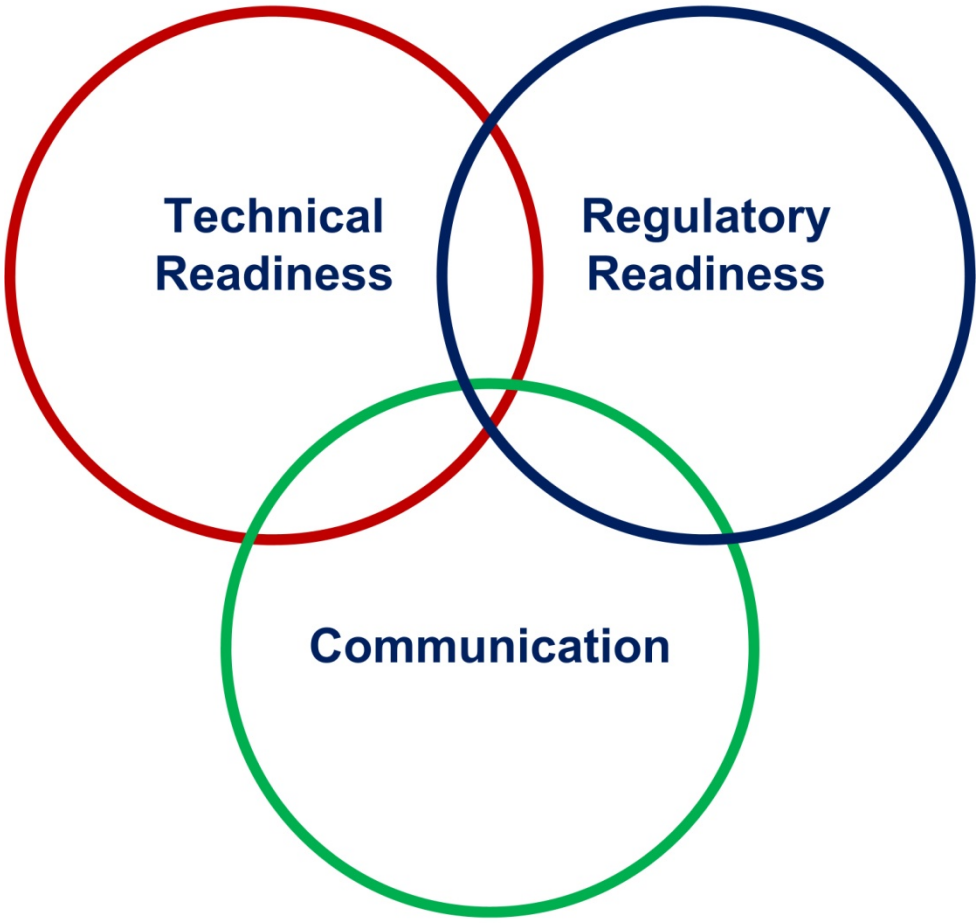
NRC Advanced Reactor Vision and Strategy: Mid-Term and Long-Term Implementation Action Plans



DRAFT

Draft being made available to the public to support public meetings and interactions with stakeholders

1.0 INTRODUCTION

This report describes the mid- and long-term activities supporting the Nuclear Regulatory Commission's (NRC) non-light water reactor (non-LWR) implementation action plans (IAPs), which have been developed to enhance the agency's readiness to license and regulate advanced reactor designs. On January 3, 2017, the NRC issued its "Vision and Strategy for Safely Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16356A670), dated December 2016. The vision and strategy document outlines how the NRC is preparing for and would subsequently regulate non-LWR technologies by developing plans to enhance technical readiness, optimize regulatory readiness, and optimize communications. The strategies and contributing activities necessary to achieve the strategic objectives are binned in near-term (0-5 years), mid-term (5-10 years) and long-term (beyond 10 years) timeframes. The role of the strategies and contributing activities in helping achieve the NRC's vision and strategic goal are represented in the following figure:

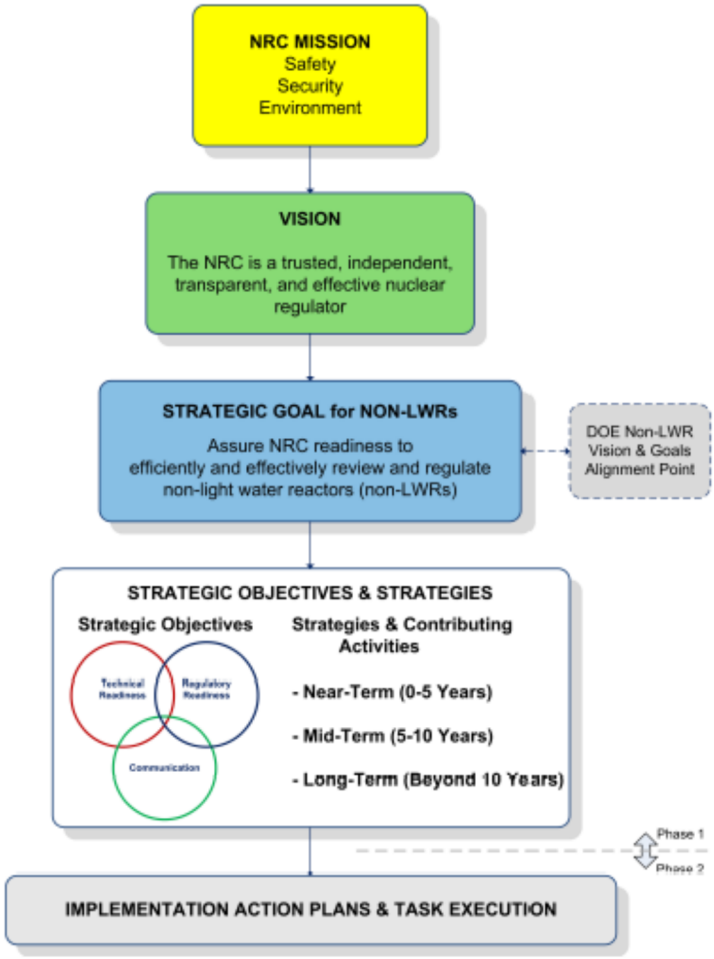


Figure 1
NRC Non-LWR Mission Readiness Roadmap
(From NRC vision and strategy document)

As shown in the figure, the second phase of the NRC's strategy involves developing IAPs for various activities needed to prepare for licensing non-LWR technologies. Those plans are then used to guide interactions with various stakeholders, including designers of specific non-LWR plants and owners/operators seeking licenses, certifications, and approvals. Preliminary IAPs for the near-term strategies and contributing activities were made available to the public in two volumes; Volume 1 (ADAMS Accession No. ML16294A181) provides an overall summary of the near-term IAPs and Volume 2 (ADAMS Accession No. ML16334A495) provides more detailed plans. The IAPs prepared for the near-term activities are intended to be "living documents" and will be adjusted based on changing conditions, agency priorities and budgets, and lessons learned from ongoing activities and interactions.

This staff report covers the activities related to the licensing and regulation of non-LWR technologies that are expected to be further developed and implemented more than 5 years from the current time (2017). These activities are divided into mid-term IAPs for those items expected to be further developed and implemented between 5 and 10 years from the current time, and long-term IAPs for those items whose implementation would likely be beyond 10 years from the current time. The staff has not developed estimates of job hours and contract dollars for the mid- and long-term activities. Such estimates would be very speculative given the large uncertainties associated with the overall advanced reactor program, including the outcomes from near-term strategies and contributing activities. If deemed appropriate by the Commission, the staff foresees steady or increasing levels of effort in the out years for continuing work on near-, mid- and long-term activities, as well as increasing focus on technology-specific technical and policy issues. The staff will continue to develop and refine the mid- and long-term plans based on progress on the near-term plans and will, as appropriate, prepare resource estimates to support the NRC's established planning and budget process.

The NRC's strategies and the related contributing activities are intended to define a program that is both flexible enough to adjust to changing conditions and priorities, and durable enough to support what might be a gradual change to the U.S. energy infrastructure. The binning and organization of the activities and development of IAPs helps identify dependencies, order of actions, needed interactions with stakeholders, and planning and budgeting of NRC resources. As previously mentioned, the plans will change to reflect conditions, insights from research, interactions with stakeholders, and progress made on resolving questions on policies, procedures, and technical issues. The near-, mid-, and long-term IAPs are only able to provide general timelines and orders of progression until additional assessments are completed, agency priorities have been defined, and resources have been allocated. The timelines mentioned for the various IAPs were largely based on the strategic goal of the NRC being ready to effectively and efficiently review and regulate non-LWRs by not later than 2025. As mentioned in the vision and strategy document, the NRC will work with vendors on design-specific licensing project plans and the NRC may accelerate specific readiness activities, as needed.

2.0 SUMMARY – MID- AND LONG-TERM STRATEGIES AND CONTRIBUTING ACTIVITIES

The mid- and long-term activities defined in the NRC's vision and strategy document generally involve working from the near-term actions to resolve more detailed or technology-specific issues. In some cases, the binning of activities into mid- and long-term timeframes simply reflects that it has traditionally taken years to achieve outcomes such as completing research projects, developing consensus codes and standards, and promulgating a new or revised regulation. The table below summarizes the near-, mid-, and long-term strategies described in the vision and strategy document.

Table 1: NRC Strategies to Enhance Readiness for Non-LWR Designs			
	Near-Term	Mid-Term	Long-Term
1	Acquire/develop sufficient knowledge, technical skills, and capacity to perform non-LWR regulatory reviews.	Continue to acquire/develop sufficient technical skills and capacity to perform regulatory reviews and to conduct oversight of non-LWRs.	
2	Acquire/develop sufficient computer codes and tools to perform non-LWR regulatory reviews.	Continue to acquire/develop sufficient computer codes and tools to perform non-LWR regulatory reviews.	
3	Develop guidance for a flexible non-LWR regulatory review process within the bounds of existing regulations, including the use of conceptual design reviews and staged-review processes.	Continue to develop guidance for a flexible non-LWR regulatory review process within the bounds of existing regulations, including the use of conceptual design reviews and staged-review processes. The NRC will work with vendors on design-specific licensing project plans and the NRC may accelerate specific readiness activities, as needed. Initiate and develop a new non-LWR regulatory framework (if needed) that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by the non-LWR NPP design being considered.	Continue to develop, finalize, and promulgate a new non-LWR regulatory framework (if needed) that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by the non-LWR Nuclear Power Plant (NPP) design being considered.
4	Facilitate industry codes and standards needed to support the non-LWR life cycle (including fuels and materials).	Continue to facilitate industry codes and standards needed to support the non-LWR life cycle (including fuels and materials).	
5	Identify and resolve technology-inclusive policy issues that impact the regulatory reviews, siting, permitting, and/or licensing of non-LWR nuclear power plants (NPPs).	Identify and resolve technology-specific policy issues that impact the regulatory reviews, siting, permitting, and/or licensing of non-LWR NPPs.	
6	Develop and implement a structured, integrated strategy to communicate with internal and external stakeholders having interests in non-LWR technologies.		

Mid-Term Strategies

The contributing activities for the mid-term strategies described in the NRC's vision and strategy document are summarized below.

Strategy 1 - Continue to acquire/develop sufficient technical skills and capacity to perform regulatory reviews and to conduct oversight of non-LWRs.

- Incorporate non-LWR regulatory review experience and technology-specific review lessons learned into staff and applicant guidance.
- Adapt construction inspection and the construction reactor oversight process to non-LWRs.
- Incorporate training and development needs for construction inspection and security reviews.

Strategy 2 - Continue to acquire/develop sufficient computer codes and tools to perform non-LWR regulatory reviews.

- Continue to develop and validate analytical codes in the areas begun in the near-term.
    - The near-term IAPs for this strategy include technology-specific examples of mid-term activities related to the development and validation of analytical codes
- Develop analytical codes in additional areas such as offsite consequences and probabilistic risk assessment.
    - The near-term IAPs for this strategy include examples of development work likely to be performed under a mid-term activity following initial scoping studies and assessments undertaken by the staff and designers

Strategy 3 - (a) Continue to develop guidance for a flexible non-LWR regulatory review process within the bounds of existing regulations, including the use of conceptual design reviews and staged-review processes.

- Identify and resolve potential regulatory framework gaps for non-LWRs in the areas of security and fuel cycle (fuel fabrication, new and spent fuel transportation, and new and spent fuel storage).
    - The near-term IAPs for this strategy describes how preliminary assessments, interactions with designers, and other activities are likely to result in additional actions that will be undertaken as mid-term activities
- Develop regulatory guides, as needed, to address regulatory gaps identified in the near-term activities.
- Conduct rulemaking, as needed, to address regulatory gaps identified in the near-term activities.

Strategy 3 - (b) Initiate and develop a new non-LWR regulatory framework (if needed) that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by the non-LWR NPP design being considered.

- Review non-LWR regulatory experiences to identify changes needed to the existing regulatory framework based on NRC experience and stakeholder feedback.

Strategy 4 - Continue to facilitate industry codes and standards needed to support the non-LWR life cycle (including fuels and materials).

- Continue efforts to facilitate development industry codes and standards.
- Develop regulatory guides and conduct rulemaking, as needed, to endorse industry codes and standards.
    - The near-term IAPs for this strategy describes how work with standards development organizations (SDOs), availability of additional design details, preparation of regulatory guides, and possible rulemakings would likely result in additional actions that will be undertaken as mid-term activities

Strategy 5 - Identify and resolve technology-specific policy issues that impact the regulatory reviews, siting, permitting, and/or licensing of non-LWR NPPs.

- The vision and strategy document and near-term IAP describe how the contributing activities for mid-term actions are dependent on the maturity of specific non-LWR technologies.

Long-Term Strategy

The contributing activity for the long-term strategy described in the NRC's vision and strategy document is summarized below.

Strategy 3 - Continue to develop, finalize, and promulgate a new non-LWR regulatory framework (if needed) that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by the non-LWR NPP design being considered.

- The NRC's vision and strategy document identifies a potential long-term rulemaking to establish a regulatory framework that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by non-LWR technologies.

3.0 MID- AND LONG-TERM IMPLEMENTATION ACTION PLANS

The staff made the following assumptions and observations during the development of the mid-and long-term IAPs.

General Notes and Assumptions

The IAPs in this report share a set of common assumptions, listed below. Specific additional assumptions, bases, or other supporting discussions for individual IAPs are included wherever necessary.

- Reference to the document "NRC Vision and Strategy: Safely Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness" is made throughout the IAPs. The vision and strategy document is found at ADAMS ML16356A670.
- For the purposes of this report, near-term activities are those expected to be initiated during the next 5 fiscal years (FY17–FY21). Actual start and completion dates of the activities will be dependent on a range of factors, including NRC work prioritization, actual funding appropriations, industry maturity and application readiness, and similar factors. The completion dates mentioned within the various IAPs support the NRC's strategic goal of being ready to effectively and efficiently review and regulate non-LWRs by not later than 2025. Near-term and mid-term activities may be accelerated if necessary to support preapplication interactions or actual applications for licenses, certifications, or approvals for specific non-LWR designs.
- The organization of the strategies and contributing activities described here and in the near-term IAPs help identify dependencies, priorities, and needed capabilities. Since they are developed without full consideration of available resources, agency priorities, and some other external factors, the IAPs will be routinely revised to reflect actual conditions and directions from the Commission.
- Consistent with Strategy 1, the NRC staff has or can obtain the needed skills and information to assess policy and technical issues for the various non-LWR technologies being proposed. The staff working on non-LWR designs and related policy and technical issues will be organized using a team approach. The core team can, as needed, involve additional staff and obtain contract support to address specific regulatory and technical issues.
- The near-term, mid-term and long-term IAPs focus on resolving issues with licensing and regulating nuclear power reactors. The overall development of non-LWR technologies also involves technical, policy, and licensing issues related to other parts of the nuclear fuel cycle. These issues will need to be raised and resolved at an appropriate time during the development and planned deployment of advanced reactor technologies.
- The mid- and long-term IAPs are dependent on near-term activities. The staff will assess and document experience and insights from the near-term strategies and interactions with stakeholders to support the subsequent revision and resolution of the mid- and long-term activities

The near-term IAPs include identifying the tasks that are expected to be undertaken and possibly completed within the next few years as the NRC prepares to review and regulate non-LWR designs. The identification of tasks to be performed is then used to determine and establish the necessary skills and capacities to perform those tasks. The staff is developing a team approach to support the near-term IAPs and this will include identifying tasks and needed knowledge, skills, and abilities. Training is being prepared in areas such as molten salt reactor

technologies. The staff will be interacting routinely with stakeholders from the Department of Energy (DOE), national laboratories, reactor designers, and other stakeholders. The staff will use these interactions as well as their work in the near-term activities to continuously assess possible skill gaps and to identify and implement appropriate training needs for team members, supporting staff, and managers.

Beyond the near-term IAPs, the NRC's vision and strategy document identified several mid-term activities that will be needed to support the development and deployment of non-LWR plants. Mid-term IAPs for these contributing activities are provided below.

Strategy 1: Continue to acquire/develop sufficient technical skills and capacity to perform regulatory reviews and to conduct oversight of non-LWRs

This strategy supports the NRC's strategic objective of enhancing non-LWR technical readiness. As described in the NRC's vision and strategy for improving the agency's readiness to regulate non-LWR technologies, the strategic objective for enhancing technical readiness is:

> Ensuring that the staff has the requisite knowledge, expertise, tools, and processes needed to effectively and efficiently evaluate non-LWR applications, and to reach an independent safety, security, or environmental finding.

The mid-term activities related to Strategy 1 continue and expand efforts from the near-term IAPs to ensure the staff has the necessary knowledge and expertise to license and regulate non-LWR technologies. The contributing activities and supporting tasks expected to be performed as part of the mid-term implementation of Strategy 1 are described below.

Contributing Activity No. 1 – Incorporate non-LWR regulatory review experience and technology-specific review lessons learned into staff and applicant guidance.

Supporting Task Descriptions

- Identify new guidance or revisions to existing guidance that can facilitate non-LWR activities by documenting the resolution of technical, policy, or procedural issues. In addition, assess staff activities for developing new or revised guidance supporting the regulation of LWRs, including small modular reactors, to identify opportunities to develop technology-inclusive guidance. The identification of useful guidance is expected during the execution of the near-term IAPs, but the preparation and issuance of more formal guidance (e.g., regulatory guides) is expected to be addressed as a mid-term activity. The categorization of guidance documents as a mid-term activity allows the staff to remain focused on more immediate issues supporting critical decisions by designers and higher priority matters for the NRC.

- Prepare and issue the identified guidance using established NRC processes, such as management directives and office instructions related to regulatory guides, interim staff guidance, or other guidance documents for the use by the staff, applicants, or other stakeholders. Where possible, encourage the development of guidance by industry organizations or other stakeholders for review and subsequent endorsement, with appropriate clarifications and exceptions, in NRC guidance documents. Note that the staff may develop interim ad hoc guidance for first-of-a-kind applications. Such

guidance would, if appropriate, be incorporated into more formal regulatory guidance documents (e.g., a regulatory guide) following the review.

- The outcome from this activity will be the issuance of sufficient guidance (generic, interim, or ad hoc) to support preapplication interactions between the staff and stakeholders; applications and reviews of submittals supporting licenses, certifications, and approvals; and the subsequent regulation of non-LWR technologies. Where possible, this outcome will be supported by NRC review and endorsement, if appropriate, of regulatory guidance developed by industry.

Contributing Activity No. 2 – Adapt construction inspection and the construction reactor oversight process to non-LWRs.

Supporting Task Descriptions

- Gather manufacturing- and construction-related information during interactions with designers and potential applicants for licenses, certifications, and approvals for non-LWRs. Lessons learned from the construction inspections and oversight of new reactors, small modular reactors, research and test reactors, medical isotope reactors, and international activities should be identified and assessed for applicability and use in developing a construction inspection plan and oversight activities for non-LWRs.

- Develop inspection and oversight plans for non-LWR projects, if and when the likelihood of a project moving into manufacturing and construction is sufficiently high to warrant the investment of NRC resources. The decision to proceed with developing generic or technology-specific non-LWR inspection and oversight plans will be made within the NRC's established processes for planning and budgeting new activities. Upon receiving direction to proceed, the staff will develop inspection and oversight processes per the scope, schedule, and resources defined in the approved project plan.

- Identify plans by designers and potential applicants for licenses, certifications, and approvals for non-LWRs for the procurement of components and other activities leading up to the manufacture and/or construction of plants structures, systems, and components. Note that activities related to the manufacture of fuel may require their own plans and guidance for construction and operation of fuel cycle facilities. Assess and as appropriate incorporate activities, including potential visits to actual or similar facilities, into the development of NRC's vendor and construction inspection processes.

- The outcome from this activity will be the issuance of program and guidance documents to support the NRC inspection of manufacturing and construction associated with non-LWR designs. The staff would complete this activity if and when needed to support the planned manufacture of important components and construction of a non-LWR-related facility.

Contributing Activity No. 3 – Incorporate training and development needs for construction inspection and security reviews.

Supporting Task Descriptions

- Assess appropriate training and development needs for construction inspections and security reviews for non-LWR projects if and when the likelihood of a project moving into manufacturing and construction is sufficiently high to warrant the investment of NRC resources. The decision to proceed with developing generic or technology-specific non-LWR inspection and oversight plans, including the training and development of staff, will be made within the NRC's established processes for planning and budgeting new activities. Upon receiving direction to proceed, the staff will develop risk-informed, performance-based training for construction, security, and other topics identified during the interactions and review of the specific non-LWR technology, including information on the potential consequences and risks of accidents and security events. Note that activities related to the manufacture of fuel for non-LWRs may require their own training and development plans to support the construction and operation of fuel cycle facilities.

- Prepare and provide the appropriate training and staff development to support the inspection and security reviews. The training activities should be coordinated with the development of related processes and procedures (see Contributing Activity No. 2), the licensing review schedules, and the applicants plans for manufacturing and construction of key structures, systems, and components, including those supporting physical or cyber security programs.

- The outcome from this activity will be developing and providing the necessary training and staff development to support the NRC inspection of manufacturing and construction associated with non-LWR designs. The NRC is using a core team approach for non-LWRs that will expand training and development to larger numbers of staff, if needed, to support preapplication interactions, and review of supporting material, such as topical reports or actual applications for licenses, certifications, or approvals.

Strategy 2: Continue to acquire/develop sufficient computer codes and tools to perform non-LWR regulatory reviews.

This strategy supports the NRC's strategic objective of enhancing non-LWR technical readiness. As described in the NRC's vision and strategy for improving the agency's readiness to regulate non-LWR technologies, the strategic objective for enhancing technical readiness is:

> Ensuring that the staff has the requisite knowledge, expertise, tools, and processes needed to effectively and efficiently evaluate non-LWR applications, and to reach an independent safety, security, or environmental finding.

The mid-term activities related to Strategy 2 continue and expand efforts from the near-term IAPs to ensure the staff has sufficient computer codes and tools to perform non-LWR regulatory reviews. The contributing activities and supporting tasks expected to be performed as part of the mid-term implementation of Strategy 2 are described below:

Contributing Activity No. 1 – Continue to develop and validate analytical codes in the areas begun in the near-term (including, as appropriate, technology-specific codes and models).

Supporting Task Descriptions

- The staff's near-term IAPs included gathering and assessing the need for and availability of analytical tools to support the licensing and regulation of non-LWR technologies. The expected outcome of those assessments differs by both the physical phenomena being simulated (e.g., fuel performance, thermal-fluid behaviors, and consequence analysis) and the specific non-LWR technologies and designs. The staff is interacting with DOE, designers, industry organizations, and international organizations as part of the assessment. Mid-term activities will be identified and pursued to support priorities established based on actual or expected applications for licenses, certifications, and approvals and preapplication interactions with designers and other stakeholders.

- The outcome from this activity is to have available sufficient analytical capabilities within the needed timeframes to support preapplication interactions and reviews of applications for licenses, certifications, and approvals. Uncertainties associated with analytical capabilities used by applicants or the staff will be appropriately addressed within the interactions and reviews for specific non-LWR technologies and designs.

Contributing Activity No. 2 – Develop analytical codes in additional areas such as offsite consequences and probabilistic risk assessment (PRA).

Supporting Task Descriptions

- The initial focus of the staff's near-term IAPs is the analytical tools to support understanding of the reactor core and connected systems providing key safety functions such as reactivity control, heat removal, and limiting the release of radioactive material. Other important analyses include the assessment of the consequences of accidents potentially releasing radioactive material from a plant and associated probabilities of plant transients and severe accidents. The staff is interacting with DOE, designers, standards developing organizations, industry groups, and international organizations as part of assessing existing capabilities and, if necessary, developing tools for non-LWRs. Mid-term activities will be identified and pursued to support priorities established based on actual or expected applications for licenses, certifications, and approvals and preapplication interactions with designers and other stakeholders.

- The outcome from this activity is to have available sufficient analytical capabilities for PRA and estimation of consequences to support preapplication interactions and reviews of applications for licenses, certifications, and approvals. Uncertainties associated with analytical capabilities used by applicants or the staff will be appropriately addressed within the interactions and reviews for specific non-LWR technologies and designs.

Strategy 3: (a) Continue to develop guidance for a flexible non-LWR regulatory review process within the bounds of existing regulations, including the use of conceptual design reviews and staged-review processes.

This element of Strategy 3 supports the NRC's strategic objective of optimizing non-LWR regulatory readiness. As described in the NRC's vision and strategy for improving the agency's readiness to regulate non-LWR technologies, the strategic objective for optimizing regulatory readiness is:

> Regulatory review processes are optimized when the resources of the NRC and potential applicants are effectively and efficiently used in a way that meets NRC requirements in a manner commensurate with the risks posed by the technology, that maximizes regulatory certainty, and that considers the business needs of potential non-LWR applicants. Additional options for long-range changes for non-LWR regulatory reviews and oversight that would require rulemaking will also be considered. Regulatory readiness includes the clear identification of NRC requirements and the effective and timely communication of those requirements to potential applicants in a manner that can be understood by stakeholders with a range of regulatory maturity.

The mid-term activities related to this element of Strategy 3 continue and expand efforts from the near-term IAPs to ensure the staff has developed the appropriate processes and guidance to support the licensing and regulation of non-LWRs. The contributing activities and supporting tasks expected to be performed as part of the mid-term implementation of Strategy 3 are described below.

Contributing Activity No. 1 – Identify and resolve potential regulatory framework gaps for non-LWRs in the areas of security and fuel cycle (fuel fabrication, new and spent fuel transportation, and new and spent fuel storage).

Supporting Task Descriptions

- The near-term IAPs focused on developing the needed infrastructure to support preapplication interactions and subsequent safety reviews for the reactor portion of non-LWR deployment strategies. The non-LWR designs use various fuel forms, have different waste streams, and will require NRC reviews and licensing actions for fuel cycle facilities and other regulated activities. The staff is interacting with DOE, designers, industry organizations, and international organizations as part of developing plans for supportive regulatory reviews (e.g., fuel cycle facilities) for non-LWR technologies. Mid-term activities will be identified and pursued to support priorities established based on actual or expected applications for licenses, certifications, approvals, and preapplication interactions with designers and other stakeholders.

- The outcome from this activity will be the identification of gaps for non-LWRs not addressed as part of the activities covered by near-term IAPs and the subsequent resolution of the gaps by issuance of necessary guidance for staff and external parties. The staff would complete this activity if and when needed to support the planned construction of fuel cycle facilities or other regulatory actions needed to support the expected deployment of a non-LWR plant.

Contributing Activity No. 2 – Develop regulatory guides, as needed, to address regulatory gaps identified in the near-term activities.

Supporting Task Descriptions

- The staff expects that some of the guidance developed during near-term interactions with non-LWR designers and other stakeholders will be issued using ad hoc measures (e.g., through specific correspondence) or as interim staff guidance. The staff will assess and, as appropriate, develop guidance using traditional vehicles such as regulatory guides. The resolution of some issues may not require interim actions and regulatory guides developed during the mid-term activities may be used to resolve such matters.

- The outcome from this activity will be the incorporation of interim guidance into regulatory guides and the issuance of regulatory guides for matters not needing interim guidance to resolve issues during preapplication interactions or to support submittal and review of applications for licenses, certifications, and approvals. The staff would undertake preparing regulatory guides applicable to specific non-LWR technologies or designs if and when needed to support the expected licensing and regulation of such facilities. As in the near-term IAPs, the staff will, as practical, consider technology-inclusive guidance when developing and issuing regulatory guides primarily focused on LWRs or other facilities.

Contributing Activity No. 3 – Conduct rulemaking, as needed, to address regulatory gaps identified in the near-term activities.

Supporting Task Descriptions

- The staff included as a mid- and long-term activity the possible development of a regulatory framework that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by non-LWR technologies. In addition to that potential rulemaking activity, the staff can foresee other potential rulemakings more narrow in scope that might be appropriate for non-LWR technologies. Examples include the inclusion of non-LWR technologies in the ongoing development of a more performance-based approach to emergency preparedness and the incorporation of new or revised consensus codes and standards (e.g., American Society of Mechanical Engineers pressure and vessel code) into NRC regulations [see also Strategy 4]. The staff will identify regulatory gaps during the near-term IAP activities and will, if and when appropriate, initiate discussions and obtain necessary management approvals to prioritize and pursue specific rulemakings supporting non-LWRs (generic, technology-, or design-specific).

- The outcome from this activity will be the identification of regulatory gaps for non-LWRs that are appropriately addressed through changes to NRC regulations and the completion of the rulemaking and related guidance documents in a timeframe supporting the expected licensing and regulation of non-LWRs. The staff would initiate and complete this activity if and when needed to support the planned licensing of non-LWR plants, supporting fuel cycle facilities or other regulatory actions needed to support the expected deployment of a non-LWR plant, consistent with the licensing project plans for specific proposed designs.

Strategy 3: (b) Initiate and develop a new non-LWR regulatory framework (if needed) that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by the non-LWR NPP design being considered.

This element of Strategy 3 also supports the NRC's strategic objective of optimizing non-LWR regulatory readiness. The mid-term IAP related to this element bridges the near-term improvements to appropriate processes and guidance and the potential longer-term activities to promulgate a new non-LWR regulatory framework with requirements and associated staff review efforts that are commensurate with the risks posed by the non-LWR NPP design being considered. The contributing activity and supporting tasks expected to be performed as part of this element of the mid-term implementation of Strategy 3 are described below.

Contributing Activity – Review non-LWR regulatory experiences to identify changes needed to the existing regulatory framework based on NRC experience and stakeholder feedback.

Supporting Task Descriptions

- The near-term IAPs focused on the infrastructure improvements needed to support preapplication interactions and subsequent safety reviews for non-LWR deployment strategies within the existing regulatory framework. The staff will interact with DOE, designers, industry organizations, and international organizations during the near- and mid-term activities. Insights from those interactions will be used as part of the staff's assessments of whether the licensing and regulation of non-LWRs could be more effectively and efficiently performed under a new or revised framework. The mid-term activities will consist of identifying possible changes, developing a preliminary framework, and initiating discussions with internal and external stakeholders to determine if a rulemaking should be pursued and if so, initiating the process to promulgate the requirements for a non-LWR regulatory framework.

- The outcome from this activity will be assessments and recommendations regarding the development of a regulatory framework for non-LWRs that would, if needed, be pursued under the long-term IAP for Strategy 3.

Strategy 4: Continue to facilitate industry codes and standards needed to support the non-LWR life cycle (including fuels and materials).

This strategy supports the NRC's strategic objective of enhancing non-LWR technical readiness. As described in the NRC's vision and strategy for improving the agency's readiness to regulate non-LWR technologies, the strategic objective for enhancing technical readiness is:

> Ensuring that the staff has the requisite knowledge, expertise, tools, and processes needed to effectively and efficiently evaluate non-LWR applications, and to reach an independent safety, security, or environmental finding.

The mid-term activities related to Strategy 2 continue and expand efforts from the near-term IAPs to use consensus codes and standards to improve the effectiveness and efficiency of the licensing and regulations of non-LWR designs. The contributing activities and supporting tasks expected to be performed as part of the mid-term implementation of Strategy 4 are described below:

Contributing Activity No. 1 – Continue efforts to facilitate development of industry codes and standards.

Supporting Task Descriptions

- The staff's near-term IAPs included gathering and assessing the need for and supporting the development of consensus codes and standards supporting non-LWR technologies and designs. The staff is interacting with DOE, designers, SDOs, industry organizations, and international organizations as part of the assessment. Mid-term activities will be identified and pursued to support priorities established based on progress being made within the SDOs and on the actual or expected applications for licenses, certifications, and approvals and preapplication interactions with designers and other stakeholders.

- The outcome from this activity is to have available consensus codes and standards to improve the effectiveness and efficiency of the licensing and regulation of non-LWR technologies. It should be noted that although the NRC staff often participates in SDO activities, the outcome of this activity is largely dependent on the SDOs and outside the control of the agency.

Contributing Activity No. 2 – Develop regulatory guides and conduct rulemaking, as needed, to endorse industry codes and standards.

Supporting Task Descriptions

- The effective and efficient use of industry codes and standards within the regulatory process involves the NRC endorsing the subject codes and standards in guidance documents, such as regulatory guides, and where appropriate incorporation into NRC regulations. The near-term IAPs address the staff's participation in SDOs during the development of codes and standards. The NRC endorsement of the codes and standards developed under the near-term IAPs will likely extend into the mid-term activities. The initiation and work on the mid-term activities will support the actual or expected applications for licenses, certifications, and approvals for non-LWR designs.

- The outcome from this activity is to have available consensus codes and standards endorsed by the NRC to improve the effectiveness and efficiency of the licensing and regulation of non-LWR technologies. The review and NRC endorsement of codes and standards (with possible clarifications and exceptions) can only follow the development and issuance of the codes and standards by SDOs.

Strategy 5: Identify and resolve technology-specific policy issues that impact the regulatory reviews, siting, permitting, and/or licensing of non-LWR NPPs.

This strategy supports the NRC's strategic objective of enhancing non-LWR technical readiness. As described in the NRC's vision and strategy for improving the agency's readiness to regulate non-LWR technologies, the strategic objective for enhancing technical readiness is:

> Ensuring that the staff has the requisite knowledge, expertise, tools, and processes needed to effectively and efficiently evaluate non-LWR applications, and to reach an independent safety, security, or environmental finding.

The mid-term activities related to Strategy 2 continue and expand efforts from the near-term IAPs to identify and resolve policy issues facing specific non-LWR technologies. The mid-term strategy to address technology-specific issues is an extension of the near-term IAPs, which focused on identifying and resolving technology-inclusive policy issues. The contributing activities and supporting tasks expected to be performed as part of the mid-term implementation of Strategy 5 are described below:

Contributing Activity No. 1 – Identify technology-specific policy issues through interactions with designers, industry groups, and other stakeholders.

Supporting Task Descriptions

- The mid-term activities to address technology-specific issues include gathering information from previous NRC activities to identify resolved and unresolved policy issues from those efforts. The staff will use routine meetings and other interactions with DOE, designers, industry groups, international organizations, and other stakeholders to identify other possible technology-specific issues. The staff will in turn assess the various issues to determine which can be resolved as technical concerns and which involve policy decisions by senior management or the Commission. Technical issues will be documented and resolved as part of staff-level preapplication interactions; review of topical reports or other submittals; or during the review of applications for licenses, certifications, and approvals.

- The outcome from this activity will be the identification of issues for non-LWRs not addressed as part of the activities covered by near-term IAPs or as a technical issue for a specific non-LWR design or technology. The staff will identify issues during routine interactions with designers and other stakeholders but a more formal assessment and compilation of issues will be undertaken if and when needed to support the expected licensing and regulation of a specific non-LWR technology or design.

Contributing Activity No. 2 – Resolve those technology-specific policy issues that are expected to hamper the effective and efficient licensing and regulation of non-LWRs.

Supporting Task Descriptions

- The mid-term activities to resolve technology-specific policy issues include performing an initial assessment of each identified policy issue in order to support interactions with stakeholders, prioritization, and development of policy-specific action plans. The action plans will to the extent practical strive to resolve policy issues to support the expected applications associated with the affected non-LWR designs. The staff will then execute the policy-specific action plans based on the established priorities, availability of resources, and needed interactions with stakeholders, including other Federal agencies.

- The outcome from this activity will be a Commission paper or other work product supporting agency decisionmakers to resolve the identified technology-specific policy issues. Although identified as a mid-term activity, the staff will not defer addressing technology-specific policy issues if they are identified, can be resolved in a shorter time frame, and are needed to support critical decisions during preapplication interactions or the expected licensing and regulation of a specific non-LWR technology or design.

Long-Term Strategy (Strategy 3)

The NRC's vision and strategy document identifies a potential long-term rulemaking to establish a regulatory framework that is risk-informed, performance-based, and that features staff review efforts commensurate with the risks posed by non-LWR technologies. The staff will evaluate the need for or potential benefits of such a rulemaking throughout near- and mid-term activities. The staff's routine assessments of the potential merits of a rulemaking will primarily consider if the activity is justified as a means to improve the effectiveness and efficiency of the licensing and regulation of non-LWR technologies as compared to handling with existing framework. The use of the existing framework oriented towards LWRs will include the issuance of guidance documents and the subsequent use of exemptions, license conditions, and design certification rulemakings to define appropriate requirements for each non-LWR technology or design. The staff will, if and when appropriate, initiate discussions and obtain necessary management approvals to prioritize and pursue a rulemaking to establish a technology-inclusive regulatory framework to define regulatory requirements commensurate with the risks posed by non-LWR technologies.