Inquiry: What alternative rules to the ASME OM Code leakage rate test frequency specified in Section ISTC-3630(a) may be used to establish the leakage rate test frequency for Reactor Coolant System (RCS) Pressure Isolation Valves?

Reply: It is the opinion of the Committee that in lieu of the 2-year leakage rate test frequency requirement specified by ASME OM Code Section ISTC-3630(a), the alternative methods provided by this Code Case may be used to establish the leakage rate test frequency for RCS Pressure Isolation Valves.

Applicability: See Applicability Index.

1 PURPOSE

This Code Case establishes requirements for implementing and maintaining a condition monitoring program for Reactor Coolant System (RCS) Pressure Isolation Valves (PIV) that may be implemented in lieu of the 2-year leakage rate test frequency specified in Section ISTC-3630(a). This Code Case does not replace or exclude any test method requirement specified in ISTC-3630.

2 GROUPINGS

The Owner shall group the RCS PIVs within the scope of this code case. Groupings shall be technically justified and documented based on:
(a) design, performance characteristics, application, and service conditions of the RCS PIVs; and
(b) analysis of test results and maintenance history of the RCS PIVs.

3 ANALYSIS

The Owner shall perform an analysis of the test and maintenance history of each valve within the scope of this code case to establish the basis for specifying inservice test frequencies and grouping. The analysis shall include the following:
(a) Evaluation of the performance characteristics of each valve during normal operation and testing.
(b) Identification of any common failure or maintenance patterns.
(c) Analysis of these patterns to determine their significance and to identify potential failure mechanisms, such as whether:
   (1) certain preventive maintenance activities would mitigate the failure or maintenance patterns to allow test frequency extension;
   (2) certain condition monitoring tests (such as MOV and AOV nonintrusive testing) are feasible and effective in monitoring for these failure mechanisms;
   (3) periodic disassembly and examination activities would be effective in monitoring for these failure mechanisms; and (4) changes in the valve groupings are required.

4 CONDITION-MONITORING ACTIVITIES

4.1 Test Frequencies

(a) RCS PIV test frequencies shall be sufficient to maintain leakage rates within permissible leakage rates specified in ISTC-3610(e).
(b) Trending and evaluation of existing data shall be used as the bases to justify the time interval between tests or examinations.

4.2 Testing Intervals

As part of the condition monitoring of the valves within the scope of this code case, the Owner shall:
(a) Perform the following activities to support the leakage rate testing intervals allowed by this code case:
   (1) Identify the applicable preventive maintenance activities including their associated intervals that
are required to maintain the continued acceptable performance of the valve or group of valves.

(2) Identify the applicable examination activities including their associated intervals that will be used to periodically assess the condition of each valve or group of valves.

(3) Identify the applicable test activities including their associated intervals that will be used to periodically verify the acceptable performance of each valve or group of valves.

(4) Identify which of these activities will be performed on each valve in the group.

(5) Identify the interval of each activity.

(b) Interval extensions shall be limited to a 24 month interval. Intervals shall not exceed the maximum interval of 6 years.

(c) All valves in a group sampling plan shall be tested again, before the interval can be extended, or until the maximum interval would be exceeded.

4.3 Sampling Plan

(a) No maximum limit is specified for the number of valves to be tested during any single 24 month interval; however, a minimum of 20% of the valves from each valve group shall be tested within any 24 month interval. This 20% shall consist of valves that have not been tested, if they exist.

(b) For those valves that are not grouped together, individual valves can be extended out to a maximum interval of 6 years following the same extension requirements of a group.

(c) Should a plant enter an operating mode requiring valve actuation due to automatic or manual action or flow through the valve, a minimum of 20% of that valve group shall be leak rate tested prior to resuming plant operation.

4.4 Acceptance Criteria

(a) If a valve exceeds the permissible leakage rates specified in ISTC-3610(e), then all remaining valves of that same valve group shall be tested.

(b) This failure and the results of the subsequent test group expansion shall be part of the periodic evaluation required in subparagraph. 4.5(e).

4.5 Other Requirements

(a) Should a plant enter an outage as a result of a leaking PIV, the group’s test interval shall be returned to the initial 24 month interval.

(b) Identify attributes that will be trended. Trending and evaluation of existing data shall be used to extend the time interval between tests or examinations. As a minimum, leak rates shall be trended using a statistical analysis approach.

(c) Revise the test plans (see paragraph 6) to document the optimized condition monitoring program activities, and the associated intervals of each activity.

(d) Perform these activities at their associated intervals.

(e) After performance, review the results of each activity to determine if any changes to the optimized condition monitoring testing program are required. If significant changes are required, the program shall be revised prior to the performance of the next activity, and the applicable requirements of paragraphs 2, 3, and 4 shall be repeated. The results of this review shall be documented.

(f) Changes to leak rate test frequencies shall consider plant safety and be supported by trending and evaluating both generic and plant-specific performance data to ensure the component is capable of performing its intended function(s) over the entire interval.

5 CORRECTIVE MAINTENANCE

(a) If corrective maintenance is performed on a valve, the analysis used to formulate the basis of the condition-monitoring activities for that valve and its associated valve group shall be reviewed to determine if any changes are required.

(b) If changes are required, the program shall be revised and the applicable requirements of paragraphs 2, 3, and 4 shall be repeated.

6 DOCUMENTATION

The PIV condition monitoring testing program shall be documented and shall include the following information:
(a) list of valves in the program;
(b) list of valves in each valve group and the bases for the valve grouping;
(c) dates that valves were added to or deleted from the program and the reason for their inclusion or deletion;
(d) analysis forming the basis for the program;
(e) performance history, identified failures, and maintenance patterns for each valve; and
(f) condition monitoring program activities, including trended attributes, bases for the associated intervals for each valve or valve group, and periodic performance reviews.

The documentation requirements in Appendix II may be used to satisfy those check valves that are also RCS PIVs.