RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**69-7994**
SRP Section:	**03.09.06 – Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints**
Application Section:	**3.9.6**
Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-1

Section 3.9.6.1, "Functional Design and Qualification for Pumps, Valves, and Dynamic Restraints," of the APR1400 Design Control Document (DCD) Tier 2 specifies that functional design and qualification of safety-related pumps, valves, and dynamic restraints are performed in accordance with ASME Standard QME-1, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants," as endorsed by NRC Regulatory Guide (RG) 1.100, "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants." NRC Standard Review Plan (SRP) Section 3.9.6 (Revision 3, March 2007), "Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints," specifies in its acceptance criteria that functional design and qualification of each safety-related pump and valve should be accomplished such that each pump and valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under all conditions ranging from normal operating to design-basis accident conditions. Based on operating experience with the performance of nuclear power plant components, the NRC staff requests that the APR1400 design certification applicant specify in the DCD that the functional design and qualification of pumps, valves, and dynamic restraints will be implemented in accordance with ASME QME-1-2007 as accepted in Revision 3 (or later revision) to RG 1.100 unless specific approval for a modification to that methodology is provided by the NRC. For example, this could be accomplished by specifying the functional design and qualification of pumps, valves, and dynamic restraints as a Tier 1 or Tier 2* requirement with long-term provisions during plant operation, or by specifying that the functional design and qualification methodology for pumps, valves, and dynamic restraints may not be modified under the change control provisions of the design certification rule unless NRC prior approval is obtained. This level of change control is consistent with other certified designs, for which this information has been categorized as Tier 2*.

Response

Section 3.9.6.1 of APR 1400 DCD will be revised to specify that “the functional design and qualification of pumps, valves, and dynamic restraints will be implemented in accordance with ASME QME-1-2007 as accepted in Revision 3 (or later revision) of RG 1.100 unless specific approval for a modification to that methodology is provided by the NRC.”

The issue about the level of change control is under discussion between the industry (NEI) and the NRC. The APR1400 DCD will incorporate the final results of the discussions between the industry (NEI) and the NRC.

Impact on DCD

DCD Section 3.9.6.1 will be revised according to the final results of the discussions between the industry (NEI) and the NRC.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

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Question No. 03.09.06-2

NRC Commission Paper SECY-05-0197, “Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria [ITAAC],” and NRC Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition),” indicate that Combined License (COL) applicants should provide a full description of their operational programs (including preservice testing [PST], inservice testing [IST], and motor-operated valve [MOV] testing) to avoid the need for ITAAC for those programs. Some COL applicants incorporate in their final safety analysis report (FSAR) the description of these programs provided in the design control document (DCD) for their applicable certified design. Therefore, the NRC staff requests that the APR1400 design certification applicant clarify whether Section 3.9.6 in the APR1400 DCD Tier 2 is intended to provide a full description of the IST (including PST and MOV testing) program for pumps, valves, and dynamic restraints with plant-specific components to be addressed by the COL applicant. If the APR1400 DCD is not intended to fully describe the IST program, the NRC staff requests that the APR1400 design certification applicant specify those aspects of the IST program description that need to be provided by the COL applicant.

Response

Section 3.9.6 of the APR1400 DCD is not intended to provide the full description of the IST program including PST and MOV testing. Section 3.9.6 of the APR1400 DCD currently states that “the COL applicant will provide a full description of IST program including PST for pumps, valves, and dynamic restraints with plant specific components as required by 10CFR 50.55a and will administratively control the IST program so that the applicable requirements of ASME OM Code edition and addenda are incorporated into the IST program.”

As requested by NRC, Section 3.9.6 of the APR1400 DCD will be revised as follows:

"The COL applicant will provide a full description of the IST program (including preservice testing (PST) and MOV testing) for pumps, valves, and dynamic restraints as required by 10CFR 50.55a, that will be administratively controlled such that the applicable requirements of ASME OM Code edition and addenda are incorporated in the IST program."

Impact on DCD

DCD Section 3.9.6 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

ASME OM Code describes the IST scope and establishes the requirements for preservice and inservice testing and examination of certain components to assess their operational readiness. ASME OM Code identifies the components subject to test or examination, responsibilities, methods, intervals, parameters to be measured and evaluated, criteria for evaluating the results, corrective action, personnel qualification, and record keeping.

These requirements apply to:

a. Pumps and valves that are required to perform a specific function in shutting down the reactor to a safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident.

b. Pressure relief devices that protect systems or portions of systems that perform one or more of the three functions identified above.

c. Dynamic restraints used in systems that perform one or more of the three functions identified above, or that ensure the integrity of the RCPB.

The COL applicant will provide a full description of the IST program ~~including preservice testing (PST) for pumps, valves and dynamic restraints as required by 10 CFR 50.55a and will be administratively controlled that the applicable requirements of the ASME OM Code edition and addenda are incorporated in the IST program (COL 3.9(4)).~~

ASME Code, Section III Class 1, 2, 3 and non-ASME Code safety-related pumps, valves, and dynamic restraints are incorporated into a 10 year interval IST program.

(including preservice testing (PST) and MOV testing) for pumps, valves, and dynamic restraints as required by 10CFR 50.55a, that will be administratively controlled such that the applicable requirements of ASME OM Code edition and addenda are incorporated in the IST program (COL 3.9(4)).

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Application Section:	**3.9.6**
Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-3

In Reference 34 in Section 3.9.10, “References,” of the APR1400 DCD Tier 2, the APR1400 design certification applicant specifies the ASME OM Code of record for the description of the inservice testing program for pumps, valves, and dynamic restraints to be used in the APR1400 reactor as the “2004 Edition with the 2006 Addenda” of the ASME OM Code. The NRC staff requests that the APR1400 design certification applicant clarify Reference 34 in Section 3.9.10 of the APR1400 DCD Tier 2 to specify a complete set of edition and addenda of the ASME OM Code (for example, 2004 Edition with the 2005 and 2006 Addenda) that are used as the basis for the description of the IST program for the APR1400 design certification application.

Response

Reference 34 in Section 3.9.10 will be revised to specify a complete set of the ASME OM Code as follows: “the 2004 edition with the 2005 and 2006 addenda.”

Impact on DCD

DCD Section 3.9.10 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

28. CENPD-252-P-A, "Method for the Analysis of Blowdown Induced Forces in a Reactor Vessel," Combustion Engineering, Inc., July 1979 (Proprietary).

29. CENPD-133P, "CEFLASH-4A: A Fortran-IV-Digital Computer Program for Reactor Blowdown Analysis," Combustion Engineering, Inc., August 1974 (Proprietary).

30. CENPD-133P, "CEFLASH-4A: A Fortran-IV Digital Computer Program for Reactor Blowdown Analysis (Modifications)," Combustion Engineering, Inc., Supplement 2, February 1975 (Proprietary).

31. Scherer, A. E., Licensing Manager, (C-E), Letter to D. F. Ross, Assistant Director of Reactor Safety Division of Systems Safety, LD-76-026, March 1976 (Proprietary).

32. Parr, O. D., Chief Light Water Reactor Project Branch 1-3, Division of Reactor Licensing (NRC), Letter to F. M. Stern, Vice President of Projects (C-E), June 1975.

33. Kniel, K., Chief Light Water Reactors Branch No. 2, Letter to A. E. Scherer, Licensing Manager (C-E), August 1976 (Staff Evaluation of CENPD-213).

34. ASME OM Code, "Code for Operation and Maintenance of Nuclear Power Plants," American Society of Mechanical Engineers, the 2004 Edition with the 2006 Addenda.

2005 and

35. Regulatory Guide 1.100, "Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants," Rev. 3, U.S. Nuclear Regulatory Commission, September 2009.

36. IEEE Std. 344-2004 (Reaffirmed 2009), "Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," Institute of Electrical and Electronics Engineers (IEEE), June 2005.

37. SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs," U.S. Nuclear Regulatory Commission, 1993.

38. Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis," Rev. 3, U.S. Nuclear Regulatory Commission, October 2012.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**69-7994**
SRP Section:	**03.09.06 – Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints**
Application Section:	**3.9.6**
Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-4

Section 3.9.6.3.2, “Inservice Testing Program for Power-Operated Valves Other than Motor-Operated Valves,” of the APR1400 Design Control Document (DCD) Tier 2 summarizes the guidance in NRC Regulatory Issue Summary (RIS) 2000-03 (March 15, 2000), “Resolution of Generic Safety Issue 158: Performance of Safety-Related Power-Operated Valves Under Design Basis Conditions,” in describing the inservice testing (IST) program for power-operated valves (POVs) other than motor operated valves (MOVs) in the APR1400 reactor. The NRC staff finds that the applicant’s summary in Section 3.9.6.3.2 of the APR1400 DCD Tier 2 of the provisions for an IST program for POVs in RIS 2000-03 is incorrect in two aspects. The NRC staff requests that the APR1400 design certification applicant correct those two aspects in its description of the IST program for POVs in Section 3.9.6.3.2 in the APR1400 DCD Tier 2 to be consistent with the specified use of the guidance in RIS 2000-03. First, the NRC staff requests that the applicant correct the provision specified in Section 3.9.6.3.2 for periodic dynamic testing of POVs by removing the comma after “if required” and prior to “based on valve qualification or operating experience.” This provision in RIS 2000-03 is intended to specify that if required based on valve qualification or operating experience, periodic dynamic testing will be performed to re-verify the capability of the valve to perform its required functions. Second, the NRC staff requests that the APR1400 design certification applicant modify the provision in Section 3.9.6.3.2 that safety-related valves are categorized according to their safety significance and risk ranking to be consistent with the provision in RIS 2000-03 that safety-related air-operated valves (AOVs) are assigned the highest category according to the Joint Owners Group (JOG) AOV program (including NRC staff comments provided in a letter to the Nuclear Energy Institute, dated October 8, 1999).

Response

DCD Section 3.9.6.3.2 will be revised to correct the two incorrect aspects of the POV IST program.

First, the comma will be removed after “if required” and prior to “based on” to read as follows:
"If required based on valve qualification or operating experience, periodic dynamic testing will be performed to re-verify the capability of the valve to perform its required safety function."

Second, Section 3.9.6.3.2 will be revised to align the categorization of air operated valves in the POV program with industry and NRC guidelines as follows:
"Safety related valves are categorized according to their safety significance and risk ranking to be consistent with the provision in RIS 2000-03. The safety related air operated valves (AOVs) are assigned the highest category according to the Joint Owners Group(JOG) AOV program (including NRC staff comments provided in a letter to the Nuclear Energy Institute, dated October 8, 1999)."

Impact on DCD

DCD Section 3.9.6.3.2 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

Insert D

Solenoid-operated valves (SOVs) are tested using Class 1E electrical power supply voltage and current to verify SOVs are capable of performing their safety functions at design basis accident conditions. SOV tests include confirmation of the energized position and fail position when de-energized.

All safety-related piping systems incorporate provisions for testing to demonstrate the operability of the POVs under design conditions. The inservice testing of POVs incorporates the use of advanced non-intrusive techniques to periodically assess degradation and performance characteristics of the POVs. The ASME OM Code, Subsection ISTC tests are performed, and valves that fail to exhibit the required performance can be disassembled for evaluation.

Periodic verification testing is conducted under adequate differential pressure and flow conditions per the guidance of Regulatory Issue Summary (RIS) 2000-03 (Reference 59), which incorporates the lessons learned from MOV analyses and tests in response to GL 96-05 (Reference 62). Periodic testing allows a justifiable demonstration of continuing POV capability for design basis conditions.

Additional testing is performed as part of the air-operated valve (AOV) periodic verification program, which includes the elements for an AOV periodic verification program as identified in the JOG air-operated valve program. The AOV periodic verification program incorporates the attributes for a successful POV design capability and long-term periodic verification program, as discussed in RIS 2000-03 (Reference 59) by incorporating lessons learned from previous nuclear power plant operations and research programs as they apply to the periodic testing of AOVs and other POVs included in the IST program. The lessons learned addressed in the AOV program include:

a. Setpoints for AOV are defined based on current vendor information or valve qualification diagnostic testing, such that the valve is capable of performing its design-basis function(s).

b. Periodic static testing is performed to identify potential degradation, unless those valves are periodically cycled during normal plant operation, under conditions that meet or exceed the worst case operating conditions within the licensing basis of the plant for the valve, which would provide adequate periodic demonstration of AOV capability. ~~If required, based on valve qualification or operating experience, periodic dynamic testing is performed to re-verify the capability of the valve to perform its required functions.~~

c. Sufficient diagnostics are used to collect relevant data (e.g., valve stem thrust and torque, fluid pressure and temperature, stroke time, operating and/or control air pressure, etc.) to verify the valve meets the functional requirements of the

If required based on valve qualification or operating experience, periodic dynamic testing will be performed to re-verify the capability of the valve to perform its required safety function.

qualification specification.

d. Test frequency is specified, and is evaluated each refueling outage based on data trends as a result of testing. Frequency for periodic testing is in accordance with References JOG air-operated valve program (Reference 63) and Comments on JOG air-operated valve program (Reference 68), with a minimum of 5 years (or 3 refueling cycles) of data collected and evaluated before extending test intervals.

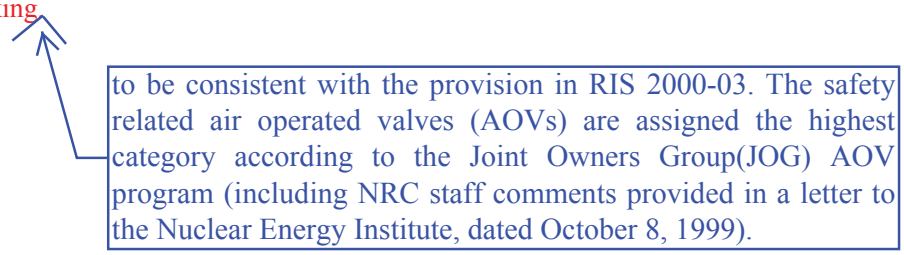
e. Post-maintenance procedures include appropriate instructions and criteria to demonstrate baseline testing is re-performed as necessary when maintenance on the valve, valve repair, or replacement has the potential to affect valve functional performance.

f. Guidance is included to address lessons learned from other valve programs in procedures and training specific to the AOV program.

g. Documentation from AOV testing, including maintenance records and records from the corrective action program are retained and periodically evaluated as part of the AOV program.

h. The attributes of the AOV testing program described above, to the extent that they apply to and can be implemented on other safety-related POVs, such as electro-hydraulic valves, are applied to those other POVs.

i. Safety-related valves are categorized according to their safety significance and risk ranking.



RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**69-7994**
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Application Section:	**3.9.6**
Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-5

Section 3.9.6.3.4, "Pressure Isolation Valve Leak Testing," in the APR1400 Design Control Document (DCD) Tier 2 describes the leak testing of pressure isolation valves (PIVs) in the APR1400 reactor, and specifies that PIVs associated with the reactor coolant system are defined in NRC Generic Letter (GL) 89-04 (dated April 3, 1989), "Guidance on Developing Acceptable Inservice Testing Programs," Attachment 1, Section 4a. In Supplement 1 to GL 89-04 (dated April 4, 1995), the NRC stated that NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," was being issued to incorporate the provisions of GL 89-04. Therefore, the NRC staff considers the reference to GL 89-04 in Section 3.9.6.3.4 of the APR1400 DCD Tier 2 to be out of date. The NRC staff requests that the APR1400 design certification applicant update Section 3.9.6.3.4 in the APR1400 DCD Tier 2 to reference the guidance in NUREG-1482 (Revision 2) for leak testing of PIVs in the APR1400 reactor.

Response

DCD section 3.9.6.3.4 will be revised to remove reference to GL 89-04 and replace it with the more up to date reference to NUREG-1482 as follows:

"The leak testing of PIVs associated with the RCS is defined in NUREG-1482, Rev.2 (Reference 60)."

Impact on DCD

DCD Section 3.9.6.3.4 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

altogether, provided the technologies demonstrate an equivalent ability to detect check valve degradation as inspection/disassembly would.

The program may be revised throughout plant life to minimize disassembly based on past disassembly experience.

3.9.6.3.4 Pressure Isolation Valve Leak Testing

The leak-tight integrity is verified for each valve relied on to provide a leak-tight function. These valves include:

The leak testing of PIVs associated with the RCS is defined in NUREG -1482, Rev.2 (Reference 60).

a. Pressure-isolation valves (PIVs) that provide isolation of a pressure differential from one part of a system to another part or between systems. ~~PIVs associated with the RCS are defined in GL 89-04, Attachment 1, Section 4a.~~ The RCS PIVs are listed in Table 3.9-14 and are tested in accordance with Table 3.9-13 and Technical Specifications surveillance requirement 3.4.13.1.

b. Temperature-isolation valves (TIVs) whose leakage may cause unacceptable thermal stress, fatigue, or stratification in the piping and thermal loading on supports or whose leakage may cause steam binding of pumps. Safety-related valves performing this duty are listed in Table 3.9-13, along with a description of specific leakage test requirements.

3.9.6.3.5 Containment Isolation Valve Leak Testing

The leak-tight integrity is verified for each valve relied on to provide a leak-tight function. These valves include containment-isolation valves (CIVs) that provide isolation capability for the piping systems penetrating containment.

CIVs are leak tested in accordance with 10 CFR Part 50, Appendix J. CIVs are listed along with their required testing in Table 6.2.4-1. Those CIVs for which a Type-C leakage rate test is specified in Table 6.2.4-1 are also tested in accordance with ASME OM Code, Subsection ISTC. These CIVs are designated in Table 3.9-13 by the valve function CIC. Those CIVs for which a Type-C leakage rate test is not specified in Table 6.2.4-1 are designated in Table 3.9-13 by the valve function CIN. The CIN valve function

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Application Section:	**3.9.6**
Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-6

Section 3.9.6.3.8, ‘‘Inservice Testing for Explosively Activated Valves,” in the APR1400 Design Control Document (DCD) Tier 2 states that the inservice testing (IST) program for explosively activated valves (commonly referred to as squib valves) is “not applicable” to the APR1400 design. The NRC staff finds that this reference to “not applicable” could be misinterpreted. Therefore, the NRC staff requests that the APR1400 design certification applicant revise Section 3.9.6.3.8 in the APR1400 DCD Tier 2 to clarify that explosively actuated valves (squib valves) are not included in the APR1400 design.

Response

DCD section 3.9.6.3.8 will be revised as follows to more clearly state that squib valves are not used in the APR1400 design:

"Explosively activated valves are not included in the APR1400 design.”

Impact on DCD

DCD Section 3.9.6.3.8 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

designation indicates that these valves are listed in Table 6.2.4-1, but are not leakage rate tested in Tables 6.2.4-1 and 3.9-13.

3.9.6.3.6 Inservice Testing Program for Safety and Relief Valves

Pressure-relief devices are tested in accordance with ASME OM Code, including Appendix I to the OM Code, for IST.

Stroke tests are performed for dual-function safety and relief valves. Power-operated relief valves subject to the IST program are tested in accordance with Subsection ISTC-5100 for Category B valves and Subsection ISTC-5240 for Category C valves. The test equipment, including gauges, transducers, load cells, and calibration standards, used to determine valve set pressure is acceptable if the overall combined accuracy does not exceed ±1 percent of the indicated (measured) set pressure.

A list of safety and relief valves included in the IST program is provided in Table 3.9-13.

3.9.6.3.7 Inservice Testing Program for Manually Operated Valves

Safety-related active manually operated valves are identified in the IST Program Plan, and exercised periodically in accordance with frequency and requirements specified in the ASME OM Code.

Manual valves are exercised at least every 2 years. Exercise of a manual valve includes a complete cycle from open to fully closed.

A list of manual valves included in the IST program is provided in Table 3.9-13.

3.9.6.3.8 Inservice Testing Program for Explosively Activated Valves

~~The in-service testing program for explosively activated valves is not applicable to the APR1400 design~~.

Explosively activated valves are not included in the APR1400 design.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

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Docket No. 52-046

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SRP Section:	**03.09.06 – Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints**
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Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-7

APR1400 DCD Tier 2, Section 3.9.6.5, "Relief Requests and Alternative Authorizations to ASME OM Code," indicates that relief requests will be made on a case-by-case basis. To address the current plans for relief requests and alternative authorizations to the ASME OM Code for the APR1400 reactor, the NRC staff requests that the APR1400 design certification applicant clarify Section 3.9.6.5 in the APR1400 DCD Tier 2 to describe any planned alternative requests under 10 CFR 50.55a(z), and relief requests under 10 CFR 50.55a(f)(6) or (g)(6) for the IST programs for pumps, valves, and dynamic restraints, as applicable. For example, Section 3.9.6.5 should specify whether any requests for relief from the ASME OM Code provisions are intended for IST activities of pumps, valves, or dynamic restraints in the APR1400 reactor. In addition, Section 3.9.6.5 should describe whether OM Code Cases will be implemented as part of the IST program for pumps, valves, and dynamic restraints as accepted in RG 1.192 as incorporated by reference in 10 CFR 50.55a, or as a separate alternative authorization pursuant to 10 CFR 50.55a(z).

Response

DCD Section 3.9.6.5 will be revised to address the current plans for relief requests and alternative authorizations to the ASME OM Code as follows:

"In case implementing the full requirements of the ASME OM Code is impractical, the relief request from the testing requirements of the ASME OM Code will be made on a case-by-case basis by the COL Applicant. The following information should be described in the relief request.

(1) Identification of the component by name, functions, ASME Section III Code class, and valve category as defined in ISTC of the ASME OM Code and pump group as defined in ISTB of the ASME OM Code.

(2) Identification of the ASME OM Code requirements from which the applicant is requesting relief or to which the applicants is requesting an alternative
(3) For a relief request under 10 CFR 50.55a(f)(6)(i) or (g)(6)(i), the basis for requesting the relief and an explanation of why compliance with the ASME OM Code is impractical
(4) For an alternative request pursuant to which 10 CFR 50.55a(a)(3), details regarding the proposed alternative(s) demonstrating that (1) the proposed IST will provide an acceptable level of quality and safety, or (2) compliance with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety
(5) ASME OM Code Cases which will be implemented as part of the IST program for pumps, valves, and dynamic restraints as accepted in RG 1.192, if applicable.

Impact on DCD

DCD Section 3.9.6.5 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

The COL applicant is to provide a table of all safety-related components that use snubbers in support systems and that includes the following information (COL 3.9(6):

In case implementing the full requirements of the ASME OM Code is impractical, the relief request from the testing requirements of the ASME OM Code will be made on a case-by-case basis by the COL Applicant. The following information should be described in the relief request.
(1) Identification of the component by name, functions, ASME Section III Code class, and valve category as defined in ISTC of the ASME OM Code and pump group as defined in ISTB of the ASME OM Code.
(2) Identification of the ASME OM Code requirements from which the applicant is requesting relief or to which the applicants is requesting an alternative
(3) For a relief request under 10 CFR 50.55a(f)(6)(i) or (g)(6)(i), the basis for requesting the relief and an explanation of why compliance with the ASME OM Code is impractical
(4) For an alternative request pursuant to which 10 CFR 50.55a(a)(3), details regarding the proposed alternative(s) demonstrating that (1) the proposed IST will provide an acceptable level of quality and safety, or (2) compliance with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety
(5) ASME OM Code Cases which will be implemented as part of the IST program for pumps, valves, and dynamic restraints as accepted in RG 1.192, if applicable.

3.9.6.5 Relief Requests and Alternative Authorizations to ASME OM Code

In case implementing the requirements of ASME OM Code is impractical, the relief request will be made on a case-by-case basis. Information provided will describe the specific area of relief requested, explain why conformance with ASME OM Code is impractical, and describe any alternative test pursuant to 10 CFR 50.55a.

3.9.7 [Reserved]

3.9.8 [Reserved]

3.9.9 Combined License Information

COL 3.9(1) The COL applicant is to provide the inspection results for the APR1400 reactor internals classified as non-prototype Category I in accordance with NRC RG 1.20.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

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Docket No. 52-046

RAI No.:	**69-7994**
SRP Section:	**03.09.06 – Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints**
Application Section:	**3.9.6**
Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-8

APR1400 Design Control Document (DCD) Tier 2, Section 3.9.9, “Combined License Information,” includes COL Information Item 3.9(4), which states that “[t]he COL applicant is to provide a full description of the IST program including PST for pumps, valves and dynamic restraints and will be administratively controlled that the applicable requirements of the ASME OM Code edition and addenda are incorporated in the IST program.” The NRC staff finds that the proposed COL Information Item is not clear. The NRC staff requests that the APR1400 design certification applicant make editorial corrections to COL Information Item 3.9(4) to clarify the action item, such as the following changes: “The COL applicant is to provide a full description of the IST program (including PST and MOV testing) for pumps, valves and dynamic restraints that ~~and~~ will be administratively controlled such that the applicable requirements of the ASME OM Code edition and addenda are incorporated in the IST program.”

Response

DCD Section 3.9.9 (4) will be revised to change a COL Item 3.9(4) to read as follows:

"The COL applicant is to provide a full description of the IST program (including PST and MOV testing) for pumps, valves and dynamic restraints that will be administratively controlled such that the applicable requirements of the ASME OM Code edition and addenda are incorporated in the IST program."

Impact on DCD

DCD Section 3.9.9 and Table 1.8-2 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

COL 3.9(2) The COL applicant is to provide a summary of the maximum total stress, deformation, and cumulative usage factor values for each of the component operating conditions for ASME Code Class 1 components except for ASME Code Class 1 nine major components. For those values that differ from the allowable limits by less than 10 percent, the contribution of each loading category (e.g., seismic, deadweight, pressure, and thermal) to the total stress is provided for each maximum stress value identified in this range.

The COL applicant is to also provide a summary of the maximum total stress and deformation values for each of the component operating conditions for Class 2 and 3 components required to shut down the reactor or mitigate consequences of a postulated piping failure without offsite power (with identification of those values that differ from the allowable limits by less than 10 percent).

COL 3.9(3) The COL applicant is to identify the site-specific active pumps.

COL 3.9~~(4)~~ (5) The COL applicant is to provide an IST program including the type of testing and frequency of site-specific pumps subject to IST in accordance with the ASME Code.

COL 3.9~~(5)~~ (6) The COL applicant is to provide an IST program including the type of testing and frequency of site-specific valves subject to IST in accordance with the ASME Code.

COL 3.9~~(6)~~ (7) The COL applicant is to provide a table listing all safety-related components that use snubbers in their support systems.

COL 3.9(4) The COL applicant is to provide a full description of the IST program (including PST and MOV testing) for pumps, valves and dynamic restraints that will be administratively controlled such that the applicable requirements of the ASME OM Code edition and addenda are incorporated in the IST program.

3.9.10 Referen

1. EPRI-NP-2.
Electric Power Research Institute, January 1982.

2. NUREG/CR-3862, "Development of Transient Initiating Event Frequencies for Use in Probabilistic Risk Assessment," U.S. Nuclear Regulatory Commission, May 1985.

Table 1.8-2 (5 of 29)

Item No.	Description
COL 3.8(7)	The COL applicant is to confirm that uneven settlement due to construction sequence of the NI basemat falls within the values specified in Table 2.0-1.
COL 3.8(8)	The COL applicant is to provide the necessary measures for foundation settlement monitoring considering site-specific conditions.
COL 3.8(9)	The COL applicant is to provide testing and inservice inspection program to examine inaccessible areas of the concrete structure for degradation and to monitor groundwater chemistry.
COL 3.8(10)	The COL application is to provide the following soil information for APR1400 site: 1) Elastic shear modulus and Poisson's ratio of the subsurface soil layers, 2) Consolidation properties including data from one-dimensional consolidation tests (initial void ratio, Cc, Ccr, OCR, and complete e-log p curves) and time-versus-consolidation plots, 3) Moisture content, Atterberg limits, grain size analyses, and soil classification, 4) Construction sequence and loading history, and 5) Excavation and dewatering programs.
COL 3.9(1)	The COL applicant is to provide the inspection results for the APR1400 reactor internals classified as non-prototype Category I in accordance with RG 1.20.
COL 3.9(2)	The COL applicant is to provide a summary of the maximum total stress, deformation, and cumulative usage factor values for each of the component operating conditions for ASME Code Class 1 components except for ASME Code Class 1 nine major components. For those values that differ from the allowable limits by less than 10 percent, the contribution of each loading category (e.g., seismic, deadweight, pressure, and thermal) to the total stress is provided for each maximum stress value identified in this range. The COL applicant is to also provide a summary of the maximum total stress and deformation values for each of the component operating conditions for Class 2 and 3 components required to shut down the reactor or mitigate consequences of a postulated piping failure without offsite power (with identification of those values that differ from the allowable limits by less than 10 percent).
COL 3.9(3)	The COL applicant is to identify the site-specific active pumps.
COL 3.9~~(4)~~ (5)	The COL applicant is to confirm the type of testing and frequency of site-specific pumps subject to IST in accordance with the ASME Code.
COL 3.9~~(5)~~ (6)	The COL applicant is to confirm the type of testing and frequency of site-specific valves subject to IST in accordance with the ASME Code.
COL 3.9~~(6)~~ (7)	The COL applicant is to provide a table listing all safety-related components that use snubbers in their support systems.
COL 3.9(4)	The COL applicant is to provide a full description of the IST program (including PST and MOV testing) for pumps, valves and dynamic restraints that will be administratively controlled such that the applicable requirements of the ASME OM Code edition and addenda are incorporated in the IST program.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**69-7994**
SRP Section:	**03.09.06 – Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints**
Application Section:	**3.9.6**
Date of RAI Issue:	**07/14/2015**

Question No. 03.09.06-9

APR1400 Design Control Document (DCD) Tier 2, Table 3.9-13, “Inservice Testing of Safety-Related Pumps and Valves,” specifies inservice testing (IST) activities and frequencies for pumps and valves in the IST program for the APR1400 reactor. NRC Standard Review Plan Section 3.9.6 specifies in its acceptance criteria that the IST program description should satisfy the IST activities and frequencies for pumps and valves provided in the applicable subsection of the ASME OM Code. The NRC staff requests that the APR1400 design certification applicant modify Table 3.9-13 to be consistent with the NRC regulations in 10 CFR 50.55a and guidance for IST programs in NUREG-1482 (as referenced in Section 3.9.6 of the APR1400 DCD Tier 2). In particular, the NRC staff considers the following changes to Table 3.9-13 to be appropriate. The applicant should evaluate all pumps and valves in Table 3.9-13 for appropriate changes similar to the specific pump and valve examples listed below.

1. Pump information should include the pump identification number, ASME OM Code Group, and specific test (Group A, Group B, and Comprehensive) and its frequency depending on OM Code Group.
2. Valve information should include the valve safety position (open, closed, or open/closed).
3. Relief valves should be specified as active Category A/C valves with position indication requirements (as applicable) in addition to other ASME OM Code, Subsection ISTC, requirements indicated in the IST table. See, for example, relief valve CS-1005 on page 3.9-173.
4. Manual valves should include position indication requirements (as applicable) in addition to other ASME OM Code, Subsection ISTC, requirements indicated in the IST table. See, for example, manual valve SI-293 on page 3.9-157.
5. Check valves should be categorized as active valves in the IST program because of their operating characteristics as indicated in NUREG-1482 (Revision 2), Section 4.1, “Check Valves.” In addition, check valves should be tested in both the open and close directions. See, for example, check valve CS-1001 on page 3.9-173.

6. The Note at the end of paragraph (h) on page 3.9-227 should justify pump curve testing to assess pump degradation with clarification of its reference to the provisions in Subsection 3.9.6.1.
7. Paragraph (i) on page 3.9-227 references Figure 3.9-15, “Typical Inservice Testing Connections,” and indicates that these typical test configurations constitute design requirements for the affected pump or valve. Paragraph (i) and Figure 3.9-15 should indicate the full set of IST program tests for pumps (such as Group A, Group B, and Comprehensive Tests) and valves (such as flow tests to periodically verify design-basis capability).

Response

A review of Table 3.9-13 was performed to correct all discrepancies noted and to keep consistency with the ASME OM Code requirements. The COL applicant will provide the full description of the IST program in accordance with COL Item 3.9(4). Table 3.9-13 (IST of Safety Related Pumps and Valves) will also be finalized by the COL applicant at that time based on the applicable OM Code. Therefore, it is not necessary or meaningful to modify Table 3.9-13 at this time during the DC stage to include all of the applicable OM Code requirements.

Impact on DCD

Table 3.9-13 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

Table 3.9-13 (1 of 90)

Inservice Testing of Safety-Related Pumps and Valves

Pump	Pump Type	Safety Class	Test Parameter [h]	Test Freq	Acceptance Criteria	Test Config.[i]	Figure No.
CCW pump 1A	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	16	9.2.2-1
CCW pump 1B	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	16	9.2.2-1
CCW pump 2A	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	16	9.2.2-1
CCW pump 2B	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	16	9.2.2-1
CCW makeup pump 3A	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	22	9.2.2-1
CCW makeup pump 3B	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	22	9.2.2-1
SI pump 1	Centrifugal	2	DP, SPs, SPo, Q, V (40)	3 mo	Table ISTB-5100-1 in ASME OM Code	18	6.3.2-1
SI pump 2	Centrifugal	2	DP, SPs, SPo, Q, V (40)	3 mo	Table ISTB-5100-1 in ASME OM Code	18	6.3.2-1
SI pump 3	Centrifugal	2	DP, SPs, SPo, Q, V (40)	3 mo	Table ISTB-5100-1 in ASME OM Code	18	6.3.2-1
SI pump 4	Centrifugal	2	DP, SPs, SPo, Q, V (40)	3 mo	Table ISTB-5100-1 in ASME OM Code	18	6.3.2-1
SC pump 1	Centrifugal vertical	2	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5100-1 in ASME OM Code	19	6.3.2-1
SC pump 2	Centrifugal vertical	2	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5100-1 in ASME OM Code	19	6.3.2-1
CS pump 3	Centrifugal	2	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	19	6.2.2-1
CS pump 4	Centrifugal	2	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	19	6.2.2-1
ESW pump 1A	Vertical line shaft centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	17	9.2.1-1
ESW pump 1B	Vertical line shaft centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	17	9.2.1-1
ESW pump 2A	Vertical line shaft centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	17	9.2.1-1
ESW pump 2B	Vertical line shaft centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	17	9.2.1-1
SFP cooling pump 1	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	20	9.1.3-1
SFP cooling pump 2	Centrifugal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	~~30~~	9.1.3-1
MD AFW pump PP02A	Centrifugal horizontal	3	DP, SPs, SPo, Q, V	3 mo	Table ISTB-5121-1 in ASME OM Code	21	10.4.9-1

1
2
20

Table 3.9-13 (3 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
RC-200	PZR POSRV	POS	SA EL	1	A/C	LT RVT LPV	~~RVT~~	RO
RC-201	PZR POSRV	POS	SA EL	1	A/C		~~RVT~~	RO
RC-202	PZR POSRV	POS	SA EL	1	A/C		~~RVT~~	RO
RC-203	PRZ POSRV	POS	SA EL	1	A/C		~~RVT~~	RO
RC-0385	POSRV relief line vent	3W	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
RC-0386	POSRV relief line vent	3W	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
RG-0410	PZR gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr
RG-0411	PZR gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr
RG-0412	PZR gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr

Table 3.9-13 (4 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
RG-0413	PZR gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr
RG-0414	Reactor vessel gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr
RG-0415	Reactor vessel gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr
RG-0416	Reactor vessel gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr
RG-0417	Reactor vessel gas vent	GL	S	1	B		S MT FS LPV	CS [12] CS [12] CS [12] 2 yr
RG-0418	RCGV discharge to reactor drain tank vent	GL	S	2	B	P	~~S~~ ~~MT~~ FS LPV	~~3 mo~~ ~~3 mo~~ 3 mo 2 yr
RG-0419	RCGV discharge to IRWST vent	GL	S	2	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr

Delete

Table 3.9-13 (5 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
RG-0420	RCGV discharge to IRWST vent	GL	S	2	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr
SI-100	IRWST return line check	CK	SA	2	A/C	CIC	S RF LT	3 mo 3 mo 2 yr
SI-101	IRWST return line check	CK	SA	2	A/C	CIC	S RF LT	3 mo 3 mo 2 yr
SI-113	SI line check	CK	SA	2	C	CIN	S RF	RO [16] RO [16]
SI-123	SI line check	CK	SA	2	C	CIN	S RF	CS [17] RO [17]
SI-133	SI line check	CK	SA	2	C	CIN	S RF	RO [16] RO [16]
SI-143	SI line check	CK	SA	2	C	CIN	S RF	CS [17] RO [17]
SI-157	CS pump suction check	CK	SA	2	C		S RF	3 mo 3 mo
SI-158	CS pump suction check	CK	SA	2	C		S RF	3 mo 3 mo
RG-1421	RCGVS vacuum relief	RV	SA	3	C		RVT	10yr

Table 3.9-13 (6 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-159	SC pump suction check	CK	SA	2	C		S RF	3 mo 3 mo
SI-160	SC pump suction check	CK	SA	2	C		S RF	3 mo 3 mo
SI-166	SI hot leg injection line relief	RV	SA	2	C		RVT	10 yr
SI-168	SCS line check	CK	SA	2	C		S RF	CS (17) 3 mo
SI-169	SCS line relief to RDT	RV	SA	1	C		RVT	5 yr
SI-178	SCS line check	CK	SA	2	C		S RF	CS (17) 3 mo
SI-179	SCS suction line relief	RV	SA	2	C	CIN	RVT	10 yr
SI-187	SCS test return line relief	RV	SA	2	C		RVT	10 yr
SI-188	SCS test return line relief	RV	SA	2	C		RVT	10 yr
SI-189	SCS suction line relief	RV	SA	2	C	CIN	RVT	10 yr
SI-211	SIT relief	RV	SA	2	C		RVT	10 yr
SI-215	SIT check	CK	SA	1	A/C	PIV	S LT RF	RR (19) 2 yr (38)
SI-217	SI line check	CK	SA	1	A/C	PIV	S LT RF	RR (20) 2 yr (38)
SI-221	SIT relief	RV	SA	2	C		RVT	10 yr
SI-225	SIT check	CK	SA	1	A/C	PIV	S LT RF	RR (19) 2 yr (38)

Table 3.9-13 (7 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-227	SI line check	CK	SA	1	A/C	PIV	S LT RF	CS [20] 2 yr (38)
SI-231	SIT relief	RV	SA	2	C		RVT	10 yr
SI-235	SIT check	CK	SA	1	A/C	PIV	S LT RF	RR [19] 2 yr (38)
SI-237	SI line check	CK	SA	1	A/C	PIV	S LT RF	RR [20] 2 yr (38)
SI-241	SIT relief	RV	SA	2	C		RVT	10 yr
SI-245	SIT check	CK	SA	1	A/C	PIV	S LT RF	RR [19] 2 yr (38)
SI-247	SI line check	CK	SA	1	A/C	PIV	S LT RF	CS [20] 2 yr (38)
SI-285	SI miniflow line relief	RV	SA	2	C		RVT	10 yr
SI-286	SI miniflow line relief	RV	SA	2	C		RVT	10 yr
SI-287	SCS test return line relief	RV	SA	2	C		RVT	10 yr
SI-289	SCS test return line relief	RV	SA	2	C		RVT	10 yr
SI-292	SIT fill return line relief	RV	SA	3	C		RVT	10 yr
SI-293	SIT fill line isolation	GL	M	2	A	P, CIC	LT	2 yr

Table 3.9-13 (9 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-309	IRWST isolation	GT	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-310	SDCHX outlet flow isolation	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-311	SDCHX outlet flow isolation	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-312	SDCHX bypass flow control	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-313	SDCHX bypass flow control	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-314	SCS test return line isolation	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-315	SCS test return line isolation	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-321	SI hot leg injection line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-322	Hot leg check valve leakage isolation	GL	AD	1	A	PIV	S MT FS LPV LT	3 mo 3 mo RO [36] 2 yr 2 yr ~~[38]~~

Table 3.9-13 (10 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-331	SI hot leg injection line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-332	Hot leg check valve leakage isolation	GL	AD	1	A	PIV	S MT FS LPV LT	3 mo 3 mo RO [36] 2 yr 2 yr ~~[36]~~
SI-340	SCS/CSS pump suction cross connect	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-341	SCS/CSS pump discharge cross connect	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-342	SCS/CSS pump suction cross connect	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-343	SCS/CSS pump discharge cross connect	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-344	SC pump suction isolation	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-346	SC pump suction isolation	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr

Table 3.9-13 (13 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-469	SCS line relief to RDT	RV	SA	1	C		RVT	5 yr
SI-473	check valve leakage line relief	RV	SA	2	C		RVT	10 yr
SI-474	SIT fill line relief	RV	SA	2	A/C	CIC	RVT LT	10 yr 2 yr
SI-522	SI hot leg injection line check	CK	SA	1	A/C	PIV	S LT RF	RO (16) 2 yr (38)
SI-523	SI hot leg injection line check	CK	SA	1	A/C	CIN, PIV	S LT RF	RO (16) 2 yr (38)
SI-532	SI hot leg injection line check	CK	SA	1	A/C	PIV	S LT RF	RO (16) 2 yr (38)
SI-533	SI hot leg injection line check	CK	SA	1	A/C	CIN, PIV	S LT RF	RO (16) 2 yr (38)
SI-540	SI line check	CK	SA	1	A/C	PIV	S LT RF	RO (16) 2 yr (38)
SI-541	SI line check	CK	SA	1	A/C	PIV	S LT RF	CS (17) 2 yr (38)
SI-542	SI line check	CK	SA	1	A/C	PIV	S LT RF	RO (16) 2 yr (38)

Table 3.9-13 (14 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-543	SI line check	CK	SA	1	A/C	PIV	S LT RF	CS [17] 2 yr (38)
SI-568	SC pump discharge check	CK	SA	2	C		S RF	3 mo 3 mo [15]
SI-569	SC pump discharge check	CK	SA	2	C		S RF	3 mo 3 mo [15]
SI-600	SCS line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-601	SCS line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-602	SI low flow control	GL	EL	2	B	CIN	S. MT LPV	3 mo 3 mo 2 yr
SI-603	SI low flow control	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-604	SI hot leg injection isolation	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr

Table 3.9-13 (16 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-613	SIT atmospheric vent isolation	GL	S	2	B		S MT FS LPV	CS [31] CS [31] CS [31] 2 yr
SI-614	SIT discharge isolation	GT	EL	1	B		S MT LPV	CS [24] CS [24] 2 yr
SI-616	SI line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-618	Check valve leakage isolation	GL	AD	1	A	PIV	S MT FS LPV. LT	3 mo 3 mo RO [36] 2 yr 2 yr [38]
SI-619	SIT nitrogen supply isolation	GL	AD	2	B		S FS LPV	EI [35] RO [35] 2 yr
SI-621	SIT fill and drain isolation	GL	AD	2	B		S MT FS LPV	3 mo 3 mo RO [36] 2 yr
SI-622	SIT nitrogen supply isolation	GL	AD	2	B		S FS LPV	EI [35] RO [35] 2 yr

Table 3.9-13 (17 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-623	SIT atmospheric vent isolation	GL	S	2	B		S MT FS LPV	CS [31] CS [31] CS [31] 2 yr
SI-624	SIT discharge isolation	GT	EL	1	B		S MT LPV	CS [24] CS [24] 2 yr
SI-626	SI line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-628	Check valve leakage isolation	GL	AD	1	A	PIV	S MT FS LPV LT	3 mo 3 mo RO [36] 2 yr 2 yr [38]
SI-629	SIT nitrogen supply isolation	GL	AD	2	B		S FS LPV	EI [35] RO [35] 2 yr
SI-631	SIT fill and drain isolation	GL	AD	2	B		S MT FS LPV	3 mo 3 mo RO[36] 2 yr
SI-632	SIT nitrogen supply isolation	GL	AD	2	B		S FS LPV	EI [35] RO [35] 2 yr

Table 3.9-13 (18 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-633	SIT atmospheric vent isolation	GL	S	2	B		S MT FS LPV	CS [31] CS [31] CS [31] 2 yr
SI-634	SIT discharge isolation	GT	EL	1	B		S MT LPV	CS [24] CS [24] 2 yr
SI-636	SI line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-638	Check valve leakage isolation	GL	AD	1	A	PIV	S MT FS LPV LT	3 mo 3 mo RO [36] 2 yr 2 yr [38]
SI-639	SIT nitrogen supply isolation	GL	AD	2	B		S FS LPV	EI [35] RO [35] 2 yr
SI-641	SIT fill and drain isolation	GL	AD	2	B		S MT FS LPV	3 mo 3 mo RO [36] 2 yr
SI-642	SIT nitrogen supply isolation	GL	AD	2	B		S FS LPV	EI [35] RO [35] 2 yr

Table 3.9-13 (19 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-643	SIT atmospheric vent isolation	GL	S	2	B		S MT FS LPV	CS [31] CS [31] CS [31] 2 yr
SI-644	SIT discharge isolation	GL	EL	1	B		S MT LPV	CS [24] CS [24] 2 yr
SI-646	SI line isolation	GL	EL	2	B	CIN	S MT LPV	3 mo 3 mo 2 yr
SI-648	Check valve leakage isolation	GL	AD	1	A	PIV	S MT FS LPV LT	3 mo 3 mo RO [36] 2 yr 2 yr ~~[38]~~
SI-649	SIT nitrogen supply isolation	GL	AD	2	B		S FS LPV	EI [35] RO [35] 2 yr
SI-651	SCS suction line isolation	GT	EL	1	A	PIV	S MT LPV LT	CS [25] CS [25] 2 yr 2 yr ~~[38]~~
SI-652	SCS suction line isolation	GT	EL	1	A	PIV	S MT LPV LT	CS [25] CS [25] 2 yr 2 yr ~~[38]~~

Table 3.9-13 (20 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-653	SCS suction line isolation	GT	EL	1	A	PIV, CIN	S MT LPV LT	CS [25] CS [25] 2 yr 2 yr ~~[36]~~
SI-654	SCS suction line isolation	GT	EL	1	A	PIV, CIN	S MT LPV LT	CS [25] CS [25] 2 yr 2 yr ~~[36]~~
SI-655	SCS suction line isolation	GT	EL	2	B	CIN	S MT LPV	CS [25] CS [25] 2 yr
SI-656	SCS suction line isolation	GT	EL	2	B	CIN	S MT LPV	CS [25] CS [25] 2 yr
SI-661	RDT isolation	GL	AD	2	B		S FS LPV	3 mo RO [36] 2 yr
SI-670	SIT drain line isolation	GL	AD	2	B		S FS LPV	3 mo RO [36] 2 yr
SI-682	SIT fill line isolation	GL	AD	2	A	CIC	S MT FS LPV LT	3 mo 3 mo 3 mo 2 yr 2 yr

Table 3.9-13 (21 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-688	SCS test return line isolation	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-690	SCS warmup line flow control	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-691	SCS warmup line flow control	GL	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
SI-693	SCS test return line isolation	GT	EL	2	B		S MT LPV	3 mo 3 mo 2 yr
~~SI-704~~	~~SIS fill check~~	~~CK~~	~~SA~~	~~2~~	~~C~~		~~S~~ ~~RF~~	~~3 mo~~ ~~3 mo~~
~~SI-705~~	~~SIS fill check~~	~~CK~~	~~SA~~	~~2~~	~~C~~		~~S~~ ~~RF~~	~~3 mo~~ ~~3 mo~~
~~SI-706~~	~~SIS fill check~~	~~CK~~	~~SA~~	~~2~~	~~C~~		~~S~~ ~~RF~~	~~3 mo~~ ~~3 mo~~
~~SI-707~~	~~SIS fill check~~	~~CK~~	~~SA~~	~~2~~	~~C~~		~~S~~ ~~RF~~	~~3 mo~~ ~~3 mo~~
~~SI-712~~	~~SCS fill check~~	~~CK~~	~~SA~~	~~2~~	~~C~~		~~S~~ ~~RF~~	~~3 mo~~ ~~3 mo~~
~~SI-713~~	~~SCS fill check~~	~~CK~~	~~SA~~	~~2~~	~~C~~		~~S~~ ~~RF~~	~~3 mo~~ ~~3 mo~~
SI-801	External emergency injection line cheek	CK	SA	2	C		S RF	3 mo 3 mo

Delete

Table 3.9-13 (22 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SI-803	External emergency injection line isolation	GT	M	2	B		S FS	3 mo 3 mo
CS-0001	Containment spray containment isolation	GT	EL	2	B		S MT ~~FS~~ LPV	3 mo 3 mo ~~RO (2 yr)~~ ~~RO (2 yr)~~
CS-0002	Containment spray containment isolation	GT	EL	2	B		S MT ~~FS~~ LPV	3 mo 3 mo ~~RO (2 yr)~~ ~~RO (2 yr)~~
CS-0003	Containment spray containment isolation	GT	EL	2	A	CIC	LT S MT ~~FS~~ LPV	RO (2 yr) RO (2 yr) 3 mo ~~RO (2 yr)~~ RO (2 yr)
CS-0004	Containment spray containment isolation	GT	EL	2	A	CIC	LT S ~~FS~~ LPV	RO (2 yr) RO (2 yr) ~~RO (2 yr)~~ RO (2 yr)
CS-0005	Containment spray IRWST return isolation	~~GT~~ GL	EL	2	B	MT	S ~~FS~~ LPV	3 mo ~~2 yr~~ 2 yr
CS-0006	Containment spray IRWST return isolation	~~GT~~ GL	EL	2	B	MT	S ~~FS~~ LPV	3 mo ~~2 yr~~ 2 yr

LPV 2yr

2 yr

2 yr
3 mo
3 mo
2 yr

3 mo

Table 3.9-13 (23 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CS-0007	Containment spray IRWST return isolation	GT	EL	2	B		S ~~FS~~ LPV	3 mo ~~2 yr~~ 2 yr
CS-0008	Containment spray IRWST return isolation	GT	EL	2	B		S ~~FS~~ LPV	3 mo ~~2 yr~~ 2 yr
CS-1001	CS pump 1A check	CK	SA	2	C	P	S ~~F~~	3 mo 3 mo
CS-1002	CS pump 1B check	CK	SA	2	C	P	S RF	3 mo 3 mo
CS-1005	CSHX 1A relief	RV	SA	2	C	P	RVT	~~RO~~ ~~(10 yr)~~
CS-1006	CSHX 1B relief	RV	SA	2	C	P	RVT	~~RO~~ ~~(10 yr)~~
CS-1007	Containment isolation check	CK	SA	2	A/C	CIC	S LT RF	~~RO (2 yr)~~
CS-1008	Containment isolation check	CK	SA	2	A/C	CIC	S LT RF	~~RO (2 yr)~~
CS-1011	Refueling pool isolation	GT	M	3	B	P	LPV	2 yr
CS-1012	Refueling pool isolation	GT	M	3	B	P	LPV	2 yr
CS-1013	ECSBS containment isolation	GT	M	2	A	P, CIC	LT	2 yr
CS-1014	ECSBS containment isolation check	CK	SA	2	A/C	CIC	S LT RF	~~RO (2 yr)~~

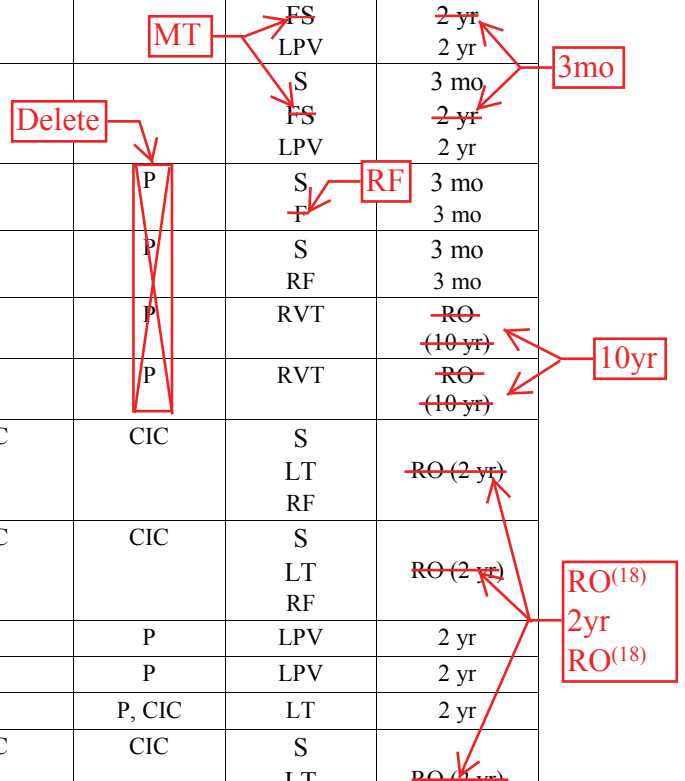

Table 3.9-13 (24 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CS-1021	CS miniflow HX 2A relief	RV	SA	3	C	P	RVT	10 yr
CS-1022	CS miniflow HX 2B relief	RV	SA	3	C	P	RVT	10 yr
CS-1023	IRWST return line relief	RV	SA	3	C	P	RVT	10 yr
CS-1024	IRWST return line relief	RV	SA	3	C	P	RVT	10 yr
IW-0001	Reactor cavity flooding isolation	GT	EL	2	B		MT S LPV	RO [34] RO [34] 2 yr
IW-0002	Reactor cavity flooding isolation	GT	EL	2	B		MT S LPV	RO [34] RO [34] 2 yr
IW-0003	Reactor cavity flooding isolation	GT	EL	2	B		MT S LPV	RO [34] RO [34] 2 yr
IW-0004	Reactor cavity flooding isolation	GT	EL	2	B		MT S LPV	RO [34] RO [34] 2 yr
IW-0010	IRWST level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	S 2 yr 3 mo 3 mo 2 yr
IW-0011	IRWST level instrument isolation	GL	S	2	~~A~~ B	~~CIC~~ CIN	~~LT~~ MT FS LPV	S ~~2 yr~~ 3 mo 3 mo 2 yr

3 mo

3 mo

Table 3.9-13 (25 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
IW-0012	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0013	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0014	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0015	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0016	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0017	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr

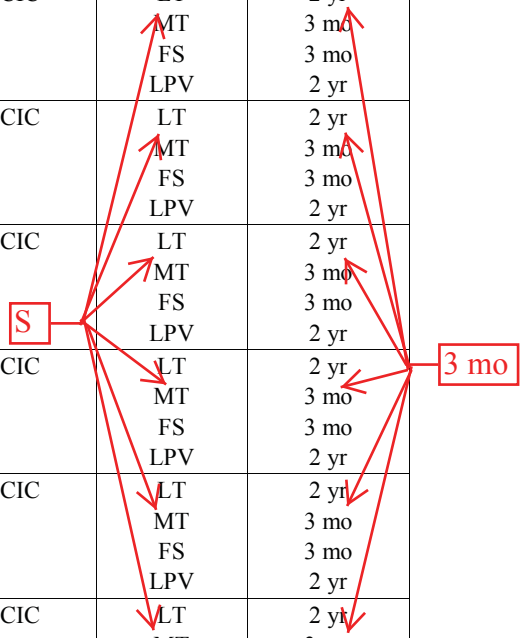

Table 3.9-13 (26 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
IW-0018	Reactor cavity level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0019	Reactor cavity level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0020	Reactor cavity level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0021	Reactor cavity level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0022	IRWST level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0023	IRWST level instrument isolation	GL	S	2	~~A~~ B	~~CIC~~ CIN	~~LT~~ S MT FS LPV	~~2 yr~~ 3 mo 3 mo 3 mo 2 yr

Table 3.9-13 (27 of 90)

Delete

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
IW-0024	IRWST level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0025	IRWST level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0026	IRWST level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0027	IRWST level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0028	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0029	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr
IW-0030	HVT level instrument isolation	GL	S	2	A	CIC	LT MT FS LPV	2 yr 3 mo 3 mo 2 yr

Table 3.9-13 (28 of 90)

Delete

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
~~IW-0031~~	~~HVT level instrument isolation~~	~~GL~~	~~S~~	~~2~~	~~A~~	~~CIC~~	~~LT~~ ~~MT~~ ~~FS~~ ~~LPV~~	~~2 yr~~ ~~3 mo~~ ~~3 mo~~ ~~2 yr~~
~~IW-0032~~	~~Reactor cavity level instrument isolation~~	~~GL~~	~~S~~	~~2~~	~~A~~	~~CIC~~	~~LT~~ ~~MT~~ ~~FS~~ ~~LPV~~	~~2 yr~~ ~~3 mo~~ ~~3 mo~~ ~~2 yr~~
~~IW-0033~~	~~Reactor cavity level instrument isolation~~	~~GL~~	~~S~~	~~2~~	~~A~~	~~CIC~~	~~LT~~ ~~MT~~ ~~FS~~ ~~LPV~~	~~2 yr~~ ~~3 mo~~ ~~3 mo~~ ~~2 yr~~
~~IW-0034~~	~~Reactor cavity level instrument isolation~~	~~GL~~	~~S~~	~~2~~	~~A~~	~~CIC~~	~~LT~~ ~~MT~~ ~~FS~~ ~~LPV~~	~~2 yr~~ ~~3 mo~~ ~~3 mo~~ ~~2 yr~~
~~IW-0035~~	~~Reactor cavity level instrument isolation~~	~~GL~~	~~S~~	~~2~~	~~A~~	~~CIC~~	~~LT~~ ~~MT~~ ~~FS~~ ~~LPV~~	~~2 yr~~ ~~3 mo~~ ~~3 mo~~ ~~2 yr~~
IW-0005	BAMP suction isolation	GT	EL	2	~~A~~ B	~~CIC~~ CIN	~~LT~~ MT S LPV	~~2 yr~~ 3 mo 3 mo 2 yr
IW-0006	BAMP suction isolation	GT	EL	2	~~A~~ B	~~CIC~~ CIN	~~LT~~ MT S LPV	~~2 yr~~ 3 mo 3 mo 2 yr

Table 3.9-13 (29 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
IW-1003	BAMP suction line relief	RV	SA	2	C	~~PIV~~ ~~CIN~~	~~LT~~ RVT	~~2 yr~~ 10 yr
CV-189	IRWST makeup line check	CK	SA	2	A/C	CIC	S LT RF	3 mo 2 yr 3 mo
CV-255	Seal injection containment isolation	GL	EL	2	A	CIC	S MT LPV LT	CS [6] CS [6] 2 yr 2 yr
CV-363	Shutdown purification line check	CK	SA	2	A/C	CIC	LT RF	2 yr CS [23]
CV-362	Shutdown purification line isolation	GT	M	2	A	P, CIC	LT LPV	2 yr 2 yr
CV-494	Resin sluice supply header to reactor drain header check	CK	SA	2	A/C	CIC	S LT RF	3 mo 2 yr 3 mo

Table 3.9-13 (30 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CV-505	RCP CBO containment isolation	GL	AD	2	A	CIC	S MT FS LPV LT	CS [7] CS [7] CS [7] 2 yr 2 yr
CV-506	RCP CBO containment isolation	GL	AD	2	A	CIC	S MT FS LPV LT	CS [7] CS [7] CS [7] 2 yr 2 yr
CV-509	IRWST makeup line containment isolation	GT	EL	2	A	CIC	S MT LPV LT	3 mo 3 mo ~~3 mo~~ 2 yr 2 yr
CV-515	Letdown isolation	GL	AD	1	A	TIV	S MT FS LPV LT	CS [8] CS [8] CS [8] 2 yr 2 yr
CV-516	Letdown isolation	GL	AD	1	A		S MT FS LPV LT	CS [8] CS [8] CS [8] 2 yr 2 yr

Table 3.9-13 (31 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CV-522	Letdown containment isolation	GL	AD	2	A	CIC	S MT FS LPV LT	CS [8] CS [8] CS [8] 2 yr 2 yr
CV-523	Letdown containment isolation	GL	AD	2	A	CIC	S MT FS LPV LT	CS [8] CS [8] CS [8] 2 yr 2 yr
CV-524	Charging containment isolation	GL	EL	2	A	CIC	S MT LPV LT	~~CS~~ [9] ~~CS~~ [9] 2 yr 2 yr
CV-560	Reactor drain tank effluent containment isolation	GL	AD	2	A	CIC	S MT FS LPV LT	3 mo 3 mo 3 mo 2 yr 2 yr
CV-561	Reactor drain tank effluent containment isolation	GL	AD	2	A	CIC	S MT FS LPV LT	3 mo 3 mo 3 mo 2 yr 2 yr

RO
RO

Table 3.9-13 (32 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CV-576	Charging flow restricting	GL	EL	2	A		LT LPV S MT	~~CS~~ [41] ~~2yr~~ ~~CS~~ [41] ~~CS~~ [41]
CV-577	Charging flow restricting	GL	EL	2	A		LT LPV MT S	~~CS~~ [41] ~~2 yr~~ ~~CS~~ [41] ~~CS~~ [41]
CV-580	Resin sluice supply header to reactor drain header isolation	GT	AD	2	A	CIC	S MT FS LPV LT	3 mo 3 mo 3 mo 2 yr 2 yr
CV-747	Charging line check	CK	SA	2	A/C	CIC	LT RF	2 yr ~~CS~~ [10]
CV-835	Seal injection containment isolation	CK	SA	2	A/C	CIC	LT RF	2 yr CS [11]
SD-0001	SG 1 blowdown isolation	GT	EL	2	B	P	LPV	2 yr
SD-0002	SG 2 blowdown isolation	GT	EL	2	B	P	LPV	2 yr
SD-0003	SG 3 blowdown isolation	GT	EL	2	B	P	LPV	2 yr
SD-0004	SG 4 blowdown isolation	GT	EL	2	B	P	LPV	2 yr
SD-0005	SG 1 blowdown to flash tank	GT	AD	2	A	CIN	S MT FS LPV LT	3 mo 3 mo 3 mo 2 yr 2 yr (39)

2yr
2yr
RO [41]
RO [41]

RO

1
2

Table 3.9-13 (33 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SD-0007	SG 1 blowdown to flash tank	GT	EL	2	A	CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr (39)
SD-0006	SG ~~1~~ blowdown to flash tank	GT	AD	2	A	CIN	S MT ~~FS~~ LPV LT	3 mo 3 mo ~~3 mo~~ 2 yr 2 yr (39)
SD-0008	SG ~~1~~ blowdown to flash tank	GT	EL	2	A	CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr (39)
SD-1115	SG 1 wet layup recirculation isolation	CK	SA	2	A/C	~~CIN~~	RF LT	CS [27] CS [27]
SD-1116	SG 2 wet layup recirculation isolation	CK	SA	2	A/C	~~CIN~~	RF LT	CS [27] CS [27]
SD-1113	SG 1 wet layup recirculation isolation	GT	M	2	A	P, ~~CIN~~	LT	CS (27)
SD-1114	SG 2 wet layup recirculation isolation	GT	M	2	A	P, ~~CIN~~	LT	CS (27)
CC-0131	Essential central chiller condenser 2A isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0132	Essential central chiller condenser 2B isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr

Table 3.9-13 (35 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CC-0939	Cross connection isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0940	Cross connection isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-1031	CCW HX 1A relief	RV	SA	3	C	P	RVT	10 yr
CC-1032	CCW HX 1B relief	RV	SA	3	C	P	RVT	10 yr
CC-1033	CCW HX 2A relief	RV	SA	3	C	P	RVT	10 yr
CC-1034	CCW HX 2B relief	RV	SA	3	C	P	RVT	10 yr
CC-1035	CCW HX 3A relief	RV	SA	3	C	P	RVT	10 yr
CC-1036	CCW HX 3B relief	RV	SA	3	C	P	RVT	10 yr
CC-1109	CCW surge tank 1A N2 supply check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1110	CCW surge tank 1B N2 supply check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1111	CCW surge tank 1A relief	RV	SA	3	C		RVT	10 yr
CC-1112	CCW surge tank 1B relief	RV	SA	3	C		RVT	10 yr
CC-1303	CCW makeup pump 3A discharge check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1304	CCW makeup pump 3B discharge check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1309	CCW surge tank 1A makeup check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1310	CCW surge tank 1B makeup check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1317	CCW surge tank 1B demi. makeup check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1318	CCW surge tank 1A demi. makeup check	CK	SA	3	C		S RF	3 mo 3 mo

A

B

Table 3.9-13 (37 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CC-0351	SCS HX 1 ~~outlet~~ isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0389	SFP HX A ~~outlet~~ isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0097	CS HX 1 ~~outlet~~ isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0145	Non-essential supply header 1 isolation	BF	EL	3	B		S MT LPV	CS [3] CS [3] 2 yr
CC-0149	Non-essential return header 1 isolation	BF	EL	3	B		S MT LPV	CS [3] CS [3] 2 yr
CC-0231	CCW supply to RCP 1A, 1B, 2A, 2B isolation	BF	EL	2	~~B~~ A	CIC	S MT LPV LT	CS [1] CS [1] 2 yr 2 yr
CC-1001	CCW pump 1A discharge check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1003	CCW pump 2A discharge check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1099	CCW supply to RCP 1A, 1B, 2A, 2B check	CK	SA	2	A/C	CIC	S RF LT	CS [2] RO [2] 2 yr

Table 3.9-13 (38 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CC-0011	CCW surge tank 01A makeup supply header isolation	~~BL~~ GL	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-1515	SC HX 1 header relief	RV	SA	3	C	P	RVT	10 yr
CC-1547	SC miniflow HX 1 header relief	RV	SA	3	C	P	RVT	10 yr
CC-0249	CCW return from RCP 1A, 1B, 2A, 2B isolation	BF	EL	2	A	CIC	S MT LPV LT	CS (1) CS (1) 2 yr 2 yr
CC-1247	CS miniflow HX 1 header relief	RV	SA	3	C	P	RVT	10 yr
CC-0250	CCW return from RCP 1A, 1B, 2A, 2B isolation	BF	EL	2	A	CIC	S MT LPV LT	CS (1) CS (1) 2 yr 2 yr
CC-1575	SFP cooling HX ~~1~~ A header relief	RV	SA	3	C	P	RVT	10 yr
CC-1215	CS HX 1 header relief	RV	SA	3	C	P	RVT	10 yr
CC-1100	CCW return from RCP 1A, 1B, 2A, 2B isolation	CK	SA	2	A/C	CIC	S LT RF	RO (2) 2 yr CS (2)
CC-1569	Essential water chiller condenser 1A header relief	RV	SA	3	C	P	RVT	10 yr
CC-1107	CCW surge tank ~~01~~ 01A vacuum relief	RV	SA	3	C		RVT	10 yr
CC-1269	Essential water chiller condenser 2A header relief	RV	SA	3	C	P	RVT	10 yr

Table 3.9-13 (39 of 90)

Delete

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
~~CC-0028~~	~~CCW HX bypass header 2 isolation~~	BF	EL	3	A		S MT LPV	3 mo 3 mo 2 yr
CC-0144	Non-essential supply header 2 isolation	BF	EL	3	B		S MT LPV	CS [3] CS [3] 2 yr
CC-0148	Non-essential return header 2 isolation	BF	EL	3	B		S MT LPV	CS [3] CS [3] 2 yr
CC-0022	CCW HX 01B outlet throttling	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0024	CCW HX 02B outlet throttling	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0026	CCW HX 03B outlet throttling	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0352	SCS HX 2 ~~outlet~~ isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0390	SFP HX ~~B outlet~~ isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-0098	CS HX 1 ~~outlet~~ isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr

Inlet

Table 3.9-13 (40 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CC-0146	Non-essential supply header 2 isolation	BF	EL	3	B		S MT LPV	CS [3] CS [3] 2 yr
CC-0150	Non-essential return header 2 isolation	BF	EL	3	B		S MT LPV	CS [3] CS [3] 2 yr
CC-1003	CCW pump 2A discharge check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1004	CCW pump 2B discharge check	CK	SA	3	C		S RF	3 mo 3 mo
~~CC-0937~~	~~Cross connection supply header isolation~~	~~BF~~	~~EL~~	~~3~~	~~B~~		~~S~~ ~~MT~~ ~~LPV~~	~~3 mo~~ ~~3 mo~~ ~~2 yr~~
~~CC-0938~~	~~Cross connection supply header isolation~~	~~BF~~	~~EL~~	~~3~~	~~B~~		~~S~~ ~~MT~~ ~~LPV~~	~~3 mo~~ ~~3 mo~~ ~~2 yr~~
~~CC-0939~~	~~Cross connection return header isolation~~	~~BF~~	~~EL~~	~~3~~	~~B~~		~~S~~ ~~MT~~ ~~LPV~~	~~3 mo~~ ~~3 mo~~ ~~2 yr~~
~~CC-0940~~	~~Cross connection return header isolation~~	~~BF~~	~~EL~~	~~3~~	~~B~~		~~S~~ ~~MT~~ ~~LPV~~	~~3 mo~~ ~~3 mo~~ ~~2 yr~~
CC-0012	CCW surge tank 01B makeup supply header isolation	~~BF~~ GL	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
CC-1516	SC HX 2 header relief	RV	SA	3	C	P	RVT	10 yr
CC-1548	SC miniflow HX 2 header relief	RV	SA	3	C	P	RVT	10 yr

Delete

Table 3.9-13 (41 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CC-1248	CS miniflow HX 2 header relief	RV	SA	3	C	P	RVT	10 yr
CC-1576	SFP cooling HX 2 header relief	RV	SA	3	C	P	RVT	10 yr
CC-1215	CS HX 1 header relief	RV	SA	3	C	P	RVT	10 yr
CC-1216	CS HX 2 header relief	RV	SA	3	C	P	RVT	10 yr
CC-0296	CCW supply to letdown HX isolation	BF	~~E~~ EL	2	A	CIC	S MT LPV LT	CS [4] CS [4] 2 yr 2 yr
CC-0297	CCW supply to letdown HX isolation	BF	EL	2	A	CIC	S MT LPV LT	CS [4] CS [4] 2 yr 2 yr
CC-0301	CCW return from letdown HX isolation	BF	EL	2	A	CIC	S MT LPV LT	CS [4] CS [4] 2 yr 2 yr
CC-0302	CCW return from letdown HX isolation	BF	EL	2	A	CIC	S MT LPV LT	CS [4] CS [4] 2 yr 2 yr
CC-1570	Essential water chiller condenser 1B header relief	RV	SA	3	C	P	RVT	10 yr
CC-1270	Essential water chiller condenser 2B header relief	RV	SA	3	C	P	RVT	10 yr
CC-1685	CCW supply to letdown HX isolation	CK	SA	2	A/C	CIC	S LT RF	CS [5] 2 yr RO [5]

Table 3.9-13 (42 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
CC-1686	CCW return from letdown HX isolation	CK	SA	2	A/C	CIC	S LT RF	RO [5] 2 yr CS [5]
CC-1108	CCW surge tank 01B vacuum relief	RV	SA	3	C		RVT	10 yr
SX-0043	ESW blowdown isolation	GT	S	3	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr
SX-0044	ESW blowdown isolation	GT	S	3	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr
SX-0045	ESW pump 1A discharge isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
SX-0046	ESW pump 1B discharge isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
SX-0047	ESW pump 2A discharge isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
SX-0048	ESW pump 2B discharge isolation	BF	EL	3	B		S MT LPV	3 mo 3 mo 2 yr
SX-1001	ESW pump 1A discharge	CK	SA	3	C		S RF	3 mo 3 mo
CC-1131	CCW Pump 1A Recirculation Check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1132	CCW Pump 1B Recirculation Check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1133	CCW Pump 2A Recirculation Check	CK	SA	3	C		S RF	3 mo 3 mo
CC-1134	CCW Pump 2B Recirculation Check	CK	SA	3	C		S RF	3 mo 3 mo

Table 3.9-13 (43 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
SX-~~1001~~ 1003	ESW pump 2A discharge	CK	SA	3	C		S RF	3 mo 3 mo
SX-1002	ESW pump 1B discharge	CK	SA	3	C		S RF	3 mo 3 mo
SX-1004	ESW pump 2B discharge	CK	SA	3	C		S RF	3 mo 3 mo
SX-1041	CCW HX 1A cold side relief	RV	SA	3	C	P	RVT	10 yr
SX-1042	CCW HX 1B cold side relief	RV	SA	3	C	P	RVT	10 yr
SX-1043	CCW HX 2A cold side relief	RV	SA	3	C	P	RVT	10 yr
SX-1044	CCW HX 2B cold side relief	RV	SA	3	C	P	RVT	10 yr
SX-1045	CCW HX 3A cold side relief	RV	SA	3	C	P	RVT	10 yr
SX-1046	CCW HX 3B cold side relief	RV	SA	3	C	P	RVT	10 yr
FC-1005	FC pump A discharge check	CK	SA	3	C		S RF	3 mo 3 mo
FC-1006	FC pump B discharge check	CK	SA	3	C		S RF	3 mo 3 mo
FC-1013	SFPC HX A relief	RV	SA	3	C	P	RVT	10yr
FC-1014	SFPC HX B relief	RV	SA	3	C	P	RVT	10 yr
FC-1142	Refueling pool cleanup suction isolation	GT	M	2	A	P, CIC	LT	2 yr
SX-1051	CCW HX Outlet Common Header Vacuum Relief	RV	SA	3	C		RVT	10 yr
SX-1052	CCW HX Outlet Common Header Vacuum Relief	RV	SA	3	C		RVT	10 yr

Table 3.9-13 (44 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
FC-1143	Refueling pool cleanup suction isolation	GT	M	2	A	P, CIC	LT	2 yr
FC-1144	Refueling pool cleanup discharge isolation	GT	M	2	A	P,CIC	LT	2 yr
FC-1145	Refueling pool cleanup discharge check valve	CK	SA	2	A/C	CIC	S LT RF	 RO (2 yr)
FC-1217	IRWST return isolation	GT	M	3	B	P	LPV	2 yr
GW-0001	Reactor drain tank gas space to GWMS	GL	~~S~~ EL	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr
GW-0002	Reactor drain tank gas space to GWMS	GL	~~EL~~ S	2	A	CIC	S MT FS LPV LT	3 mo 3 mo 3 mo 2 yr 2 yr
DE-0005	Containment building isolation	GL	~~M~~ EL	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr
DE-0006	Containment building isolation	GL	AD	2	A	CIC	S MT FS LPV LT	3 mo 3 mo 3 mo 2 yr 2 yr
HG-001	Containment Hydrogen Purge Isolation	GT	EL	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr
HG-003	Containment Hydrogen Purge Isolation	GT	EL	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr

Table 3.9-13 (49 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
AF-0036	~~Turbine~~-driven AFW pump ~~PP01B~~ flow modulating	GL	S	3	B		S MT LPV	3 mo 3 mo 2 yr
AF-0037	~~Steam~~-driven AFW pump PP01A flow modulating	GL	S	3	B		S MT LPV	3 mo 3 mo 2 yr
AF-0038	Motor-driven AFW pump ~~PP02B~~ flow modulating	GL	S	3	B		S MT LPV	3 mo 3 mo 2 yr
AF-0043	Motor-driven AFW pump PP02A AFW isolation	GT	EL	2	B	TIV, CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr (39,45)
AF-0044	~~Turbine~~-driven AFW pump ~~PP01B~~ AFW isolation	GT	EL	2	B	TIV, CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr (39,45)
AF-0045	Turbine-driven AFW pump PP01A AFW isolation	GT	EL	2	B	TIV, CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr (39,45)

Table 3.9-13 (50 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
AF-0046	~~Motor~~-driven AFW pump ~~PP02B~~ PP01B AFW isolation	GT	EL	2	B	TIV, CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr ~~(39,45)~~ (39.45)
AF-1003A	Motor-driven AF pump PP02A discharge	CK	SA	3	C		S RF	CS [44] 3 mo [44]
AF-1003B	Motor-driven AF pump PP02B discharge	CK	SA	3	C		S RF	CS [44] 3 mo [44]
AF-1004A	Turbine-driven AF pump PP01A discharge	CK	SA	3	C		S RF	CS [44] 3 mo [44]
AF-1004B	Turbine-driven AF pump PP01B discharge	CK	SA	3	C		S RF	CS [44] 3 mo [44]
AF-1007A	Motor-driven AFW pump PP02A AFW isolation	CK	SA	2	C		S RF LT	CS [44] 3 mo [44] 2 yr [39]
AF-1007B	Motor-driven AFW pump PP02B AFW isolation	CK	SA	2	C		S RF LT	CS [44] 3 mo [44] 2 yr [39]
AF-1008A	Turbine-driven AFW pump PP01A AFW isolation	CK	SA	2	C		S RF LT	CS [44] 3 mo [44] 2 yr [39]
AF-1008B	Turbine-driven AFW pump PP01B AFW isolation	CK	SA	2	C		S RF LT	CS [44] 3 mo [44] 2 yr [39]

Table 3.9-13 (51 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
AF-1022A	Chemical injection for AFW	CK	SA	3	C		S RF	CS 3 mo
AF-1022B	Chemical injection for AFW	CK	SA	3	C		S RF	CS 3 mo
AF-1024A	Chemical injection for AFW	CK	SA	3	C		S RF	CS 3 mo
AF-1024B	Chemical injection for AFW	CK	SA	3	C		S RF	CS 3 mo
AT-0007	AF pump turbine TA01A ~~emergency steam drain~~	GL	~~AD~~ P	3	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr
AT-0008	AF pump turbine TA01B ~~emergency steam drain~~	GL	~~AD~~ P	3	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr
AT-0009	AF pump turbine TA01A steam isolation	GL	~~AD~~ P	3	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr
AT-0010	AF pump turbine TA01B steam isolation	GL	~~AD~~ P	3	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr
~~AT-0011~~	AF pump turbine TA01A steam bypass	GL	AD	3	B		S MT FS LPV	3 mo 3 mo 3 mo 2 yr

Steam supply line drip leg control

Delete

Table 3.9-13 (52 of 90)

Delete

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
~~AT-0012~~	~~AF pump turbine TA01B steam isolation bypass~~	GL	AD	3	B		~~S~~ MT FS LPV	~~3 mo~~ 3 mo 3 mo ~~2 yr~~
CA-0013	Condenser vacuum exhaust gas Containment Isolation	GT	EL	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr
CA-1023	Condenser vacuum exhaust gas Containment Isolation	CK	SA	2	A/C	CIC	S LT RF	3 mo 2 yr 3 mo
DG-4022A	~~Start air receiver 40A inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4022B	~~Start air receiver 40B inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4022C	~~Start air receiver 40C inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4022D	~~Start air receiver 40D inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4030A	~~Start air receiver 41A inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4030B	~~Start air receiver 41B inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4030C	~~Start air receiver 41C inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4030D	~~Start air receiver 41D inlet~~	CK	SA	3	A/C		Note 37	Note 37
DG-4034A	Air receiver 40A discharge	CK	SA	3	C		Note 37	Note 37
DG-4034B	Air receiver 40B discharge	CK	SA	3	C		Note 37	Note 37
DG-4034C	Air receiver 40C discharge	CK	SA	3	C		Note 37	Note 37
DG-4034D	Air receiver 40D discharge	CK	SA	3	C		Note 37	Note 37
DG-4312~~B~~	Air receiver 41A discharge	CK	SA	3	C		Note 37	Note 37

Backflow prevention for the starting air compressor

A

Table 3.9-13 (56 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
FW-0133	SG 2 main FW downcomer isolation	GT	EH	2	B	CIN	S MT FS LPV LT	CS [13] CS [13] CS [13] 2 yr 2 yr [39]
FW-0134	SG 2 main FW downcomer isolation	GT	EH	2	B	CIN	S MT FS LPV LT	CS [13] CS [13] CS [13] 2 yr 2 yr [39]
FW-0138	Feedwater chemical injection valve	GL	~~AD~~ P	2	B	CIN	S MT FS LPV	3 mo 3 mo 3 mo 2 yr
FW-0139	Feedwater chemical injection valve	GL	~~AD~~ P	2	B	CIN	S MT FS LPV	3 mo 3 mo 3 mo 2 yr
FW-1035	SG 1 economizer FW line check valve	CK	SA	2	C		RF	CS [29]
FW-1036	SG 1 economizer FW line check valve	CK	SA	2	C		RF	CS [29]
FW-1037	SG 1 economizer FW line check valve	CK	SA	2	C		RF	CS [29]
FW-1039	SG 1 downcomer FW line check valve	CK	SA	2	C	~~CIN~~	RF LT	CS [29] 2yr [39]
FW-1040	SG 1 downcomer FW line check valve	CK	SA	2	C		RF LT	CS [29] 2 yr [39]
FW-1042	SG 2 economizer FW line check valve	CK	SA	2	C		RF	CS [29]
FW-1043	SG 1 economizer FW line check valve	CK	SA	2	C		RF	CS [29]

Table 3.9-13 (57 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
FW-1044	SG 2 economizer FW line check valve	CK	SA	2	C		RF	CS [29]
FW-1046	SG 2 downcomer FW line check valve	CK	SA	2	C	~~CIN~~	RF LT	CS [29] 2 yr [39]
FW-1047	SG 2 downcomer FW line check valve	CK	SA	2	C		RF LT	CS [29] 2 yr [39]
FW-1050	SG 1 feedwater chemical injection	CK	SA	2	C		S RF	3 mo 3 mo
FW-1052	SG 1 feedwater chemical injection	CK	SA	2	C		S RF	3 mo 3 mo
IA-0020	Instrumentation air supply	GL	~~AD~~ P	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr
IA-1601	Instrumentation air supply	CK	SA	2	A/C	CIC	S LT RF	3 mo 2 yr 3 mo
MS-011	SG 1 main steam isolation	GT	EH	2	B	CIN	S MT FS LPV LT	CS [14] CS [14] CS [14] 2 yr 2 yr [39]
MS-012	SG 1 main steam isolation	GT	EH	2	B	CIN	S MT FS LPV LT	CS [14] CS [14] CS [14] 2 yr 2 yr [39]

Table 3.9-13 (61 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
MS-106	SG 1 MS ADV isolation valve	GT	EL	2	B	CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr [39]
MS-107	SG 2 MS ADV isolation valve	GT	EL	2	B	CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr [39]
MS-108	SG 2 MS ADV isolation valve	GT	EL	2	B	CIN	S MT LPV LT	3 mo 3 mo 2 yr 2 yr [39]
MS-109	AF Pump turbine TA01B steam supply	GL	AD	2	B	-	S MT FS LPV	3 mo 3 mo 3 mo 2 yr
MS-110	AF Pump turbine TA01A steam supply	GL	AD	2	B	-	S MT FS LPV	3 mo 3 mo 3 mo 2 yr
MS-111	AF Pump turbine TA01B warmup supply	GL	AD	2	B	-	S MT FS LPV	3 mo 3 mo 3 mo 2 yr
MS-112	AF Pump turbine TA01A steam supply	GL	AD	2	B	-	S MT FS LPV	3 mo 3 mo 3 mo 2 yr

Table 3.9-13 (63 of 90)

Valve No.	Valve Description	Valve Type [a]	Valve Act [b]	Safety Class [c]	Code Cat [d]	Valve Funct [e]	Test Reqd [f]	Test Freq [g]
MS-1315	SG 2 main steam safety valve	RV	SA	2	C	CIN	RVT LT	5 yr 2 yr [39]
MS-1316	SG 2 main steam safety valve	RV	SA	2	C	CIN	RVT LT	5 yr 2 yr [39]
MS-1317	SG 2 main steam safety valve	RV	SA	2	C	CIN	RVT LT	5 yr 2 yr [39]
MS-1318	SG 2 main steam safety valve	RV	SA	2	C	CIN	RVT LT	5 yr 2 yr [39]
MS-1319	SG 2 main steam safety valve	RV	SA	2	C	CIN	RVT LT	5 yr 2 yr [39]
MS-1320	SG 2 main steam safety valve	RV	SA	2	C	CIN	RVT LT	5 yr 2 yr [39]
NT-0004	Nitrogen supply	GL	AD	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr
NT-1016	Nitrogen supply	CK	SA	2	A/C	CIC	S LT RF	3 mo 2 yr 3 mo
SA-0001	Service air supply	GL	~~AD~~ P	2	A	CIC	S MT LPV LT	3 mo 3 mo 2 yr 2 yr
SA-1401	Service air supply	CK	SA	2	A/C	CIC	S LT RF	3 mo 2 yr 3 mo

Table 3.9-13 (74 of 90)

Notes:

(a) Valve Type:

GL - Globe		BF - Butterfly	
GT - Gate		PK - Packless	
CK - Check		PL - Plug	
RV - Relief		POS - Pilot operated safety relief valve	
~~BL - Bal~~		3W - 3Way	
BL - Ball			

(b) Valve Actuator:

EL - Electric motor		S - Solenoid	
SA - Self actuating		EH - Electro-hydraulic	
AD - Air diaphragm		P - Piston	
M - Manual			

(c) Safety Classification as defined in Subsection 3.2.3.

(d) Valve ASME Code Category A, B, C, or D as defined in ASME OM Code, ISTC 1300.

(e) Valve Function:

CIC - Containment isolation valve as listed in Table 6.2.4-1, which is Type-C leakage rate tested in accordance with ANSI/ANS 56.8
CIN - Containment isolation valve as listed in Table 6.2.4-1, which is not Type-C leakage rate tested in accordance with ANSI/ANS 56.8
PIV - Pressure isolation valve
TIV - Temperature isolation valve
P - Passive valves as defined by ASME OM Code, ISTA-2000 are denoted by a P in this column. All other valves are active valves.

Table 3.9-13 (78 of 90)

0249

The reverse stroke (RF) test of CC-1100 is impractical to perform without isolating CC-~~0245~~1 and CC-1085 and then pressurizing against the check valve seat in the reverse flow direction via test connection CC-2086. The resultant leakage is then measured through test connection CC-2086. Since this method of testing requires access to areas of high radiation and contamination, a test of this type can be performed only during refueling. This method of testing is the same as will be employed for the ANSI/ANS 56.8-1994 Type-C leakage rate tests. Therefore, LT testing accomplishes and satisfies the reverse flow testing requirements for CC-1100.

(3) Valves: CC-0143, CC-0144, CC-0145, CC-0146, CC-0147, CC-0148, CC-0149, CC-0150

These valves close on receipt of a safety injection actuation signal to isolate the non-essential component cooling water (CCW) loops. The non-essential cooling loops provide cooling of the non-essential chillers. When Division 1 non-essential chilled water (NECW) is secured for testing of Division 1 NECW valves and Division 1 non-essential header CCW valves CC-0143, CC-0145, CC-0147, and CC-0149 may then be stroke tested. These valves will use the same test frequency as the NECW valves, as described in (28).

The Division 2 non-essential CCW header services the letdown heat exchanger in addition to the Division 2 non-essential chillers. Closing the Division 2 non-essential CCW header valves during plant operation could result in unnecessary reactor coolant system transients. Also, failure to cool the high temperature letdown flow leaving the regenerative heat exchanger can lead to cavitation at the letdown orifices, which has been known to cause line failure. Therefore, valves CC-0144, CC-0146, CC-0148, and CC-0150 will be tested during cold shutdown.

(4) Valves: CC-0296, CC-0297, CC-0301, CC-0302

These valves isolate cooling water to/from the letdown heat exchanger and close on a containment isolation actuation signal. For reasons stated in Note (3) above, testing these valves during normal operations is not practical. Therefore, these valves will be tested during cold shutdown.

(5) Valves: CC-1685, CC-1686

These valves provide containment isolation and overpressure protection for the component cooling water (CCW) supply and return lines to/from the letdown heat exchanger (refer to Figure 9.2.2-1 (4 of 4)). Since these CCW lines are to remain in service during plant operation, it is impractical to perform S or RF testing on the valves on a quarterly test frequency.

Valve CC-1685 is forward stroke tested during cold shutdown by isolating CC-0297 while keeping CC-0296 open to allow a CCW header pressure to stroke CC-1685. The reverse stroke (RF) test of CC-1685, however, is impractical to perform without isolating CC-0297, CC-1683, and CC-1681, and then pressurizing against the check valve seat in the reverse direction via test connection CC-2663. The resultant leakage is then measured through test connection CC-2662. Since this method of testing requires access to areas of high radiation and contamination, a test of this type can be performed only during refueling. This method of testing is the same as will be employed for the ANSI/ANS 56.8-1994 Type-C leakage rate tests. Therefore, LT testing accomplishes and satisfies the reverse flow testing requirement for CC-1685.

Table 3.9-13 (79 of 90)

Valve CC-1686 is reverse flow stroke tested during cold shutdown. With CCW letdown supply and return lines in service, CC-0301 and CC-1682 are isolated, thus backseating check valve CC-1686 against CCW header pressure. Any leakage past CC-1686 may then be measured via test connection CC-2667. The forward stroke (S) of CC-1686, however, is impractical to perform without isolating CC-0301, CC-1682, and CC-1684, while keeping CC-0302 open and injecting a test flow through test connection CC-2666. The resultant outleakage is then measured at test connection CC-2668. Since this valve testing methodology requires containment entries to areas of high radiation and contamination, the forward stroke testing of CC-1686 will be performed during refueling.

(6) Valves: CV-255

This valve isolates seal injection water to the RCP seals. Valve closure during normal operations with the RCPs operating would result in damage to pump seals. Therefore, this valve will be tested during cold shutdown when the RCPs are not operating.

(7) Valves: CV-505, CV-506

seal return

These valves close on receipt of a containment spray actuation signal to isolate the RCP ~~HP leakage~~ line. During normal operations, these valves are open to maintain seal injection flow across the RCP seals. Closure of these valves during normal operations would inhibit seal water flow across the RCP seals, which would result in damage to the pump seals. Therefore, these valves will be tested during cold shutdown when the RCPs are not operating.

(8) Valves: CV-515, CV-516, CV-522, CV-523

These valves are normally open to pass letdown flow from the RCS to the chemical and volume control system (CVCS). Stroking these valves during normal operations could result in unnecessary RCS transients. In addition, these valves are subjected to high stresses when cycled due to the high-pressure environment in which they operate. Repeated cycling of the valves at this high pressure could severely affect valve integrity over the expected operating life of the valves. In addition, failure of these valves in the closed position could result in a loss of pressurizer level control, forcing a unit shutdown. Therefore, these valves will be tested during cold shutdown when the effects of valve operation are minimized. Globe valve CV-515 performs a temperature isolation valve (TIV) function. This valve isolates the letdown line on a high temperature, as sensed downstream of the letdown heat exchanger by dedicated temperature monitors (refer to Figure 9.3.4-1, Sheet 1).

The setpoints of these temperature monitors and associated valve isolation actuation circuitry are such that the design temperature limits of the interfacing CVCS piping and components will not be exceeded prior to the closure of CV-515. Temperature monitors are also used to evaluate the integrity of CV-515 in this closed position. Each refueling outage, an integrity evaluation of CV-515 is performed by isolating the letdown line using CV-515, and then subjecting the valve to reactor coolant system pressure and temperature and analyzing the resultant temperature differential across the valve over time. RCS pressure and temperature may be actually lower than plant at-power RCS pressure and temperature levels to avoid valve duty stress, provided these parameters are analyzed and extrapolated to full RCS pressure and temperature.

Table 3.9-13 (80 of 90)

(9) Valves: CV-524

This valve functions as a containment isolation valve and isolates charging flow to the RCS. During normal operations, this charging flow is used to cool the letdown flow in the regenerative heat exchanger and to provide makeup to the RCS. ~~For reasons stated in Note (3), it is not practical to test this valve during normal operations~~. In addition, failure of this valve in the closed position could result in a loss of pressurizer level control, forcing a unit shutdown. Therefore, this valve will be tested during ~~cold shutdown~~ refueling because it is not practical to test during normal operation and cold shutdown.

(10) Valves: CV-747

This valve functions as a containment isolation valve. Testing requires that charging flow be isolated. As stated in Note (9) above, this is not practical during normal operations. Therefore, this valve will be tested during ~~cold shutdown~~ refueling.

(11) Valves: CV-835

This valve functions as a containment isolation valve. Testing requires that seal injection to the RCPs be isolated. As stated in Note (6), this is not practical during normal operations. Therefore, this valve will be tested during cold shutdown.

(12) Valves: RG-0410, RG-0411, RG-0412, RG-0413, RG-0414, RG-0415, RG-0416, RG-0417

These valves are closed during normal plant operations to maintain the reactor coolant pressure boundary (RCPB). These valves are active valves and are designed to be used during a safety-grade cooldown of the RCS. Opening these valves during normal operation leaves only one Class 1 valve, which does not maintain the RCPB according to 10 CFR 50.2 and ANSI/ANS 51.1 definitions. While there is a third valve downstream of the two reactor coolant gas vent system (RCGVS) valves, the piping and the third valve are Class 2. In order to maintain the integrity of the RCPB, these valves are to be tested during plant shutdown periods only and not during reactor operation.

These valves will be tested as cold shutdown valves.

(13) Valves: FW-0121, FW-0122, FW-0123, FW-0124, FW-0131, FW-0132, FW-0133, FW-0134

These valves isolate main feedwater to the SGs upon receipt of a main steam isolation signal (MSIS). Closure of these valves during normal operations would isolate feedwater to the SGs, which may result in a severe transient in the SG and a unit trip. Therefore, these valves will be tested during cold shutdown.

Table 3.9-13 (82 of 90)

(16A) Valves: SI-404, SI-405, SI-434, SI-446

These valves are reverse flow tested by pressurizing the volume of piping between these valves and their respective SI pump discharge maintenance isolation valve (SI-476, SI-478, SI-435, and SI-447) with water, and using either pressure decay or volumetric analysis to determine valve reverse seating function.

(17) Valves: SI-123, SI-143, SI-541, SI-543, SI-168, SI-178

Check valves SI-123, SI-143, SI-541, SI-543, SI-168, and SI-178 are to be provided with sufficient flow to stroke to their full-open position. This test flow ultimately passes through the DVI nozzles and into the RCS. Neither the SI nor the SC/CS pump discharge pressures are sufficient to overcome normal RCS operating pressure in order to establish the flow required to perform a partial or full stroke test of these valves. In addition, any flow from safety injection or shutdown cooling to the RCS during power operations would produce an undesirable temperature transient at the DVI nozzles. During cold shutdown, the SI pumps may not be used for stroke testing these valves, because this could result in low-temperature overpressurization of the reactor vessel. A full flow stroke test of these valves during cold shutdown is achievable by use of the SC/CS pumps.

Valves SI-123 and SI-143 are not reverse flow tested quarterly, since testing of these valves during power operations would require containment entries by testing personnel to high radiation and airborne contamination areas. These valves are not reverse flow tested every cold shutdown because of the extensive test equipment setup which could extend the cold shutdown. These valves are reverse flow tested during refueling.

(18) Valves: CS-1007, CS-1008, CS-1014

These valves are required to open to pass flow from the containment spray (CS) pumps to the containment atmosphere. These valves cannot be stroked open with CS flow, since this would result in spraying down containment. These valves will be equipped with external means to exercise the valve obturator and to measure the force required to exercise the valve open and closed (this performs both the S and RF test). Since the valves are located in a containment area subject to moderate to high radiation and contamination levels, the valves will be exercised each refueling outage, instead of during cold shutdown or plant operation (every 3 months).

(19) Valves: SI-215, SI-225, SI-235, SI-245

These SIT outlet check valves are to be provided with sufficient flow from the SITs to the RCS to stroke to their full-open position. During normal operations, the SI tanks are not capable of providing flow to the RCS, due to RCS pressure and tank pressure limitations. Also, providing flow to the DVI nozzles during plant operations would cause undesirable temperature transients at the DVI nozzles. The SITs may be used, however, to provide flow to partially stroke these valves, with minimal temperature transient impact to the DVI nozzles, when proceeding to or starting up from cold shutdown. In this configuration, a full-flow stroke test is impractical due to significant inventory additions to the RCS should the SIT water level become too low. During refueling and with the reactor head removed, full-flow testing of these valves is practical. In this condition, SIT flow may be obtained, which is sufficient to full stroke the SIT outlet check valve, with minimal risk of injecting nitrogen into the RCS. Therefore, these valves will be partially stroke tested during cold shutdown and full-stroke tested during refueling.

Table 3.9-13 (84 of 90)

CV-362, CV-363

(23) Valves: ~~CV-363~~

~~This check valve functions as a containment isolation valve and isolates the shutdown cooling purification line. During normal operation, CV-363 and manual valve CV-362 are in the closed position to isolate this line. When shutdown cooling purification is used during cold shutdown, these valves are open.~~ To provide reasonable assurance of the operability of CV-363 for its containment isolation function, this valve is reverse flow tested. Reverse flow testing of CV-363 is not practical quarterly, since during unit operation, opening of CV-362 or other venting path could result in an inter-system LOCA.

These valves function as containment isolation valves and isolate shutdown cooling purification line. The valves are close during normal operation and open during shutdown cooling purification. Therefore, these valves will be tested during cold shutdown.

The appropriate interval for such testing is during cold shutdown when the sl

(24) Valves: SI-614, SI-624, SI-634, SI-644

These valves are to be open to pass flow from the SITs to the RCS. Technical Specifications do not permit testing these valves during normal operation since all four SITs are to be operable. Normal shutdown/startup procedures require these valves to be closed when proceeding to cold shutdown and to be opened when starting up from cold shutdown. Testing of these valves will be performed at this time.

(25) Valves: SI-651, SI-652, SI-653, SI-654, SI-655, SI-656

These valves are to open to align the SC/CS pump suction to the RCS. These valves are interlocked such that they cannot be opened when RCS pressure is above the operating pressure of the SCS. Therefore, these valves cannot be tested during normal operations. Testing will be performed during cold shutdown when valves can be manipulated.

(26) Valves: VQ-0011, VQ-0012, VQ-0013, VQ-0014

These valves are to close on receipt of a CIAS to perform their containment isolation function. During normal operations, these valves are closed and Technical Specifications do not permit opening. Therefore, these valves will be tested during cold shutdown.

SD-1113, SD-1114

(27) Valves: SD-1115, SD-1116

These valves are to close on reverse flow in the SG wet layup recirculation line to perform their containment isolation function. The recirculation lines are isolated during normal operations and are only used when the SGs are in wet layup conditions such as during cold shutdown. Therefore, these valves will be tested during cold shutdown when the recirculation system is stopped.

Table 3.9-13 (86 of 90)

(31) Valves: SI-605, SI-606, SI-607, SI-608, SI-613, SI-623, SI-633, SI-634

These solenoid valves are both stroke tested (S) and fail-safe tested (FS) during cold shutdown because opening any of these valves will result in depressurizing the affected SIT, thus causing the SIT to be inoperable. These valves cannot be tested during plant operations, since plant Technical Specification 3.5.1 requires all SITs to remain operable in Mode 1 (power operations). Technical Specification LCO 3.5.1 (required action) for inoperability of any SIT requires restoration of that SIT to operable status in one hour, or commence unit shutdown. Since this LCO is too stringent to allow valve stroke or fail-safe testing of these valves during plant operations, this testing will be performed during cold shutdown.

Delete

(32) Valves: ~~FP-0030,~~ FP-1440

The safety function of valves ~~FP-0030 and~~ FP-1440 in the forward stroke direction is to relieve thermal pressure to the containment fire water supply piping and thus prevent damage to the containment penetration as a result of containment heatup following a LOCA. It is impractical to perform a forward stroke test for check valves ~~FP-0030 and~~ FP-1440 during power operations or cold shutdown for several reasons: significant radiation and contamination exposure to test personnel in containment, the necessity of disabling the sprinkler system within containment to perform the test, which jeopardizes system response to containment fire, and the extensive restoration/draining of the fire supply headers inside of containment post-testing to their normal "dry" status, which would result in extending the cold shutdown.

The reverse flow safety function is containment isolation. Reverse flow testing of these check valves is impractical during power operations or cold shutdown for several reasons: significant radiation and contamination exposure to test personnel in containment, the necessity of disabling the sprinkler systems to fill the "dry" fire water supply piping in the reverse flow test volume in order to establish backpressure on the check valve seat, which jeopardizes system response to containment fire, and the extensive restoration/draining of the fire supply headers inside of containment post-testing to their normal "dry" status, which would result in extending the cold shutdown.

(33) Valves: WM-1752

The safety function of valve WM-1752 in the forward stroke direction is to relieve thermal pressure to the containment demineralized water piping as a result of containment heatup following a LOCA. Verification of this safety function requires forward stroke testing, and use of demineralized water within containment. However, during power operations and cold shutdown, there are no users of demineralized water within containment to establish this flow, without necessitating containment entry to areas of high radiation dose and airborne contamination present during power operations and cold shutdown to manipulate manual valves at decontamination sinks, etc. The forward stroke test will be performed during refueling for ALARA purposes. Similarly, the RF test will require containment entry to areas of high radiation dose and airborne contamination present during power operations and cold shutdown. For ALARA purposes, this test will be performed during refueling.

Table 3.9-13 (89 of 90)

Auxiliary feedwater (AF) containment isolation valves are tested for gross leakage each refueling outage. The AF isolation check valves are leakage tested by individually subjecting these valves to steam generator pressures experienced during unit startup/shutdown and then measuring resultant valve leakage through the provided test connection. The outside-containment AF isolation valves are leakage tested by pressurizing the piping between these valves and their inside-containment containment isolation check valves while the steam generators are at startup/shutdown pressures. Valve leakage is then measured through the provided test connection. These AF valves also employ installed temperature instrumentation to detect leakage past these valves.

refueling because it is not practical to test during normal operation and cold shutdown.

(40) Safety Injection System

For inservice testing of the safety injection pumps during refueling outages, a walkdown visual examination of safety injection system piping and components outside containment will be conducted to verify the leak-tight integrity of the system.

(41) Valves: CV-576, CV-577

These valves limit charging flow to RCS. ~~It is not practical to test these valves during normal operations.~~ In addition, failure of these valves in the closed position could result in a loss of pressurizer level control. Therefore, these valves will be tested during ~~cold shutdown~~.

(42) Valve: PX-1005

This valve is installed to isolate the containment building and protect the overpressure of sample collecting piping of the post-accident primary sampling system (Figure 9.3.2-1). PX-1005 is closed for normal plant operation, and the right-direction and reverse-direction stroke test of PX-1005 is operated by using test-fitting. The right-direction and reverse-direction stroke test of PX-1005 is not operated every quarter because an operator has to enter the high-radiation and radiation contamination air-particle areas in the containment building during power operations. This valve is not tested during cold shutdown because cold shutdown can be extended by the installation of test equipment but tested during refueling operation.

(43) Valve: PX-1020

This valve is installed to isolate the containment building of sample collecting piping of containment atmosphere (Figure 9.3.2-1). PX-1020 is closed for normal plant operation, and the right-direction and reverse-direction stroke test of PX-1020 is operated by using test-fitting. The right-direction and reverse-direction stroke test of PX-1005 is not operated every quarter because an operator has to enter the high-radiation and radiation contamination air-particle areas in the containment building during power operations. This valve is not tested during cold shutdown because cold shutdown can be extended by the installation of test equipment but tested during refueling operation.