POLICY ISSUE
(Information)

May 9, 2025 SECY-25-0036

FOR: The Commissioners

FROM: Gregory T. Bowman for
Michael F. King, Acting Director
Office of Nuclear Reactor Regulation

SUBJECT: ADVANCED REACTOR PROGRAM STATUS

PURPOSE:

This paper provides the Commission with an update on progress made by the U.S. Nuclear Regulatory Commission (NRC) staff (the staff) in calendar year (CY) 2024 regarding the regulation of the Nation's civilian use of advanced reactor technology, including non-light-water reactors (non-LWRs), microreactors, and light-water small modular reactors (SMRs). This work included regulatory framework enhancement, licensing, oversight, research activities, international collaboration, and external coordination and communication. This paper also discusses the status of the goals and objectives stated in the 2016 advanced reactor vision and strategy report and the associated near-, mid-, and long-term action plans. This paper does not address any new commitments or resource implications.

BACKGROUND:

To prepare for the licensing and regulation of a new generation of non-LWRs, the staff issued a vision and strategy report[1] in December 2016. The staff developed near-, mid-, and long-term action plans, which were issued in July 2017,[2] to achieve the goals and objectives stated in that report. The status of the goals and objectives stated in this paper are complete or are being tracked and communicated through a dedicated process.

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1 "NRC Vision and Strategy: Safely Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness," December 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16356A670).

2 "NRC Non-Light Water Reactor Near-Term Implementation Action Plans," July 2017 (ML17165A069), and "NRC Non-Light Water Reactor Mid-Term and Long-Term Implementation Action Plans," July 2017 (ML17164A173).

All the information in this paper is routinely communicated through other means, such as public dashboards, web pages, and periodic stakeholder meetings. To minimize redundant efforts and eliminate the need to divert resources from other priority activities to complete this report, the staff intends for this paper to be the final standalone advanced reactor program status update. Future periodic updates on the advanced reactor program will continue on an ongoing basis during the annual New Reactor Business Line Commission Meeting, public stakeholder meetings, Commission policy papers, and public website updates.

In addition, the staff continues to engage with various stakeholders in multiple venues to identify and prioritize issues regarding current and upcoming industry design, licensing, and deployment models and to communicate the status of the NRC's activities in these areas. The staff will continue to engage proactively with stakeholders, communicate with other Federal agencies, and pursue further opportunities to cooperate with international counterparts to fully leverage technical resources to address new and novel advanced reactor regulatory topics.

DISCUSSION:

The Nuclear Energy Innovation and Modernization Act of 2019

The purpose of the Nuclear Energy Innovation and Modernization Act (NEIMA) (Pub. L. 115-439)[3] is to provide a program to develop the expertise and regulatory processes necessary to allow innovation and commercialization of advanced nuclear reactors. NEIMA requires the staff to develop and implement strategies within the existing regulatory framework to increase the use of risk insights and performance-based licensing evaluation techniques. It also requires the staff to complete a new rulemaking by December 31, 2027, to establish a technology-inclusive regulatory framework for optional use in new reactor license applications by commercial advanced reactor applicants. Activities completed in response to NEIMA's requirements are discussed below.[4]

The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy of 2024

The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act (Pub. L. 118-67)[5] requires the NRC to take several actions related to development and deployment of new nuclear technologies, including in the areas of nonelectric applications of nuclear energy, regulation of fusion machines, nuclear facilities at brownfield sites, microreactors, and combined license reviews.[6] Activities completed in response to portions of the ADVANCE Act's requirements are also discussed below.

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3 https://www.congress.gov/bill/115th-congress/senate-bill/512

4 https://www.nrc.gov/reactors/new-reactors/advanced/references/neima-vision-and-strategy.html

5 https://www.congress.gov/118/bills/s870/BILLS-118s870enr.pdf

6 For additional information on the ADVANCE Act, including the staff's current progress in implementation, see https://www.nrc.gov/about-nrc/governing-laws/advance-act.html.

The staff is actively reviewing advanced reactor licensing submittals in parallel with efforts to enhance the regulatory framework for future reviews. This paper summarizes the key accomplishments and activities during CY 2024 and discusses activities under the following headings:

- Regulatory Framework Enhancement
- Licensing
- Oversight
- Advanced Reactor Research Topics
- International Collaboration
- External Coordination and Communication

The enclosure summarizes key accomplishments and activities in these areas.

Regulatory Framework Enhancement

Rulemaking

Rulemaking to Create 10 CFR Part 53

On October 31, 2024, the staff published a notice of the proposed Title 10 of the *Code of Federal Regulations* (10 CFR) Part 53, titled "Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors," in the *Federal Register* (FR) (89 FR 86918) for public comment. The proposed rule is in response to the Commission decision[7] directing the staff to establish a voluntary risk-informed, performance-based, and technology-inclusive regulatory framework for commercial nuclear plants. In addition to being responsive to NEIMA, the technology-inclusive, risk-informed nature of this rulemaking supports section 505(a)(4) of the ADVANCE Act to establish advanced reactor licensing techniques and guidance to improve efficient licensing and regulation of advanced reactors. The public comment period closed on February 28, 2025. Information on this rulemaking is available on the NRC's 10 CFR Part 53 rulemaking web page.[8]

Rulemaking to Address Alternative Physical Security Requirements for Advanced Reactors

On August 9, 2024, the staff published the proposed rule, "Alternative Physical Security Requirements for Advanced Reactors" (89 FR 65226), for public comment. The rule would establish voluntary alternatives to certain physical security requirements under the existing regulatory framework in 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," if certain consequence-based criteria are met. The public comment period closed on October 23, 2024, and the staff plans to submit a final rulemaking package to the Commission later in 2025. Information on this rulemaking is available on the NRC's rulemaking web page.[9]

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7 SRM-SECY-23-0021, "Staff Requirements—SECY-23-0021—Proposed Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors (RIN 3150-AK31)," March 4, 2024 (ML24064A047).

8 https://www.nrc.gov/reactors/new-reactors/advanced/modernizing/rulemaking/part-53.html

9 https://www.nrc.gov/reactors/new-reactors/advanced/modernizing/rulemaking/physical-security.html

Rulemaking to Address Licensure and Regulation of Fusion Machines

On December 11, 2024, the staff delivered a proposed rule on the regulatory framework for fusion machines[10] to the Commission. The proposed rule implements the Commission's April 13, 2023, direction (ML23103A449) to develop a limited-scope rulemaking to establish a regulatory framework for fusion machines that augments the NRC's byproduct material framework in 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material." In addition, the proposed rule incorporates the ADVANCE Act's new definition of "fusion machine" and amends the definition of "byproduct material." Information on this rulemaking is available on the NRC's Fusion Machine web page.[11]

Rulemaking to Address Advanced Reactor Export Licensing Considerations in 10 CFR Part 110

On August 30, 2024, the Office of International Programs informed the Commission of a request from the U.S. Department of Energy (DOE) to delay the 10 CFR Part 110, "Export and Import of Nuclear Equipment and Material," Advanced Reactor Export Rulemaking pending the resolution of discussions with the Nuclear Suppliers Group (NSG) on carrier and coolant salts. The U.S. Government has proposed that the NSG, an international export control body of 48 members, add carrier and coolant salts (used in some advanced reactor designs) to the list of export-controlled items. Absent an NSG consensus on this proposal, proceeding with rulemaking may result in inconsistencies between U.S. controls and international standards and may necessitate an additional rulemaking once an NSG position is finalized. Information on this rulemaking is available on the NRC's public rulemaking web page.[12]

Policy Issues

When new policy issues are identified by the staff, such as through interactions with stakeholders, the staff seeks Commission direction to inform its review and licensing strategies and support establishment of a clear and stable regulatory framework.

On January 24, 2024, the staff provided the Commission with a SECY paper with options for regulating certain aspects of fuel loading and operational testing of commercial factory-fabricated microreactors.[13] The paper addresses, in part, the requirements in section 208 of the ADVANCE Act to develop strategies and guidance related to regulatory requirements for microreactors. This paper is currently before the Commission.

On July 22, 2024, the staff delivered a SECY paper to inform the Commission of a risk-informed methodology that the staff considers acceptable for use in future U.S. Department of Defense (DOD) transportable microreactors based on tri-structural isotropic fuel particles (TRISO).[14] This item may require Commission direction in the future.

On September 27, 2024, the staff publicly released a preliminary white paper on "nth-of-a-kind" microreactor licensing and deployment considerations, documenting the staff's proposed

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10 SECY-24-0085, "Proposed Rule: Regulatory Framework for Fusion Machines" (ML24019A064).

11 https://www.nrc.gov/materials/fusion-machine.html#rule

12 https://www.nrc.gov/reading-rm/doc-collections/rulemaking-ruleforum/active/ruledetails.html?id=1169

13 SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory," January 24, 2024 (ML23207A250).

14 SECY-24-0062, "Risk-Informed Methodology for a Future Transportable TRISO-Based Micro-Reactor Package Application," July 22, 2024 (ML23320A124).

strategy to efficiently license nth-of-a-kind microreactors.[15] This white paper and its enclosures were made available to facilitate engagement with external stakeholders. An additional enclosure to the paper, focusing on environment reviews, was released on October 29, 2024.[16] The paper was discussed with the Advisory Committee on Reactor Safeguards at a meeting held on November 6, 2024.[17] In mid-CY 2025, the staff intends to provide the Commission with a SECY paper that will provide options to enhance nth-of-a-kind licensing of microreactors.

Guidance

During CY 2024, the staff issued numerous guidance documents to support near-term advanced reactor applications. The collection of all advanced reactor-related guidance is available on the NRC's Guidance for Advanced Reactors web page.[18]

Contents of Applications

On March 24, 2024, the staff issued nine interim staff guidance documents from the NRC-led Advanced Reactor Content of Application Project (ARCAP). On March 31, 2024, the staff issued revised guidance[19] for a technology-inclusive content of application methodology, including guidance on the acceptability of a probabilistic risk assessment that supports a non-LWR construction permit application based on the Licensing Modernization Project methodology. These documents will facilitate preparation of non-LWR applications for construction permits or operating licenses and they will address, in part, requirements in section 505(a)(4) of the ADVANCE Act to establish advanced reactor licensing techniques and guidance to improve the efficient licensing and regulation of advanced reactors. These documents are available on the NRC's ARCAP web page.[20]

Siting

On February 29, 2024, the staff issued guidance[21] that included alternative approaches to the population density criterion in 10 CFR Part 100. This guidance will facilitate assessment of population-related issues when siting advanced reactors, including consideration of design features, attributes, and associated event analysis. This guidance will address, in part, requirements in section 208(a)(1) of the ADVANCE Act to establish strategies and guidance for the siting of microreactors.

The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act

The NRC staff's work related to several sections of the ADVANCE Act will result in enhancements to regulatory framework for advanced reactors. In addition to the sections

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15 https://www.nrc.gov/docs/ML2427/ML24270A206.pdf

16 https://www.nrc.gov/docs/ML2430/ML24302A292.pdff

17 https://www.nrc.gov/docs/ML2433/ML24331A143.pdf

18 https://www.nrc.gov/reactors/new-reactors/advanced/modernizing/guidance.html

19 Regulatory Guide 1.253, "Guidance for a Technology-Inclusive Content-of-Application Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light-Water Reactors," March 2024 (ML23269A222).

20 https://www.nrc.gov/reactors/new-reactors/advanced/modernizing/guidance/advanced-reactor-content-of-application-project.html

21 Regulatory Guide 4.7, Revision 4, "General Site Suitability Criteria for Nuclear Power Stations," February 2024 (ML23348A082).

discussed above, in CY 2024 the staff began work on section 401, "Report on advanced methods of manufacturing and construction for nuclear energy projects," and section 203, "Licensing considerations relating to use of nuclear energy for nonelectric applications." The staff plans to complete work to address the requirements of these two sections of the Act in CY 2025.

Licensing Activities

In CY 2024, the staff achieved several significant accomplishments in its reviews of advanced reactor permits, licenses, certifications, and other submittals. The staff continued to see an increase in these activities in CY 2024 compared to prior years. The staff monitors the number and type of planned licensing submittals and adjusts staffing levels, organizational structure, and contract support to ensure readiness for the number of advanced reactor applications that are expected in the near term. Information on expected applications is available on the internal Advanced Reactor Landscape dashboard.[22]

In addition to the above, the work the NRC staff is doing related to the following sections of the ADVANCE Act will result in a more efficient and effective advanced reactor licensing process:

- Section 206, "Regulatory issues for nuclear facilities at brownfield sites"
- Section 207, "Combined license review procedure"
- Section 208, "Regulatory requirements for microreactors"
- Section 505, "Nuclear licensing efficiency"
- Section 506, "Modernization of nuclear reactor environmental review"

Non-Light-Water Reactors

Information on the projects listed below can be found on the Advanced Reactor Application Projects or the Past Licensing Activities web pages.[23]

Abilene Christian University Research Reactor

On September 16, 2024, the staff issued a construction permit (Construction Permit No. CPRR-124 (ML24243A040) and accompanying safety evaluation (ML24243A042) to Abilene Christian University. The NRC web page[24] for Abilene Christian University's molten salt research reactor construction permit application provides access to documents that supported the review.

Kairos Power Hermes 2 Test Reactor Facility

On November 21, 2024, the staff issued the construction permits for Hermes 2 Test Reactor Facility Units 1 and 2 (Construction Permit Nos. CPTR-7 (ML24324A021) and CPTR-8 (ML24324A022), respectively). The corresponding safety evaluation (ML24200A114) and environmental assessment (ML24240A034) were issued on July 19, 2024, and

22 https://app.powerbigov.us/groups/me/reports/18c401ac-2693-4a5b-8235-2742524ae0d8/f5e73dd741da08805118?ctid=e8d01475-c3b5-436a-a065-5def4c64f52e
23 https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with.html
24 https://www.nrc.gov/reactors/non-power/new-facility-licensing/msrr-acu.html

August 30, 2024, respectively. The NRC web page[25] for the Hermes 2 construction permit application provides access to documents that supported the review.

TerraPower Kemmerer Unit 1

On May 21, 2024, the staff docketed the construction permit application for Kemmerer Power Station Unit 1 (ML24135A109) for review. Subsequently, on June 12, 2024, the staff issued the construction permit application review schedule and resource estimate (ML24162A063). The NRC web page[26] for the Kemmerer Unit 1 construction permit application provides access to documents supporting the review. The NRC Dashboard web page[27] for Kemmerer Unit 1 provides information regarding the current project status.

Non-Light-Water Reactor Preapplication Interactions

The staff was engaged in preapplication interactions with numerous non-LWR developers and prospective applicants during CY 2024.

Substantial preapplication engagement continued with the DOE's Advanced Reactor Demonstration Program projects, X-energy's Xe-100 reactor and TerraPower's Natrium reactor. The staff conducted two readiness assessments of portions of Project Long Mott's draft preliminary safety analysis report for its planned application for a construction permit for X-energy's Xe-100 reactor in late 2023 (ML24010A222) and late CY 2024 (ML24344A100). The staff also conducted a readiness assessment of portions of TerraPower's preliminary construction permit application for Kemmerer Station Unit 1 (ML24060A227).

The staff is also engaged in preapplication interactions with the following entities:

- Aalo Atomics (Aalo-1 Microreactor)
- Abilene Christian University (Molten Salt Research Reactor operating license)
- ARC Clean Technology (ARC-100 Sodium Fast Reactor)
- Energy Northwest (Xe-100)
- General Atomics (Energy Multiplier Module)
- General Atomics Electromagnetic Systems (GA Fast Modular Reactor)
- Kairos Power (Hermes and Hermes 2 Test Reactor operating licenses)
- Long Mott Energy, LLC (Xe-100)
- Natura Resources, LLC (Liquid Fueled Molten Salt Reactor)
- Oklo, Inc. (Aurora Powerhouse Microreactor)
- Radiant Industries, Inc. (Kaleidos Microreactor)
- TerraPower, LLC (Molten Chloride Fast Reactor)
- TerraPower, LLC and GE-Hitachi (Natrium Reactor)
- Terrestrial Energy USA (Integral Molten Salt Reactor)
- University of Illinois at Urbana-Champaign (Campus Test Reactor)
- Westinghouse Electric Company (eVinci Microreactor)
- X-energy (Xe-100; XENITH Microreactor)

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25 https://www.nrc.gov/reactors/non-power/new-facility-licensing/hermes2-kairos/documents.html

26 https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with/applicant-projects/terrapower/documents.html

27 https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with/applicant-projects/terrapower/dashboard.html

These interactions include meetings, design familiarization activities, and reviews of white papers and topical reports on a variety of technical and programmatic topics, including principal design criteria, licensing approaches, emergency preparedness, fuel qualification, source term, and seismic design. Additional information is available on the preapplication activities web page.[28]

Small Modular Reactors

As used in this paper, SMRs are light-water reactors that are significantly different in size and design from the currently operating fleet of commercial reactors. Information on these projects is available on the NRC's Advanced Reactors web page.[29]

NuScale

In CY 2024, the staff continued its review of the standard design approval application for the NuScale Power, LLC US460 SMR design application.[30] The staff is on schedule to issue the final safety evaluation report by June 30, 2025. Information on project activities is available on the NuScale US460 Standard Design Approval web page.[31]

Small Modular Reactor Preapplication Interactions

The staff is engaged in preapplication interactions with several SMR developers and prospective license applicants as listed below. These interactions include conducting meetings, issuing audit plans, providing feedback on white papers, and reviewing topical reports. Information on preapplication interactions is available on the SMR Preapplication Activities web page.[32]

- Deep Fission, Inc (Deep Borehole Pressurized Water Reactor)
- Duke Energy (Belews Creek site)
- GE-Hitachi (BWRX-300)
- Holtec International (SMR-300)
- Tennessee Valley Authority (Clinch River site)
- Texas A&M University System (RELLIS Campus)
- Westinghouse Electric Company (AP300 design)

Fuel Cycle Licensing

On August 19, 2024, the NRC approved an exemption that supports bifurcation of the planned license application for the Global Laser Enrichment, LLC, Paducah Laser Enrichment Facility to submit the environmental report up to 1 year in advance of safety and safeguards analysis report (ML24184B971).

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28 https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with/pre-application-activities.html

29 https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with.html

30 These documents can be found in ADAMS under Accession Nos. ML24040A063, ML24011A133, ML24016A033, ML23355A271, and ML23346A042.

31 https://www.nrc.gov/reactors/new-reactors/smr/licensing-activities/current-licensing-reviews/nuscale-us460.html

32 https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with/pre-application-activities.html

The staff is also engaged in preapplication interactions with the following entities:

- American Centrifuge Plant (existing enrichment facility expansion)
- Framatome (existing fuel fabrication facility expansion)
- Global Laser Enrichment (Paducah Laser Enrichment Facility)
- General Matter (enrichment facility for high-assay low-enriched uranium)
- Global Nuclear Fuels Americas (existing enrichment facility expansion)
- Kairos Atlas (TRISO fuel fabrication facility)
- Orano USA (gas centrifuge enrichment facility)
- Urenco LES (existing enrichment facility expansion)

Oversight

Advanced Reactor Construction Oversight Program

The NRC staff held four Advanced Reactor Construction Oversight Program (ARCOP) public workshops in CY 2024. During these workshops, external stakeholders and the staff discussed several topics through tabletop exercises. Several options for ARCOP inspection scoping, issue dispositioning, and performance assessment were included in those discussions. The results of these workshops will be reflected in a SECY paper planned for CY 2025, which will describe several details of the ARCOP. Development of ARCOP staff guidance in inspection manual chapters and inspection procedures is scheduled to be completed in CY 2025. These activities will support section 208 of the ADVANCE Act by providing for efficient staff oversight and inspection of microreactors.

Research Activities

Information on the projects listed below can be found on NRC's research activities web page.[33]

Computer Codes

The staff updated two existing proof-of-concept reference plant models (Systems Analysis) and completed one new proof-of-concept reference plant model (Nuclear Fuel Cycle Analysis) in CY 2024. In total, the staff has developed 14 reference plant models across various advanced reactor technologies. These models can be leveraged during licensing reviews, as was successfully demonstrated during the Kairos Hermes 2 construction permit review. Information on how the NRC conducts analytical modeling is available on the Computer Codes web page.[34]

Codes and Standards

On April 4, 2024, the NRC co-hosted an event with Idaho National Laboratory to share technical expertise and knowledge, and to identify opportunities for enhancing the NRC's codes and standards program to increase the efficiency of NRC's licensing and oversight of new and advanced reactors. Information on this event is available on the New & Advanced Reactors Codes & Standards web page.[35]

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33 https://www.nrc.gov/about-nrc/regulatory/research.html.

34 https://www.nrc.gov/about-nrc/regulatory/research/safetycodes.html

35 https://www.nrc.gov/public-involve/conference-symposia/new-adv-codes-standards.html

Other Activities

In CY 2024, the staff led additional workshops[36] across a variety of topics, including human factors considerations for remote operations, risk metric and tool development to support non-LWR risk estimation, and the SCALE/MELCOR non-LWR fuel cycle demonstration project. The staff also developed a public web site[37] on the use of probabilistic risk assessment standards for non-LWRs.

International Collaboration

In CY 2024, the staff continued its mutually beneficial engagements with the international community on technical and regulatory topics for new technologies.

Memorandum of Cooperation Between NRC, Canadian Nuclear Safety Commission, and United Kingdom's Office for Nuclear Regulation

On March 12, 2024, the memorandum of cooperation between the NRC and the Canadian Nuclear Safety Commission was expanded to include the United Kingdom's Office for Nuclear Regulation (ML24066A026). Information on how activities support collaboration on the technical reviews of advanced reactor and SMR technologies is available on the memorandum of cooperation International Cooperation web page.[38]

International Atomic Energy Agency

In CY 2024, the staff continued to support the International Atomic Energy Agency (IAEA) on topics of mutual interest, such as the SMR regulators' forum and development of draft safety guides.[39]

Nuclear Energy Agency

The staff chairs the Working Group on Policy and Licensing under the Committee on Nuclear Regulatory Activities at the Nuclear Energy Agency (NEA).[40] Within this NEA committee, the staff also participates in the Working Group on New Technologies.[41] Relevant tasks for the working groups include pre-application engagement, safety classification of pressure boundary components, regulatory practices to ensure appropriate qualification and through-life performance of materials in advanced reactors.

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36 Meeting summaries for these topics can be found at the following: ML24061A181 and ML24220A189.

37 https://prastandards.sandia.gov/

38 https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with/international-cooperation/nrc-cnsc-moc.html

39 https://nucleus.iaea.org/sites/smr/SitePages/NHSI-Regulatory-Track.aspx?web=1

40 https://www.oecd-nea.org/tools/mandates/

41 https://www.oecd-nea.org/tools/mandates/index/id/11595/lang/en_gb

External Coordination and Communication

In CY 2024, the staff continued to engage with the public, industry, and other government agencies in a variety of ways. These efforts help increase public and industry involvement, enhance awareness of the staff's activities in advanced reactor licensing and regulatory framework development, ensure the staff's efforts are focused on current and upcoming areas of interest, and coordinate activities with related government agency programs and projects.

Public Engagement

NRC Advanced Reactor Web Page

The staff continued to maintain and update information on the NRC's Advanced Reactors public web page.[42] This web page includes information on the status of ongoing rulemakings, guidance development, and licensing projects. The web page format was also updated in 2024 to provide a more user-friendly interface, and the staff continues to seek stakeholder feedback on the information provided through this interface.

Public Meetings and Outreach

In CY 2024, the staff continued to communicate regularly with stakeholders, including prospective applicants, industry groups, and non-governmental organizations to seek feedback on a variety of advanced reactor activities. The staff held over 100 public meetings on advanced reactor policy and licensing topics during CY 2024. This included multiple periodic Advanced Reactor Stakeholder public meetings, which are widely attended by external stakeholders such as potential applicants and industry groups. Examples of meeting topics this year included the human factors remote operation workshop, microreactor licensing and deployment considerations, ARCAP interim staff guidance documents, performance-based regulation, and regulatory priorities. Information on these meetings is available on the NRC's Advanced Reactor Stakeholder Meetings web page.[43] Additional public meetings took place for the proposed 10 CFR Part 53 rule and the proposed limited-scope security rule.

Advisory Committee on Reactor Safeguards Meetings

The staff also briefed the Advisory Committee on Reactor Safeguards (ACRS) subcommittees and the ACRS Full Committee on various topics supporting pre-application engagements, licensing reviews, or framework development. Examples include the staff safety evaluation for the Kairos Power LLC, Hermes 1 test reactor construction permit application and two Kairos topical report safety evaluations; proposed guidance on the content of applications; the draft white paper on microreactor licensing and deployment considerations; and other topics related to advanced reactors. Information on past and future meetings is available on the ACRS meeting schedule web page.[44]

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42 https://www.nrc.gov/reactors/new-reactors/advanced.html

43 https://www.nrc.gov/reactors/new-reactors/advanced/get-involved/meetings.html

44 https://www.nrc.gov/reading-rm/doc-collections/acrs/agenda/index.html

Commission Meetings

During CY 2024, the staff briefed the Commission on multiple topics, including advanced reactor licensing under 10 CFR Part 50 and 10 CFR Part 52, an update on the 10 CFR Part 53 rulemaking, the interface of research and test reactors with advanced reactors, international initiatives, transportable microreactors, and new fuels licensing. The staff also provided a briefing on the strategic programmatic overview of the New Reactor Business Line. Information on past and future meetings is available on the Commission meeting web page.[45]

Other Government Organizations

Department of Energy

The staff continued routine interactions with the Office of Clean Energy Demonstration and the Office of Nuclear Energy in the DOE. Through these engagements, the NRC supports the Federal government's comprehensive understanding of the landscape for nuclear developers and potential applicants and ensures accurate information is available to enable the safe, secure deployment of advanced reactor technologies.

Department of Defense

On October 7, 2024, the staff endorsed a risk assessment methodology (ML24271A054) for prospective licensees to use in applying for transport package approval of a DOD transportable microreactor.

The staff continued interaction with the U.S. Department of the Air Force (DAF) in support of its Eielson Air Force Base microreactor pilot program. The DAF is working to complete its procurement process to select a commercial vendor for this program.[46] Additionally, the staff started engagements with the Departments of the Army and Navy about potential deployment of new and advanced reactors at domestic bases.

CONCLUSION:

In CY 2024, the staff made substantial progress to support the Federal government's comprehensive understanding of the landscape for nuclear developers and potential applicants and ensure that accurate information is available to enable the safe, secure deployment of advanced reactor technologies. The staff continued to enhance and maintain an agile, sustainable program for regulating advanced reactors; demonstrated its ability to conduct timely reviews of advanced reactor license applications; and is positioned to review anticipated advanced reactor applications in the future.

Because the status of the goals and objectives stated in the 2016 advanced reactor vision and strategy report and the associated near-, mid-, and long-term action plans issued in July 2017 are complete or being tracked and communicated through a dedicated process (e.g., the Part 53 rulemaking), the staff is sunsetting this standalone annual advanced reactor status paper. The staff will keep the Commission and the public informed of its advanced reactor activities through use of the public dashboards and web pages referenced throughout this

45 https://www.nrc.gov/reading-rm/doc-collections/commission/tr/index.html
46 https://www.eielson.af.mil/microreactor/

paper, Commission meetings, public stakeholder meetings, and Commission policy and information papers. The staff will seek Commission direction on its activities, where appropriate.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objections.

GREGORY BOWMAN
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Date: 2025.05.09 13:50:24 -04'00'

Gregory T. Bowman for
Michael F. King, Acting Director
Office of Nuclear Reactor Regulation

Enclosure:
SECY-25-0036 – Significant Advanced Reactor Accomplishments for CY 2024

SUBJECT: ADVANCED REACTOR PROGRAM STATUS, DATED: MAY 9, 2025

SRM-M170511-4

ADAMS Accession Nos.:
Pkg:ML24334A054
SECY: ML24334A055
Enclosure: ML24334A056 **SECY-012**

OFFICE	NRR/DANU/UARP/PM	NRR/DANU/UARP/PM	NRR/DANU/UARP/BC	QTE
NAME	JO'Driscoll	TBuchanan (J O'Driscoll for)	MWentzel	KAzariah-Kribbs
DATE	12/26/2024	12/26/2024	12/27/2024	12/09/2024
OFFICE	NRR/DANU/UAL1/BC	NRR/DANU/UAL2/BC	NRR/DANU/D	NRR/DNRL/D
NAME	JBorromeo	JSegala	JBowen	MSampson
DATE	01/07/2025	01/09/2025	01/16/2025	01/20/2025
OFFICE	OGC/NLO	NRR/D		
NAME	MCarpentier	MKing (GBowman for)		
DATE	02/13/2025	05/09/2025		

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