

**10 CFR Part 53 “Risk-Informed, Technology-  
Inclusive Regulatory Framework For Commercial  
Nuclear Plants”**

**Public Meeting on Second Iteration of the  
Consolidated Rule Text**

May 25, 2022



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# Agenda

## Topic

- Staff Introduction
- Part 53 Overview
- Framework A Subparts
- Fitness for Duty (Part 26)
- Physical Security, Cyber Security, Access Authorization (Part 73)

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# Welcome and Introductions

**Welcome:** Steve Lynch, Office of Nuclear Reactor Regulation

**NRC Speakers / Presenters:**

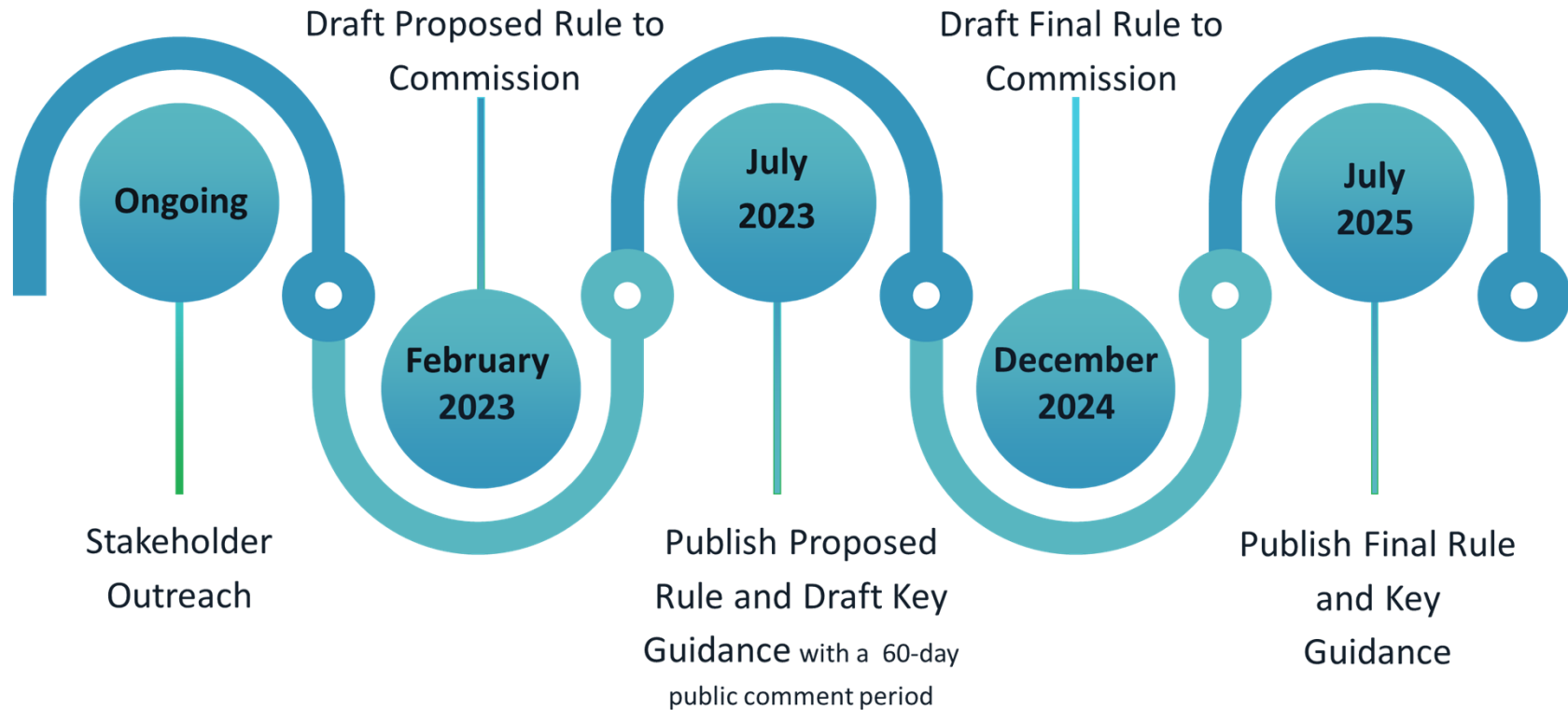
- Office of Nuclear Material Safety and Safeguards
- Office of Nuclear Reactor Regulation
- Office of Nuclear Security and Incident Response

**Meeting Slides:**

- ADAMS Accession No. ML22131A001

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# Rulemaking Schedule



# Part 53 Licensing Frameworks

Subpart A – *General Provisions*

## Framework A

- Subpart B – Safety Requirements
- Subpart C – Design & Analysis
- Subpart D – Siting
- Subpart E – Construction & Manufacturing
- Subpart F – Operations
- Subpart G – Decommissioning
- Subpart H – Licensing Processes
- Subpart I – License Maintenance
- Subpart J – Reporting
- Subpart K – Quality Assurance

## Framework B

- Subpart N – Purpose/Definitions
- Subpart O – Construction & Manufacturing
- Subpart P – Operations
- Subpart Q – Decommissioning
- Subpart R – Licensing Processes
- Subpart S – License Maintenance
- Subpart T – Reporting
- Subpart U – Quality Assurance

Alternate  
Evaluation  
for Risk  
Insights

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# **Consolidated Preliminary Rule Language Second Iteration (May 2022)**

(ADAMS Accession No. ML22125A000)

## **Summary & Changes**

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# Framework A

<b>Subpart A</b>	<b>General Provisions (Definitions)</b>
<b>Subpart B</b>	<b>Safety Requirements (Including QHOs, ALARA)</b>
<b>Subpart C</b>	<b>Design and Analysis</b>
<b>Subpart D</b>	<b>Siting</b>
<b>Subpart E</b>	<b>Construction and Manufacturing</b>
<i>Subpart F</i>	<i>Operations (Including Engineering Expertise, Operator Licensing)</i>
<b>Subpart G</b>	<b>Decommissioning</b>
<b>Subpart H</b>	<b>Licenses, Certifications and Approvals</b>
<b>Subpart I</b>	<b>Maintaining Licensing Basis</b>
<b>Subpart J</b>	<b>Reporting and Administrative</b>
<b>Subpart K</b>	<b>Quality Assurance</b>

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# Subpart A – General Provisions

- Selected definitions
  - Commercial nuclear plant
  - Commercial nuclear reactor
  - Manufactured reactor
  - Manufactured reactor module
- Methodology definitions
  - Event categories
  - Defense in depth



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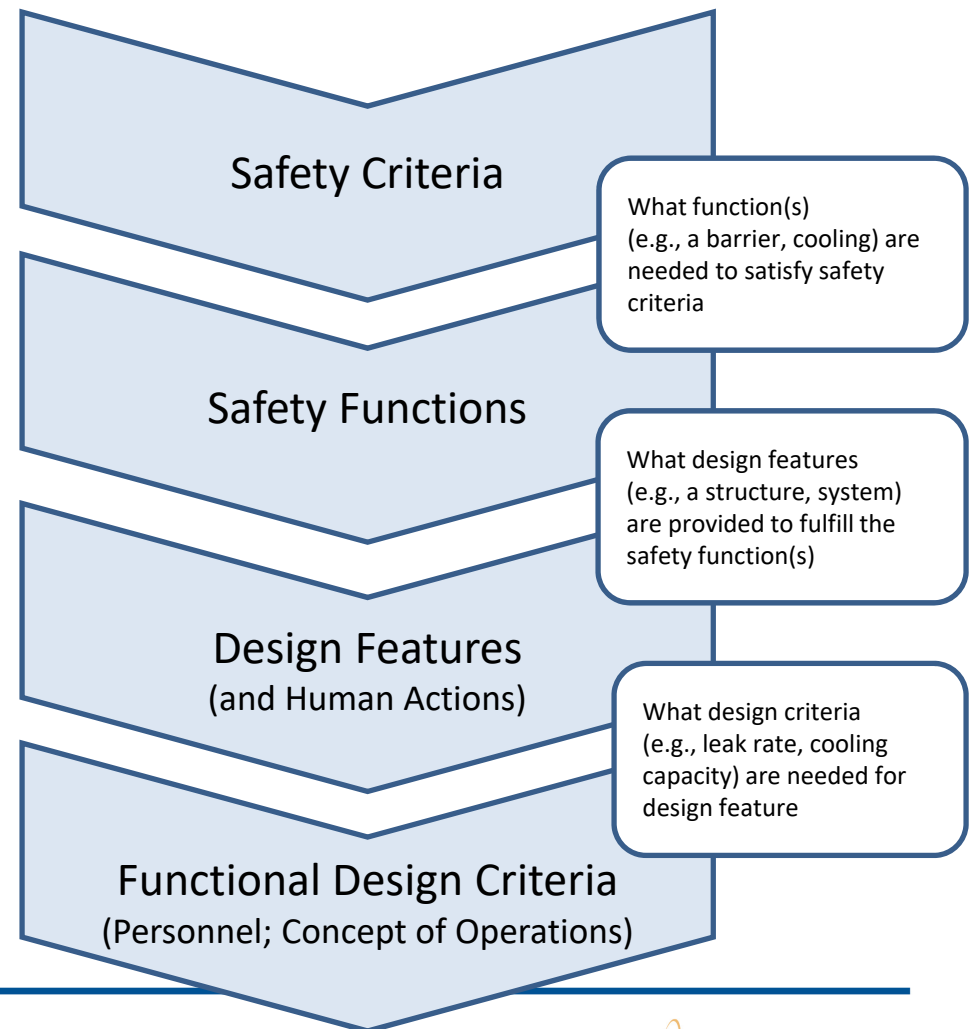
## Subpart B - Technology-Inclusive Safety Requirements

- § 53.200 Safety objectives.
- § 53.210 Safety criteria for design basis accidents.
- § 53.220 Safety criteria for licensing basis events other than design basis accidents.
- § 53.230 Safety functions.
- § 53.240 Licensing basis events.
- § 53.250 Defense in depth.
- § 53.260 Normal operations.
- § 53.270 Protection of plant workers.

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# Subpart B – Safety Criteria

- Safety Objectives
- Design basis accident (DBA) Safety Criteria
- Non-DBA Safety Criteria
- Safety Functions
- Licensing Basis Events (LBEs)
- Defense in Depth
- Role of:
  - Structures, systems, and components (SSCs)
  - Personnel
  - Programs



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# Subpart B - Technology-Inclusive Safety Requirements

- Revised criterion related to NRC quantitative health objectives (QHOs) to address feedback

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## QHOs – Updated Preliminary Proposed Rule Language (May 2022)

§ 53.220 Safety criteria for licensing basis events other than design basis accidents.

Design features and programmatic controls must be provided to:

(a) Ensure plant structures, systems and components (SSCs), personnel, and programs provide the necessary capabilities and maintain the necessary reliability to address licensing basis events in accordance with § 53.240 and provide measures for defense-in-depth in accordance with § 53.250; and

(b) Maintain overall cumulative plant risk from licensing basis events other than design basis accidents analyzed in accordance with § 53.450(e) such that the calculated risk to an average individual in the vicinity of the commercial nuclear plant of **prompt fatalities** remains below five in 10 million years, and the calculated risk the population in the area near a commercial nuclear plant of **cancer fatalities** remains below two in one million years.

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## Subpart C - Design and Analysis Requirements

- § 53.400 Design features for licensing basis events.
- § 53.410 Functional design criteria for design basis accidents.
- § 53.420 Functional design criteria for licensing basis events other than design basis accidents.
- § 53.425 Design features and functional design criteria for normal operations.
- § 53.430 Design features and functional design criteria for protection of plant workers.
- § 53.440 Design requirements.
- § 53.450 Analysis requirements.
- § 53.460 Safety categorization and special treatment.
- § 53.470 Maintaining analytical safety margins used to justify operational flexibilities.
- § 53.480 Earthquake engineering.

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## Subpart C - Design and Analysis Requirements

- Clarified references to use of consensus codes and standards and requirement that they must be found acceptable by NRC.
- Added design requirements for:
  - Minimizing contamination
- Reordered and clarified design requirements

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## Subpart C - Design and Analysis Requirements

- Changes and Clarifications for Analysis Sections
  - Added need to define evaluation criteria for each event or specific categories of LBEs
- § 53.480 “Earthquake engineering”
  - Applicability to non-safety-related but safety significant SSCs commensurate with their safety significance

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## § 53.450(e) – LBEs other than DBA

*(e) Analyses of licensing basis events other than design basis accidents.*

Analyses must be performed for licensing basis events other than design basis accidents. These licensing basis events must be identified using insights from a PRA in combination with other generally accepted approaches for systematically evaluating engineered systems to identify and analyze equipment failures and human errors.

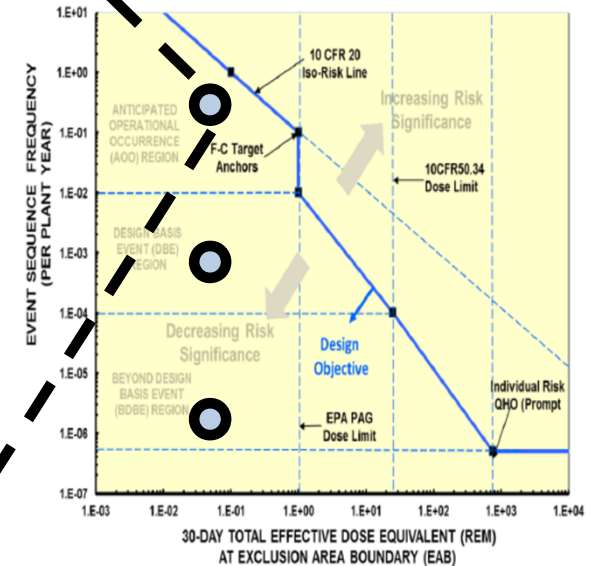
The analysis of licensing basis events other than design basis accidents must include definition of evaluation criteria for each event or specific categories of licensing basis events to determine the acceptability of the plant response to the challenges posed by internal and external hazards. The analyses must address event sequences from initiation to a defined end state and be used in combination with other engineering analyses to demonstrate that the functional design criteria required by § 53.420 provide sufficient barriers to the unplanned release of radionuclides to satisfy the evaluation criteria defined for each licensing basis event, to satisfy the safety criteria of § 53.220, and provide defense in depth as required by § 53.250. The methodology used to identify, categorize, and analyze licensing basis events must include a means to identify event sequences deemed significant for controlling the risks posed to public health and safety.



# Event Selection & Analysis

## Licensing Modernization Project Anticipated Operational Occurrences (AOOs)

Anticipated **event sequences** expected to occur one or more times during the life of a nuclear power plant, which may include one or more reactor modules. **Event sequences with mean frequencies of  $1 \times 10^{-2}$ /plant-year and greater** are classified as AOOs. AOOs take into account the expected response of all SSCs within the plant, regardless of safety classification.



# Event Selection & Analysis

## Licensing Modernization Project Design Basis Events (DBEs) Part 53: Unlikely Event Sequences

Infrequent **event sequences** that are not expected to occur in the life of a nuclear power plant, which may include one or more reactor modules, but are less likely than AOOs. **Event sequences with mean frequencies of  $1 \times 10^{-4}$ /plant-year to  $1 \times 10^{-2}$ /plant-year** are classified as DBEs. DBEs take into account the expected response of all SSCs within the plant regardless of safety classification.

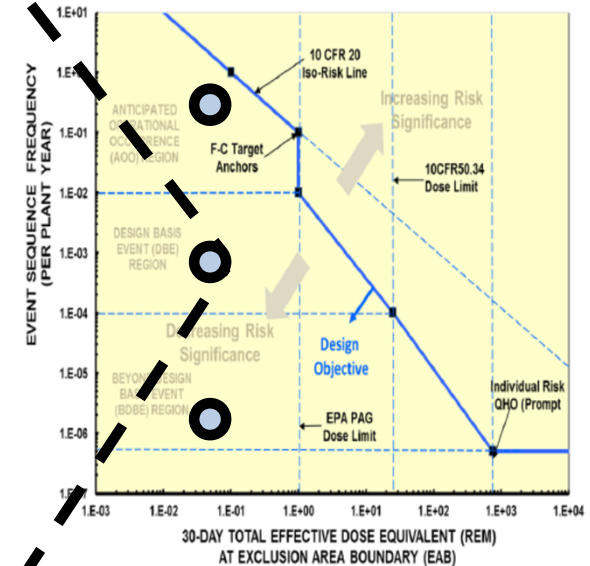
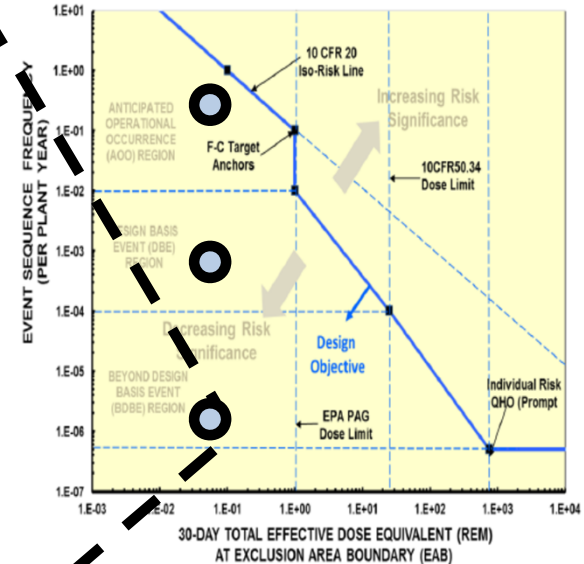


Figure 3-1. Frequency-Consequence Target

# Event Selection & Analysis

## Licensing Modernization Project Beyond Design Basis Events (BDBEs) Part 53: Very Unlikely Event Sequences

Rare **event sequences** that are not expected to occur in the life of a nuclear power plant, which may include one or more reactor modules, but are less likely than a DBE. **Event sequences with mean frequencies of  $5 \times 10^{-7}$ /plant-year to  $1 \times 10^{-4}$ /plant-year** are classified as BDBEs. BDBEs take into account the expected response of all SSCs within the plant regardless of safety classification.



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## § 53.450(f) – Design basis accidents

*(f) Analysis of design basis accidents.*

The analysis of licensing basis events required by § 53.240 must include analysis of design basis accidents that address possible challenges to the safety functions identified in accordance with § 53.230. The events selected as design basis accidents must be those that, if not terminated, have the potential for exceeding the safety criteria in § 53.210. The design basis accidents selected must be analyzed using deterministic methods that address event sequences from initiation to a safe stable end state and assume only the safety-related SSCs identified in accordance with § 53.460 and human actions addressed by the requirements of Subpart F are available to perform the safety functions identified in accordance with § 53.230. The analysis must conservatively demonstrate compliance with the safety criteria in § 53.210.

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## Subpart D – Siting Requirements

- § 53.500 General siting.
  - § 53.510 External hazards.
  - § 53.520 Site characteristics.
  - § 53.530 Population-related considerations.
  - § 53.540 Siting interfaces.
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- Added special treatment, including where appropriate quality assurance (QA) criteria from Subpart K, for siting activities.

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## Subpart E - Construction and Manufacturing Requirements

§ 53.600 Construction and manufacturing - scope and purpose.

§ 53.605 Reporting of defects and noncompliance.

§ 53.610 Construction.

§ 53.620 Manufacturing.

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- Added § 53.605 to capture requirements in § 50.55(e).
  - Clarified requirements for manufacturing licenses (MLs) allowing fuel loading.
    - References to 10 CFR Part 70

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# Subpart F - Requirements for Operation

To be discussed during June ACRS meeting

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## Subpart G - Decommissioning Requirements

- § 53.1000 Scope and purpose.
- § 53.1010 Financial assurance for decommissioning.
- § 53.1020 Cost estimates for required decommissioning funds.
- § 53.1030 Annual adjustments to cost estimates for decommissioning.
- § 53.1040 Methods for providing financial assurance for decommissioning.
- § 53.1045 Requirements for decommissioning trust funds.
- § 53.1050 NRC oversight.
- § 53.1060 Reporting and recordkeeping requirements.
- § 53.1070 Termination of license.
- § 53.1080 Release of part of a commercial nuclear plant for unrestricted use.



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# Subpart H - Licenses, Certifications and Approvals

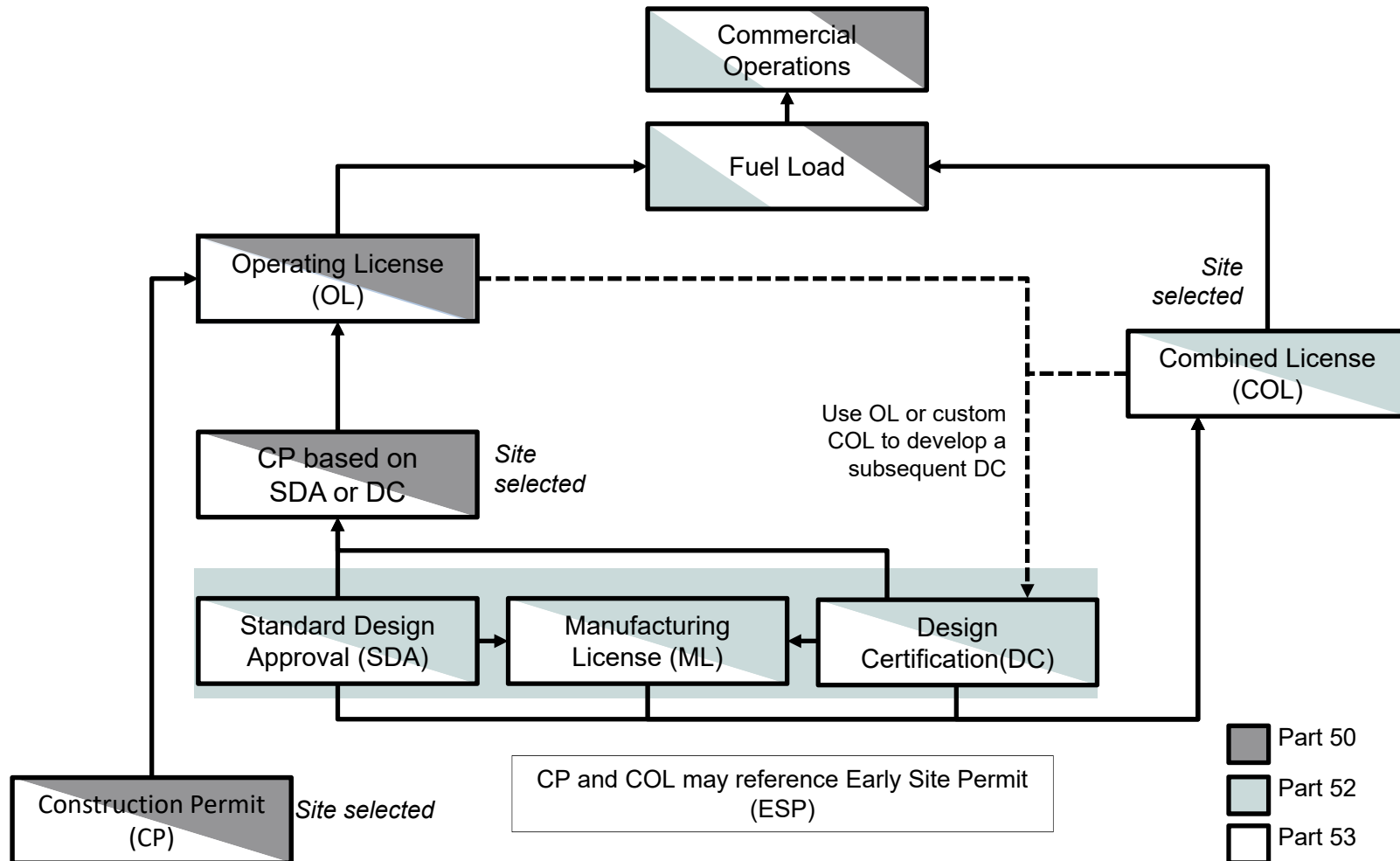
- § 53.1100 - 53.1121 General/common requirements.
- § 53.1124 Relationship between sections.
- § 53.1130 Limited work authorizations.
- § 53.1140 – 53.1188 **Early site permits.**
- § 53.1200 – 53.1221 Standard design approvals.
- § 53.1230 – 53.1263 **Standard design certifications.**
- § 53.1270 – 53.1295 Manufacturing licenses.
- § 53.1300 – 53.1348 Construction permits.
- § 53.1360 – 53.1405 Operating licenses.
- § 53.1410 – 53.1461 Combined licenses.
- § 53.1470 Standardization of commercial nuclear power plant designs: licenses to construct and operate nuclear power reactors of identical design at multiple sites.

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## Subpart H - Licenses, Certifications and Approvals

- Added existing provisions exempting U.S. Department of Defense reactors from NRC licensing (§ 53.1120).
- Removed allowance for construction permits to reference MLs.

# Leveraging and Combining Existing Licensing Processes



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## Subpart I - Maintaining and Revising Licensing Basis Information

- § 53.1500 Licensing basis information.
- § 53.1502 Specific terms and conditions.
- § 53.1505 Changes to licensing basis information requiring prior NRC approval.
- § 53.1510 – 53.1520 License amendments.
- § 53.1525 – 53.1535 Specific provisions.
- § 53.1540 – 53.1545 Other licensing information.
- § 53.1550 Evaluating changes to facility as described in final safety analysis reports.
- § 53.1555 – 53.1565 Program-related documents.
- § 53.1570 Transfer of licenses.
- § 53.1575 Termination of license.
- § 53.1580 Information requests.
- § 53.1585 Revocation, suspension, modification of licenses and approvals for cause.
- § 53.1590 Backfitting.
- § 53.1595 Renewal.

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## Subpart I - Maintaining and Revising Licensing Basis Information

- Added existing change control requirements for individual programs (QA, Emergency Preparedness, security).
- Added change control provisions for DBAs and aircraft impact (§ 53.1550(a)(2)(vi)-(viii)).
- Added existing generic license conditions (§ 53.1502).

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# Subpart J – Reporting and Other Administrative Requirements

- § 53.1600 General information.
- § 53.1610 Unfettered access for inspections.
- § 53.1620 Maintenance of records, making of reports.
- § 53.1630 Immediate notification requirements for operating commercial nuclear plants.
- § 53.1640 Licensee event report system.
- § 53.1645 Periodic reports.
- § 53.1650 Facility information and verification.
- § 53.1660 Financial requirements.
- § 53.1670 Financial qualifications.
- § 53.1680 Annual financial reports.
- § 53.1690 Licensee's change of status; financial qualifications.
- § 53.1700 Creditor regulations.
- § 53.1710 Financial protection.
- § 53.1720 Insurance required to stabilize and decontaminate plant following an accident.
- § 53.1730 Financial protection requirements.

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## Subpart K – Quality Assurance Criteria

§ 53.1800	General provisions.	<u>10 CFR Part 50, Appendix B</u>
§ 53.1805	Organization.	(Criterion I)
§ 53.1810	Quality assurance program.	(Criterion II)
§ 53.1815	Design control.	(Criterion III)
§ 53.1820	Procurement document control.	(Criterion IV)
§ 53.1825	Instructions, procedures and drawings.	(Criterion V)
§ 53.1830	Document control.	(Criterion VI)
§ 53.1835	Control of purchased material, equipment and services.	(Criterion VII)
§ 53.1840	Identification and control of materials, parts and components.	(Criterion VIII)
§ 53.1845	Control of special processes.	(Criterion IX)
§ 53.1850	Inspection.	(Criterion X)
§ 53.1855	Test control.	(Criterion XI)
§ 53.1860	Control of measuring and test equipment.	(Criterion XII)
§ 53.1865	Handling, storage and shipping.	(Criterion XIII)
§ 53.1870	Inspection, test and operating status.	(Criterion XIV)
§ 53.1875	Nonconforming materials, parts or components.	(Criterion XV)
§ 53.1880	Corrective action.	(Criterion XVI)
§ 53.1885	Quality assurance records.	(Criterion XVII)
§ 53.1890	Audits.	(Criterion XVIII)

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# Discussion



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# Part 26 – Fitness for Duty

- Revised Fitness for Duty (FFD) criteria from two criteria to one
- Enabled the use of hair specimens for pre-access drug screening and portal monitor passive drug and alcohol screening at the Protected Area access point
- Published proposed performance measures
  1. Conduct of the behavioral observation program
  2. Occurrence of FFD policy violations categorized by licensee employee, contractor/vendor, and labor category
  3. Occurrence of individuals with potentially disqualifying information, who possessed FFD prohibited items, or who were impaired while in a work status
  4. If drug and alcohol testing, performance measures must also include:
    - a) pre-access and random positive testing rates
    - b) the number of subversion attempts categorized by licensee employee, contractor/vendor, and labor category

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# Part 26 – Fitness for Duty

## Minimum Staff Sizes and/or Geographically-remote Sites

- Upon further review of facilities licensed with minimal staff sizes (potentially in remote locations), the NRC staff strengthened the behavioral observation requirement to ensure that individuals who arrive onsite to monitor the facility “at the controls” are subject to behavioral observation by a video and audible capture at the central monitoring or security station

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# Part 26 – Fitness for Duty

## Minimum Staff Sizes and/or Geographically-remote Sites

- NRC staff intends to issue regulatory guidance to address the implementation of behavioral observation and random drug and alcohol testing programs at facilities that have relatively small staff sizes and/or are geographically remote
  - Small staff sizes have the potential to degrade the conduct of behavioral observation (e.g., the identification and mitigation of the insider threat) and challenge NRC Safety Culture
  - Geographically-remote locations may intensify the small staff size challenge

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# Discussion

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## Section 73.110 – Cyber Security

- The NRC staff made changes to enhance the consistency/clarity of the current rule language. Examples include:
  - Changed the term “postulated radiological release” in §73.110(a)(1) to “postulated fission product release” to align with terminology used in other Part 53 sections.
  - Changed §73.110 (e)(2)(ii) to clarify that the Cyber Security Plan should include the analysis described in paragraph (b)(1) dealing with the potential consequences resulting from cyber attacks.

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## Section 73.120 – Access Authorization

- The NRC staff made changes to enhance the consistency/clarity of the current rule language to be in alignment with the Part 52 rulemaking effort. For example:
  - Revised Section 73.120(a)(1), Introduction and scope, to align with the security trigger point under Part 52 for requirements to establish, maintain, and implement an access authorization program before initial fuel load into the reactor.
  - Deleted the reference to (ii)(A) self-reporting of legal actions, under (c)(2), and made it its own performance element as a (c)(3). This would be consistent with how the current operating power reactors implement self-reporting of legal actions under § 73.56.

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# Discussion

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# Final Discussion and Questions





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## Next Steps—Future Public Meetings

- **June TBD** Public Meeting on Framework B
- **June 23<sup>rd</sup> and 24<sup>th</sup>** ACRS Subcommittee Meeting on Framework B and Subpart F (Operations) of Framework A

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# Closing Remarks

## Rulemaking Contacts

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Regulations.gov docket ID: **NRC-2019-0062**

Please provide feedback on this public meeting using this link:

<https://www.nrc.gov/public-involve/public-meetings/contactus.html>

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# Acronyms and Abbreviations

ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
AOO	Anticipated operational occurrence
BDBE	Beyond design basis event
CFR	Code of Federal Regulations
COL	Combined license
CP	Construction permit
DBA	Design basis accident
DBE	Design basis event
DC	Design certification
EAB	Exclusion Area Boundary
EPA	U.S. Environmental Protection Agency

ESP	Early site permit
F-C	Frequency-consequence
FFD	Fitness for Duty
LBE	Licensing basis event
ML	Manufacturing license
NRC	U.S. Nuclear Regulatory Commission
OL	Operating license
PAG	Protective Action Guide
PRA	probabilistic risk assessment
QA	Quality assurance
QHO	Quantitative Health Objective
Rem	Roentgen equivalent man
SDA	Standard design approval
SSCs	Structures, systems, and components