



## Targeted in-service Inspections Using Risk Insights

SCOTT KULAT,  
BEN MONTGOMERY,  
M. ROBIN GRAYBEAL

*IE – Inservice Engineering*

1250 Wallen Pl, Downers Grove,  
IL 60516-1880, USA

skulat@inserviceeng.com,

bmontgomery@inserviceeng.com,

rgraybeal@inserviceeng.com

This paper includes a discussion of the historical background and rationale for development of a targeted In-service Inspection (ISI) program using risk insights, known as Risk-Informed In-service Inspection (RI-ISI). RI-ISI programs are optimized inspection programs which target specific welds for inspection based upon potential degradation mechanisms and consequences of failure. Inspections are performed on those welds that are the highest contributors to plant risk. Additionally the inspections are tailored to detect the specific postulated degradation mechanisms. As a result, the numbers of inspections are reduced along with the associated cost and radiation exposure, while maintaining or improving the level of quality and safety.

Provided in this paper are the basic principles of RI-ISI program development, and a summary of the impact of the implementation of such programs. For example, implementation of a Risk-Informed In-service Inspection program results in a reduction of both cost and radiation exposure. Cost savings are estimated at between USD 1,000,000 and USD 2,300,000 per unit per ten year interval for a Class 1 & 2 RI-ISI application. Cost savings are estimated based on average cost per weld of USD 7600 for examination, including the following activities:

- Erection and removal of scaffolding
- Removal and replacement of insulation
- Removal and replacement of interferences
- Weld preparation
- Examination
- Documentation
- Craft support

Reduction in radiation exposure is estimated at 75% to 90% for a Class 1 & 2 RI-ISI application. Reduction in radiation exposure is due to the following factors.

- Number of welds selected for examination decreases by 60% to 75%
- Surface examinations essentially eliminated
- Within a given risk category, welds can be selected for examination based on additional factors such as the minimization of radiation exposure

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