PHYSICAL SECURITY REQUIREMENTS FOR FACILITIES WITH CATEGORY II QUANTITIES OF SPECIAL NUCLEAR MATERIAL INFORMATIONAL SHEET

Background

The purpose of these questions and answers (Q&As) is to provide clarity on the US Nuclear Regulatory Commission (NRC) staff's current regulatory approach for the physical security of special nuclear material (SNM) of moderate strategic significance as defined in Title 10 of the *Code for Federal Regulations* (10 CFR) Section 70.4 and 10 CFR 73.2 (also referred to as Category II quantity of SNM). High assay low enriched uranium (HALEU) is uranium enriched between 5% but less than 20% in U-235 isotope; facilities that possess U-235 that is enriched between 10% but less than 20% would fall under the Category II requirements in 10 CFR 73.67. The NRC licensees such as fuel cycle facilities, non-power reactors and medical isotope facilities that plan to use, produce and handle HALEU as part of their proposed licensed activities may be subject to the requirements applicable to Category II quantities of SNM. Additional public information on HALEU and certain licensing requests/actions can be found at Centrus Energy Corp Facility Licensing High Assay Low Enriched Uranium Demonstration webpage and at SHINE NRC Webpage.

Key Messages

- Protection of Category II quantities of SNM is regulated under 10 CFR 73.67.
- Supplemental security measures for the protection of Category II quantities of SNM may be required to address the current threat environment and the changing understanding of the risks associated with facilities possessing Category II quantities of SNM.
- Staff uses a risk-informed analysis on a case-by-case basis to develop appropriate site-specific supplemental security measures, if needed, that would be implemented through license conditions to ensure the security of Category II quantities of SNM.
- Supplemental security requirements could include measures to provide greater security or control over material in use and storage and vital equipment; requirements for access controls (e.g., background checks), controlled access area (CAA) portals and vehicle access, escort requirements, random entry searches and exit searches, alarm stations, security patrols, communication and coordination with law enforcement, and implementation of a security equipment maintenance program.
- To ensure a timely and efficient review, applicants planning to possess Category II quantities of SNM should engage with NRC staff early in the licensing process and should provide the facility setting, facility processes, types of materials (physical/chemical forms, enrichment, quantity), facility layout, and material flow (transportation, storage, use). The early establishment of an information security program allows for more detailed information to be shared expeditiously.

Q&As

1. What are the types of SNM that the NRC regulates?

   There are three categories of SNM that the NRC regulates: Category I (i.e., formula quantity[1] of strategic SNM), Category II (i.e., SNM of moderate strategic significance[2]), or Category III (i.e., SNM of low strategic significance[3]). The SNM is categorized based on its type, quantity (i.e., mass), and enrichment for uranium-235. Strategic SNM consists of high enriched uranium, uranium-233, and plutonium. The regulations in 10 CFR Part 73 implement a risk-informed graded approach and identify requirements for the physical protection of SNM depending on the Category (i.e., the protection of Category I SNM is significantly greater than Category III SNM).

2. What types of facilities possess Category II quantities of SNM? How are these facilities related to advanced reactor fuels?

   Category II facilities are licensed to possess SNM of moderate strategic significance as defined in 10 CFR 70.4 and 73.2. These facilities include HALEU fuel cycle facilities (e.g., uranium enrichment plants and fuel fabrication facilities), non-power reactors, and medical isotope facilities. HALEU fuel is required for most of the U.S. advanced reactors types to achieve smaller designs that produce more power per unit of volume.

3. Can a licensee possess some amount of high-enriched uranium (20% U-235 or greater) and still be considered a Category II facility?

   Yes, the definition of Category II quantities of SNM includes possession of less than a formula quantity of strategic special nuclear material, but more than 1000 grams of U-235 contained in uranium enriched to 20% or more of U-235. The Category II physical security requirements apply to licensees that possess this limited amount of higher-enriched uranium.

4. What are the existing physical protection requirements and current regulatory approach for Category II quantities of SNM?

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[1] *Formula quantity* means strategic special nuclear material in any combination in a quantity of 5000 grams or more computed by the formula, grams = (grams contained U-235) + 2.5 (grams U-233 + grams plutonium). This class of material is sometimes referred to as a Category I quantity of material.

[2] *SNM of moderate strategic significance* means less than a formula quantity of strategic special nuclear material but more than 1,000 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope) or more than 500 grams of uranium-233 or plutonium, or in a combined quantity of more than 1,000 grams when computed by the equation, grams = (grams contained U-235) + 2 (grams U-233 + grams plutonium); or 10,000 grams or more of uranium-235 (contained in uranium enriched to 10 percent or more but less than 20 percent in the U-235 isotope).

[3] *SNM of low strategic significance* means less than an amount of special nuclear material of moderate strategic significance as defined in paragraph (1) of the definition of strategic nuclear material of moderate strategic significance in this section, but more than 15 grams of uranium-235 (contained in uranium enriched to 20 percent or more in U-235 isotope) or 15 grams of uranium-233 or 15 grams of plutonium or the combination of 15 grams when computed by the equation, grams = (grams contained U-235) + (grams plutonium) + (grams U-233); or Less than 10,000 grams but more than 1,000 grams of uranium-235 (contained in uranium enriched to 10 percent or more but less than 20 percent in the U-235 isotope); or 10,000 grams or more of uranium-235 (contained in uranium enriched above natural but less than 10 percent in the U-235 isotope)

The existing physical security requirements for possession of and transport of Category II quantities of SNM are in 10 CFR 73.67. Regulatory Guide 5.59, "Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate or Low Strategic Significance," describes, in part, the information required in the physical security plan submitted as part of an application for a license to possess, use, or transport Category II quantities of SNM or 10 kg or more of Category III quantities of SNM and recommends a standard format for presenting the information in an orderly arrangement. These regulations and guidance address a wide variety of Category II facilities, taking into account the material being used, the purpose of the facility, and security aspects of specific sites. However, this flexibility may not obviate the need for specific supplemental measures at a given Category II facility.

The NRC staff's current regulatory approach considers the need for supplemental security measures in addition to the requirements in the existing regulations because the threat environment has changed and the risks associated with SNM are better understood than when the existing regulations were promulgated. Therefore, the NRC staff conducts case-specific reviews of physical security plans and includes site-specific supplemental security measures, as needed, as license conditions. The staff review relies on a risk-informed analysis to determine whether supplemental requirements are necessary and considers (1) the attractiveness of the material involved, and (2) the overall effectiveness of the applicant's physical security plan. These supplemental measures are applied based on the specific threat environment and the risks associated with SNM. The general performance objectives in the existing regulations (10 CFR 73.67(a)), require in part, that a licensee's physical protection system provide *early detection* and assessment of unauthorized access or activities by an external adversary within the CAA containing special nuclear material. In contrast, the supplemental measures aim to ensure that a licensee is able to *promptly* detect and assess attempts to remove special nuclear material. This change in detection and assessment timing, in part, drives the need for supplemental security measures.

- Because of the range of potential Category II facilities, supplemental security measures would generally be site-specific and implemented through license conditions instead of generic orders. Facility-specific examples cannot be discussed due to the sensitive nature of the information; however, the staff is relying upon information in the regulatory basis document for rulemaking (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18332A053) to inform its understanding of the types of supplemental security information that could potentially be applied to Category II facilities. Such supplemental security requirements could include measures to provide greater security or control over material in use and storage and vital equipment; requirements for access controls (e.g., background checks), controlled access area (CAA) portals and vehicle access, escort requirements, random entry searches and exit searches, alarm stations, security patrols, communication and coordination with law enforcement, and implementation of a security equipment maintenance program.

5. How will the NRC staff provide consistent and transparent Part 73 reviews?

   Consistent with the NRC's Open Government Policy, all NRC reviews are conducted in a manner that is as open and transparent as possible, while still maintaining the necessary information security standards. As each application proceeds through the licensing

process, the staff will provide appropriate information to the public through public meetings, security evaluation reports, etc., when possible.

6. What information should an applicant be prepared to discuss to ensure productive discussions with NRC during early interactions (e.g., pre-application meetings)?

   Consistent with the Advanced Reactor Policy Statement[4], NRC encourages applicants to participate in early interactions with the NRC. In order for an applicant or licensee to effectively engage in the early interactions, they should be prepared to discuss the facility setting, facility processes, types of materials (physical/chemical forms, enrichment, quantity), facility layout, and material flow (transportation, storage, use). Specific information can be found under the physical security requirements for Category II quantities of SNM in 10 CFR 73.67. The corresponding guidance for the development of a physical security plan in Regulatory Guide 5.59, "Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate or Low Strategic Significance," explains the intent of the provisions of 10 CFR 73.76 and discusses of each subsection provides for alternative ways to fulfill the requirements. Furthermore, the NRC follows its public meeting policy[5] when engaging with applicants or licensees.

7. Has the NRC staff identified lessons learned during the recent SHINE and Centrus license reviews?

   Lessons learned include: (1) early and frequent engagements among applicants, licensees and the NRC staff lead to more efficient reviews because site-specific information can be thoroughly discussed, (2) use of audits can aid in shared understanding of how an applicant will ensure adequate security design, and (3) the early establishment of an information security program allows for more detailed information to be shared expeditiously.

8. Is SECY-11-0184, "Security Regulatory Framework for Certifying, Approving, and Licensing Small Modular Reactors," applicable for physical security requirements for fuel cycle facilities with Category II quantities of SNM?

   No. SECY-11-0184 (ADAMS Accession No. ML112991113) validated the Category III (special nuclear material of low strategic significance) security requirements as being adequate for Small Modular Reactors. It did not validate Category II security requirements for Small Modular Reactors or any other facility with Category II quantities of SNM. Therefore, it is not applicable to HALEU Category II applicants.

9. Does the Physical Security for Advanced Reactors rulemaking include requirements for Category II SNM at facilities other than power reactors?

   No. SECY-18-0076, "Options and Recommendation for Physical Security for Advanced Reactors" (ADAMS Accession No. ML18052B032), proposed a series of options to address a limited set of security alternatives for advanced reactors. In SRM SECY-18-0076, the Commission approved Option 3, a limited-scope rulemaking that retains the

[4] Policy Statement on the Regulation of Advanced Reactors (73 FR 60612; October 14, 2008)

[5] Policy Statement on Enhancing Participation in NRC Public Meetings (86 FR 14964; March 19, 2021)

current overall framework for security requirements but provides certain alternative security requirements for advanced reactors. The limited scope of the proposed rule, if approved by the Commission, will provide a set of alternative security requirements (i.e., armed responders, physical barriers, secondary alarm station, and vital areas) that qualified applicants or licensees may elect to implement instead of certain existing prescriptive requirements in 10 CFR 73.55. The Commission did not authorize a broader rulemaking for a new security framework for advanced reactors, and did not authorize any rulemaking to update the security requirements in 10 CFR 73.67 for the possession of Category II or Category III quantities of material. Currently, for a licensee to possess Category II quantities of material, the NRC addresses the needed security commensurate with the strategic significance of the SNM through regulations and license conditions to assure that activities involving SNM are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety.

10. Will the Part 53 rulemaking include new requirements for Category II quantities of SNM?

    No. The current preliminary proposed rule text for Part 53, “Risk Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors,” does not add new physical security requirements for Category II quantities of materials. The new rulemaking would adopt technology-inclusive approaches (approaches not specific to a single technology) and include the appropriate use of risk-informed and performance-based techniques, to provide the necessary flexibility for licensing and regulating a variety of advanced nuclear reactor technologies and designs.