1 Introduction

Nuclear power plants vary widely with respect to size, capacity, and design details. Available leak detection methods must be individually examined by the designers to determine their suitability for a particular plant or system. The applicable federal regulation on the requirements for Reactor Coolant Pressure Boundary (RCPB) leak detection is specified in the Code of Federal Regulations, Title 10, Part 50 (10CFR50), Appendix A, Criterion 30.*

Detection of leakage from pressurized pipes and vessels is needed because small leaks may develop into larger leaks or ruptures. During reactor operation, detection of reactor coolant leakage from nonisolatable portions of the RCPB is important to allow early identification of minor flaws before they can develop into a pipe break or component rupture that could result in the accidental loss of coolant. Since the RCPB is housed in a containment structure, physical access is limited during power operation and remote indicating leakage detection systems are necessary.**

This standard defines design criteria that are intended to insure that adequate RCPB leak detection capabilities are provided to the nuclear plant operator and to meet the intent of the Code of Federal Regulations. However, the burden of proof of compliance with federal regulations shall remain the responsibility of the plant owner.

2 Scope

This standard covers identification and quantitative measurement of reactor coolant system leakage in light water cooled power reactors. Leak detection for gas and liquid metal cooled reactors and for containment building structures surrounding the reactor coolant pressure boundary is not covered in this standard.

3 Purpose

The purpose of this standard is to standardize criteria, methods, and procedures for assuring the design and operational adequacy of reactor coolant pressure boundary leak detection systems used in light water cooled nuclear power plants. A further objective is to encourage design improvements yielding increased utility and reliability of reactor coolant leakage detection systems.

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^{*}Other related federal regulations not addressed in this standard cover the requirements for RCPB fracture prevention, inservice inspection, coolant makeup capability and quality assurance as specified in the Code of Federal Regulations, Title 10, Part 50 (10CFR50), References (1) and (2)

^{**}Appendix A provides information on primary coolant leakage detection outside of the containment structure for boiling water reactors (BWR).