

NRC Staff Perspective and Feedback on ASME Draft Code Case on Alternate Rules for Non-Destructive Examination and Testing

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Context – Regulatory Guide 1.87, Rev. 2

Table A-1. Classification and Standards Applicable to Components in High Temperature Reactors

Classification Method	Component Classification		
Traditional	Quality Group A	Quality Group B	Quality Group C
Risk-Informed (10 CFR 50.69) ⁶	RISC-1	RISC-1	RISC-2, RISC-3
Risk-Informed (RG 1.233)	SR	SR	NSRST
	SR Quality Design Standards		Important to Safety Design Standards
Components			
Pressure Vessels	ASME Code, Section III, Division 5, Class A	ASME Code, Section III, Division 5, Class B	ASME Code, Section VIII, Division 1 or Division 2 ⁷
Piping			ASME B31.1/B31.3 ⁷
Pumps			
Valves			ASME B31.1/B31.3 ⁷
Atmospheric Storage Tanks			
Storage Tanks (0-15 pounds per square inch gauge)			ASME Code, Section VIII, Division 1 or Division 2 ⁷
Metallic Core Support Structures	ASME Code, Section III, Division 5, Subsection HG	N/A	
Nonmetallic Core Support Structures	ASME Code, Section III, Division 5, Subsection HH	N/A	

⁶ Alternative treatment under 10 CFR 50.69 for SSCs categorized as RISC-1, RISC-2, RISC-3, or RISC-4 requires NRC review and approval in accordance with 10 CFR 50.69.

⁷ These standards address design in high temperature environments and may be acceptable with appropriate justification. Applicants may propose alternate standards with appropriate justification.

Background - UT in Lieu of RT

- Prior NRC Technical Basis on Ultrasonic Testing (UT) in lieu of Radiographic Testing (RT)
 - 2015 NRC Public Meeting presentation: “UT in Lieu of RT for Nuclear Power Plant Applications” ([ML15009A025](#))
 - [NUREG/CR-7204](#), “Applying Ultrasonic Testing in Lieu of Radiography for Volumetric Examination of Carbon Steel Piping”
- Recent Code Cases on UT in lieu of RT
 - ASME Section XI Code Case N-831-1 is [endorsed by NRC](#) for use in repair / replacement activities
 - Applicable to carbon and stainless steel with performance demonstration and flaw analysis (Section XI acceptance criteria)
 - Applied successfully in the operating fleet
 - ASME Section III Code Case N-659-3 for Class 1 components, which is on the list of disapproved code cases in Regulatory Guide (RG) 1.193

UT in Lieu of RT for the Draft Code Case

- Areas for Further Clarification
 - Code Case provides a limited technical basis to justify using UT in lieu of RT (ample basis was provided for N-831-1)
 - Lack of detail on critical/allowable flaw sizes, etc.
 - At high temperatures, construction defects are more vulnerable to creep-enhanced failure
 - UT challenged at distinguishing between planar and volumetric flaws
 - RT is challenged to identify planar flaws
 - Lack of performance demonstration specified in Code Case
 - 5% random sample for UT
 - Technical basis for random sampling, and the proposed value? Statistical justification?
 - Technical basis for sample expansion, and random RT or UT in lieu of targeted inspection of most susceptible/vulnerable location?

Hydrostatic Testing

- Basis for the changes proposed to hydrostatic testing
 - Code Case technical basis states: “Section III Certificate Holder experience has shown that **essentially no valves fail** during the additional hold time past the required B16.34 holding times.”
 - Can industry provide data (sample size/scope, number of failures) to support this statement?

Questions

- Cross-cutting
 - Taking all of these changes together, how does this provide reasonable confidence that the component will perform its intended function?
- Scope / Applicability
 - Is this Code Case applicable to LWRs or only for non-LWRs?
 - Can you clarify that this is not applicable to safety-related components and intended to be applied to non safety-related with special treatment (NSRST) for RG 1.233?
- How does reducing the fabrication inspection effort impact the effectiveness of (or take into account) the Reliability Integrity Management (RIM) or in-service inspection (ISI) program during operation?
 - Is there reasonable confidence that the component will perform its intended function for certain cases (e.g., not in 5% fabrication sample inspection and no ISI is required)?