

## Division 1, Mandatory Appendix II<sup>1</sup> Check Valve Condition Monitoring Program

(17)

### II-1000 PURPOSE

This Appendix establishes the requirements for implementing and maintaining a check valve condition monitoring program as discussed in para. ISTC-5222.

### II-2000 GROUPINGS

Groupings shall be determined by the Owner. Groupings shall be technically justified and shall be based on

(a) the intended purpose of the condition monitoring program (e.g., improve performance, or optimize testing, examination, and preventive maintenance activities)

(b) analysis of test results and maintenance history

(c) design characteristics, application, and service conditions

The Owner shall assess the significance to plant safety if an extended test or examination interval is planned.

The Owner should also consider the sample disassembly examination program grouping details of subpara. ISTC-5221(c).

### II-3000 ANALYSIS

The Owner shall perform an analysis of the test and maintenance history of a valve or group of valves in order to establish the basis for specifying inservice testing, examination, and preventive maintenance activities. The analysis shall include the following:

(a) Identify any common failure or maintenance patterns.

(b) Analyze these patterns to determine their significance and to identify potential failure mechanisms:

(1) determine whether certain preventive maintenance activities would mitigate the failure or maintenance patterns

(2) determine whether certain condition monitoring tests such as nonintrusive testing are feasible and effective in monitoring for these failure mechanisms

(3) determine whether periodic disassembly and examination activities would be effective in monitoring for these failure mechanisms

(4) determine whether changes in the valve groupings are required

<sup>1</sup> This Appendix contains requirements to augment the rules of Subsection ISTC, Inservice Testing of Valves in Water-Cooled Reactor Nuclear Power Plants.

### II-4000 CONDITION-MONITORING ACTIVITIES

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Valve obturator movement during applicable test or examination activities shall be sufficient to determine the bidirectional functionality of the moving parts. A full open exercise test, or an open test to the position required to perform its intended function (see para. ISTA-1100), is not required for this assessment.

#### (a) Performance Improvement Activities

(1) If sufficient information is not currently available to complete the analysis required in section II-3000, or if this analysis is inconclusive, then the following activities shall be performed at sufficient intervals over an interim period of the next 5 yr or two refueling outages, whichever is less, to determine the cause of the failure or the maintenance patterns:

(-a) Identify interim tests (e.g., nonintrusive tests) to assess the performance of the valve or the group of valves.

(-b) Identify interim examinations to evaluate potential degradation mechanisms.

(-c) Identify other types of analysis that will be performed to assess check valve condition.

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

(-e) Identify the interval of each activity.

(2) Identify attributes that will be trended. Trending and evaluation of existing data must be used as the bases to reduce or extend the time interval between tests or examinations.

(5) After completion of II-4000(a)(1), II-4000(a)(2), II-4000(a)(3), and II-4000(a)(4),

ties and their associated frequencies.

(4) Perform these activities at their associated intervals until

(-a) sufficient information is obtained to permit an adequate evaluation of the specific application or

(-b) until the end of the interim period

(5) After completion of II-4000(a)(1) through II-4000(a)(4), review those attributes that were selected for trending, along with the results of each activity and trends to determine whether any changes to the performance improvement program are required. If needed based on the results of the last scheduled test or examination, the program shall be revised in accordance with the site corrective action program prior to the performance of any activity on the next valve in the group, and



the applicable requirements of sections II-2000, II-3000, and II-4000 shall be repeated.

(b) *Optimization of Condition-Monitoring Activities*

(1) If sufficient information is available to assess the performance adequacy of the check valve or the group of check valves, then the following activities shall be performed:

(-a) Identify the applicable preventive maintenance activities including their associated intervals that are required to maintain the continued acceptable performance of the check valve or group of check valves.

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

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

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

(-e) Identify the interval of each activity. Initial intervals shall be established using (b) provided that the condition-monitoring test and examination intervals consider plant safety and are supported by the trending and evaluation of generic and plant-specific performance data. Trending and evaluation shall be used to support the conclusion that the valve or group of valves is capable of performing its intended function(s) over the entire interval. At least one of the identified activities for a valve group shall be performed at approximately equal intervals within the maximum interval shown in Table II-4000-1.

(-f) Interval extensions shall be based on an 18-month or 24-month fuel cycle or 2 yr, whichever is longer. All valves in a group-sampling plan shall be examined again, before the interval expires, or until the maximum interval is exceeded.

(-g) Intervals shall not exceed the intervals shown in Table II-4000-1. The requirements of para. ISTA-3120, Inservice Examination Interval, do not apply.

(2) Identify attributes that will be used for trending and evaluation of existing data must be used to extend the time interval between tests.

(3) Revise the test plans (see section II-6000) to document the optimized condition-monitoring program activities, and the associated intervals of each activity.

(4) Perform these activities at their associated intervals.

(5) After performance, review the results of each activity to determine whether any changes to the optimized condition-monitoring program are required. If significant changes are required, the program shall be revised prior to the performance of the next activity, and

**Table II-4000-1 Maximum Intervals for Use When Applying Internal Extensions** (17)

Group Size [Note (1)]	Maximum Interval Between Activities of Member Valves in the Groups, yr [Note (2)]	Maximum Interval Between Activities of Each Valve in the Groups, yr
≥4	4.5	16
3	4.5	12
2	6.0	12
1	N/A	10

**NOTES:**

- (1) The maximum interval was determined by how many interval extensions could be obtained based on an 18-month or 24-month fuel cycle. All of the valves had to be tested or examined within the maximum interval to be considered a valid extension.
- (2) These intervals shall not exceed intervals imposed by other station programs where activities are credited for meeting the requirements of condition monitoring (e.g., Containment Leakage Rate Testing Program).

~~the applicable requirements of sections II-2000, II-3000, and II-4000 shall be repeated.~~

Changes to IST intervals must 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) After completion of II-4000 (b) (1), II-4000 (b) (2), II-4000 (b) (3), and II-4000 (b) (4), review those attributes that were selected for trending, along with the results of each activity and trends to determine whether any changes to the optimized program are required. If needed based on the results of the last scheduled test or examination, the program shall be revised in accordance with the site corrective action program prior to the performance of any activity on the next valve in the group, and applicable requirements of sections II-2000, II-3000, and II-4000 shall be repeated.

**MAINTENANCE**

performed on a check valve, the program shall be documented on the basis of the following information:

- (a) list of valves in the program
- (b) list of valves in each valve group
- (c) dates valves were added/deleted to the program and the reason for their inclusion/deletion
- (d) analysis forming the basis for the program
- (e) identified failure or maintenance history patterns for each valve
- (f) condition-monitoring program activities, including the trended attributes and the bases for the associated intervals for each valve or valve group