New Regulatory Frameworks

Part 53, Proposed Part 57 and considerations for licensing

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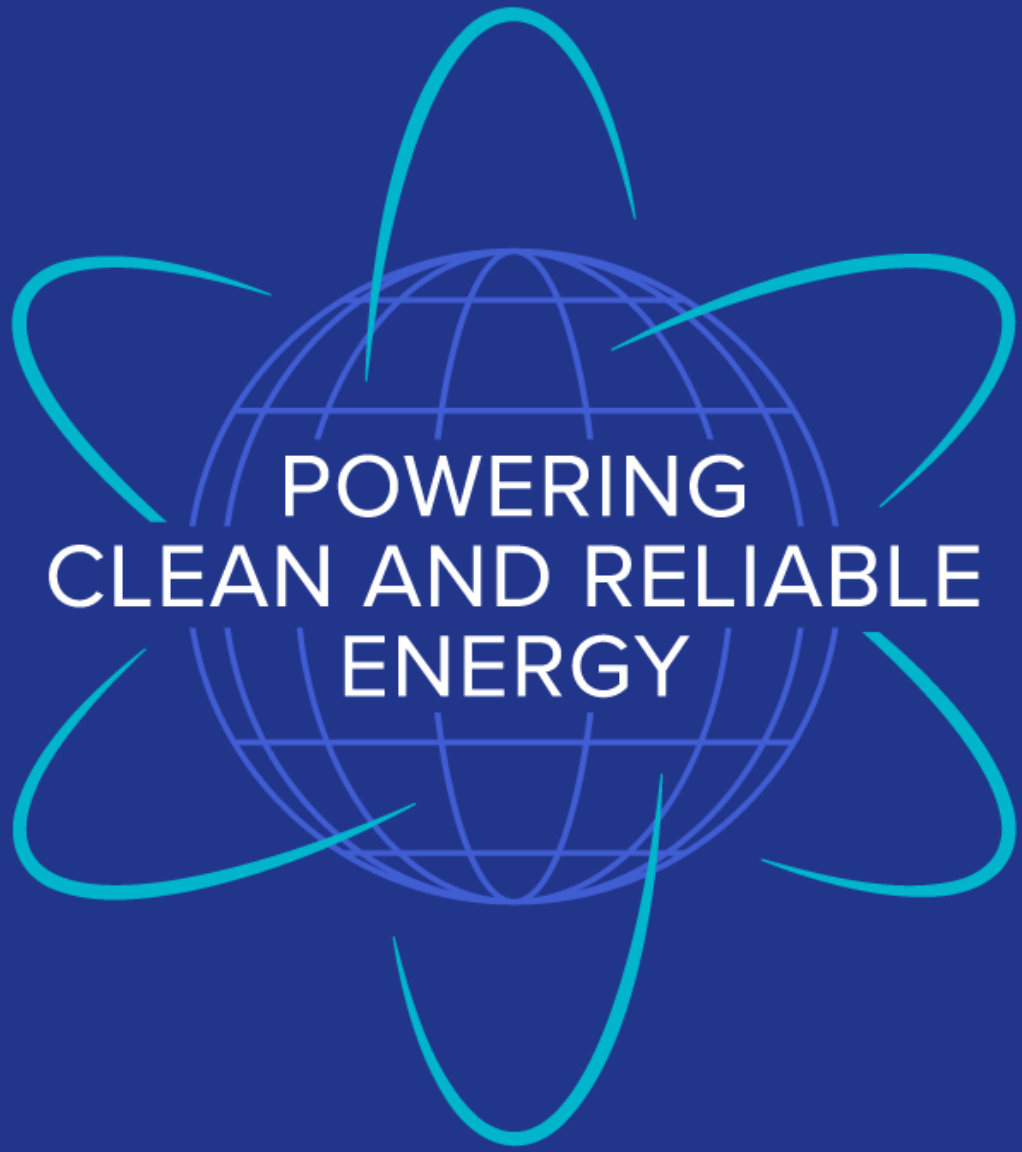

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Impetus for Change

- Nuclear Energy Innovation and Modernization Act (NEIMA) passed in 2019: “Not later than December 31, 2027, the Commission shall complete a rulemaking to establish a technology-inclusive, regulatory framework for optional use by commercial advanced nuclear reactor applicants for new reactor license applications.”
- ADVANCE Act passed in 2024 including Section 208 on microreactor licensing: “not later than 3 years after the date of enactment of this Act, implement” via 50, 52, 53 or a new rulemaking “risk-informed and performance-based strategies and guidance to license and regulate micro-reactors pursuant to section 103 of the Atomic Energy Act of 1954”
- Executive Orders signed in 2025 built upon NEIMA and ADVANCE Act and encouraged Nuclear Regulatory Commission (NRC) and Department of Energy (DOE) to go faster and further

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Licensing- Background

Framework	
DOE	DOE mission – Not commercial!
DOD	Military Purposes
NRC- Class 104	Medical Therapy or Research & Development
NRC- Class 103	Commercial Power Production

- Atomic Energy Act describes DOE, DOD, NRC authority
- Section 202 of the Energy Reorganization Act (ERA) restricts uses of DOE reactors
- Broad interpretation DOE mission could open some doors (Genesis mission)
- Some Congressional effort (NEIDA) towards broader DOE authority
- For now, NRC is THE pathway for commercial nuclear

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Proven Reactors Rulemaking

Proposes a licensing pathway for previously DOE/DOW authorized reactors

- Applicable to Parts 50, 52, and 53 frameworks (expected for future Part 57)
- NEI Comments Submitted May 4th
- Improve clarity on how to leverage prior authorizations
  - Adjust review scope and depth based on prior authorization
  - Focus on material differences between application and prior authorization
- Efficiently meet Statutory Obligations
  - Authority for safety decisions, independent review, and public opportunity
- Implementation clarity depends on NRC Guidance
  - Comments submitted on May 18th

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Part 53

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Background

- Part 53 has been published in Federal Register Notice (FRN) on March 30, 2026: https://www.federalregister.gov/documents/2026/03/30/2026-06048/risk-informed-technology-inclusive-regulatory-framework-for-advanced-reactors
- Rule became effective April 29th, 2026.
- Rule meets the Technology-Inclusive Risk-Informed Performance-Based Licensing Framework requirement mandated by the Nuclear Energy Innovation and Modernization Act (NEIMA)
- While heavily informed by the Licensing Modernization Project (NEI 18-04, RG 1.233, NEI 21-07, RG 1.253) or LMP, Part 53 does have some flexibility in implementation.
- Supports Generally Licensed Reactor Operators (GLROs), loading of fuel at a manufacturing facility, performance-based requirements for security, fitness for duty and access authorization, reduced staffing requirements for Ops and Security
- Addresses many, but not all the key issues from the February 2025 NEI comment letter

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Key Provisions

- Licensing Basis guidance is well established if following LMP, guidance on Systematic Risk Evaluations (SREs) is pre-decisional draft. Opportunity for industry to propose something reasonable for NRC endorsement.
- PRA-centric application will be easier for staff to review, but other approaches (maximum hypothetical accident, maximum credible accident, more traditional standard review plan licensing basis events) should be acceptable under SRE framework.
  - https://www.nrc.gov/docs/ML2612/ML26120A132.pdf
- All of the benefits of LMP are gained under Part 53 and then some: smaller scope for Tech Specs, no need for exemptions, additional flexibilities for certain deployment models
- Unclear on pathway from Part 50 or 52 to Part 53.

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Operations

- Many comments incorporated to clarify industry questions either in the rule or guidance documents with some notable exceptions
  - Defense in Depth was not clarified to provide flexibility
  - Significant Plant Damage not clarified, so may be point of discussions
- Self-Reliant Mitigation Facility
  - 53.800(a)(5) Flexible language around defense in depth and operator actions, which is an improvement.
- Generally Licensed Reactor Operator (GLRO)
  - For Self-Reliant Mitigation Facilities
  - No appreciable reduction in administrative record retention for training program
- Non-INPO accredited training program (DRO-ISG-2023-01)
  - NRC has not had the opportunity to review a non-NNAB training program for training licensed operators at advanced reactor facilities to decide if sufficient for approval. If you use INPO to accredit no approval is required as process is approved.
- Engineering Expertise (DRO-ISG-2023-02)
  - Required to support on-shift personnel however not necessarily at the site.
  - Still requires 4-year degree based on 41-year-old Commission Policy Statement.

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Physical Security

- Final rule sets three tiers of security requirements
  - Facility has no achievable target sets **AND** no active measure(s) are credited - licensee is relieved from security requirements.
  - Facility has no achievable target sets **AND** an active measure(s) is credited - licensee must implement security requirements to the extent that there is reasonable assurance that the measure(s) will be accomplished as credited.
  - Facility has achievable target sets - licensee must implement all security requirements.
- Achievable target sets are those that the DBT could render non-functional; **AND** cannot be mitigated after adversary interference is precluded and prior to a release exceeding dose reference values in 10 CFR 53.210; **AND**, if lost, result irreversibly in exceedance of the dose reference values in 10 CFR 53.210
  - Dose reference values are 25 rem at EAB and LPZ
- The security response may rely on the use of onsite responders, law enforcement or other offsite armed responders, or a combination thereof

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Financial Qualification & Protection Requirements

- Financial qualification went from “possesses or has reasonable assurance of obtaining” the funds necessary for construction and operation to “appears to be financially qualified,” similar to the standard used in § 70.23(a)(5).
  - No annual financial reporting requirement equivalent to 10 CFR 50.71(b)
  - More flexible less burdensome

- For CPs, “If available funding at the time of application is 50 percent or less, the applicant should include proposed license conditions to facilitate verification that funding is available prior to the start of construction.”
  - Similar language for OL for first 5 years of operation

- Financial protection: Property insurance requirements are taken from § 50.54(w), but have a provision allowing plant-specific estimates of costs to stabilize and decontaminate a plant as an alternative to the $1.06 billion minimum coverage in § 50.54(w).

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Miscellaneous

- 10 CFR 53.440(j) requirement for an aircraft impact assessment similar to 10 CFR 50.150 was removed.
- Unnecessary 10 CFR 50.470 bounding criteria language removed
- 10 CFR 53.440(k) still requires chemical hazard assessment
- Big win! 10 CFR 53.530 allows siting in populated areas as based on an assessment of “societal risks in comparison to societal benefits for the specific site.”
- Fuel loading of a manufactured reactor at the manufacturing facility is explicitly allowed based on features to preclude criticality. Problematic language, “two independent physical mechanisms” has been removed.
- Allows remote ops and load following
- DCs & MLs can be changed without LARs in line with 53.1550 (50.59 equivalent) criteria
- Reporting requirements decreased in line with SECY-24-0049

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Big Picture

- Mostly positive, significant industry comments were favorably addressed.
- Will allow more efficient licensing of plants following an LMP methodology and opens the door to other licensing methodologies.
- Allows big cost savings / efficiencies via GLROs.
- Allows fuel loading at manufacturing facility without problematic requirements
- Removes the need for exemptions for many non-LWRs and SMRs
- Graded physical security requirements in line with past NEI proposal
- Graded FFD / AA with fewer prescriptive requirements
- ALARA removed as design requirement
- Allows siting reactors near population centers
- Part 53 DC or SDA can reference Part 53 OL or COL streamlining standard design
- Leverages 53.1550 (50.59 equivalent) to allow licensee changes to ML or DC without prior NRC approval!

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More coming

- RG 4.7 R5 (DG-4035): General Site Suitability Criteria (societal risk vs benefit)
- RG 1.263 R0 (DG-1443): Comprehensive Risk Metrics & Associated Performance Objectives
- Systematic Risk Evaluation guidance including licensing basis vs owner control
- RG 1.251 (DG-1410) endorsing ASCE 43-19 for seismic design criteria
- RG 1.252 (DG-1307) on Seismic Isolation
- RG 1.260 R0 (DG-1431): Applications for Commercial NPPs under Part 53
- NUREG-XXXX: Consolidated Staff Guidance for the Review of Commercial NPPs Under Part 53
- Updates to RG 1.87, 1.246, 1.242 and 1.247
- RG 1.264 R0 (DG-1444) – Assessing Public Health Risk Associated with Chemical Hazards
- RG 1.242 – Address NEI 24-05 R1, Seismic LBE selection & Part 53
- Unclear on NRC's plans for DG-5073 on fitness for duty, ODCM and related guidance or LMP-related guidance

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Part 57

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Background

Need for Alternative Regulatory Framework

- Congressional mandate under Nuclear Energy Innovation and Modernization Act and Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act requires risk-informed and performance-based licensing strategies for microreactors.
- Executive Order 14300 directs NRC to establish high-volume licensing process for microreactors and modular reactors including standardized applications and general licenses where appropriate.
- Market demand for baseload power has resulted in business cases for high-volume deployment of microreactors in markets where traditional large-scale nuclear power plants are impractical or uneconomical.
- Proposed framework based on simplified safety requirements maximizes benefits of standardization while existing Part 50 and Part 52 regulations were designed for stationary large light water reactors.

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Part 57 – NRC Proposed Rule for Microreactors

Entry Criteria for Use of Rule

Dose Limit

1 rem TEDE or less in unrestricted area
(57.25(a))

Fuel Limit

10 MTU max of uranium, plutonium and thorium
(57.25(b))

Prescriptive Design Criteria

(1) Reactivity control, (2) Heat removal, (3) Fission product retention, (4) Shielding, (5) Radioactive effluents control, and (6) Security by design
(57.30)

Analytical Method

Maximum Hypothetical Accident (Worst Case Severe Release) OR
Maximum Credible Accident (Risk-informed Justification)
(57.60(a))

Low Consequence

License Application

Joint Construction Permit and Operating License
(57.19(f))

Expedited Review

Rule Issued: May 1
Comments Submitted: June 15

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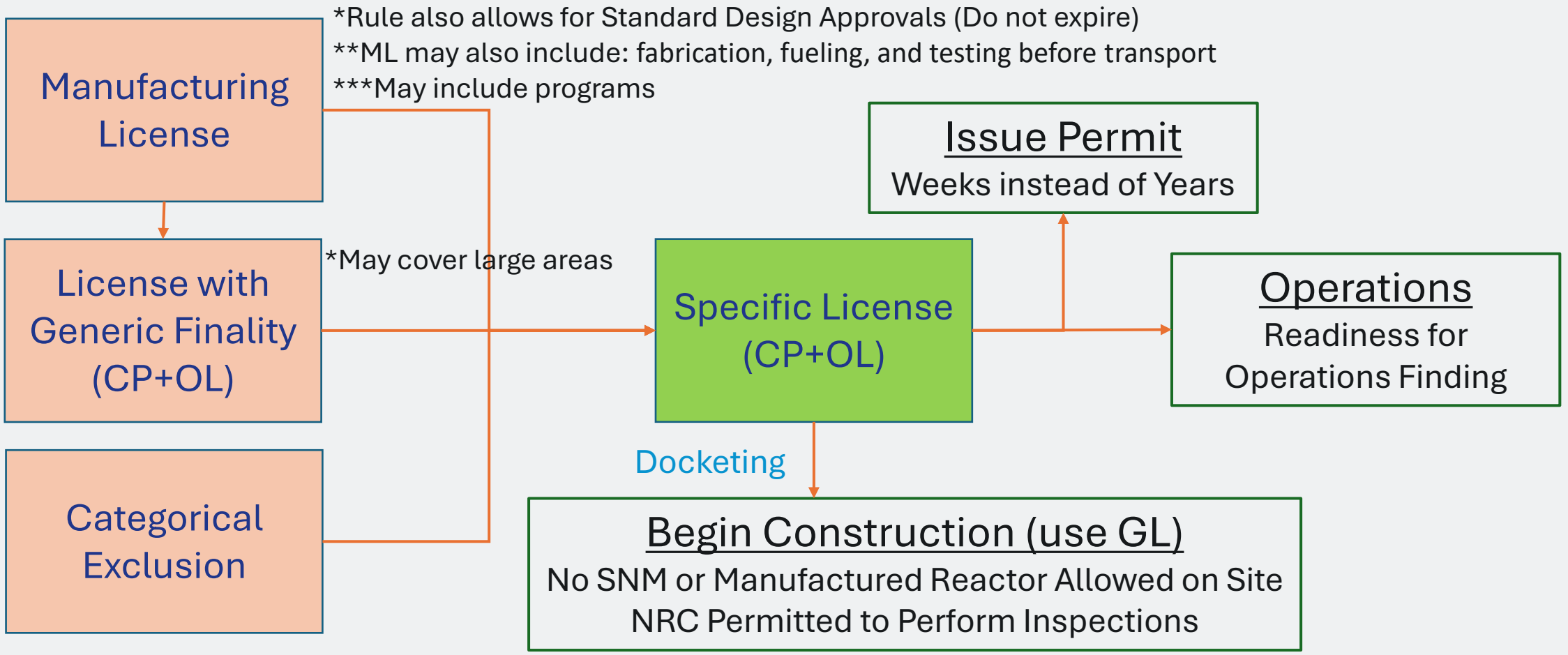
Optional Requirements – Streamlined Review



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Subpart C—Construction Permits and Operating Licenses

General License

- Establishes a general license under which an applicant that files a joint application for a CP and associated OL(s) for a “nth-of-a-kind facility” could begin construction activities before the issuance of a CP, provided that certain conditions are met.
- Would require that the general licensee has submitted, and the Commission docketed, a joint application for a CP and associated OL(s) under proposed part 57.
- Must reference a Manufacturing License (ML), an approved CP/OL with generic finality referencing the same ML, and meet categorical exclusion criteria.
- All applicable permits, licenses, and approvals must be obtained; Federal environmental consultations must be completed before construction begins.
- No SNM or radioactive material associated with reactor operation may be brought to the site under the general license
- No manufactured reactor may be brought to the site under the general license
- General licensee must allow NRC inspections. All activities are at the licensee's risk with no bearing on CP issuance.

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Subpart C—Construction Permits and Operating Licenses

Quality Assurance

- Alignment with ANSI Standards: The proposed framework follows the approach of ANSI/ANS-15.8-1995 for research reactor quality assurance.
- Commercial Standards RIPB vs. Strict-Compliance Based
- Retention of Defect Reporting: Part 57 retains statutory defect reporting via Subpart F, extending the 10 CFR Part 21 framework to reactors with lower risk profiles.
- Modified Commercial Grade Dedication: Proposed § 57.240 updates the dedication process to function under a facility's specific QA program rather than Appendix B. Once dedicated, the entity assumes full legal responsibility for identifying, evaluating, and reporting all component defects.

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Subpart I—Transportation Package Design Certification

Transportation provisions allow risk methodology for evaluating transport of fueled reactors when 10 CFR Part 71 testing requirements cannot be met, accommodating unique reactor deployment models.

- Addresses transport of fueled reactors to deployment sites
- Risk methodology alternative to Part 71 testing requirements
- Applies to normal and accident conditions
- Supports manufactured reactor deployment model

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Subpart J—Physical Security Requirements

The rule establishes a technology-inclusive, performance-based graded approach to physical protection requirements

- If the consequences from a DBT-initiated event would result in offsite doses below 25 rem at EAB & LPZ, even if mitigation and recovery actions were unavailable or ineffective, then no requirement to protect against the DBT
  - Where the criteria **are met**, the security requirements would be those under proposed§57.60(a)(8)(v)(A)(1)-(2) for protection of Cat 1 and 2 SNM
- If the consequence-based criteria **are not met**, then the performance-based security requirements in Subpart J would be applicable
  - The key security performance objective is to establish a physical security program to protect against the DBT such that the consequences from a DBT-initiated event would not exceed 25 rem at EAB & LPZ

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Subpart J—Physical Security Requirements (cont.)

- **Required Core Security Capabilities**
  - Intrusion Detection and Assessment, Security Communication, and Security Response (using offsite law enforcement or armed responders)
- **A required Security "Design Criteria Attribute"**
  - The design itself should address security risks, using built-in engineering and physical protection features instead of relying only on procedural measures
- **Other Observations**
  - Can use standard security plans administered at a corporate or institutional level
  - Licensees not be subject to force-on-force exercises but must have an internal performance evaluation program to assess security effectiveness
  - Proposed requirements to address security at a ML authorized to load fuel and requirements for protecting fueled reactors during transport to a site

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Subpart K—Categorical Exclusion

Subpart K provides a categorical exclusion (CE) pathway to streamline NEPA review for qualifying Part 57 actions.

- No NRC EA/EIS required if 10 CFR 57.350 criteria are met
- Applicant must justify CE applicability
- PPE/SPE values must be bounded by NR GEIS/Table C-1 of Appendix C to Part 51
- Site/resource criteria specified in § 57.350(b)(2)(i)-(iv) must be satisfied, including that the site be within a “previously disturbed area” as defined in § 57.3
- CE not available where a Part 57 exemption or extraordinary circumstances require further review
- Applies to microreactors and reactors with comparable risk profiles, including multi-unit/area deployments

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Subpart L—Inspections

Inspection program moves from continuous resident inspectors to targeted inspections while maintaining same regulatory foundation

- Part 57 leverages existing inspection and reporting requirements – no fundamental change to underlying regulatory requirements (i.e., 50.70, 71.93, 72.82, 70.55)
- Construction verified via conformance to approved design
- Single regulatory decision point for operation
  - Readiness finding is outcome-based

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Subpart P—Operator Licensing and Human Factors

Human Factors (Subpart P)

- Human factors engineering requirements ensure reliable human-system interfaces
- Load following is permitted with appropriate automated controls or qualified operator oversight.

Remote & Autonomous Operations (Subpart C)

- Remote monitoring design features required to be provided
- Remote operation outside site boundary enabled for appropriately designed systems
- Autonomous operation capabilities permitted for reactors not requiring operator action
- FRN solicits industry input on intended use of remote operation and autonomous operation to inform development of supplemental guidance

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Part 57 – Big Picture

- Provides a pathway for rapid licensing (6-9 months for first, weeks for subsequent) for reactors that qualify
- Focused on final designs with known operational programs.
- Graded Site Characterization, needs improvement
- Analysis requirements like an NPUF, no PRA requirement, no severe accident or beyond design basis event requirements.
- Categorical Exclusions available but difficult, needs improvement
- Flexibility in QA and C&S, unclear how this will be implemented
- Provisions for factory fueling and transportation of fueled microreactors
- Could be an available pathway for licensing as early as November 2026

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Decision factor	Part 50	Part 52	Part 53	Part 57
Best-fit applicant	Design finality is low and construction flexibility is more valuable than early finality	Design is mature and applicant wants a single up-front licensing decision	Commercial non-LLWR needing technology-inclusive, risk-informed treatment. Does not meet Part 57 eligibility	Design is small, low-risk, standardized, and applicant's business case depends on repeat deployment or factory model
Design maturity needed	Lower. CP can precede final design while OL resolves as-built details	High. COL/ITAAC structure needs more upfront completed design finality	Flexible licensing approach (staged or combined), but requires sufficient PRA and safety analysis maturity. CP+OL option enables lower maturity designs to get same benefits as Part 50 while COL option works closer to Part 52.	High for standardized/fleet deployment. Requires design finality and operational programs defined up front
Tolerance for Design Changes During Deployment	High	Low	Moderate (Risk-Informed)	Low

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Decision factor	Part 50	Part 52	Part 53	Part 57
Factory fabrication / fueling / testing	Not integrated into framework. Requires separate licensing (e.g., Part 70/71) for fabrication, fueling, and transport	Limited support via Manufacturing License, but not designed for fueled/transportable reactors or high-volume deployment	Supports manufacturing/construction concepts for commercial plants, but not not tailored to factory-fueled, transportable microreactors	Fully integrated model. Manufacturing License provisions allow fabricated, fueled, and tested reactors at a manufacturing facility before transport, with Part 70 interfaces for fuel loading.
Deployment model	Site-specific, project-specific deployment.	Optimized for standardized project deployment.	Broad advanced-reactor deployment, including non-LWR and commercial process-heat applications	Multiple reactors, multiple sites, large designated areas, rapid deployment, and potentially operation soon after site selection if prerequisites are met.
Eligibility	None	None	None as long as sufficient PRA / safety analysis is completed before licensing	Limited to designs meeting Part 57 eligibility criteria: 1) ≤ 1 rem TEDE accident dose at unrestricted area 2) total thorium/uranium/plutonium inventory per reactor ≤ 10 metric tons.

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Decision factor	Part 50	Part 52	Part 53	Part 57
Licensing risk profile	Flexibility, but higher back-end licensing and hearing risk (OL stage)	High up-front certainty, but change-control and ITAAC risk	Predictability still developing. Depends heavily on PRA and guidance maturity	Predictability still developing. Potentially fastest for eligible standardized designs, but relies on readiness finding and less structured oversight
Avoid when…	Applicant needs strong up-front operational certainty or standardized deployment	Design is evolving or construction-phase changes are expected	Applicant needs near-term regulatory certainty Applicant does not have PRA / safety analysis information to determine risk insights	Applicant needs near-term regulatory certainty Design is not standardized, exceeds eligibility criteria, or operational programs/design are not sufficiently mature

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