



## Aspects of the Optimization on the In-Service Inspection

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### Abstract

In the present paper, the aspects of optimizing In-Service Inspection (ISI) is discussed. Slovenian Nuclear Safety Administration (SNSA) and its authorized organization for the ISI activities, Institute of Metals and Technologies, are actually permanently involved in the ISI processes of the nuclear power plant (NPP) Krško. Based on the previous experience on the ISI activities, evaluation of the results and review of the new ISI program, the decision was made to improve recent regulatory and professional practice. That means, the conclusion was made to optimize the evaluation process of the ISI as a process. Traditional criteria, standards and practice gives good fundament for the improvements implementation. Improvements can be done on the way that the more broad knowledge about safety important components of the systems shall be added to the basic practice. It is necessary to identify conditions of the safety important components, such as realistic stress and fatigue conditions, material properties changes due aging processes, the temperature cycling effects, existing flaws characterization in the light of the previous detection and equipment technique used, assessment of the measurement accuracy on the results etc. In addition to the above mentioned, risk assessment and evaluation of the whole ISI shall be done. To do this it is necessary to made risk evaluation, based on previous structural element probability assessment. Probabilistic risk assessment is important and one of the most powerful tools in the ISI optimization. Some basic work on the filed of the risk informed methods related to the nuclear safety components has been already done. Based on reference documentation, the most important steps in risk informed ISI are discussed: scope definition, consequence evaluation, failure probability estimation, risk evaluation, non-destructive examination method selection and possibilities of implementation, monitoring and feedback. Recent experience on the ISI in the nuclear world shows that such practice plays strong role in the ISI decision making process and has some measurable effects too. It is clear that classical criteria for the selection of ISI inspection locations are not completely in accordance with current measures of safety importance. Optimization shall give the operator of nuclear facility benefits on the resources and duration of the ISI inspections, on the other hand, the most important benefit for the nuclear safety administration shall be more effective control of the safety important components, aging management control and overall nuclear safety.