

# **ISI Plan for SMR Rx Head**

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Worldwide demand for nuclear power technology, owing to its carbon-free and energy-intensive features, is increasing mainly in the existing countries intending to replace their old nuclear power plants and in the emerging countries seeking to introduce nuclear programs. Small modular reactors (SMRs) having electricity capacities less than 300MWe are especially attractive to the countries having weak electrical grid or being composed of islands. Many small modular reactors using light water as moderator or coolant are integrated types, that is, they contain main reactor coolant system components such as steam generator, reactor coolant pump, or pressurizer in its inner area without main piping system. In the other hand, most of the small modular reactors maintain control rod drive mechanism system above the upper head of the integrated reactor so they have many penetrations having dissimilar metal welds in the upper head. It is well known that primary water stress corrosion cracking (PWSCC) is the leading degradation mechanism at those positions under the light water reactor operating environment, therefore periodic inservice inspections are required on those area to check the structural integrity of the upper head. In this study, reviews on the operating conditions and applied materials for SMR reactor heads are performed, susceptibility to PWSCC of some SMR reactor head penetrations are evaluated according to the Code Case N-729-1, and appropriate methods and periods for in-service inspection are determined based upon the evaluation results.