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THE
FUTURE**

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Security for New and Advanced Reactors

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NRC's Security Initiatives

- Provide flexible, risk-informed, and performance-based regulatory approaches that consider threat, vulnerability, consequence, and mitigation
- Include a consequence-based approach to justify security alternatives
- Create a new class of licensees that may not be subject to the design basis threat (DBT) of radiological sabotage
- Enable designers and applicants to incorporate security-by-design principles and use innovative technologies



Current Licensees

- Licensed under 10 CFR Part 50 or Part 52
- Subject to security requirements in 10 CFR Part 73.55, “Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage”
- Robust and performance-based regulatory framework with some prescriptive requirements
- Physical protection program designed to prevent significant core damage and spent fuel sabotage
- Includes capabilities to detect, assess, interdict, and neutralize threats up to and including the DBT of radiological sabotage
- Security not integral to initial designs

Shaping the Future

2008 - U.S. Nuclear Regulatory Commission (NRC) policy statement on advanced reactors

- The design of advanced reactors should, “include considerations for safety and security requirements together in the design process such that security issues can be effectively resolved through facility design and engineered security features, and formulation of mitigation measures, with reduced reliance on human actions.”

2019 - Nuclear Energy Innovation and Modernization Act (NEIMA) signed into law

- This law directed the NRC to “...complete a rulemaking to establish a technology-inclusive, regulatory framework for optional use by commercial advanced nuclear reactor applicants for new reactor license applications” by December 31, 2027.

New Reactor Technology

Key Features that may reduce the need for traditional security measures

- Reliance on passive safety features
- Lower source term or demonstrated lower offsite dose consequences
- Security by design (e.g., below grade construction, hardening of interior and exterior walls)

Features that may pose unique security challenges

- Use of higher enriched fuels
- Diverse locations of radioactive material
- Ability to control a reactor remotely



Proposed Rule: Alternative Physical Security Requirements for Advanced Reactors

Allows for use of flexible security alternatives based on a radiological consequence analysis, including:

- Eliminates requirements for a minimum number of onsite armed responders to interdict and neutralize DBT adversary
- Law enforcement of other offsite responders can be used to interdict and neutralize the DBT adversary
- Allows for alternative means for accomplishing delay other than with physical barriers
- Allows for an offsite secondary alarm station
- Allows for removal of designation of offsite secondary alarm station or its secondary power supply as vital areas

Proposed Rule: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors (Part 53)

- Covers a broad range of technologies and source terms
- Consists of a performance-based, graded approach vs. prescriptive requirements
- Includes physical security, cyber security, fitness for duty, and access authorization
- Leverages experience from research and test reactors, large light water reactors, and fuel cycle facilities
- Proposes a class of reactors that would not be subject to the DBT
- Promotes innovation and enables the use of technology advances in areas of security and fitness for duty
- Considers the possibility of remote operations and remote maintenance
- Supports security by design

NRC Security Rulemaking Activities

- Alternative Physical Security Requirement for Advanced Reactors: Limited-Scope Rule
 - Draft proposed rule issued as [SECY-22-0072](https://www.regulations.gov/docket/NRC-2017-0227) on August 2, 2022 (ML21334A003)
 - NRC Docket ID: NRC-2017-0227 - <https://www.regulations.gov/docket/NRC-2017-0227>
- Physical Security Portions of 10 CFR Part 53: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors
 - Draft proposed rule issued as [SECY-23-0021](https://www.regulations.gov/docket/NRC-2019-0062) on Mar 6, 2023 (ML21162A093)
 - NRC Docket ID: NRC-2019-0062 - <https://www.regulations.gov/docket/NRC-2019-0062>
 - Staff Requirements Memorandum (SRM) to SECY-23-0021, “Proposed Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors” (ML24064A047)

Applicable Draft Guides

On February 2, 2024, the NRC released the following preliminary Draft Regulatory Guides (DG)

DGs for Alternative Physical Security Requirements for Advanced Reactors:

- DG-5072, “Guidance for Alternative Physical Security Requirements for Small Modular Reactors and Non-Light-Water Reactors” (ML23263A997)

DGs for Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors (Part 53):

- DG-5073, “Fitness-For-Duty Programs for Commercial Nuclear Plants and Manufacturing Facilities Licensed Under 10 CFR Part 53” (ML23286A251)
- DG-5074, “Access Authorization Program for Commercial Nuclear Plants” (ML23286A268)
- DG-5075, “Establishing Cybersecurity Programs for Commercial Nuclear Plants Licensed Under 10 CFR Part 53” (ML23286A278)
- DG-5076, “Guidance for Technology Inclusive Requirements for Physical Protection of Licensed Activities at Commercial Nuclear Plants” (ML23286A282)
- DG-5078, “Fatigue Management for Nuclear Power Plant Personnel at Commercial Nuclear Plants Licensed Under 10 CFR Part 53” (ML23286A286)