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## CHARTING THE NEXT 50 YEARS

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# The Role of Appendix B to 10 CFR Part 50 in the NRC's Licensing Process & Pathways for Meeting Appendix B to 10 CFR Part 50

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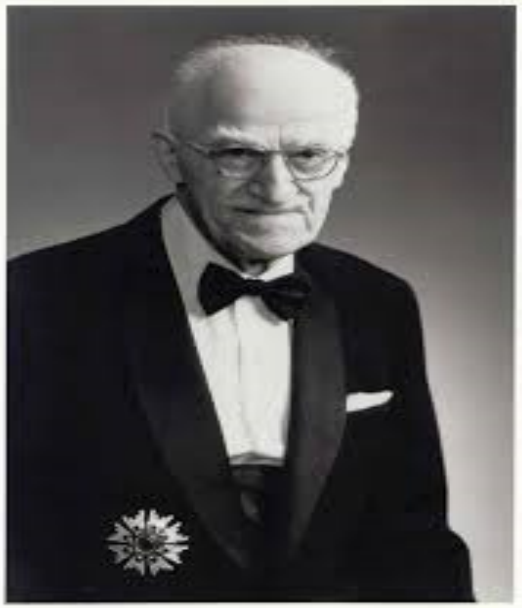
# Source of Quality

- Quality starts at the initial design.
- Designers determine the classification of components.
- Appropriate quality measures are then applied based on the classification of structures, systems, and components (SSCs).



"Without a standard there is no logical basis for making a decision or taking action."
-Dr. Joseph M. Juran

# General Design Criteria (GDC) in Appendix A to 10 CFR Part 50

GDC 1, "Quality standards and records," contains three fundamental quality assurance requirements:

- "Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed."
- "A quality assurance program shall be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions."
- "Appropriate records of the design, fabrication, erection, and testing of structures, systems and components important to safety shall be maintained by or under the control of the nuclear power unit licensee throughout the life of the unit."

## Principle Design Criteria (PDC)—Design Criteria for Non-Light-Water Reactors

- GDC are not applicable to non-light-water reactors.
- Regulatory Guide (RG) 1.232, "Guidance for Developing Principal Design Criteria for Non-Light-Water Reactors," provides design criteria.
  - Table 1, "Non-Light-Water-Reactor Crosswalk," provides guidance between the GDC and the PDC.
- The NRC's Regulatory Position: GDC 1 should be used for PDC 1.

# Guidance on the Classification of Structures, Systems, and Components

**10 CFR Part 50 or Part 52 Applications for Light-Water Reactors**

- RG 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants"

**10 CFR 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power plants"**

- RG 1.201, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to Their Safety Significance"

# Guidance on the Classification of Structures, Systems, and Components

**Licensing Modernization Project**

- Nuclear Energy Institute (NEI) 18-04, Revision 1, "Risk-Informed Performance-Based Technology Inclusive Guidance for Non-Light Water Reactor Licensing Basis Development"
- RG 1.233, "Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors"

# Classifications

Definition of "safety-related SSCs" from 10 CFR 50.2: "those [SSCs] that are relied upon to remain functional during and following design basis events to assure:

(1) The integrity of the reactor coolant pressure boundary,

(2) The capability to shut done the reactor and maintain it in a safe shutdown condition, or

(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the applicable guideline exposures set forth in § 50.34(a)(1) or § 100.11 of this chapter, as applicable."

# Risk-Informed Safety Class (RISC) Classifications

**RISC 1**: Safety-related SSCs that perform safety significant functions

**RISC 2**: Non-safety-related SSCs that perform safety significant functions

10 CFR 50.69

**RISC 3**: Safety-related SSCs that perform low safety significant functions

**RISC** 4: Non-safety-related SSCs that perform low safety significant functions

**Non-Safety-Related with Special Treatment SSCs**: Non-safety-related SSCs that perform risk-significant functions or perform functions that are necessary for defense-in-depth adequacy

# Graded Approach to Nuclear Quality Assurance (Appendix B to 10 CFR Part 50)

- Criterion II, "Quality Assurance Program," states, in part—
  - "[…]This program shall be documented by written policies, procedures, or instructions and shall be carried out throughout plant life in accordance with those policies, procedures, or instructions.
  - The applicant shall identify the structures, systems, and components to be covered by the quality assurance program and the major organizations participating in the program, together with the designated functions of these organizations.
  - The quality assurance program shall provide control over activities affecting the quality of the identified structures, systems, and components, ***to an extent consistent with their importance to safety****.[…]"*

# Guidance for Implementing Quality Assurance Programs

| | | |
|---|---|---|
| NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition"<br><br>Section 17.5, "Quality Assurance Program Description—Design Certification, Early Site Permit and New License Applicants" | RG 1.28, "Quality Assurance Program Criteria (Design and Construction)" | RG 1.33, "Quality Assurance Program Requirements (Operation)" |

## State and Jurisdiction Requirements

- States and jurisdictions have their own quality requirements for American Society of Mechanical Engineers code components.
- Applicants should be aware of these requirements based on the location of the reactor site.
- In some cases, the State and jurisdiction requirements may be more limiting than the Federal requirements.

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