POLICY ISSUE
(Information)

August 28, 2014 SECY-14-0095

FOR: The Commissioners

FROM: Glenn M. Tracy, Director
Office of New Reactors

SUBJECT: STATUS OF THE OFFICE OF NEW REACTORS READINESS TO REVIEW SMALL MODULAR REACTOR APPLICATIONS

PURPOSE:

The purpose of this paper is to inform the Commission of the readiness of the Office of New Reactors (NRO) to conduct safety and environmental reviews of new small modular reactor (SMR) applications under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," and under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." The scope of the paper includes both light-water and non-light-water SMR designs. This paper does not address any new commitments or resource implications.

SUMMARY:

NRO is ready to conduct safety and environmental reviews of all types of light-water SMR applications. The office has gained significant experience in the use of the 10 CFR Part 52 licensing process during the reviews of recent large light-water reactor (LLWR) applications, and continues to refine internal and external guidance consistent with current regulations and with lessons learned from the LLWR, 10 CFR Part 52 application reviews. NRO is systematically updating existing guidance such as NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" (SRP).

CONTACT: Michael S. Jones, NRO/DARR
301-415-0189

Staff activities conducted since NRO's last SMR program update to the Commission in March 2011 align closely with the key activities necessary to prepare the agency for reviews of applications related to the design, construction, and operation of advanced reactors described in the U.S. Nuclear Regulatory Commission's (NRC's) "Report to Congress, Advanced Reactor Licensing," August 2012 ("Report to Congress") (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12153A014). Examples include the issuance of new review guidance, such as the development and deployment of design-specific review standards (DSRSs) and the implementation of a risk-informed, integrated review framework for SMRs.

In SECY-10-0034, "Potential Policy, Licensing, and Key Technical Issues for Small Modular Nuclear Reactor Designs" (ADAMS Accession No. ML093290268), NRO identified a range of potential issues to be reviewed and resolved for both light-water and non-light-water SMR designs. NRO also developed and implemented a systematic methodology to identify and rank possible SMR issues, known as the Issues Identification and Ranking Program (IIRP). The staff has reviewed the issues identified in SECY-10-0034 and by the IIRP reviews, and is working to resolve these issues or to develop recommendations for the Commission where appropriate. This paper summarizes and provides the current status of these issues, and provides the bases for those determinations.

Opportunities for enhancing NRO's readiness are identified in the areas of design-specific training for SMR technical reviewers; staff familiarization with 10 CFR Part 50 construction permit (CP) and operating license (OL) application reviews; long-term planning for attrition of subject matter experts (SMEs); and coordination between primary, secondary, and interface technical reviewers.

Separately, NRO faces a significant readiness challenge to review a non-light-water SMR application if one is submitted in the near term (within 5 years). This paper describes current efforts to remain engaged with the non-light-water reactor (non-LWR) community, and areas where NRO and the agency need to make additional preparations for non-LWR applications. The "Report to Congress" remains relevant and accurate as a reference in this regard.

BACKGROUND:

NRO last presented formal SMR program updates to the Commission in a meeting on March 29, 2011 (ADAMS Accession No. ML110880157) and published further updates in the "2013 New Reactor Program," NUREG/BR-0476, Volume 3, March 2014 (ADAMS Accession No. ML14055A176).

DISCUSSION:

NRO has prepared this paper to inform the Commission of its readiness to review new SMR applications, and to describe some associated challenges and opportunities for enhancing NRO's readiness. Both light-water and non-light-water SMR designs are considered. The scope of the paper comprises staff SMR activities including infrastructure development, pre-application interactions with potential SMR applicants and stakeholders, possible issuance of safety and environmental licensing decisions, rulemaking, and inter-office coordination as appropriate. The scope excludes post-licensing activities within the NRC's regulatory purview

such as construction oversight, the Reactor Oversight Program, and end-of-lifecycle decommissioning activities. The paper focuses on the core functions required to perform safety and environmental reviews of SMR application submittals. However, related NRC secondary support functions and infrastructure are also reviewed to the extent that they directly impact the NRC's ability to execute the core functions successfully.

Infrastructure Development, Pre-Application Activities, Accomplishments, and SMR Stakeholder Interactions

NRO has worked continuously since the office was established to create the necessary organizational infrastructure to support new reactor licensing reviews, including SMRs. The "Report to Congress" lists the key activities necessary to prepare the agency for reviews of applications related to the design, construction, and operation of advanced reactors.[1] These activities are as follows:

- Identify and resolve significant policy, technical, and licensing issues.
- Develop the regulatory framework to support efficient and timely licensing reviews.
- Engage in research focused on key areas to support licensing reviews.
- Engage reactor designers, potential applicants, industry, and the U.S. Department of Energy (DOE) in meaningful pre-application interactions and coordinate with internal and external stakeholders.
- Establish an advanced reactors training curriculum for the NRC staff.
- Remain cognizant of international developments and programs.

This list correlates closely with staff activities (completed or in-progress) in preparation for conducting light-water SMR application reviews. Examples of related staff activities and accomplishments since 2011 include:

- Identification of overarching policy and technical issues for SMRs that will need to be addressed to support licensing reviews through the use of IIRP reviews. The IIRP topics reviewed or in-progress include SMR security, emergency preparedness, source term, environmental issues, control room staffing, SMR cross-organizational issues, and multi-module licensing.
- Development of SMR review infrastructure including internal and external guidance. Examples include revisions to the NRO Office Instruction for acceptance reviews for design certification (DC) and combined license (COL) applications, DSRS development, and preparation of guidance for conducting SMR readiness reviews.

[1] As used in the 2012 report, "advanced reactors" refers to those designs of commercial reactors, employing either light-water or non-light-water technology which incorporate the Commission's expectations set forth in the Policy Statement on the Regulation of Advanced Reactors, 73 *Federal Register*, 60612 (October 14, 2008).

- Revision of the SRP Introduction to add a second part specific to light-water SMRs for the implementation of a risk-informed and integrated review framework.

- Development of an optimum baseline schedule for light-water SMR DC reviews with assumptions and bases.

- Updates to reviewer guidance for environmental reviews to include lessons learned. ISGs are being developed for use while the primary review guidance (NUREG-1555) undergoes more extensive revisions.

A more detailed listing of SMR activities and accomplishments since 2011 is provided in Enclosure 1.

NRO is conducting robust, technically substantive pre-application interactions with potential SMR applicants and SMR stakeholders. In response to documents and presentations provided by these potential applicants, the staff has provided informal feedback that the vendors have considered while developing their designs, maximizing the benefits of pre-application engagement.

Other SMR stakeholders that have engaged with the NRC for SMR matters include the Nuclear Energy Institute (NEI) and the industry, the International Atomic Energy Agency (IAEA), DOE, the Environmental Protection Agency (EPA), the Department of Homeland Security (DHS), and the Federal Emergency Management Agency (FEMA). These interactions have considered a wide range of subject matters related to the development and deployment of SMRs. Specific examples of these stakeholder interactions are provided in Enclosure 2.

Potential SMR Applicants

NRO is currently conducting pre-application interactions with four light-water SMR vendors—Generation mPower (mPower), NuScale, Westinghouse, and Holtec. The levels of pre-application activities vary, depending on the requests of the vendors. These vendors may submit a 10 CFR Part 52 DC application to the NRC for review within the next 2 to 5 years.

The Tennessee Valley Authority (TVA) had originally planned to submit a 10 CFR Part 50 CP application for up to four mPower SMRs at the Clinch River site near Oak Ridge, Tennessee, in the second quarter of 2015. It was expected that the NRC review of this application would proceed in parallel with review of the mPower 10 CFR Part 52 DC application. However, this plan is likely to change as a result of a decision by the reactor designer, Babcock and Wilcox (B&W), to significantly reduce resources devoted to design development. More information regarding TVA's plans is expected later in 2014.

SMR Application Review Efficiency and Effectiveness

The NRC's mission is to ensure adequate protection of public health and safety, to promote the common defense and security, and to protect the environment. Safety will not be compromised in order to expedite SMR application reviews. Within that framework, NRO plans to complete SMR licensing reviews in an efficient and effective manner.

The staff developed a 39-month optimum baseline schedule for light-water SMR DC application reviews and held a public meeting on February 24, 2014, with all interested stakeholders to discuss the schedule and the underlying bases and assumptions. The actual duration of SMR application reviews will be contingent upon a number of factors, such as the degree of productive pre-application engagement with the NRC by the applicant, and the completeness and adequacy of the SMR application.

NRO is currently working to identify and manage the review factors that are within the agency's control, such as open policy issues, guidance development, and SMR-related technical questions. NRO is also interacting with potential applicants and other stakeholders to identify external factors that could cause extended review schedules, such as the need for early design finality and the need for timely, complete responses to requests for additional information (RAIs) during the application review. The goal of these interactions is to develop a common understanding of the information exchange necessary to conduct efficient and effective SMR application reviews.

SMR Application Review Challenges

SECY-10-0034 and NRO's IIRP efforts identified a range of potential issues to be reviewed and resolved for both light water and non-light-water SMR designs. As NRO's infrastructure for SMR application reviews has been developed, these policy issues have been examined and either resolved or identified as candidates for further study and potential escalation for Commission consideration. The list of open issues identified by the IIRP reviews or cited in SECY-10-0034 that may require Commission consideration and direction, along with the documents providing the bases for those conclusions, are provided in Enclosure 3. Issues cited in SECY-10-0034 that have been considered resolved or are awaiting design-specific applications to conduct further detailed analysis are provided in Enclosure 4.

The "Report to Congress" included an examination of the NRC's readiness to license advanced non-LWR designs. The report described potential license applications in the longer term (10 years or more) and various ongoing agency efforts to coordinate with DOE and international organizations to keep informed of the non-LWR state-of-the-art. Agency efforts and the status of its readiness to license non-LWR designs have not changed materially since issuance of the 2012 report, and the NRC would be challenged to efficiently review a new non-LWR application if one is submitted in the near term (within 5 years). During the preparation of this paper, the agency received a letter from a potential non-light-water SMR vendor notifying the NRC of the company's intent to engage in pre-application interactions and to submit a DC application for a non-light-water, high-temperature pebble bed SMR design in 2017. The staff expects that the company will engage with the NRC further as this effort progresses. Once the company has demonstrated that they have sufficient design maturity to support this schedule, the staff will re-examine NRO's priorities and needs with respect to conducting a non-LWR application review in the near term.

Opportunities for Enhancing NRO's Readiness

Several staff-related topics were reviewed to determine whether NRO is ready to review SMR applications. These topics included whether the organization had sufficient full-time equivalent (FTE) employee levels, appropriate technical skills, and sufficient training opportunities available

to prepare for and conduct the reviews. Planning processes for the attrition of SMEs were also examined. Finally, the current work process for technical review coordination between primary, secondary, and interface reviewers was examined for potential improvement opportunities.

Based on the findings of the FTE and technical skills reviews described above, NRO staff is prepared to perform light-water SMR reviews. For highly specialized technical questions or areas of expertise that are outside of the NRC's experience base, NRO will use contracted technical support in accordance with the agency's established processes.

During the preparation of this Commission paper, four specific training needs related to performance of SMR application reviews were identified.

- First, new review processes for SMRs may require staff training development and deployment. Examples of new processes include the development and use of DSRSs, and the implementation of a risk-informed and integrated review framework in accordance with SECY-11-0024, "Use of Risk Insights to Enhance the Safety Focus of Small Modular Reactor Reviews," May 11, 2011 (ADAMS Accession No. ML111320551).

- Second, a need for design-specific training to aid reviewer familiarity with new or innovative SMR features was identified. NRO has commissioned design-specific training for the mPower design in preparation for the mPower DC application. Similar needs for other vendor designs are anticipated.

- Third, a need for in-depth, design-specific integrated system operations training was identified for reviewers responsible for reviewing plant operating and emergency operating procedures.

- Fourth, NRC staff have not received a new reactor CP or OL application for review under 10 CFR Part 50 since the late 1970s. Most staff reviewers need training on the conduct of those reviews if new 10 CFR Part 50 CP/OL applications are anticipated.

NRO will work with training experts in the Office of the Chief Human Capital Officer (OCHCO), and others as needed, to develop the needed training in a timely manner to support SMR application reviews.

Regarding planning for SME attrition, NRO branch chiefs use internal budget formulation and staffing plan development processes, or other methods, to consider future staff needs and to provide recruiting needs to OCHCO. NRO is currently surveying critical skills in order to identify gaps and prepare for a possible larger percentage of the staff SME population leaving the NRO organization. NRO will work with OCHCO, as appropriate.

Regarding technical review coordination, the NRC has traditionally been organized along discipline-specific technical branch lines. NRO continues this organizational approach, which has been effective during NRO's review of LLWR applications. Lessons learned during those reviews with regard to the coordination and management of technical reviews between primary, secondary, and interface reviewers indicate that there is an opportunity for improvement in this

area. NRO has commissioned a working group to identify specific areas for improvement and to recommend changes to review guidance that will reflect the process improvements.

COMMITMENTS:

This paper contains no new staff commitments.

CONCLUSIONS:

NRO is ready to conduct safety and environmental reviews of light-water SMR applications. The duration of SMR application reviews will be contingent upon a number of factors, such as the degree of productive pre-application engagement with the NRC by the applicant, and the completeness and adequacy of the SMR application.

NRO has previously identified several overarching policy and technical issues that will require review and resolution to support efficient and effective SMR licensing reviews. Commission guidance may be required for resolution of some of these issues, and NRO will develop recommendations for the Commission, when necessary.

NRO faces significant challenges to be ready to review non-light-water SMR applications in the near term (within 5 years). The agency needs to continue development of the requisite review policies and guidance, and to develop a sufficient depth of technology-specific staff skills (including training) to be ready to review a non-LWR application. The agency also needs to continue working with international nuclear regulators that have non-LWR facility experience to leverage that experience for potential domestic designs. Additional research may be required to develop independent analytical tools and methods for designs that differ significantly from light-water-reactor technology, so that the analysis methods and supporting experimental data can support an independent safety finding by the NRC.

RESOURCES:

Current NRO resources are adequate to support SMR-related activities for FY 2014 through FY 2015. Resources needed beyond FY 2015 will be requested through the planning, budgeting, and performance management process. The staff will further clarify resource needs as the schedules for application submittals become more certain and as pre-application activities proceed.

COORDINATION:

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

The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections.

/RA/

Glenn M. Tracy, Director
Office of New Reactors

Enclosures:
1. Listing of Activities and Accomplishments Since 2011 Related to Preparation for SMR Application Reviews
2. Examples of Interactions with SMR Stakeholders
3. SECY-10-0034 SMR Technical and Policy Issues Which May Require Commission Consideration and Direction
4. SECY-10-0034 SMR Technical and Policy Issues Which Are Considered Resolved or Are Awaiting Design-Specific Applications to Conduct Further Detailed Analysis

DISTRIBUTION:
Commissioners
SECY
OGC
OCAA
ASLBP

LISTING OF THE OFFICE OF NEW REACTORS ACTIVITIES AND ACCOMPLISHMENTS SINCE 2011 RELATED TO PREPARATION FOR SMALL MODULAR REACTOR APPLICATION REVIEWS

Examples of small modular reactor (SMR)-related staff activities and accomplishments since 2011 include:

- Development of SMR review infrastructure including internal and external guidance. Examples include revisions to the Office of New Reactors (NRO) Office Instruction for acceptance reviews for design certification (DC) and combined license applications, design-specific review standard (DSRS) development, and preparation of guidance for conducting SMR readiness reviews. The NRO application acceptance review process for applications is being revised to incorporate lessons learned from the previous large light-water reactor (LLWR) application reviews ("New Reactor Licensing Process Lessons Learned Review: 10 CFR Part 52," April 2013, Agencywide Documents Access and Management System (ADAMS) Accession No. ML13059A239). The revised process was piloted during the acceptance review of the Korea Hydro and Nuclear Power DC application for the APR1400. Additional experience gained during that pilot test will be incorporated in the NRO Office Instruction as appropriate and will be made publically available.

- Issuance of over 40 Standard Review Plan (SRP) section updates in draft-for-comment or final revision as part of the regular guidance update cycle. The staff has also issued eight Interim Staff Guidance documents (draft or final) since the last Commission briefing. These updates benefit all light-water reactor (LWR) application reviews, including SMRs, and will ultimately be incorporated as final NRC guidance.

- Identification of overarching policy and technical issues for SMRs that will need to be addressed to support licensing reviews through the use of Issues Identification and Ranking Program (IIRP) reviews. The IIRP topics reviewed or in-progress include SMR security, emergency preparedness, source term, environmental issues, control room staffing, SMR cross-organizational issues, and multi-module licensing.

- Revision of the SRP Introduction to add a second part specific to light-water SMRs for the implementation of a risk-informed and integrated review framework. Implementation of this framework is described in NUREG-0800, SRP Introduction, Part 2, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: Light-Water Small Modular Reactor Edition," January 2014 (ADAMS Accession No. ML13207A315). The framework provides technical reviewers with a methodology to apply a graded review approach to SMR structures, systems, and components (SSCs) in consideration of the safety and risk significance of the SSCs. The review approach is developed for a particular SMR design during development of the associated DSRS. Once the application has been received, reviewers have the flexibility to adjust the graded review approaches based on application specifics.

- Conduct of extensive and ongoing interactions with internal and external SMR stakeholders, both domestic and international. Examples of these international interactions include NRO's work with the International Agency for Atomic Energy

(IAEA) and with the Multinational Design Evaluation Program. NRO coordinates international SMR outreach efforts with the Office of International Programs as appropriate.

- Development of an optimum baseline schedule for SMR DC reviews with assumptions and bases.

- Preparation of the first draft DSRS for the Generation mPower (mPower) design for public comments.

- Development of a design-specific training curriculum for staff assigned to review the mPower DC application.

- Development of confirmatory tools and analyses for SMR deeply-embedded structures. Development of reviewer guidance for flow-induced vibration and acoustic resonance phenomena.

- Completion of a formal lessons learned review associated with first use of the Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52 licensing process for LLWRs, and implementation of an action plan that will be applied to SMR reviews.

- A comparison and evaluation of the licensing requirements for new reactors under 10 CFR Parts 50 and 52 is ongoing. The staff is preparing recommendations for the Commission to incorporate 10 CFR Part 52 lessons learned and to ensure clear alignment between the outcomes of new reactor licensing reviews, regardless of which review licensing framework is selected by an applicant.

- While not specific to SMRs, several work process improvements have been made that will contribute directly to SMR licensing effectiveness and efficiency. These include significant improvements in project management support systems including the scheduling, change management, risk management, and the electronic request for additional information process workflow system (eRAI) platforms. The purpose of these processes is to more effectively manage new reactor licensing reviews through enhanced work management controls, management reports, and schedule impact analysis.

- NRO, working closely with the Office of Nuclear Materials Safety and Safeguards, will pay particular attention to the integrated fuel cycle management strategies for SMR designs. The staff will review fuel fabrication, spent fuel pool storage, and interim spent fuel management features such as on-site cask storage (the “back-end” of the fuel cycle) proposed by applicants. The SMR strategies are expected to be similar to those used by the LLWRs.

EXAMPLES OF INTERACTIONS WITH SMR STAKEHOLDERS

SMR Stakeholder Interactions – Nuclear Energy Institute (NEI)/Industry

As part of the pre-application meetings and workshops NRO has conducted to discuss general technical and policy issues related to SMRs, NRO has received several industry position papers from the NEI. These papers have addressed a range of topics, including reactor source terms, emergency planning zone (EPZ) methodology and criteria, control room staffing requirements, insurance and liability requirements, pre-application engagement, multi-module facility license structures, decommissioning funding, annual fee assessments, and physical security. As the staff determines the best way to address the SMR technical and policy issues, the industry perspective is reviewed and considered, and meetings are held with NEI as needed to obtain clarifications or additional information.

SMR Stakeholder Interactions – IAEA/International SMR Regulators' Forum

Several countries that are licensing or preparing to license SMRs have expressed an interest in piloting a forum for regulators. The purpose of the forum is to identify, understand, and address key regulatory challenges that may emerge in future SMR regulatory discussions.

This will help improve efficiency in licensing and reviews and enable regulators to inform changes, if necessary, to their requirements and regulatory practices. During the 2-year pilot, Argentina, Canada, China, Finland, France, Germany, India, Japan, the Republic of Korea, the Russian Federation, South Africa, United Kingdom, and the United States may be invited to be members of the new forum.

The IAEA will act as the forum (Steering Committee) secretariat and will, subject to the availability of extra-budgetary resources, promote and facilitate the forum. The United States has provided funds for the creation of a Cost-Free Expert position to support the IAEA for this effort for a period of 3 years. The structure of the forum will be a steering committee and issue-specific working groups.

A draft "Terms of Reference" (ToR) for the forum was developed and sent to each country in March 2014 for review and approval. A consultancy meeting to establish the forum for SMRs was held at the IAEA on July 22-24, 2014. At the July 2014 meeting, the ToR was approved, a program plan was developed, and issues to move forward with in the forum were identified.

SMR Stakeholder Interactions – U.S. Department of Energy (DOE)

Since NRO's last Commission briefing on SMR licensing preparations in 2011, both DOE and domestic industry support for near-term non-light-water (non-LWR) technologies have been de-emphasized. With the domestic SMR community's commercial focus on LWR designs, readiness for reviewing these applications has become a higher NRO priority than for the review of non-LWR applications. NRO activities since the previous Commission meeting include maintaining liaison efforts with the DOE, the review of various related non-LWR technical reports and white papers, participation in international non-LWR conferences, interactions with the Generation IV International Forum, and observing DOE's development of proposed General Design Criteria for non-light-water designs, which will ultimately be sent to the NRC for review.

SMR Stakeholder Interactions – Emergency Planning

In SECY-11-0152, "Development of an Emergency Planning and Preparedness Framework for Small Modular Reactors," October 28, 2011 (ADAMS Accession No. ML112570439), the NRC staff stated its intent to develop a technology-neutral, dose-based, consequence-oriented emergency preparedness (EP) framework for SMR sites that considers the various designs, modularity and collocation with other industrial facilities. In that Commission paper, the staff also discussed developing a concept that EP requirements could be scaled to be commensurate with the accident source term, fission product release, and associated dose characteristics for the designs. The staff continues to review this concept and prepared an update of the review in a memorandum to the Commissioners dated May 30, 2013 (ADAMS Accession No. ML13107A052). In that memo, the staff clarified that it will continue to work with external stakeholders to address this issue further, as resources allow, but it will not go further in proposing new policy or revising guidance for specific changes to EP requirements absent specific proposals from an applicant or nuclear industry group. On December 23, 2013, NEI submitted a white paper to the staff entitled "A Proposed Methodology and Criteria for Establishing the Technical Basis for Small Modular Reactor Emergency Planning Zone" (ADAMS Accession No. ML13364A345). The staff conducted a public meeting to discuss the white paper on April 8, 2014, and sent a letter to NEI with follow-up questions on the proposed methodology on June 11, 2014 (ADAMS Accession No. ML14142A406).

The Office of Nuclear Security and Incident Response (NSIR), with NRO participation, began to engage in late 2011 with stakeholders on the proposed framework laid out in SECY-11-0152. The staff made several presentations on proposed SMR EP to other Federal agencies at the Federal Radiological Protection Coordinating Committee (FRPCC) and to the Environmental Protection Agency (EPA)-led Protective Actions Guidelines (PAGs) subcommittee of the FRPCC. The FRPCC is an interagency body chaired by the Department of Homeland Security and the Federal Emergency Management Agency. The staff is working with the EPA PAGs subcommittee to establish an SMR EP subcommittee.

Additionally, the staff made presentations on SMR EP at the 2012 annual and 2013 winter meetings of the American Nuclear Society, the National Radiological Emergency Preparedness annual meeting, the Conference of Radiation Control Program Directors, and the Health Physics Society annual meetings.

Communication and coordination with internal and external stakeholders will continue as the staff further develops the SMR EP framework and associated recommendations. NRO is currently preparing a notation vote paper for the Commission with SMR EP policy recommendations. The paper is scheduled for completion in 2015.

SECY-10-0034 SMR TECHNICAL AND POLICY ISSUES WHICH MAY REQUIRE COMMISSION CONSIDERATION AND DIRECTION

SECY-10-0034 Line Item No.	Issue Title	Status	References
3.2	Use of Probabilistic Risk Assessment in the Licensing Process for SMRs	An inter-office staff working group has developed preliminary guidance for multi-module risk for SMRs and engaged stakeholders in a public meeting in June 2014. This guidance expands upon that which is currently in SRP Section 19.0, "Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors," Revision 3 (Draft) by providing criteria to ensure appropriate treatment of important insights related to multi-module design and operation. It is consistent with current Commission policy and objectives for the use of probabilistic risk assessment in the design, certification, and licensing of advanced light-water reactors.	SECY-11-0079, ML110620459

SECY-10-0034 Line Item No.	Issue Title	Status	References
3.3	Appropriate Source Term, Dose Calculations, and Siting for SMRs	In the Commission Memo dated December 29, 2011, the staff stated it would remain engaged with SMR stakeholders regarding the applications of a mechanistic source term (MST), review pre-application white papers and topical reports concerning source term issues that it receives from potential SMR applicants, discuss design-specific proposals to address this matter, and consider research and development in this area. If necessary, the staff would propose revised review guidance or regulations, or propose new guidance to support reviews of SMRs. In Commission Memos dated May 30, 2013 and June 20, 2014, the staff provided updates with regard to MST activities and interactions with DOE and nuclear-industry organizations. NRO continues to engage potential SMR applicants such as mPower and NuScale to review their design-specific approaches for source term. For example, a closed meeting was held by the staff and NuScale on March 9, 2014, to discuss NuScale's accident source term methodology for a single reactor module. NRO is actively working to better characterize the source term issue for SMRs through internal reviews and through interactions with stakeholders in order to determine whether a policy recommendation to the Commission is needed.	Commission Memo, 12/29/2011, ML113410366 Commission Memo, 05/30/2013, ML13107A052 Commission Memo, 06/20/2014, ML14135A482

SECY-10-0034 Line Item No.	Issue Title	Status	References
4.7	Offsite Emergency Planning (EP) Requirements for SMRs	In SECY-11-0152, staff identified three potential policy issues for future development and discussion in a future Commission paper: • Scalable EPZ • Modularity and Collocation • Considerations for Establishing SMR EPZ Size The referenced SECY stated that NRO is working with NSIR and the Office of Nuclear Reactor Regulation on an internal working group to review these issues further, liaise with other Federal agency stakeholders, consider industry position papers on this topic, and develop recommendations. In the referenced Commission Memo, the staff provided updates on staff activities for this issue with DOE and industry representatives. The staff stated that it would not go further in proposing new policy or revising guidance for specific changes to EP requirements absent specific proposals from an applicant or nuclear-industry group. On December 23, 2013, NEI submitted a white paper to the staff entitled “A Proposed Methodology and Criteria for Establishing the Technical Basis for a Small Modular Reactor Emergency Planning Zone.” The staff conducted a public meeting to discuss the white paper on April 8, 2014, and issued follow-up questions to NEI on June 11, 2014.	SECY-11-0152, ML112570439 Commission Memo, 05/30/2013, ML13107A052 NEI white paper, 12/23/2013, ML13364A345 NRC Letter to NEI (R. Bell), 06/11/2014, ML14142A406

SECY-10-0034 Line Item No.	Issue Title	Status	References
5.1	Annual Fee for Multi-Module Facilities	In accordance with the memo to the Commissioners from the Chief Financial Officer (CFO) on February 7, 2011, the staff intends to proceed with rulemaking for Alternative 4, Calculate the Annual Fee for Each Licensed Power Reactor as a Function of its Licensed Thermal Power Rating (MWt). The memo stated that Commission approval for the approach will be requested during development of the proposed rule. In July 2014, the Office of the Chief Financial Officer established a follow-up working group to draft a SECY paper, proposed rule, and final rule for the variable annual fee structure.	Memo to Commission from CFO, 2/7/2011 ML110380251
5.2	Insurance and Liability for SMRs	In accordance with SECY-11-0178, staff will prepare a comparative analysis of different designs to determine if an inequity exists between the treatment of reactors producing electrical power greater than 100 MW (MWe) and those with individual modules producing less than 100 MWe. Stakeholders will be engaged during the analysis. Rulemaking or a change to the current interpretation of the definition of “nuclear reactor” as given in the Price-Anderson Act may be required. Staff is beginning substantive work on this issue.	SECY-11-0178, ML113340133

SECY-10-0034 SMR TECHNICAL AND POLICY ISSUES WHICH ARE CONSIDERED RESOLVED OR ARE AWAITING DESIGN-SPECIFIC APPLICATIONS TO CONDUCT FURTHER DETAILED ANALYSIS

SECY-10-0034 Line Item No.	Issue Title	Status	References
2.1	License for Prototype Reactors	No policy issues or rulemaking needs identified by staff in SECY-11-0112. No further staff action planned unless an application for a prototype reactor is received.	SECY-11-0112, ML110460434
2.2	License Structure for Multi-Module Facilities	Staff concluded that Alternative 3 (license each module individually) with additional analysis to be performed for addressing common SSCs is preferable. In SECY-11-0079, staff committed to submit a specific proposal to the Commission for its consideration and approval. The staff is awaiting an SMR application to finalize the recommended licensing approach for shared SSCs, using a specific multi-module facility design for practical insights.	SECY-11-0079, ML110620459
2.3	Manufacturing License Requirements for Future Reactors	Staff has studied the issue and discussed it with the SMR community in public meetings. No current technical issue or policy issue was identified for resolution and no interest in obtaining a manufacturing license from near-term SMR applicants was expressed. Therefore, no further staff action is planned at this time.	Commission Memo, 3/27/13, ML13018A168

SECY-10-0034 Line Item No.	Issue Title	Status	References
3.1	Implementation of Defense-In-Depth (DID) Philosophy for Advanced Reactors	As described in SECY-10-0034, DID as an issue was focused on non-light-water SMRs. In SECY-09-0056, the staff proposed to defer development of a DID policy statement pending gaining additional experience and related insights from Next-Generation Nuclear Plant or other non-LWR reviews. More broadly, the concepts and goals of DID as applied generally to a technology-neutral regulatory framework was discussed in Enclosure 3 of the staff's recommendations for disposition of NRC Fukushima Near-Term Task Force Recommendation 1 (SECY-13-0132). In SRM-SECY-13-0132, the Commission disapproved SECY-13-0132 Improvement Activity 2, "Establish Commission Expectations for Defense-in-Depth" and directed the staff to re-evaluate the topic as appropriate in the context of the Commission direction on a long-term Risk Management Regulatory Framework. The Commission also directed the staff to enshrine SECY-13-0132, Enclosure 3, "Defense-in-Depth Observations and Detailed History," as an agency knowledge management tool and to republish the enclosure in other formats to make it more widely available. NRO will keep apprised of this issue as it is re-evaluated for potential SMR impacts.	SECY-09-0056, ML090360197 SECY-13-0132, ML13277A413 SECY-13-0132, Enclosure 3: Defense-In-Depth Observations and Detailed History, ML13277A425 SRM-SECY-13-0132, ML14139A104

SECY-10-0034 Line Item No.	Issue Title	Status	References
3.4	Key Component and System Design Issues for SMRs	Policy impacts on key components and system designs are design-specific and will be evaluated for individual applications.	No further general references have been developed by the staff for this item. Item 3.4 technical issue titled "Core Composition and Source Term Issues for SMRs" is discussed separately in Enclosure 3, Line Item No. 3.3.
4.1	Appropriate Requirements for Operator Staffing for Small or Multi-Module Facilities	In SECY-11-0098, staff concluded that evaluating applicant operator staffing exemption requests is the best short-term response for this issue. The SECY discussed performing updates of NUREG 0800, NUREG 0711, and NUREG 1791 for guidance of the short-term evaluations. Staff now concludes that the existing version of SRP Chapter 18 and Revision 3 to NUREG 0711 (published November 2012) comprise adequate guidance for performing the exemption request evaluations. As experience is gained in performing the operator staffing exemption requests, the need for a long-term approach will be further evaluated.	SECY-11-0098, ML111870574 NUREG 0711, Revision 3, November 2012
4.2	Operational Programs for Small or Multi-Module Facilities	As discussed in SECY-11-0112, this issue can be addressed with current guidance, no rulemaking or policy changes needed.	SECY-11-0112, ML110460434

SECY-10-0034 Line Item No.	Issue Title	Status	References
4.3	Installation of Reactor Modules During Operation of Multi-Module Facilities	As discussed in SECY-11-0112, this issue can be addressed with current guidance, no rulemaking or policy changes needed.	SECY-11-0112, ML110460434
4.4	Industrial Facilities Using Nuclear-Generated Process Heat	As discussed in SECY-11-0112, this issue can be addressed with current guidance, no rulemaking or policy changes needed. This may be re-assessed if an applicant applies for this plant usage, depending on the specifics of the application.	SECY-11-0112, ML110460434
4.5	Security and Safeguards Requirements for SMRs	Staff determined in SECY-11-0184 that the current regulatory framework is adequate to certify, approve, and license light-water SMRs, the manufacturing of SMR fuel, transportation of special nuclear material and irradiated fuel, and the interim storage of irradiated fuel proposed for light-water SMRs under 10 CFR Parts 50, 52, 70, 71, and 72, respectively. Also, security and material control and accounting (MC&A) requirements in 10 CFR Parts 72, 73, and 74, respectively, are comprehensive and sufficiently robust, and therefore are adequate for light-water SMRs.	SECY-11-0184, ML112991113
4.6	Aircraft Impact Assessments for SMRs	As discussed in SECY-11-0112, this issue can be addressed with current guidance, no rulemaking or policy changes needed.	SECY-11-0112, ML110460434

SECY-10-0034 Line Item No.	Issue Title	Status	References
5.3	Decommissioning Funding for SMRs	Design-specific features will influence decommissioning costs. The near-term approach will be to consider allowing SMR applicants to deviate from existing regulations through exemption requests with supporting analysis. The long-term approach is to propose rulemaking based on the near-term exemption experience. No additional review of this issue has been performed since the SECY-11-0181 was issued. The issue may need to be revisited if there are changes to the regulatory and industry environments in the future.	SECY-11-0181, ML112620358