Proposal to Establish Alternate Requirements for Components Commensurate with Safety and Risk

NRC Public Meeting
November 14, 2022

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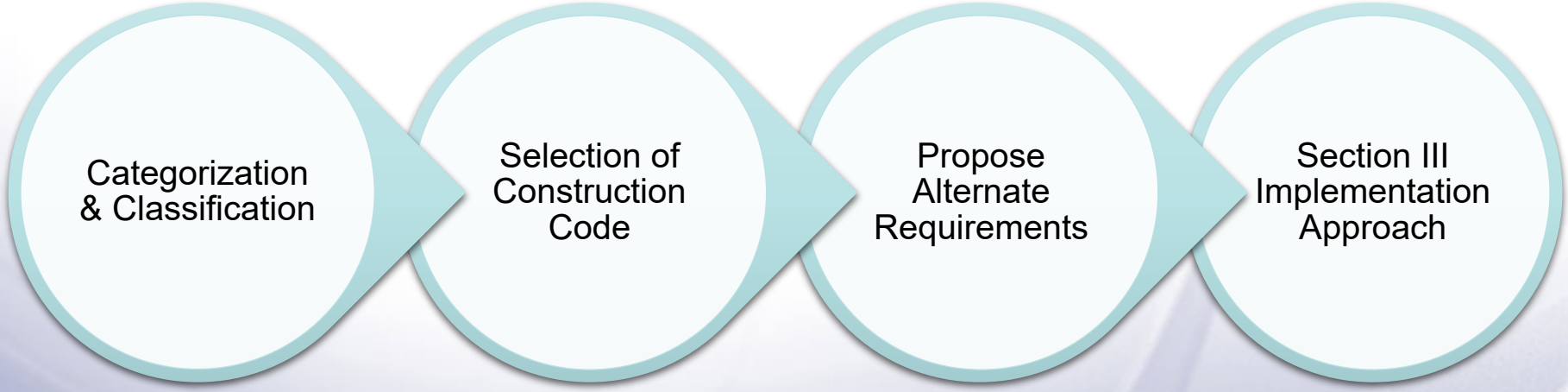
MPR Associates

Introduction

Purpose:

Discuss the technical basis for proposed alternate requirements for the construction of ASME Section III nuclear items commensurate with an item's contribution to safety or risk



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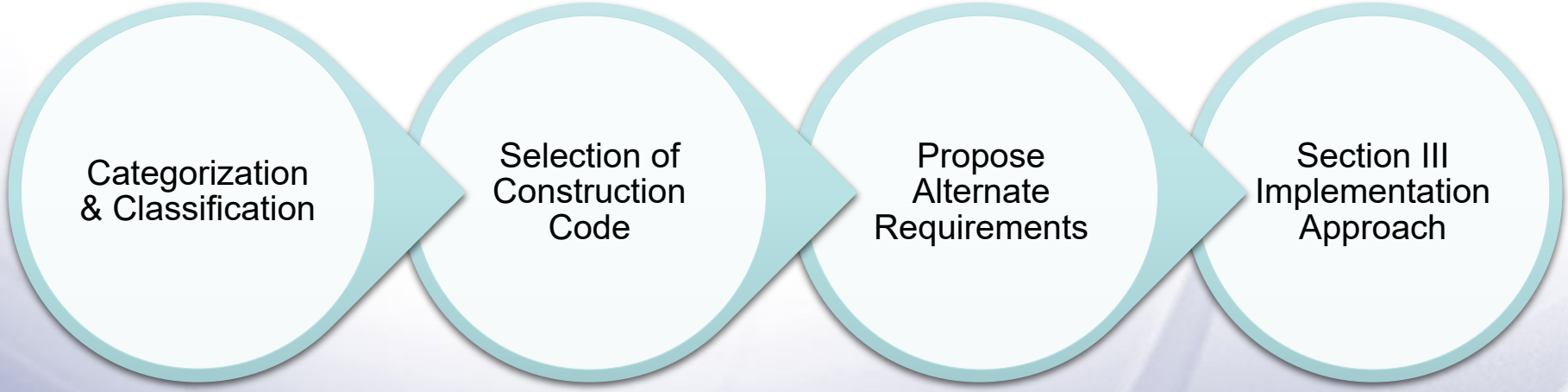
Introduction

Desired Outcome:

Open and interactive discussion of viewpoints on technical basis and Section III approach to rules for these items and potential regulatory avenues for endorsement



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Section III Approach Summary

- Section III is developing alternative requirements commensurate with an item's contribution to safety and risk (e.g., NEI 18-04)
  - Results in increased value for construction
  - Aligned with the design needs of advanced reactors

ASME Section III	Industrial Codes + Additional Requirements
☑ Rules well suited for nuclear applications	☑ Value commensurate with item's contribution to safety and risk

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Review and Discussion of Proposed ASME III Alternate Requirements for Construction

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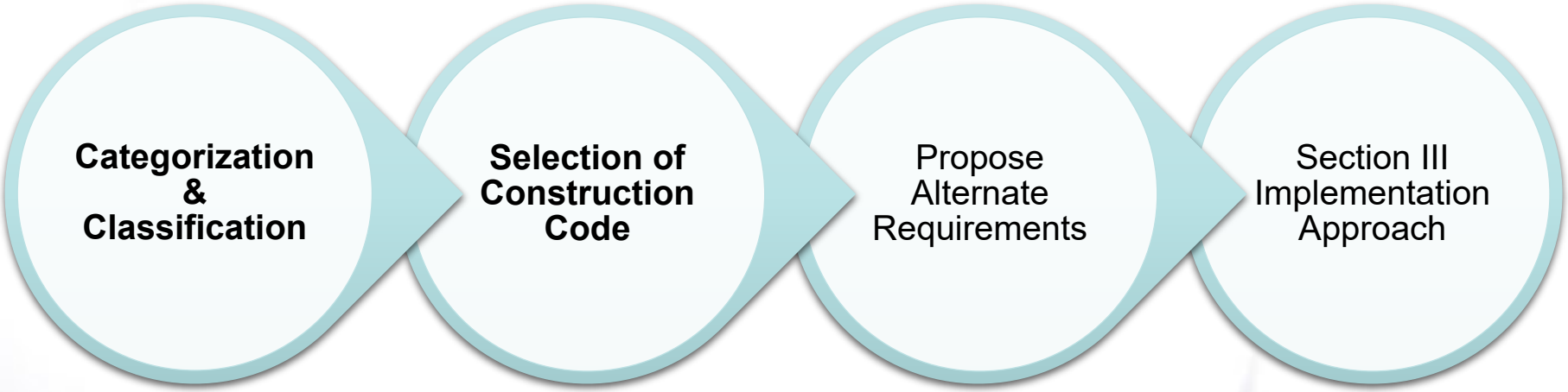
Background


Categorization & Classification
Selection of Construction Code
Propose Alternate Requirements
Section III Implementation Approach

Categorization & Classification

- Traditional categorization process is deterministic:
  - Safety Related or Non-Safety Related
- Risk-based approaches for LWRs consider Core Damage Frequency and Large Early Release

Risk-Informed Safety Classifications

“RISC-1” SSCs Safety-Related Safety Significant	**“RISC-2” SSCs** Nonsafety-Related Safety Significant
“RISC-3” SSCs Safety-Related Low Safety Significant	**“RISC-4” SSCs** Nonsafety-Related Low Safety Significant

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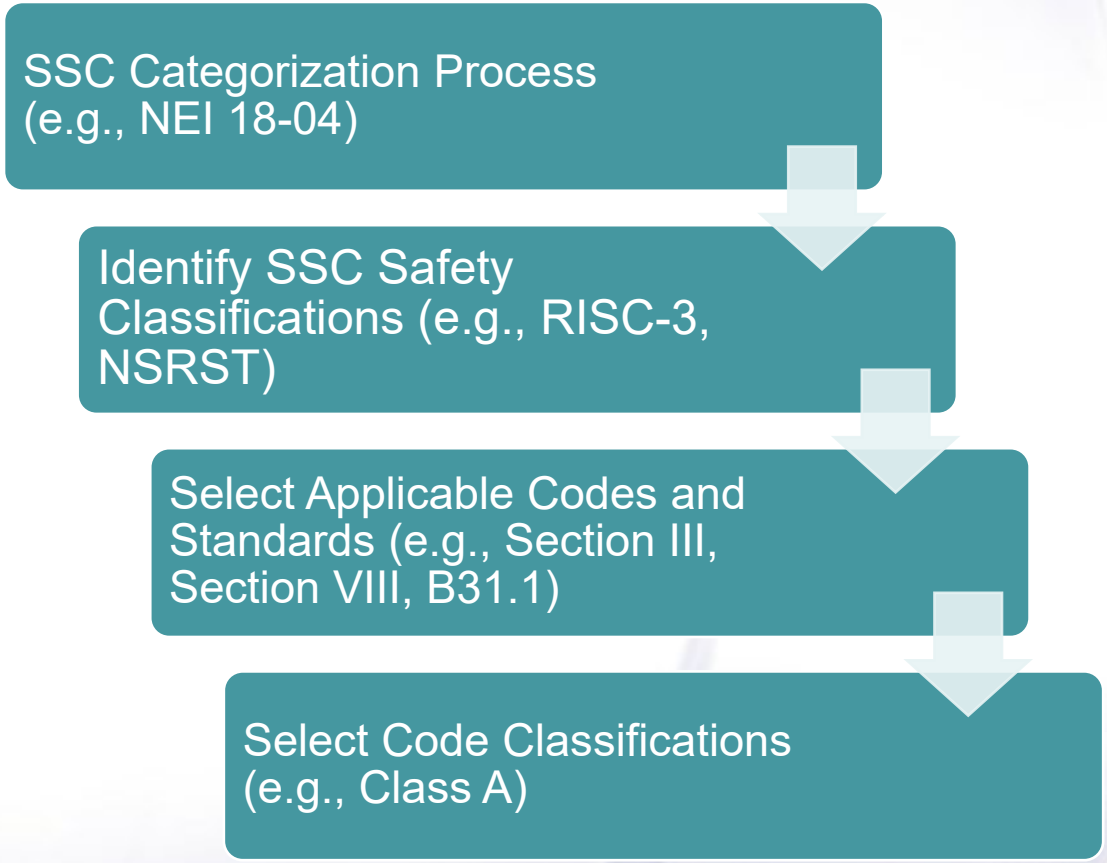
Categorization & Classification

- Paradigm shift in advanced reactor safety basis from traditional nuclear reactors
- Categorization processes developed, and some endorsed, that recognize this paradigm shift



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Categorization & Classification

- Paradigm shift in
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  ba
  nu
- Ca
  de
  en
  thi

SSC Categorization Process
(e.g., NEI 18-04)

Nuclear Codes and Standards do not yet fully recognize advancements in categorization and classification of systems, structures, and components

(e.g., Class A)

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Selection of Construction Codes

- Current available options to construct items with a minimal contribution to safety or risk:
  1. Construct to requirements of Section III
  2. Construct to industrial codes and as necessary, apply additional requirements

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☒ Value may not be commensurate with item's contribution to safety and risk	Industrial design rules not well suited for nuclear application

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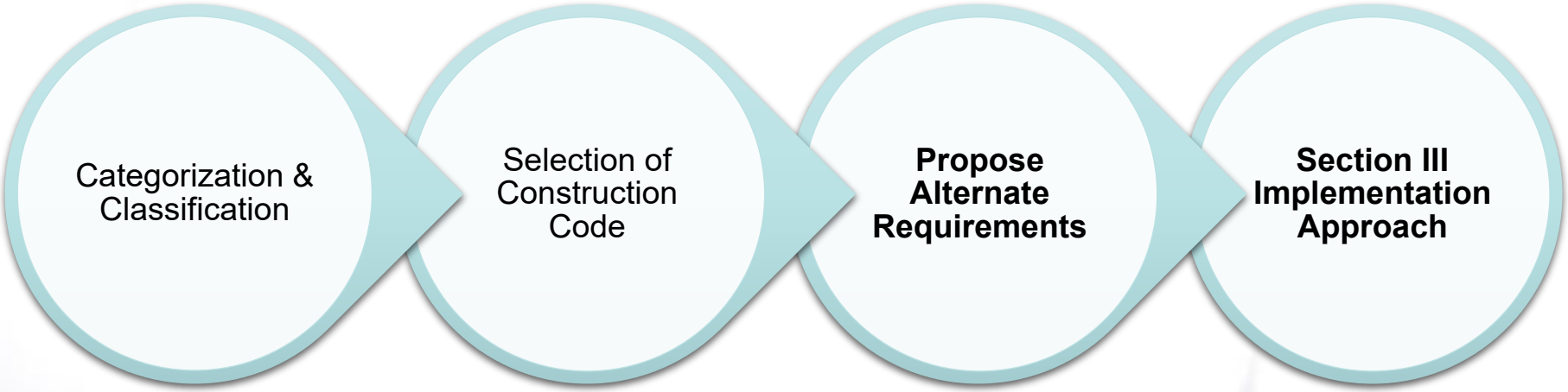
Proposed Changes



Proposed Alternate Requirements

- Provide a new construction ***option*** commensurate with an item's contribution to safety and risk via alternative requirements within Section III that:
  - ☑ Uses design rules developed specifically for nuclear applications
  - ☑ Aligns Section III construction requirements with typical industrial codes

Technical Basis:

- Nuclear design rules are already used in nuclear applications
- Construction of low safety significant items to industrial code requirements is already permitted (e.g., 10CFR50.69)

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Proposed Alternate Requirements

- Materials, Fabrication, and Examination Requirements
  - Code revisions for alternate material procurement
  - Code Case to permit alternate methods for NDE and testing
- Quality Requirements
  - Subsection NCA revision for alternate quality requirements

Implementation Approach

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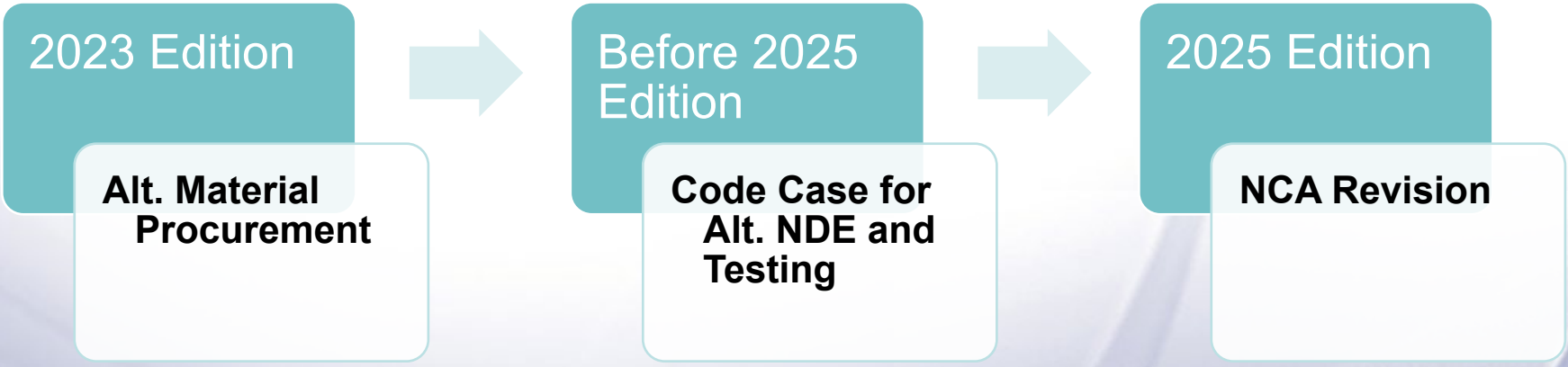

Alternate Material Procurement

- Alternate requirements for material procurement of items commensurate with their contribution to safety or risk
  - Modeled after ‘small parts exemption’
- Permitted for all Classes in Division 5
  - Changes to Division 5 Subsections HBA and HBB, not Subsection NB
  - Changes to referenced Division 1 Subsections NCD, NE, NG and NF
- C&S Connect Record 22-979
  - *To see the evolution from the alternate requirements presented in the initial Code Case, see background file in Record 21-1257*

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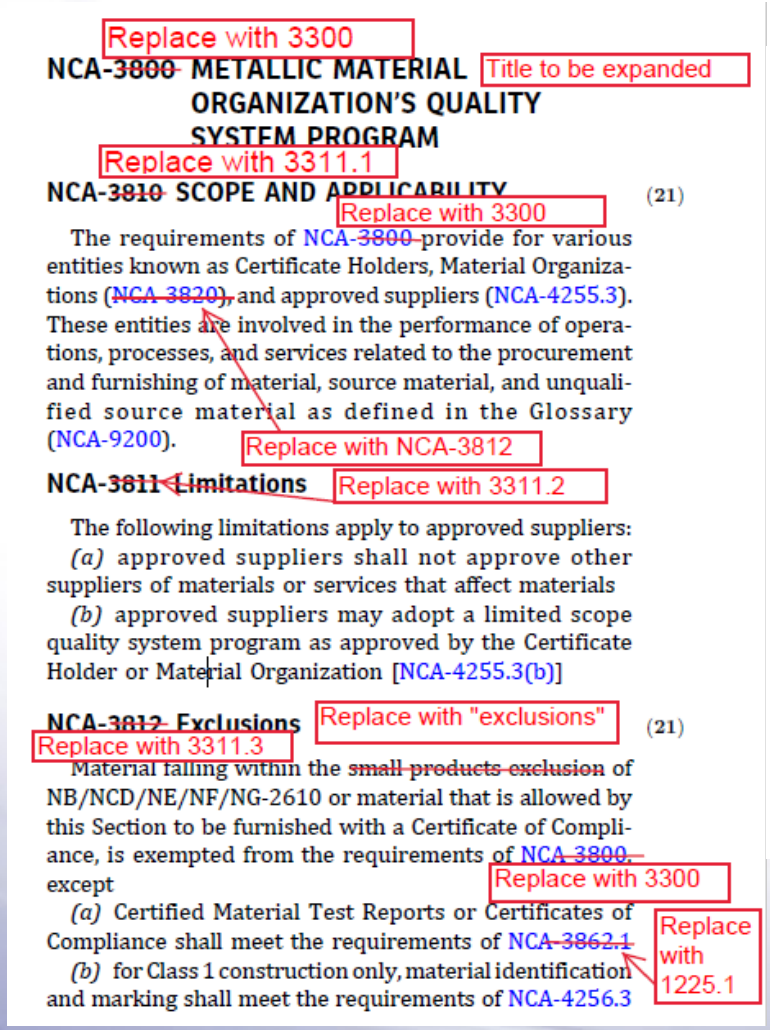
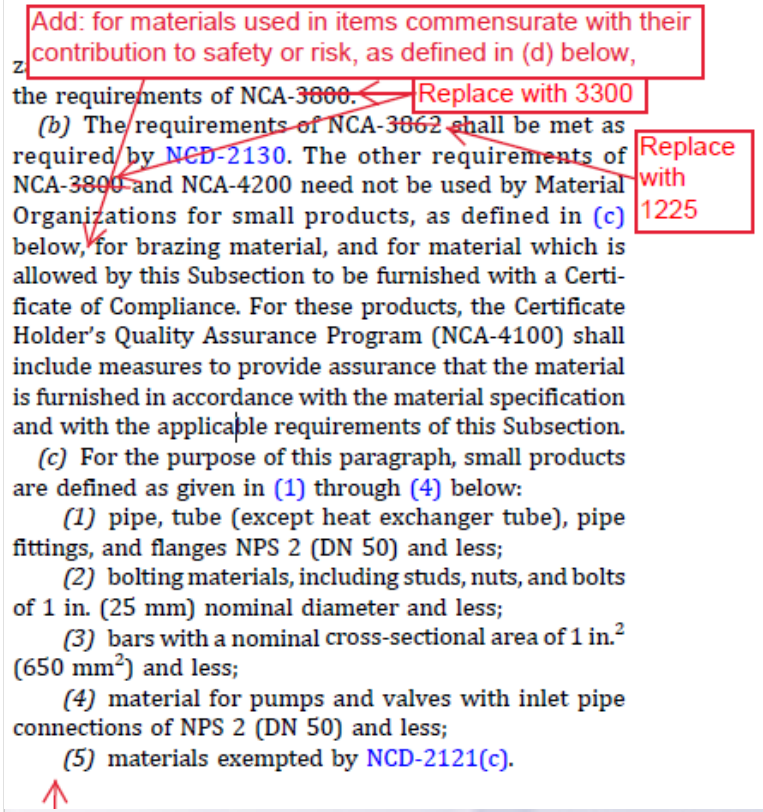
Record 22-979 - Revisions to NCA/HAA-3812 and HBA/HBB/NCD/NE/NF/NG-2610





Record 22-979 - Revisions to NCA/HAA-3812 and HBA/HBB/NCD/NE/NF/NG-2610

Add: (d) For the purpose of this paragraph, items commensurate with their contribution to safety or risk are defined as given in (1) and (2) below:

(1) The Owner or their designee has established that the exemption is consistent with the safety or risk significance of the item. The determination of the safety or risk significance of the item to design and operations is beyond the scope of this Section. Appropriate guidance for the safety or risk significance of the item shall be derived from system criteria documents for specific types of nuclear power systems and may be found in the requirements of regulatory and enforcement authorities having jurisdiction at the site.

(2) The Owner or their designee has permitted the exemption in the Design Specification and shall specify to which items this exemption applies.

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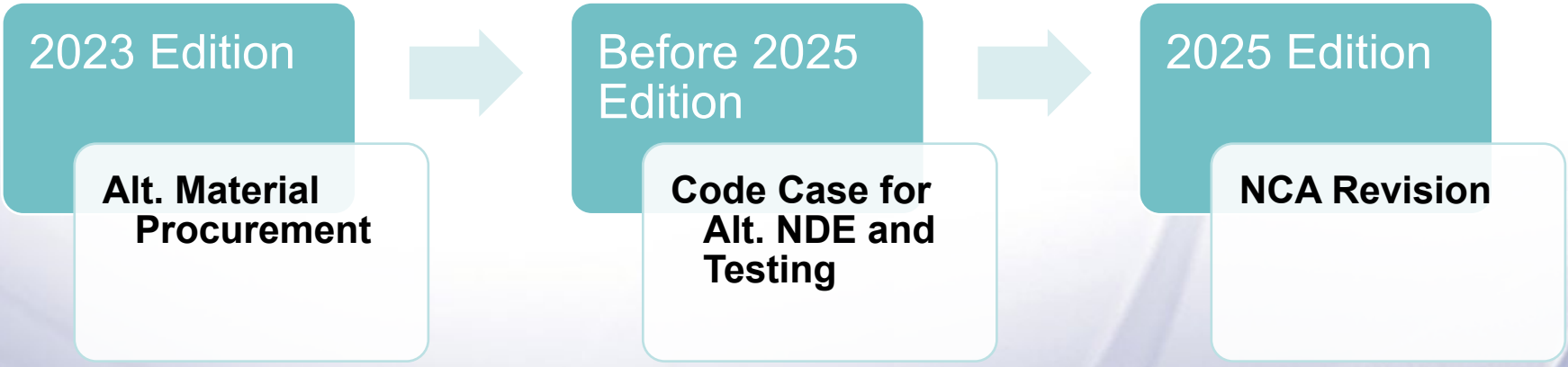

Future Section III Engagement

- Alternate Requirements Commensurate with an Item's Contribution to Safety and Risk
- Code Case on Class 2/3 Small Piping Alternate Requirements
- Ultrasonic Examinations during Construction
- Updates to Seismic Rules
- Nuclear Technical Bulletin 5

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Regulatory Strategy and Options

- Reason for a Regulatory Strategy
  - Unique approaches
  - Stakeholder needs
  - Broader and more frequent engagement
- Strategy
  - NRC Drop-in's
  - Public Meetings including AR Stakeholder Meetings
    - White papers
    - Draft Code Changes
- Explore various available regulatory options
  - Most efficient endorsement avenue

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Q&A
and
Next Steps

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