications relying on advanced manufacturing processes.	Completed issuance of action plan; activities pursuant to action plan completed
Issue Action Plan for Enhancing U.S. Nuclear Regulatory Commission (NRC) Codes and Standards Program for Future Reactors	401(a)	Substantial impact to the NRC and external entities in supporting prioritization and facilitating enhanced readiness to review, for potential endorsement, codes and standards for use by future light-water reactor (LWR) and non-LWR applicants.	Completed issuance of action plan; activities pursuant to action plan ongoing
Approve GE-Hitachi Nuclear Energy Topical Report on BWRX-300 SteelPlate Composite Containment Vessel and Reactor Building Structural Design	401(a)	Moderate impact to the NRC and external entities by documenting NRC approval of an advanced construction methodology and demonstrating the NRC's readiness to review advanced construction techniques for nuclear energy projects.	Completed

ENCLOSURE 1, TABLE 2 Ongoing NRC Program Actions	ADVANCE Act, Section 401 Provision(s)	Responsible Organization Lead, BC, SES	Timeframe
DD7 Evaluating Options for Regulatory Flexibility in 10 CFR Part 52 During Construction & Operational Phases	(c)(1)(A)	NRR/DNRL Lead: joseph.colaccino@nrc.gov BC: M. Jardaneh SES: M. Sampson	Q2 FY 2025
DD6 Design Review Lessons Learned to Improve Review Process; Rapid Development and Iterative Innovation	(c)(1)(A)(iii)	NRR/DNRL Lead: getachew.tesfaye@nrc.gov BC: M. Jardaneh SES: M. Sampson	Q4 FY 2025
DI1 Advanced Reactor Construction Oversight Program	(c)(1)(A)(ii)	NRR/DANU Lead: phil.obryan@nrc.gov BC: M. Wentzel SES: J. Bowen	Q1 FY 2026
DE2 Pre-Application Engagement on Revision to Approved Topical Report for Steel-Plate Composite Structures	(c)(1)(A)(ii)	NRR/DEX Lead: george.thomas2@nrc.gov BC: I. Tseng SES: T. Martinez Navedo	Q4 FY 2026
DE3 Seismic Design of Advanced Reactors	(c)(1)(C)	RES/DE Team Lead: thomas.weaver@nrc.gov BC: L. Bauer SES: C. Araguas	Q1 FY 2028

ENCLOSURE 1, TABLE 3 Potential New NRC Program Actions	ADVANCE Act Section 401 Provision(s)	Responsible Organization Team Lead, BC, SES	Timeframe
DD2 Risk-Informed & Performance-Based Structural & Mechanical Review of Components	(c)(1)(B)(ii)	NRR/DANU Lead: greg.oberson@nrc.gov BC: G. Oberson SES: J. Bowen	Q2 FY 2025 – Q1 FY 2026
DD3 New Materials That Do Not Yet Have Applicable Codes & Standards	(c)(1)(A) & (c)(1)(B)(iii)	NRR/DNRL Lead: david.rudland@nrc.gov BC: A. Buford SES: M. Sampson	Q2 FY 2025 – Q1 FY 2026
DD4 Accelerated Material Qualification	(c)(1)(A)(iii)	RES/DE Lead: christopher.ulmer@nrc.gov BC: R. Iyengar SES: C. Araguas	Q2 FY 2025 – Q1 FY 2028
DD5 Examination of Novel Materials	(c)(1)(C)	NRR/DNRL Lead: stephen.cumblidge@nrc.gov BC: M. Mitchell SES: M. Sampson	Q2 FY 2025 – Q1 FY 2028
N1 Transport-Related Use of New/Non-Nuclear Technologies to Provide Greater Manufacturing Flexibility in Package Designs	(c)(1)(B)(iv)	NMSS/DFM Lead: jesse.carlson@nrc.gov BC: J. Piotter SES: S. Helton	Q2 FY 2025 – Q1 FY 2028

ENCLOSURE 1, TABLE 3 Potential New NRC Program Actions	ADVANCE Act Section 401 Provision(s)	Responsible Organization Team Lead, BC, SES	Timeframe
DE1 Structural Monitoring of Designs Using Advanced Construction Techniques	(c)(1)(A)(ii)	NRR/DEX Lead: patrick.koch@nrc.gov BC: I. Tseng SES: T. Martinez-Navedo	Q2 FY 2025 – Q1 FY 2028

#ADVANCENRC

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