

An Introduction to 10 CFR Part 53 – Risk-Informed, Technology- Inclusive Regulatory Framework for Commercial Nuclear Plants

May 18, 2026

Agenda



Introduction – Part 53 and Other Regulatory Frameworks



Foundations of Part 53 – General Rule Structure, Principles, and Major Features



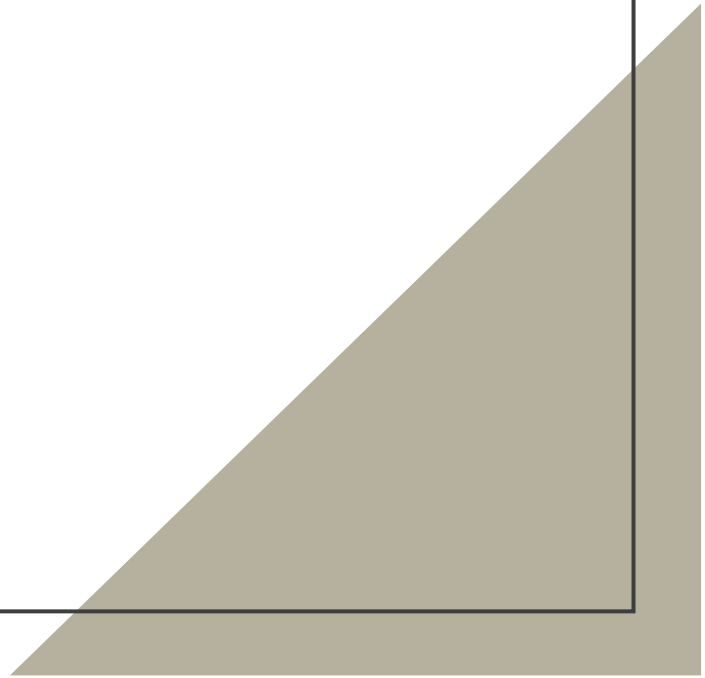
Guidance Development



Reference Information

Introduction

Part 53 and Other Regulatory
Frameworks



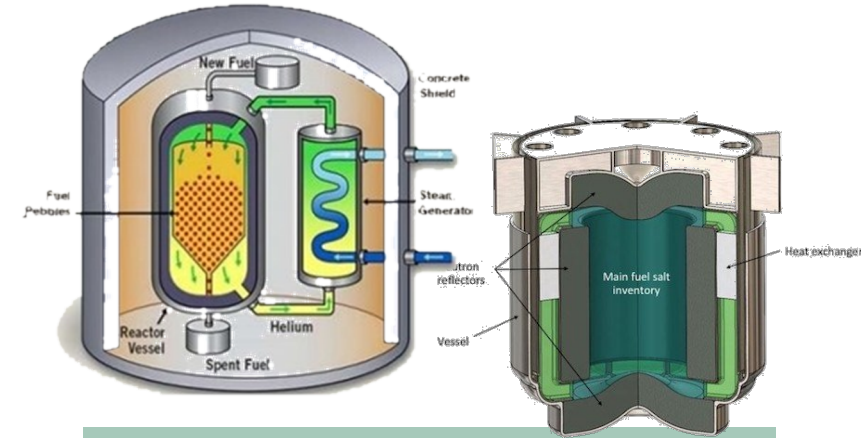
NRC Reactor Licensing Frameworks

10 CFR Part 52

Design finality up front,
standardization

Early Site Permit, COL, Design
Certification, Manuf. License, Standard
Design Approval

Vogtle AP-1000, NuScale

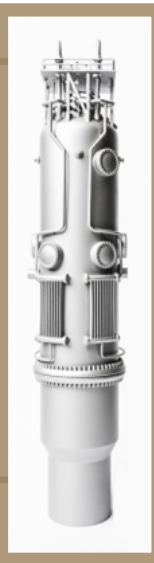


10 CFR Part 53

Technology-inclusive, risk-informed,
performance-based framework for
commercial nuclear plants

Parts 50 & 52-like licensing
instruments

LMP applications under Part 50
providing useful insights



10 CFR Part 50

Allows construction to start prior
to final design

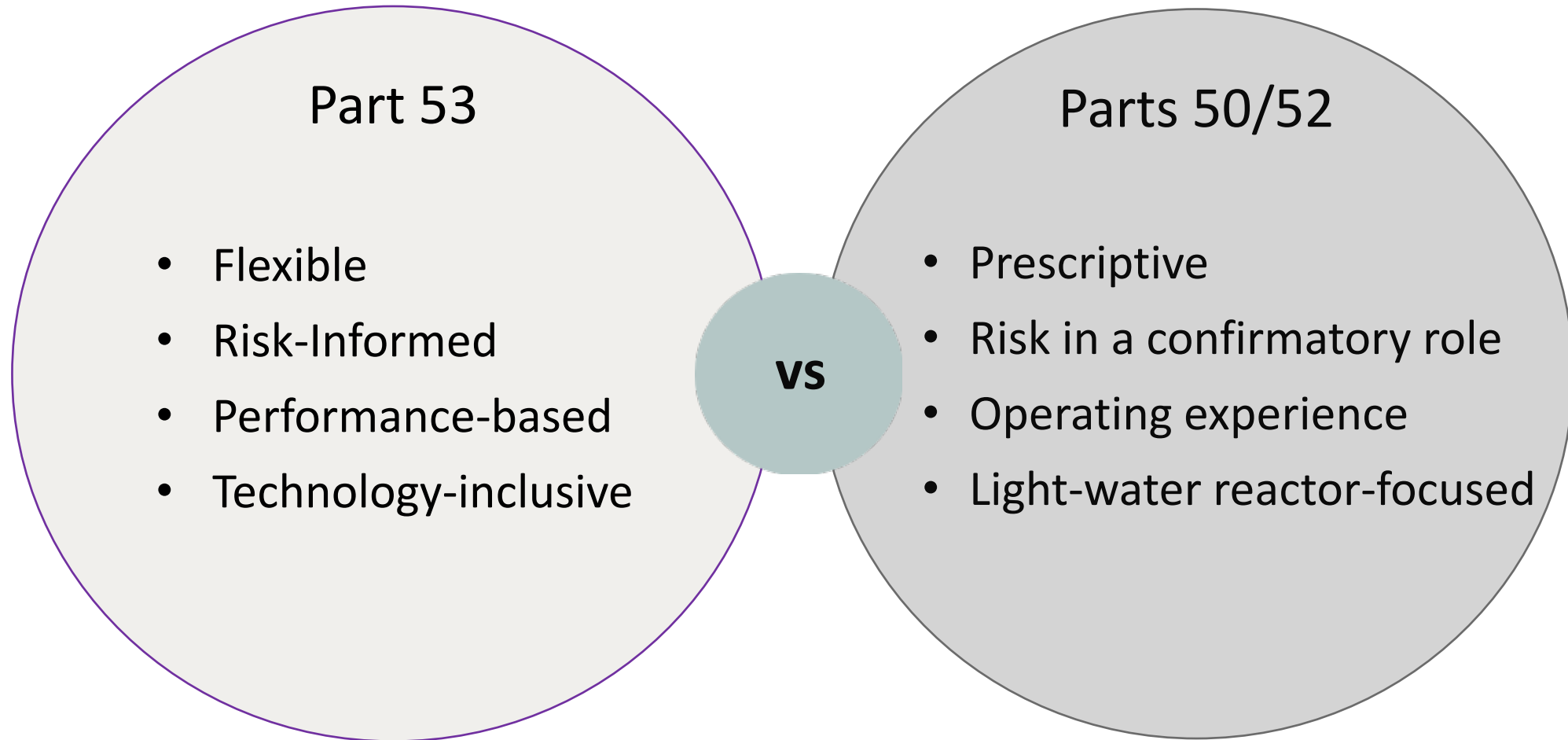
Construction Permit + Operating
License

Large majority of operating
power reactor and NPUF fleet



*10 CFR Part 57 Proposed Rulemaking – “Licensing Requirements for Microreactors and Other Reactors with Comparable Risk Profiles” ([ML26113A208](#))

Comparison of Part 53 and Parts 50 & 52





Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants

Risk-Informed:

- ✓ Provides a holistic approach that explicitly considers risk insights using flexible methods (i.e., PRA, other SREs, or a combination thereof) to assess and manage risks.
- ✓ Supports leveraging safety margins and focusing on those aspects of a design and its operation that are important to protecting public health and safety.

Performance-Based:

- ✓ Promotes efficiency and innovation by allowing applicants to propose design features to meet safety objectives and achieve safety outcomes rather than prescribing specific methods or processes.

Technology-Inclusive:

- ✓ Provides a broad and flexible regulatory framework that can be used for any reactor technology, any size reactor, and any commercial end-use.

| | |
|-----------|--------------------------------|
| Subpart A | General Provisions |
| Subpart B | Safety Requirements |
| Subpart C | Design and Analysis |
| Subpart D | Siting |
| Subpart E | Construction and Manufacturing |
| Subpart F | Operations |
| Subpart G | Decommissioning |
| Subpart H | Licensing Processes |
| Subpart I | License Maintenance |
| Subpart J | Reporting |
| Subpart M | Enforcement |

PROJECT LIFECYCLE

Information Access for 10 CFR Part 53

10 CFR Part 53 can be accessed via:

- *Federal Register* notice - [91 FR 15696](#)
- eCFR - <https://www.ecfr.gov/current/title-10/chapter-I/part-53?toc=1>

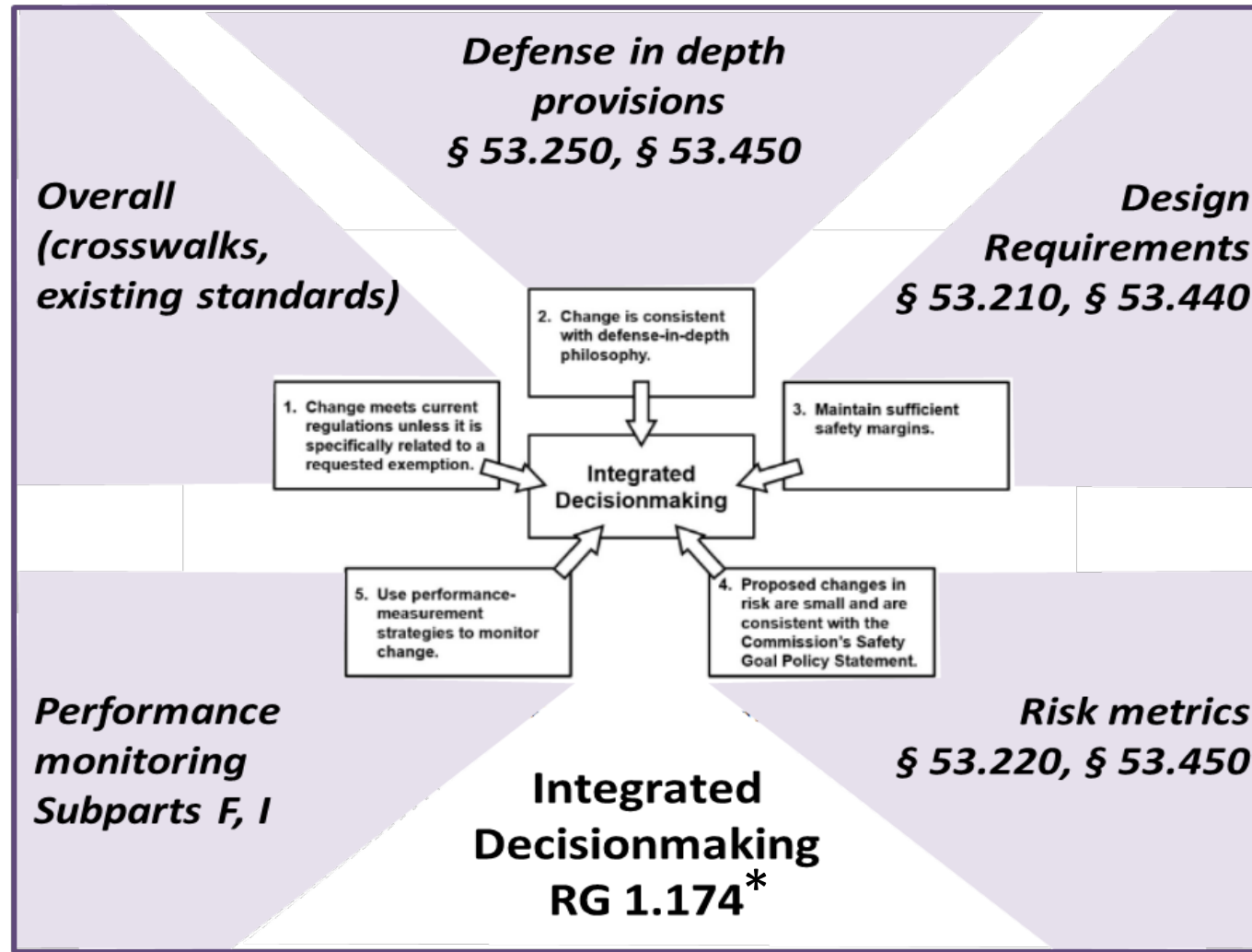
General information about Part 53 is on the public website:

<https://www.nrc.gov/reactors/new-reactors/advanced/modernizing/rulemaking/part-53>

Foundations of 10 CFR Part 53

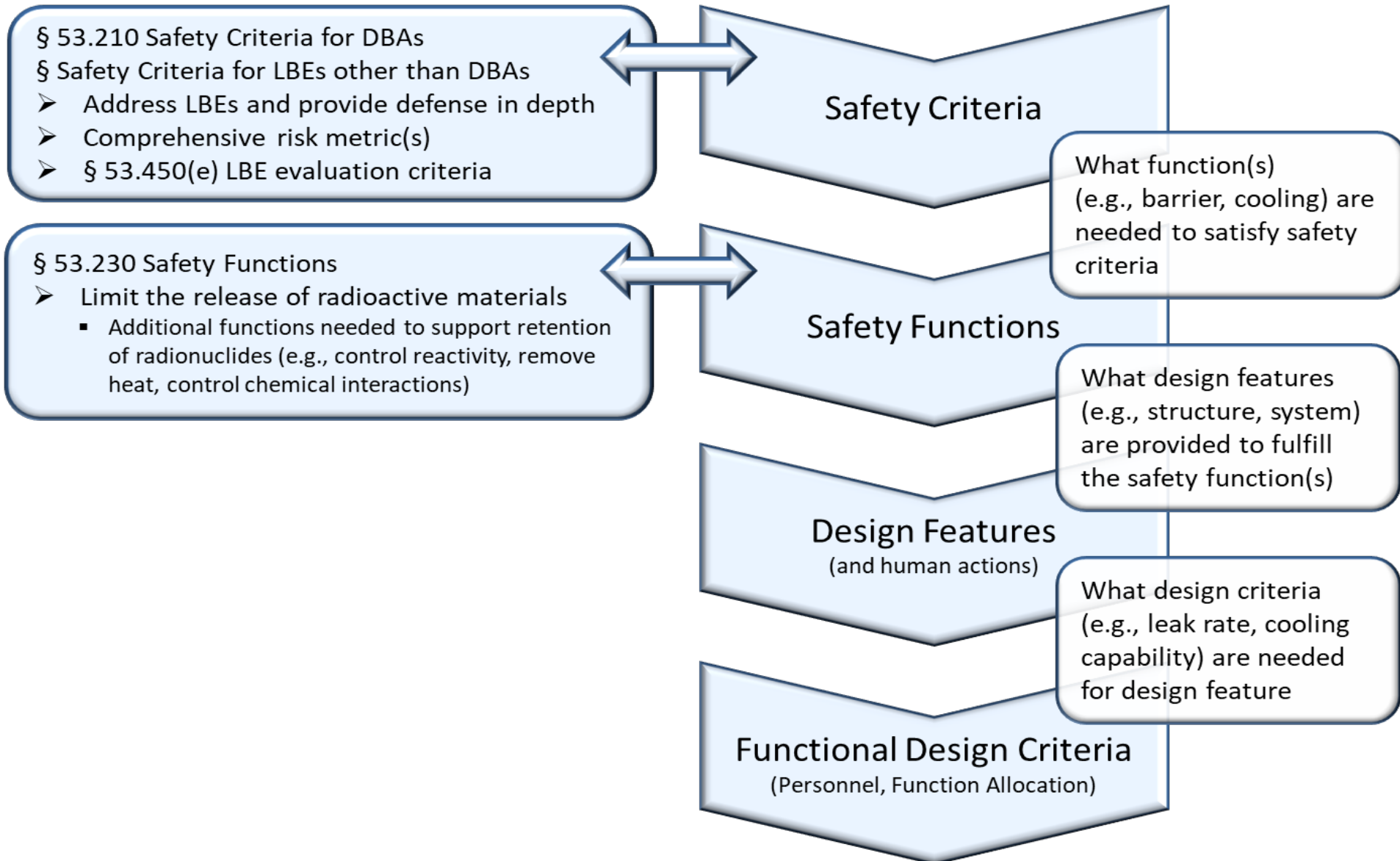
General Rule Structure, Principles,
and Major Features

Foundational Principles



*Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"

10 CFR Part 53 Hierarchy of Requirements



Licensing Instrument Relationships in Part 53

- ESP early site permit
- SDA standard design approval
- DC design certification
- ML manufacturing license
- CP construction permit
- OL operating license
- COL combined license
- C-COL custom COL
- LWA limited work authorization

| | | Referenced Actions | | | | |
|------------------|-------|--------------------|----------------------|----|----|------------------|
| | | Siting | Standardized Designs | | | Facility License |
| | | ESP | SDA | DC | ML | OL & C-COL* |
| Facility License | COL | ✓ | ✓ | ✓ | ✓ | |
| | CP/OL | ✓ | ✓ | ✓ | ✓ | |
| Standard Design | SDA | | | | | ✓ |
| | DC | | ✓ | | | ✓ |
| | ML | | ✓ | ✓ | | |

An LWA may be submitted as part of an ESP, CP, or COL

* New relationship added under Part 53, operating license afforded finality similar to an SDA

10 CFR Part 53 Major Features



Flexible use of risk methodologies: 10 CFR 53.450 includes explicit consideration of risk through the use of PRAs, other SREs, or a combination thereof to generate risk insights and to assess and manage those risks.



Alternative siting criteria: 10 CFR 53.530 provides an alternative to the NRC's preference for siting reactors in areas of low population density which allow siting in areas of higher population densities or within a densely populated center containing more than about 25,000 residents based on assessments of societal risk in comparison with societal benefits.



Expanded use of consensus codes and standards: 10 CFR 53.440 allows the use of generally accepted codes and standards to be tailored to the safety significance of structures, systems, and components (SSCs), such as the use of non-nuclear codes and standards for SSCs composed of commercial grade components.



Generally licensed reactor operators (GLROs): For self-reliant mitigation facilities, GLROs are allowed to perform duties under the provisions of a general license that is effective without the filing of an application with the Commission or the issuance of licensing documents to a particular person (see §§ 53.800 through 53.820).



Factory loading of fuel into manufactured reactors: 10 CFR 53.620 includes provisions that allow for the loading of fuel into a manufactured reactor at the manufacturing site for subsequent transport to a commercial nuclear facility that will operate pursuant to a combined license or operating license.

10 CFR Part 53 Major Features (Cont.)



Remote operations: Removal of the “onsite” limitation to include activities performed both within the owner-controlled area as well as operations and maintenance duties performed at remote facilities where safety-significant systems and components are expected to be operated within the design basis of the commercial nuclear plant.



Functional containment: This concept can be implemented under Part 53, which as described in [SECY-18-0096](#), is taken as a barrier or a set of barriers taken together, that effectively limits the physical transport of radioactive material to the environment.



Load following: 10 CFR 53.740 allows for, with appropriate measures in place, plant output to automatically change to match expected demand in response to externally originated instructions or signals.



First-of-a-kind (FOAK) licensing provisions: Allows an application for either a standard design approval or a standard design certification to reference applicable licensing-basis information that supported issuance of an operating license or combined license under Part 53 (see 10 CFR Part 53, Subpart H).



Reduces the future need for regulatory approvals: The risk-informed approach for managing plant equipment and programmatic controls provides opportunities to improve regulatory efficiency.

Cross-Part Licensing (Transferability of Products)

- Information from previous approvals under 10 CFR Parts 50 and 52 and other sources can be leveraged to support applications under 10 CFR Part 53 which can improve review efficiency
- Safety constructs under Part 53 are fundamentally different than Parts 50/52
- Some licensing products may be more easily referenced from one framework to another due to similarities—e.g., ESP:
 - Requirements and fundamental constructs of an ESP under Part 53 are largely the same as an ESP under Part 52
 - Technical differences of a Part 52 ESP may need to be addressed with supplemental information in a Part 53 application
 - Early engagement with NRC is encouraged regarding administrative and procedural differences of referencing a Part 52 ESP under Part 53

Guidance Published with the 10 CFR Part 53 Final Rule

| | Document Identifier | Title |
|--|---------------------|--|
| ADAMS Package No. ML25232A039 | RG 1.254, Rev. 0 | Technology-Inclusive Identification of Licensing Events for Commercial Nuclear Plants |
| | RG 5.81, Rev. 2 | Target Set Identification and Development for Nuclear Power Reactors |
| | RG 5.95, Rev. 0 | Access Authorization Program for Commercial Nuclear Plants |
| | RG 5.96, Rev. 0 | Establishing Cybersecurity Programs for Commercial Nuclear Plants Licensed Under 10 CFR Part 53 |
| | RG 5.97, Rev. 0 | Guidance For Technology-Inclusive Requirements for Physical Protection of Licensed Activities at Commercial Nuclear Plants |
| | RG 5.99, Rev. 0 | Fatigue Management For Nuclear Power Plant Personnel at Commercial Nuclear Plants Licensed Under 10 CFR Part 53 |
| ADAMS Package No. ML25232A021 | DRO-ISG-2023-01 | Operator Licensing Programs - 10 CFR Part 53 |
| | DRO-ISG-2023-02 | ISG Augmenting NUREG-1791, 'Guidance for Assessing Exemption Requests from the Nuclear Power Plant Licensed Operator Staffing Requirements Specified in 10 CFR 50.54(m),' for Licensing Commercial Nuclear Plants Under 10 CFR Part 53 |
| | DRO-ISG-2023-03 | Development of Scalable Human Factors Engineering |

10 CFR Part 53 Key Supporting Documents

| Title | ADAMS Accession No. |
|---|-----------------------------|
| Final Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors (91 FR 15696) | ML26042A232 |
| Comment Response Document for the Final Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors, Volume I | ML26042A229 |
| Comment Response Document for the Final Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors, Volume II | ML26042A228 |
| Environmental Assessment for the Final Rule—Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors | ML26042A231 |
| Regulatory Analysis for the Final Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors | ML26042A230 |

Guidance Under Development for 10 CFR Part 53

| Document Identifier | Title |
|-----------------------------|---|
| RG 1.263, Rev. 0 (DG-1443)* | Comprehensive Risk Metrics and Associated Risk Performance Objectives for Commercial Nuclear Plants |
| RG 1.264, Rev. 0 (DG-1444)* | Assessing Public Health Risk Associated with Chemical Hazards of Licensed Material Under 10 CFR Part 53 |
| DANU-ISG-2026-XX* | Evaluations of Risk Assessments for Risk-Informed Decision-Making for Regulatory Applications |
| RG 4.7, Rev. 5 (DG-4035)* | General Site Suitability Criteria for Nuclear Power Stations |
| RG 1.251, Rev. 0 (DG-1410)* | Technology-Inclusive, Risk-Informed, and Performance-Based Methodology for Seismic Design of Commercial Nuclear Plants |
| RG 1.252, Rev. 0 (DG-1307)* | Seismically Isolated Nuclear Power Plants |
| RG 1.260, Rev. 0 (DG-1431)* | Applications for Commercial Nuclear Plants Under 10 CFR Part 53 |
| NUREG-XXXX* | Consolidated Staff Guidance for the Review of Commercial Nuclear Plant Applications Under 10 CFR Part 53 |
| RG 1.87, Rev. 4 (DG-1429) | Acceptability of ASME Code, Section III, Division 5, “High Temperature Reactors” |
| RG 1.246, Rev. 1 (DG-1432) | Acceptability of ASME Code, Section XI, Division 2, Requirements for RIM Programs for NPPs, for Non-LWRs |
| RG 1.242, Rev. 1 (DG-1430) | Performance-Based Emergency Preparedness for Small Modular Reactors, Non-Light-Water Reactors, and Non-power Production or Utilization Facilities |
| RG 1.247, Rev. 0 (DG-1433) | Acceptability of Probabilistic Risk Assessment Results for Non-Light Water Reactor Risk-Informed Activities |

* Guidance that is currently under development

QUESTIONS?

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- Jack.Minzerbryant@nrc.gov

Acronyms

| | | | |
|-------|---|------|---|
| ADAMS | Agencywide Documents Access and Management System | LMP | Licensing Modernization Project |
| ASME | American Society of Mechanical Engineers | NPP | Nuclear Power Plant |
| CFR | Code of Federal Regulation | NPUF | Non-Power Production and Utilization Facilities |
| DBA | Design Basis Accident | NRC | Nuclear Regulatory Commission |
| DG | Draft Guide | PRA | Probabilistic Risk Assessment |
| FOAK | First-of-a-kind | RG | Regulatory Guide |
| FR | Federal Register | SECY | Commission Papers |
| GLRO | Generally Licensed Reactor Operator | SSC | Systems, Structures, and Components |
| ISG | Interim Staff Guidance | SRE | Systematic Risk Evaluation |
| LBE | Licensing Basis Event | | |