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POLICY ISSUE

(Notation Vote)

March 29, 2023

SECY-23-0029

FOR: The Commissioners

FROM: David L. Skeen, Director
Office of International Programs

SUBJECT: RULEMAKING PLAN FOR THE IMPLEMENTATION OF CHANGES TO
REFLECT ADVANCED REACTOR EXPORT LICENSING CONSIDERATIONS

PURPOSE:

This paper requests Commission approval to initiate a rulemaking that would more clearly incorporate advanced reactor concepts into the U.S. Nuclear Regulatory Commission's (NRC) regulations that govern the export of nuclear material and equipment. The rulemaking would reduce regulatory uncertainties associated with the deployment of equipment and substances associated with advanced reactors and ensure predictability and efficiency in the NRC's licensing reviews of export applications.

SUMMARY:

The NRC is responsible for licensing the export of nuclear-related equipment and material, in accordance with the provisions found in Part 110 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Export and Import of Nuclear Equipment and Material." These regulations were drafted with light- and heavy-water reactor technology in mind.

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Advanced reactors¹ use different technology than the existing reactor fleet. The anticipated use of advanced reactor technology in the nuclear industry prompted staff from the Office of International Programs (OIP) to form the AREWG to review 10 CFR Part 110 and identify any gaps in the regulations. The goal of the review was to ensure that there will continue to be sufficient controls on the export of nuclear equipment and substances to support nonproliferation, as well as prevent any future delays or disruptions to the export licensing process. Further, the AREWG wanted to ensure that the NRC would be prepared to license the export of non-light-water reactor technologies and to reduce the regulatory uncertainties associated with the deployment of new nuclear reactor technologies.

The AREWG did not study advanced reactor imports since imports are domestically regulated and controlled. Additionally, most imports into the U.S. for production and utilization facilities are completed under an NRC general license. Commercial light- and heavy-water power reactors and non-power utilization facilities also were not included in the scope of the AREWG study.

The AREWG identified 5 advanced reactor types and 14 associated designs to consider for potential export (see the AREWG Report located at Accession No. ML21194A213 in the NRC's Agencywide Documents Access and Management System). The AREWG compared these reactor types and designs to the export controls in 10 CFR Part 110 and reached several conclusions. As a result, the AREWG did not identify any significant regulatory gaps in 10 CFR Part 110 that would prevent the export of a component and/or material regulated under the NRC's export licensing jurisdiction for use in an advanced reactor. However, the AREWG did identify that rulemaking could provide improved clarity in 10 CFR Part 110. Specifically, while the current rule can be used to regulate salt that is especially designed or prepared for use as a reactor coolant, a change to the rule could make the applicability of the rule to these materials more explicit. Further, changes to 10 CFR Part 110 could clarify that the regulations apply to new and prominent reactor designs and components. Based on the AREWG's findings, OIP recommends clarifying changes to 10 CFR Part 110 through rulemaking.

BACKGROUND:

Currently, 10 CFR 110.8, "List of nuclear facilities and equipment under NRC export licensing authority," and 10 CFR 110.9, "List of Nuclear Material under NRC export licensing authority," list the items under the NRC's export licensing jurisdiction. The appendices to 10 CFR Part 110 provide illustrative lists of the equipment, components, and materials that encompass the items listed in 10 CFR 110.8 and 110.9. However, the regulations in 10 CFR Part 110 contain only two references to advanced reactors—in 10 CFR 110.40, "Commission review," and 10 CFR 110.41, "Executive Branch review." Specifically, the requirements in 10 CFR 110.40(b)(3) and 110.41(a)(7), which contain the references to "advanced reactors," only address the circumstances that require Commission review or Executive Branch review, respectively. The regulations do not explicitly reference some of the new equipment and substances currently in advanced reactor designs.

Appendix A to 10 CFR Part 110, "Illustrative List of Nuclear Reactor Equipment Under NRC Export Licensing Authority," is not intended to be exhaustive. The Atomic Energy Act of 1954, as amended (AEA), authorizes the Commission to license for export utilization facilities and their major components as determined by the NRC (AEA Sections 103, 11(cc)), and minor

¹ After identifying several definitions used by the international community, the Advanced Reactor Exports Working Group (AREWG) agreed not to choose one working definition but rather to use the concept that any non-light water reactor design should be considered an "advanced reactor."

components and substances that the NRC determines to be significant for nuclear explosive purposes (AEA Section 109b.). The NRC's export licensing jurisdiction encompasses commodities beyond those explicitly set forth in Appendix A. Appendix A to 10 CFR Part 110 has 11 entries ranging from major reactor components, such as reactor pressure vessels, to minor reactor components, such as heat exchangers. While Appendix A does include a catchall in item 11 ("Any other components especially designed or prepared for use in a nuclear reactor or in any of the components described in this appendix"), the terminology in 10 CFR Part 110 in general, and Appendix A in particular, is based on the technologies associated with light- and heavy-water reactor designs. The regulations do not specifically account for any new equipment and substances currently used or under development for advanced reactors. The AREWG recommended, and OIP agrees, that the emphasis in 10 CFR Part 110 on light- and heavy-water reactor technologies could cause confusion as to whether certain equipment and substances associated with advanced reactors are within the scope of 10 CFR Part 110 and the NRC's export licensing jurisdiction. This potential confusion could lead to multiple time-consuming jurisdictional determination requests.

Requests for jurisdictional determinations come into play when a nuclear-related item is not specifically referenced in 10 CFR Part 110 and there is uncertainty over whether an item falls under the export licensing jurisdiction of the NRC or the U.S. Department of Commerce (DOC). The NRC considers two criteria to determine whether an item or substance is under the NRC's export licensing jurisdiction. First, the NRC considers whether an item or substance has been especially designed or prepared for only a nuclear end use. If the item or substance can be used in other non-nuclear applications, then the item is determined to be "dual use" and under the DOC's export licensing jurisdiction. Second, the NRC considers whether the item or substance is especially relevant from the standpoint of export controls because of its significance for nuclear explosive purposes. An item that meets either criterion is deemed to fall under the NRC's licensing jurisdiction.

The OIP has already received several license applications for authorization to export special nuclear material for advanced reactor fuel testing. An increase in the number of export licensing applications for components, equipment, and substances used in advanced reactors is expected. If the regulations are not updated to specifically address advanced reactors, OIP may also see an influx of jurisdictional determination requests. This increase could expand the workload for the NRC's export licensing staff and result in processing delays for export licensing applications.

The Nuclear Suppliers Group (NSG) is a group of nuclear supplier countries that seeks to contribute to the nonproliferation of nuclear weapons through the implementation of two sets of guidelines for nuclear exports and nuclear-related exports. The NSG establishes guidelines through an exchange of information by Participating Governments in nuclear supplier countries, notably on developments of nuclear proliferation concern. Proposed guidelines are adopted by consensus. The NSG Part 1 Guidelines govern the export of items that are especially designed or prepared for nuclear use.² The NSG Part 1 Guidelines are implemented by each Participating Government in accordance with its national laws and practices. Changes made to the NSG Part 1 Guidelines also are made by consensus; all 48 Participating Governments must agree to a proposed change. The U.S. implements the export controls established in the NSG Part 1 Guidelines in the appendices of 10 CFR Part 110. Although the NSG Guidelines are not legally

² The NSG Part 2 Guidelines govern the export of nuclear "dual use" items and are entitled "Guidelines for transfers of nuclear-related dual-use equipment, materials, software, and related technology."

binding, the U.S. is obligated as a member of the NSG to implement any changes to the NSG Guidelines. However, the U.S. may go beyond the NSG Guidelines and make changes to its own domestic export controls beyond what is adopted by the NSG.

Because each proposal must be adopted by consensus, proposed changes to the NSG Part 1 Guidelines can take years to implement. The U.S. Government is currently formulating its strategy for communicating the necessity of implementing changes to the NSG Part 1 Guidelines that are similar to those proposed in this rulemaking plan. The international export control community and fellow nuclear supplier countries often look to the U.S. as a leader in matters pertaining to the implementation of nonproliferation standards. If the regulatory changes outlined in this rulemaking plan are implemented, the NRC would set an important precedent for the international export control community and for fellow nuclear supplier countries. If approved, this rulemaking would be an important indicator of the U.S. leadership within the NSG on these issues and would highlight the forward-looking approach to maintaining the highest standards for nonproliferation.

DISCUSSION:

Title

Implementation of Changes to Reflect Advanced Reactor Export Licensing Considerations

Regulation

10 CFR Part 110

Regulatory Issue

Export controls are used to prevent unauthorized entities from acquiring proliferation significant nuclear materials, equipment, and substances. U.S. laws and regulations that govern export controls promote the highest standards of nonproliferation and international civil nuclear cooperation. Strict adherence to these nonproliferation standards establishes the U.S. as a leader and a reliable civil nuclear cooperation partner among the NSG and the international community.

An increased interest in nuclear power, specifically the development and commercialization of advanced reactor technologies as part of a global effort to mitigate the worst effects of climate change, highlights the need for and importance of updating U.S. export controls to ensure they clearly account for all nuclear technologies.

The regulations in 10 CFR Part 110 are based on light- and heavy-water reactor technologies and do not explicitly address equipment and substances associated with advanced reactor designs. If the sections of the regulations that describe the NRC's export licensing jurisdiction do not list the equipment or substances especially designed or prepared for use in an advanced reactor, applicants may be unaware that such exports are covered under the NRC's jurisdiction. Absent clarifications in the regulations, there may be confusion as to the extent to which certain items fall within the scope of 10 CFR Part 110 and the NRC's export licensing jurisdiction.

With more advanced reactor designs coming to the market, the NRC's export licensing staff's resources could be significantly impacted by an increase in jurisdictional requests from advanced reactor vendors who are not familiar with U.S. export controls.

As a member of the NSG, the U.S. is committed to ensuring that nuclear trade for peaceful purposes does not contribute to the proliferation of nuclear weapons or other nuclear explosive devices. This commitment includes avoiding unnecessary delays and disruptions in the export licensing process and ensuring that the applicability of export control requirements is clear in the regulations.

Existing Regulatory Framework

Regulations

The regulations at 10 CFR Part 110 provide licensing, enforcement, and rulemaking procedures and criteria under the AEA, for the export of nuclear equipment and materials. These regulations identify what is under the NRC's export licensing jurisdiction in 10 CFR 110.8 and 110.9. The appendices to 10 CFR Part 110 contain illustrative lists of the equipment, components, and materials that encompass items in 10 CFR 110.8 and 110.9 that are typically used in light- and heavy-water reactor technology. The regulations do not specifically account for some of the new equipment and substances currently in advanced reactor designs.

Explanation of Why Rulemaking is the Preferred Solution

Alternative 1: No action (Status Quo)

Under this alternative, OIP would not make any changes to the existing regulations in 10 CFR Part 110 to clarify that 10 CFR Part 110 applies to the equipment, components, and substances associated with advanced reactors.

Pros:

NRC export licensing staff would save time and resources in the short-term by not proceeding with a rulemaking.

This alternative would not create a regulatory change or impact current agency direction.

Cons:

If the current regulations are not updated to more clearly account for advanced reactor exports, OIP may soon see an influx of jurisdictional determination requests.

An increase in jurisdictional determinations for proposed advanced reactor exports could also result in an increase in workload for the NRC's export licensing staff and lead to delays in processing other export licensing actions.

Taking no action would not align with the level of leadership currently maintained by the U.S. among the nuclear suppliers in the NSG. Additionally, taking no action would not set as clear of a precedent to the NSG on what would and would not be covered by our export regulations because some examples that contain language specific to light-water reactor technology would remain. It would also increase the risk that an entity would proceed with an unapproved export.

Alternative 2: Issue guidance on advanced reactor exports licensing

Under this alternative, OIP would revise current guidance to clarify that 10 CFR Part 110 applies to the equipment, components, and substances associated with advanced reactors. OIP would

not pursue changes to the existing regulatory framework for advanced reactor exports licensing considerations.

Pros:

This alternative would require less resources than a rulemaking.

The time to complete this alternative would also be less than that required for rulemaking. This would allow for guidance to be available to licensees and NRC export licensing staff in a timely manner and may alleviate the challenges associated with jurisdictional determination requests.

Cons:

Providing guidance without rulemaking would not set as clear of a precedent to the NSG on what would and would not be covered by our export regulations because some examples that contain language specific to light-water reactor technology would remain. This could lead to inconsistencies in implementation of export controls in the international community and may be perceived as undermining the proliferation goals of the NSG.

Additional resources may be needed to ensure that the NRC's export licensing staff are able to process case-specific jurisdictional determination reviews and other export licensing actions in a timely manner.

Alternative 3: Issue a risk-informed and performance-based rulemaking

In this alternative, the NRC's export licensing staff would conduct rulemaking to clarify that 10 CFR Part 110 also applies to the equipment, components, and substances associated with advanced reactors. This would include clarifying changes to the illustrative export control list in Appendix A to 10 CFR Part 110, which is currently based entirely on light- and heavy-water reactor technology, to encompass advanced reactor equipment, components, and substances.

Pros:

The implementation of the proposed clarifying changes in rulemaking would be an important indicator of the U.S. leadership within the NSG and would allow the U.S. to maintain the highest standards for nonproliferation by ensuring nuclear trade for peaceful purposes and the evaluation of relevant licensing requests in accordance with U.S. export controls.

Rulemaking would decrease regulatory uncertainties for advanced reactor exports and promote reliability and efficiency in the export licensing process.

Rulemaking would decrease the need for jurisdictional requests to determine the appropriate regulatory authority (e.g., NRC, DOC).

Cons:

Rulemaking would not eliminate the need for case-specific reviews. The AREWG only considered the types of advanced reactor export licensing applications that the NRC is likely to see over the next 5 to 10 years and the potential proliferation significance of these items. As technological advances are made and other reactor types are developed, beyond those considered in this review, there still may be a need for jurisdictional determinations.

Considering each of the alternatives presented in this paper, the staff recommends Alternative 3 as the best option to ensure the highest standards of nonproliferation by providing greater

regulatory clarity and certainty in export controls for advanced reactors and predictability in the export licensing process. Alternative 3 also would further the Principles of Good Regulation (efficiency, clarity, and reliability).

Description of Rulemaking: Scope

The recommended changes would clarify that the NRC's export licensing jurisdiction extends to all especially designed or prepared nuclear equipment, components, and substances that are associated with advanced reactors by revising Appendix A to 10 CFR Part 110 to replace light-water reactor-specific wording with technology-inclusive language.

The first recommended change would be made to entry number 6 in Appendix A to 10 CFR Part 110. Appendix A is an illustrative list of nuclear reactor equipment, and the current entry number 6 refers to "Zirconium tubes, i.e., zirconium metal and alloys in the form of tubes or assemblies of tubes especially designed or prepared for use as fuel cladding in a nuclear reactor." However, reactor designs may employ other materials besides zirconium³ for nuclear fuel cladding, or other forms of cladding apart from tubes. This entry would be amended to clarify that the NRC has regulatory authority over all types of fuel cladding for export, including the new types of cladding used in advanced reactors. This change would minimize the potential need for the NRC to conduct jurisdictional reviews on other types and forms of cladding that are not comprised of zirconium in the form of tubes. This change also reflects a current proposal before the NSG for a similar change to the NSG Part 1 Guidelines.

The second recommended change would remove the parenthetical in entry number 2 of Appendix A. OIP recommends removing "(e.g., CANDU)" from this entry to clarify that the NRC would control other types of fuel charging and discharging machines and systems apart from those used in CANDU reactors, even if not specifically listed.

The third recommended change would address the use of salt especially designed and prepared for use as coolant in a nuclear reactor. Salt, as a coolant, does not fall within any of the existing specific entries in Appendix A. Currently, the NRC could regulate the export of salt as a coolant as a "component" under the catchall provision in Appendix A to 10 CFR Part 110. However, given its proliferation significance, and to make clear that the NRC would have regulatory authority over its export, OIP proposes that specialized salt as a coolant be added as a new specific entry to the illustrative list in Appendix A.

The AREWG also recommended, and OIP agrees to, a corresponding revision to the catchall in item 11 in Appendix A to 10 CFR Part 110 to add the term "substances." This change would further reduce potential confusion over whether the NRC has export licensing jurisdiction over substances such as specialized salt as a coolant.

Description of Rulemaking: Preliminary Backfitting and Issue Finality Analysis

The NRC staff does not expect that the proposed changes would constitute backfitting or issue finality. The proposed amendments do not involve any provisions that would impose backfits as defined in 10 CFR Chapter I. Additionally, the amendments would not introduce any changes or

³ While the clarifying changes presented in this paper are focused on advanced reactors, this change could also be beneficial for operating light-water reactors that seek to use accident tolerant or other advanced fuels.

additions to requirements for existing structures, systems, components, procedures, organizations, or designs associated with the construction or operation of a facility.

Estimated Schedule

Publish proposed rule -- 12 months from approval of the rulemaking plan.

Publish final rule -- 12 months after the end of the comment period on the proposed rule.

Description of Rulemaking: Preliminary Recommendation on Priority

Based on the Common Prioritization of Rulemaking (CPR) prioritization methodology (ML23018A148), the preliminary priority for this rulemaking activity is medium. The priority is based on several factors, including the timing and volume of requests for export licenses as well as the need to ensure the effectiveness and efficiency of the NRC's export licensing process and to clarify the agency's regulatory requirements.

Description of Rulemaking: Estimate of Resources

The proposed action is estimated to involve a low magnitude of costs throughout the rulemaking process. Therefore, the level of effort for rulemaking is estimated to be 0.6 full time equivalents (FTE) per year for an estimated total of 1.8 FTE. The proposed action would provide a reduction in burden on the NRC's export licensing staff's time and resources, decrease regulatory uncertainties for advanced reactor exports and promote reliability and efficiency, and reduce uncertainty should there be any perceived inconsistencies in the interpretation of regulatory controls.

Cumulative Effects of Regulation

The NRC staff's preliminary assessment of the cumulative effects of regulation concludes that no known activities or affected entities would be significantly impacted by implementing the proposed changes.

OIP has a well-established process for communicating changes in the regulations to its licensees, including public speaking engagements, notifications on OIP's website, and direct communication with affected licensees. Any activities associated with this proposed rulemaking would be included in these outreach opportunities.

Agreement State Considerations

There are no Agreement State considerations associated with this rulemaking plan. Export licensing is not an activity that the NRC has delegated to Agreement States.

Guidance

If the Commission approves the recommended alternative of rulemaking, the NRC's export licensing staff may need to update existing guidance documents in parallel with this rulemaking. However, the NRC's export licensing staff estimates that no new guidance documents(s) on advanced reactor exports would need to be developed.

Advisory Committee on Reactor Safeguards (ACRS) Review

OIP recommends that there is no need for an ACRS review.

Committee to Review Generic Requirements (CRGR) Review

OIP recommends that there is no need for a CRGR review.

Advisory Committee on the Medical Use of Isotopes (ACMUI) Review

OIP recommends that there is no need for an ACMUI review.

Analysis of Legal Matters

The Office of General Counsel has reviewed this rulemaking plan and has not identified any issues necessitating a separate legal analysis at this time.

COMMITMENT:

If the Commission approves initiation of the rulemaking, in accordance with SECY-16-0042, "Recommended Improvements for Rulemaking Tracking and Reporting," dated April 4, 2016 (ML16075A070), the rulemaking activity would be added to the agency's rulemaking tracking tool.

RECOMMENDATION:

OIP recommends that the Commission approve Alternative 3, initiation of a rulemaking to incorporate clarifying changes on advanced reactor concepts into the NRC's regulations governing the export of nuclear reactor equipment and materials.

RESOURCES:

The enclosure includes an estimate of the resources needed to complete this rulemaking.

COORDINATION:

The Office of the General Counsel has no legal objection to this action. The Office of the Chief Financial Officer has reviewed this paper and has no concerns with the estimated resources in the enclosure.

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David Skeen, Director
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Enclosure:

Estimated Resources (non-public)

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