Adoption of Risk Informed Repair and Replacement

Summary

With submittal and approval by the regulator to use Case N-752 with the initial plant, there is new wave of fast followers across the U.S. to implement Risk Informed – Repair and Replacement (RI-RRA). Case N-752 titled "Risk-Informed Categorization and Treatment for Repair/Replacement Activities in Class 2 and 3 Systems" allows categorization and risk informed methodology to an entire system or to a single component. The ability to analyze a single or multiple components in a system can provide a significant advantage compared to traditional 10CFR50.69 rules. Specifically, a utility member now has the ability the conduct an analysis of a component on an emergent basis, or within a system where the cost of completing 50.69 categorization of an entire system did not expect to obtain significant benefits.

Members that have successfully obtained approval to implement Case N-752 can categorize and then provide alternate treatments if a component or a system is classified as low-safety-significance (LSS). Components and systems categorized as LSS have the potential to reduce costs such as administrative burden, material procurement, non-destructive examination, and other associated ASME Section XI requirements. These benefits could also extend to reducing outage duration for component(s) that require evaluation on an emergent basis. Thus, using Case N-752 can be thought of a long-term strategy and a tool available as-needed on an emergent basis.

APPLICABILITY

U.S. Plants can use this methodology now, and could be extended to other regions with appropriate regulatory interactions and approvals.

VALUE

Cost savings in the repair or replacement of low-safety-significant systems and components including administrative, material procurement and non-destructive examination costs.

EPRI PROGRAM

Welding and Repair Technology Center

Examples – Member Application

In one member estimate comparing traditional repair and replacement to RI-RRA of systematic replacement of ASME Class 2 and 3 Service water and Containment Coolant Piping, the estimate resulted in 95%, 59%, and 83% savings of administrative documentation, materials (piping/fitting), and weld examinations, respectively. These combined to an estimated savings of roughly $478,000.

A second member estimated a cost savings of $5,693,000 in the procurement and installation of two (ASME Class 3) 36 in. (914 mm) nominal pipe size service water pipe. In a second application the same member estimated $50,000,000–$100,000,000 savings to reline 6,500 ft. (1981 m) of 11 ft. (3.3 m) diameter piping.

Background

When using a risk informed approach, all systems, components, portions of systems and items in a nuclear power plant can be categorized into one of two categories: High Safety Significant or Low Safety Significant. The classification is established by an Owner-and includes probabilistic risk assessment (PRA), plant operations, system design, and safety or accident analysis. The Owner performs methodical failure modes and effects analyses (FMEA), establishes consequences and ranking thereof using probabilistic risk analyses, applies defense-in-depth principles, and ranks

the safety significance of systems, portions of systems or individual items as high, medium or low consequence rank. Those items classified as medium or low consequence rank are further categorized as having either high or low safety significance by applying prescribed criteria.

Code Case N-752 enables relief of Class 2 and 3 systems, piping segments, items or components classified as Low Safety Significant (LSS) from the administrative, technical, and quality assurance requirements associated with high safety significance items.

EPRI's Role

EPRI has produced the technical basis and guidance on selecting and implementing alternative treatments for various systems.

EPRI also captures operating experience and lessons learned that can be shared with current and future implementers.

Value

Use of these risk informed approaches and alternative treatment for low-safety-significant systems and components can result in significant cost savings in the administrative costs, material procurement costs and non-destructive examination costs.

To support more effective technology transfer, EPRI is tracking implementation of key R&D activities.

Please access this link to provide input on your company's use of this particular research: https://www.surveymonkey.com/r/T8DB8J2

Access additional Value Guides and examples of EPRI R&D application at: https://interactive.epri.com/nuclear-value/p/1

IMPLEMENTATION GUIDANCE

The ability to implement Case N-752 is dependent on a successful submittal to the regulator and subsequent approval. Any U.S. utility member may ask for approval to use Case N-752. There are now a few members that have already obtained approval and their request for alternative can be used to aid with future submittals.

Other members that are implementing risk-informed methodologies could evaluate if they also could implement risk- informed repair and replacement per Case N-752.

Resources

EPRI provides guidance, training, and workshops in addition to supporting members directly on submittals and on-going questions:

- 3002023830, *Welding and Repair Technology Center: Risk-Informed Repair and Replacement Activities: Guidance for Implementation of Case N-752*
- 3002026414, *Welding and Repair Technology Center: Risk-Informed Repair and Replacement Activities: Guidance for Use of HDPE for Class 3 Piping Categorized as Low Safety Significant*
- 3002012984, *10 CFR 50.69 Categorization Guidance Document*
- Webinar #1: *Introduction to Case N-752: Risk Informed Repair and Replacement Activities* (recorded)
- Webinar #2: *Guidance on Implementing ASME Code Case N-752*

EPRI CONTACT

NICK MOHR, *Program Manager*
614.325.0532, nmohr@epri.com

For more information, contact:

EPRI Customer Assistance Center
800.313.3774 • askepri@epri.com

February 2025

EPRI
3420 Hillview Avenue, Palo Alto, California 94304-1338 USA • 650.855.2121 • www.epri.com