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TSB2 - TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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SSES MANUAL

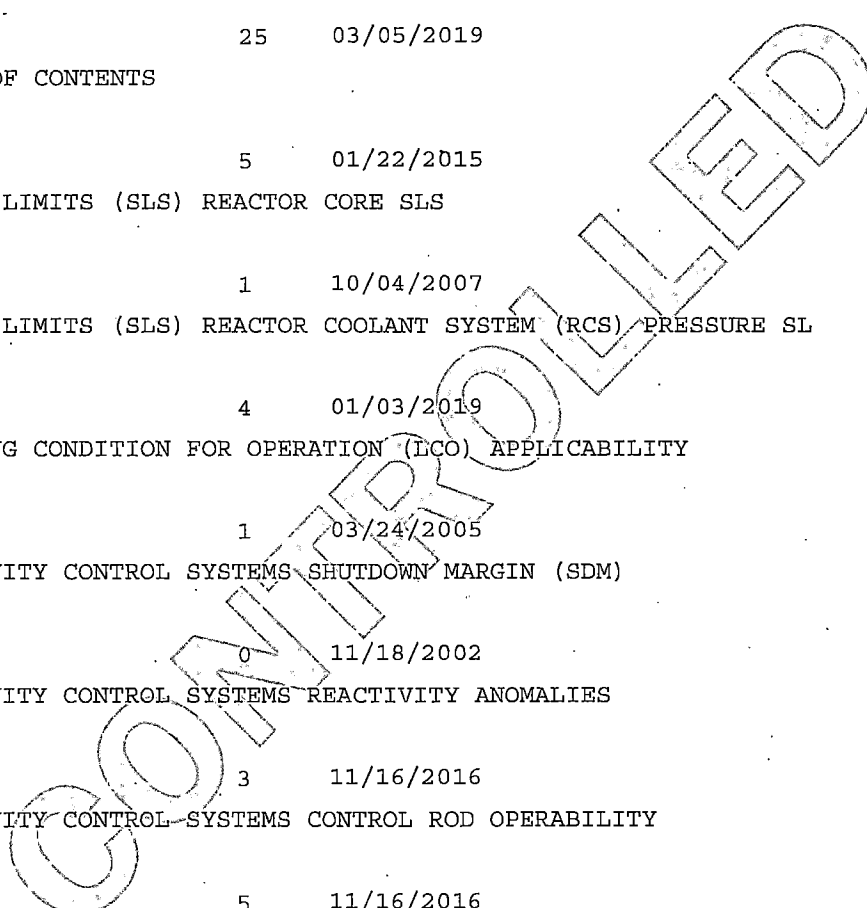
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.1.3 Primary Containment Isolation Valves (PCIVs)

#### BASES

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**BACKGROUND** The function of the PCIVs, in combination with other accident mitigation systems, including secondary containment bypass valves that are not PCIVs is to limit fission product release during and following postulated Design Basis Accidents (DBAs) to within limits. Primary containment isolation within the time limits specified for those isolation valves designed to close automatically ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a DBA.

The OPERABILITY requirements for PCIVs help ensure that an adequate primary containment boundary is maintained during and after an accident by minimizing potential paths to the environment. Therefore, the OPERABILITY requirements provide assurance that primary containment function assumed in the safety analyses will be maintained. For PCIVs, the primary containment isolation function is that the valve must be able to close (automatically or manually) and/or remain closed, and maintain leakage within that assumed in the DBA LOCA Dose Analysis. These isolation devices are either passive or active (automatic). Manual valves, de-activated automatic valves secured in their closed position (including check valves with flow through the valve secured), blind flanges, and closed systems are considered passive devices. The OPERABILITY requirements for closed systems are discussed in Technical Requirements Manual (TRM) Bases 3.6.4. Check valves, or other automatic valves designed to close without operator action following an accident, are considered active devices. Two barriers in series are provided for each penetration so that no single credible failure or malfunction of an active component can result in a loss of isolation or leakage that exceeds limits assumed in the safety analyses. One of these barriers may be a closed system.

For each division of H<sub>2</sub>O<sub>2</sub> Analyzers, the lines, up to and including the first normally closed valves within the H<sub>2</sub>O<sub>2</sub> Analyzer panels, are extensions of primary containment (i.e., closed system), and are required to be leak rate tested in accordance with the Leakage Rate Test Program. The H<sub>2</sub>O<sub>2</sub> Analyzer closed system boundary is identified in the Leakage Rate Test Program. The closed system boundary consists of those components, piping, tubing, fittings, and valves, which meet the guidance of Reference 6. The closed system provides a secondary barrier in the event of a single failure of the PCIVs, as described below. The closed system boundary

## BASES

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### BACKGROUND (continued)

between PASS and the H2O2 Analyzer system ends at the process sampling solenoid operated isolation valves between the systems (SV-22361, SV-22365, SV-22366, SV-22368, and SV-22369). These solenoid operated isolation valves do not fully meet the guidance of Reference 6 for closed system boundary valves in that they are not powered from a Class 1E power source. However, based upon a risk determination, operating these valves as closed system boundary valves is not risk significant. These valves also form the end of the Seismic Category I boundary between the systems. These process sampling solenoid operated isolation valves are normally closed and are required to be leak rate tested in accordance with the Leakage Rate Test Program as part of the closed system for the H2O2 Analyzer system. These valves are "closed system boundary valves" and may be opened under administrative control, as delineated in Technical Requirements Manual (TRM) Bases 3.6.4. Opening of these valves to permit testing of PASS in Modes 1, 2, and 3 is permitted in accordance with TRO 3.6.4.

Each H2O2 Analyzer Sampling line penetrating primary containment has two PCIVs, located just outside primary containment. While two PCIVs are provided on each line, a single active failure of a relay in the control circuitry for these valves could result in both valves failing to close or failing to remain closed. Furthermore, a single failure (a hot short in the common raceway to all the valves) could simultaneously affect all of the PCIVs within a H2O2 Analyzer division. Therefore, the containment isolation barriers for these penetrations consist of two PCIVs and a closed system. For situations where one or both PCIVs are inoperable, the ACTIONS to be taken are similar to the ACTIONS for a single PCIV backed by a closed system.

The drywell vent and purge lines are 24 inches in diameter; the suppression chamber vent and purge lines are 18 inches in diameter. The containment purge valves are normally maintained closed in MODES 1, 2, and 3 to ensure the primary containment boundary is maintained. The outboard isolation valves have 2 inch bypass lines around them for use during normal reactor operation.

The RHR Shutdown Cooling return line containment penetrations {X-13A(B)} are provided with a normally closed gate valve {HV-251F015A(B)} and a normally open globe valve {HV-251F017A(B)} outside containment and a testable check valve {HV-251F050A(B)} with a normally closed parallel air operated globe valve {HV-251F122A(B)} inside containment. The gate valve is manually opened and automatically isolates upon a containment isolation signal from the Nuclear Steam Supply Shutoff System or RPV low level 3 when the RHR System is operated in the Shutdown Cooling Mode only. The LPCI subsystem is an operational mode of the RHR System and uses the same injection lines to the RPV as the Shutdown Cooling Mode.

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BASES

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BACKGROUND  
(continued)

The design of these containment penetrations is unique in that some valves are containment isolation valves while others perform the function of pressure isolation valves. In order to meet the 10 CFR 50 Appendix J leakage testing requirements, the closed system outside containment is the only barriers tested in accordance with the Leakage Rate Test Program. HV-251F015A(B) are not required to be Appendix J leak rate tested since the Appendix J testing exemption requirements are met. Since these containment penetrations {X-13A and X-13B} include a containment isolation valve outside containment and a closed system outside containment that meets the requirements of USNRC Standard Review Plan 6.2.4 (September 1975), paragraph II.3.e, the containment isolation provisions for these penetrations provide an acceptable alternative to the explicit requirements of 10 CFR 50, Appendix A, GDC 55.

Containment penetrations X-13A(B) are also high/low pressure system interfaces. In order to meet the requirements to have two (2) isolation valves between the high pressure and low pressure systems, the HV-251F050A(B), HV-251F122A(B), 251130, and HV-251F015A(B) valves are used to meet this requirement and are tested in accordance with the pressure test program.

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APPLICABLE  
SAFETY  
ANALYSES

The PCIVs LCO was derived from the assumptions related to minimizing the loss of reactor coolant inventory, and establishing the primary containment boundary during major accidents. As part of the primary containment boundary, PCIV OPERABILITY supports leak tightness of primary containment. Therefore, the safety analysis of any event requiring isolation of primary containment is applicable to this LCO.

The DBAs that result in a release of radioactive material within primary containment are a LOCA and a main steam line break (MSLB). In the analysis for each of these accidents, it is assumed that PCIVs are either closed or close within the required isolation times following event initiation. This ensures that potential paths to the environment through PCIVs (including primary containment purge valves) and secondary containment bypass valves that are not PCIVs are minimized. The closure time of the main steam isolation valves (MSIVs) for a MSLB outside primary containment is a significant variable from a radiological standpoint. The MSIVs are required to close within 3 to 5 seconds since the 5 second closure time is assumed in the analysis. The safety analyses assume that the purge valves were closed at event initiation. Likewise, it is assumed that the primary containment is isolated such that release of fission products to the environment is controlled.

## BASES

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APPLICABLE  
SAFETY  
ANALYSES  
(continued)

The DBA analysis assumes that within the required isolation time leakage is terminated, except for the maximum allowable leakage rate,  $L_a$ .

The single failure criterion required to be imposed in the conduct of unit safety analyses was considered in the original design of the primary containment purge valves. Two valves in series on each purge line provide assurance that both the supply and exhaust lines could be isolated even if a single failure occurred.

The primary containment purge valves may be unable to close in the environment following a LOCA. Therefore, each of the purge valves is required to remain closed during MODES 1, 2, and 3 except as permitted under the Note of SR 3.6.1.3.1. In this case, the single failure criterion remains applicable to the primary containment purge valve due to failure in the control circuit associated with each valve. The primary containment purge valve design precludes a single failure from compromising the primary containment boundary as long as the system is operated in accordance with this LCO.

Both  $H_2O_2$  Analyzer PCIVs may not be able to close given a single failure in the control circuitry of the valves. The single failure is caused by a "hot short" in the cables/raceway to the PCIVs that causes both PCIVs for a given penetration to remain open or to open when required to be closed. This failure is required to be considered in accordance with IEEE-279 as discussed in FSAR Section 7.3.2a. However, the single failure criterion for containment isolation of the  $H_2O_2$  Analyzer penetrations is satisfied by virtue of the combination of the associated PCIVs and the closed system formed by the  $H_2O_2$  Analyzer piping system as discussed in the BACKGROUND section above.

The closed system boundary between PASS and the  $H_2O_2$  Analyzer system ends at the process sampling solenoid operated isolation valves between the systems (SV-22361, SV-22365, SV-22366, SV-22368, and SV-22369). The closed system is not fully qualified to the guidance of Reference 6 in that the closed system boundary valves between the  $H_2O_2$  system and PASS are not powered from a Class 1E power source. However, based upon a risk determination, the use of these valves is considered to have no risk significance. This exemption to the requirement of Reference 6 for the closed system boundary is documented in License Amendment No. 170.

PCIVs satisfy Criterion 3 of the NRC Policy Statement. (Ref. 2)

## BASES

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### LCO

PCIVs form a part of the primary containment boundary, or in the case of SCBL valves limit leakage from the primary containment. The PCIV safety function is related to minimizing the loss of reactor coolant inventory and establishing the primary containment boundary during a DBA.

The power operated, automatic isolation valves are required to have isolation times within limits and actuate on an automatic isolation signal. The valves covered by this LCO are listed in Table B 3.6.1.3-1 and Table B 3.6.1.3-2.

The normally closed PCIVs, including secondary containment bypass valves listed in Table B 3.6.1.3-2 that are not PCIVs are considered OPERABLE when manual valves are closed or open in accordance with appropriate administrative controls, automatic valves are in their closed position, blind flanges are in place, and closed systems are intact. These passive isolation valves and devices are those listed in Table B 3.6.1.3-1.

Leak rate testing of the secondary containment bypass valves listed in Table 3.6.1.3-2 is permitted in Modes 1, 2 & 3 as described in the Primary Containment Leakage Rate Testing Program.

Purge valves with resilient seals, secondary containment bypass valves, including secondary containment bypass valves listed in Table B 3.6.1.3-2 that are not PCIVs, MSIVs, and hydrostatically tested valves must meet additional leakage rate requirements. Other PCIV leakage rates are addressed by LCO 3.6.1.1, "Primary Containment," as Type B or C testing.

This LCO provides assurance that the PCIVs will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the primary containment boundary during accidents.

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### APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, PCIVs are not required to be OPERABLE and the primary containment purge valves are not required to be closed in MODES 4 and 5.

## BASES

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### ACTIONS

The ACTIONS are modified by a Note allowing penetration flow path(s) to be unisolated intermittently under administrative controls. These controls consist of stationing a dedicated operator at the controls of the valve, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for primary containment isolation is indicated.

A second Note has been added to provide clarification that, for the purpose of this LCO, separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable PCIV. Complying with the Required Actions may allow for continued operation, and subsequent inoperable PCIVs are governed by subsequent Condition entry and application of associated Required Actions.

The ACTIONS are modified by Notes 3 and 4. Note 3 ensures that appropriate remedial actions are taken, if necessary, if the affected system(s) are rendered inoperable by an inoperable PCIV (e.g., an Emergency Core Cooling System subsystem is inoperable due to a failed open test return valve). Note 4 ensures appropriate remedial actions are taken when the primary containment leakage limits are exceeded. Pursuant to LCO 3.0.6, these actions are not required even when the associated LCO is not met. Therefore, Notes 3 and 4 are added to require the proper actions be taken.

#### A.1 and A.2

With one or more penetration flow paths with one PCIV inoperable except for purge valve leakage not within limit, the affected penetration flow paths must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured. For a penetration isolated in accordance with Required Action A.1, the device used to isolate the penetration should be the closest available valve to the primary containment. The Required Action must be completed within the 4 hour Completion Time (8 hours for main steam lines). The Completion Time of 4 hours is reasonable considering the time required to isolate the penetration and the relative importance of supporting primary containment OPERABILITY during MODES 1, 2, and 3. For main steam lines, an 8 hour Completion Time is allowed. The Completion Time of 8 hours for the main steam lines allows a period of time to restore the MSIVs to OPERABLE status given the fact that MSIV closure will result in isolation of the main steam line(s) and a potential for plant shutdown.



BASES

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ACTIONS  
(continued)

A.1 and A.2 (continued)

For affected penetrations that have been isolated in accordance with Required Action A.1, the affected penetration flow path(s) must be verified to be isolated on a periodic basis. This is necessary to ensure that primary containment penetrations required to be isolated following an accident, and no longer capable of being automatically isolated, will be in the isolation position should an event occur. This Required Action does not require any testing or device manipulation. Rather, it involves verification that those devices outside containment and capable of potentially being mispositioned are in the correct position. The Completion Time of "once per 31 days for isolation devices outside primary containment" is appropriate because the devices are operated under administrative controls and the probability of their misalignment is low. For the devices inside primary containment, the time period specified "prior to entering MODE 2 or 3 from MODE 4, if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the devices and other administrative controls ensuring that device misalignment is an unlikely possibility.

Condition A is modified by a Note indicating that this Condition is only applicable to those penetration flow paths with two PCIVs except for the H<sub>2</sub>O<sub>2</sub> Analyzer penetrations. For penetration flow paths with one PCIV, Condition C provides the appropriate Required Actions. For the H<sub>2</sub>O<sub>2</sub> Analyzer penetrations, Condition D provides the appropriate Required Actions.

Required Action A.2 is modified by a Note that applies to isolation devices located in high radiation areas, and allows them to be verified by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these devices, once they have been verified to be in the proper position, is low.

B.1

With one or more penetration flow paths with two PCIVs inoperable except for purge valve leakage not within limit, either the inoperable PCIVs must be restored to OPERABLE status or the affected penetration flow path must be isolated within 1 hour. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, and a blind flange. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.1.1.

BASES

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ACTIONS  
(continued)

B.1 (continued)

Condition B is modified by a Note indicating this Condition is only applicable to penetration flow paths with two PCIVs except for the H<sub>2</sub>O<sub>2</sub> Analyzer penetrations. For penetration flow paths with one PCIV, Condition C provides the appropriate Required Actions. For the H<sub>2</sub>O<sub>2</sub> Analyzer penetrations, Condition D provides the appropriate Required Actions.

C.1 and C.2

With one or more penetration flow paths with one PCIV inoperable, the inoperable valve must be restored to OPERABLE status or the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, and a blind flange. A check valve may not be used to isolate the affected penetration. Required Action C.1 must be completed within the 72 hour Completion Time. The Completion Time of 72 hours is reasonable considering the relative stability of the closed system (hence, reliability) to act as a penetration isolation boundary and the relative importance of supporting primary containment OPERABILITY during MODES 1, 2, and 3. The closed system must meet the requirements of Reference 6. For conditions where the PCIV and the closed system are inoperable, the Required Actions of TRO 3.6.4, Condition B apply. For the Excess Flow Check Valves (EFCV), the Completion Time of 12 hours is reasonable considering the instrument and the small pipe diameter of penetration (hence, reliability) to act as a penetration isolation boundary and the small pipe diameter of the affected penetrations. In the event the affected penetration flow path is isolated in accordance with Required Action C.1, the affected penetration must be verified to be isolated on a periodic basis. This is necessary to ensure that primary containment penetrations required to be isolated following an accident are isolated. The Completion Time of once per 31 days for verifying each affected penetration is isolated is appropriate because the valves are operated under administrative controls and the probability of their misalignment is low.

Condition C is modified by a Note indicating that this Condition is only applicable to penetration flow paths with only one PCIV. For penetration flow paths with two PCIVs and the H<sub>2</sub>O<sub>2</sub> Analyzer penetration, Conditions A, B, and D provide the appropriate Required Actions.

BASES

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ACTIONS  
(continued)

C.1 and C.2 (continued)

Required Action C.2 is modified by a Note that applies to valves and blind flanges located in high radiation areas and allows them to be verified by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is low.

D.1 and D.2

With one or more H<sub>2</sub>O<sub>2</sub> Analyzer penetrations with one or both PCIVs inoperable, the inoperable valve(s) must be restored to OPERABLE status or the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, and a blind flange. A check valve may not be used to isolate the affected penetration. Required Action D.1 must be completed within the 72 hour Completion Time. The Completion Time of 72 hours is reasonable considering the unique design of the H<sub>2</sub>O<sub>2</sub> Analyzer penetrations. The containment isolation barriers for these penetrations consist of two PCIVs and a closed system. In addition, the Completion Time of 72 hours is reasonable considering the relative stability of the closed system (hence, reliability) to act as a penetration isolation boundary and the relative importance of supporting primary containment OPERABILITY during MODES 1, 2, and 3. In the event the affected penetration flow path is isolated in accordance with Required Action D.1, the affected penetration must be verified to be isolated on a periodic basis. This is necessary to ensure that primary containment penetrations required to be isolated following an accident are isolated. The Completion Time of once per 31 days for verifying each affected penetration is isolated is appropriate because the valves are operated under administrative controls and the probability of their misalignment is low.

When an H<sub>2</sub>O<sub>2</sub> Analyzer penetration PCIV is to be closed and deactivated in accordance with Condition D, this must be accomplished by pulling the fuse for the power supply, and either determining the power cables at the solenoid valve, or jumpering of the power side of the solenoid to ground.

The OPERABILITY requirements for the closed system are discussed in Technical Requirements Manual (TRM) Bases 3.6.4. In the event that either one or both of the PCIVs and the closed system are inoperable, the Required Actions of TRO 3.6.4, Condition B apply.

BASES

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ACTIONS  
(continued)

D.1 and D.2 (continued)

Condition D is modified by a Note indicating that this Condition is only applicable to the H<sub>2</sub>O<sub>2</sub> Analyzer penetrations.

E.1

With the secondary containment bypass leakage rate not within limit, the assumptions of the safety analysis may not be met. Therefore, the leakage must be restored to within limit within 4 hours. Restoration can be accomplished by isolating the penetration that caused the limit to be exceeded by use of one closed and de-activated automatic valve, closed manual valve, or blind flange. When a penetration is isolated, the leakage rate for the isolated penetration is assumed to be the actual pathway leakage through the isolation device. If two isolation devices are used to isolate the penetration, the leakage rate is assumed to be the lesser actual pathway leakage of the two devices. The 4 hour Completion Time is reasonable considering the time required to restore the leakage by isolating the penetration and the relative importance of secondary containment bypass leakage to the overall containment function.

F.1

In the event one or more containment purge valves are not within the purge valve leakage limits, purge valve leakage must be restored to within limits. The 24 hour Completion Time is reasonable, considering that one containment purge valve remains closed, except as controlled by SR 3.6.1.3.1 so that a gross breach of containment does not exist.

G.1 and G.2

If any Required Action and associated Completion Time cannot be met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

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SURVEILLANCE REQUIREMENTS SR 3.6.1.3.1

This SR ensures that the primary containment purge valves are closed as required or, if open, open for an allowable reason. If a purge valve is open in violation of this SR, the valve is considered inoperable. If the inoperable valve is not otherwise known to have excessive leakage when closed, it is not considered to have leakage outside of limits. If a LOCA inside primary containment occurs in MODES 1, 2, or 3, the purge valves may not be capable of closing before the pressure pulse affects systems downstream of the purge valves, or the release of radioactive material will exceed limits prior to the purge valves closing. At other times when the purge valves are required to be capable of closing (e.g., during handling of irradiated fuel), pressurization concerns are not present and the purge valves are allowed to be open. The SR is modified by a Note stating that the SR is not required to be met when the purge valves are open for the stated reasons. The Note states that these valves may be opened for inerting, de-inerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open. The vent and purge valves are capable of closing in the environment following a LOCA. Therefore, these valves are allowed to be open for limited periods of time. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.6.1.3.2

This SR verifies that each primary containment isolation manual valve and blind flange that is located outside primary containment and not locked, sealed, or otherwise secured and is required to be closed during accident conditions is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside the primary containment boundary is within design limits.

This SR does not require any testing or valve manipulation. Rather, it involves verification that those PCIVs outside primary containment, and capable of being mispositioned, are in the correct position. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

Two Notes have been added to this SR. The first Note allows valves and blind flanges located in high radiation areas to be verified by use of administrative controls. Allowing verification by administrative controls is considered acceptable since access to these areas is typically restricted during MODES 1, 2, and 3 for ALARA reasons. Therefore, the probability of misalignment of these PCIVs, once they have been verified to be in the proper position, is low. A second Note has been included to clarify that

BASES

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SURVEILLANCE REQUIREMENTS  
(continued) SR 3.6.1.3.2 (continued)

PCIVs that are open under administrative controls are not required to meet the SR during the time that the PCIVs are open. This SR does not apply to valves that are locked, sealed, or otherwise secured in the closed position, since these were verified to be in the correct position upon locking, sealing, or securing.

SR 3.6.1.3.3

This SR verifies that each primary containment manual isolation valve and blind flange that is located inside primary containment and not locked, sealed, or otherwise secured and is required to be closed during accident conditions is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside the primary containment boundary is within design limits. For PCIVs inside primary containment, the Frequency defined as "prior to entering MODE 2 or 3 from MODE 4 if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days" is appropriate since these PCIVs are operated under administrative controls and the probability of their misalignment is low. This SR does not apply to valves that are locked, sealed, or otherwise secured in the closed position, since these were verified to be in the correct position upon locking, sealing, or securing. Two Notes have been added to this SR. The first Note allows valves and blind flanges located in high radiation areas to be verified by use of administrative controls. Allowing verification by administrative controls is considered acceptable since the primary containment is inerted and access to these areas is typically restricted during MODES 1, 2, and 3 for ALARA reasons. Therefore, the probability of misalignment of these PCIVs, once they have been verified to be in their proper position, is low. A second Note has been included to clarify that PCIVs that are open under administrative controls are not required to meet the SR during the time that the PCIVs are open.

SR 3.6.1.3.4

The traversing incore probe (TIP) shear isolation valves are actuated by explosive charges. Surveillance of explosive charge continuity provides assurance that TIP valves will actuate when required. Other administrative controls, such as those that limit the shelf life of the explosive charges, must be followed. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.1.3.5

Verifying the isolation time of each power operated and each automatic PCIV is within limits is required to demonstrate OPERABILITY. MSIVs may be excluded from this SR since MSIV full closure isolation time is demonstrated by SR 3.6.1.3.7. The isolation time test ensures that the valve will isolate in a time period less than or equal to that assumed in the Final Safety Analyses Report. The isolation time and Frequency of this SR are in accordance with the requirements of the Inservice Testing Program.

SR 3.6.1.3.6

For primary containment purge valves with resilient seals, the Appendix J Leakage Rate Test Interval is sufficient. The acceptance criteria for these valves is defined in the Primary Containment Leakage Rate Testing Program, 5.5.12.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

If a LOCA inside primary containment occurs in MODES 1, 2, or 3, purge valve leakage must be minimized to ensure offsite radiological release is within limits. At other times when the purge valves are required to be capable of closing (e.g., during handling of irradiated fuel), pressurization concerns are not present and the purge valves are not required to meet any specific leakage criteria.

SR 3.6.1.3.7

Verifying that the isolation time of each MSIV is within the specified limits is required to demonstrate OPERABILITY. The isolation time test ensures that the MSIV will isolate in a time period that does not exceed the times assumed in the DBA analyses. This ensures that the calculated radiological consequences of these events remain within regulatory limits.

The Frequency of this SR is in accordance with the requirements of the Inservice Testing Program.

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.1.3.8

Automatic PCIVs close on a primary containment isolation signal to prevent leakage of radioactive material from primary containment following a DBA. This SR ensures that each automatic PCIV will actuate to its isolation position on a primary containment isolation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.1.5 overlaps this SR to provide complete testing of the safety function. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.6.1.3.9

This SR requires a demonstration that a representative sample of reactor instrumentation line excess flow check valves (EFCV) are OPERABLE by verifying that the valve actuates to check flow on a simulated instrument line break. As defined in FSAR Section 6.2.4.3.5 (Reference 4), the conditions under which an EFCV will isolate, simulated instrument line breaks are at flow rates, which develop a differential pressure of between 3 psid and 10 psid. This SR provides assurance that the instrumentation line EFCVs will perform its design function to check flow. No specific valve leakage limits are specified because no specific leakage limits are defined in the FSAR. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The representative sample consists of an approximate equal number of EFCVs such that each EFCV is tested at least once every 10 years (nominal). The nominal 10 year interval is based on other performance-based testing programs, such as Inservice Testing (snubbers) and Option B to 10 CFR 50, Appendix J. In addition, the EFCVs in the sample are representative of the various plant configurations, models, sizes and operating environments. This ensures that any potential common problem with a specific type or application of EFCV is detected at the earliest possible time. EFCV failures will be evaluated to determine if additional testing in that test interval is warranted to ensure overall reliability and that failures to isolate are very infrequent. Therefore, testing of a representative sample was concluded to be acceptable from a reliability standpoint (Reference 7).

SR 3.6.1.3.10

The TIP shear isolation valves are actuated by explosive charges. An in place functional test is not possible with this design. The explosive squib is removed and tested to provide assurance that the valves will actuate when required. The replacement charge for the explosive squib shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of the batch successfully fired. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.



BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.1.3.11

This SR ensures that the leakage rate of secondary containment bypass leakage paths is less than the specified leakage rate. This provides assurance that the assumptions in the radiological evaluations of Reference 4 are met. The secondary containment leakage pathways and Frequency are defined by the Primary Containment Leakage Rate Testing Program. This SR simply imposes additional acceptance criteria. In MODES other than 1, 2, or 3, the Reactor Coolant System is not pressurized and specific primary containment leakage limits are not required.

SR 3.6.1.3.12

The analyses in References 1 and 4 are based on the specified leakage rate. Leakage through each MSIV must be  $\leq 100$  scfh for anyone MSIV and  $\leq 300$  scfh for total leakage through the MSIVs combined with the Main Steam Line Drain Isolation Valve, HPCI Steam Supply Isolation Valve and the RCIC Steam Supply Isolation Valve. The MSIVs can be tested at either  $\geq P_t$  (24.3 psig) or  $P_a$  (48.6 psig). Main Steam Line Drain Isolation, HPCI and RCIC Steam Supply Line Isolation Valves, are tested at  $P_a$  (48.6 psig). In MODES other than 1, 2, or 3, the Reactor Coolant System is not pressurized and specific primary containment leakage limits are not required. The Frequency is required by the Primary Containment Leakage Rate Testing Program.

SR 3.6.1.3.13

Surveillance of hydrostatically tested lines provides assurance that the calculation assumptions of Reference 2 are met. The acceptance criteria for the combined leakage of all hydrostatically tested lines is 3.3 gpm when tested at 1.1  $P_a$ , (53.46 psig). The combined leakage rates must be demonstrated in accordance with the leakage rate test Frequency required by the Primary Containment Leakage Testing Program.

As noted in Table B 3.6.1.3-1, PCIVs associated with this SR are not Type C tested. Containment bypass leakage is prevented since the line terminates below the minimum water level in the suppression chamber. These valves are tested in accordance with the IST Program. Therefore, these valves leakage is not included as containment leakage.

In some instances, the valves are required to be capable of automatically closing during MODES other than MODES 1, 2, and 3. However, specific leakage limits are not applicable in these other MODES or conditions.

BASES

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- REFERENCES
1. FSAR, Chapter 15.
  2. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
  3. 10 CFR 50, Appendix J, Option B.
  4. FSAR, Section 6.2.
  5. NEDO-30851-P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," March 1988.
  6. Standard Review Plan 6.2.4, Rev. 1, September 1975.
  7. NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation," June 2000.
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Table B 3.6.1.3-1  
Primary Containment Isolation Valve  
(Page 1 of 10)

Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Containment Atmospheric Control	2-57-199 (d)	ILRT	Manual	N/A
	2-57-200 (d)	ILRT	Manual	N/A
	HV-25703	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25704	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25705	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25711	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25713	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25714	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25721	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25722	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25723	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25724	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25725	Containment Purge	Automatic Valve	2.b, 2.d, 2.e (15)
	HV-25766 (a)	Suppression Pool Cleanup	Automatic Valve	2.b, 2.d (35)
	HV-25768 (a)	Suppression Pool Cleanup	Automatic Valve	2.b, 2.d (30)
	HV-257113 (d)	Hardened Containment Vent	Power Operated (Air)	N/A
	HV-257114 (d)	Hardened Containment Vent	Power Operated (Air)	N/A
	SV-257100-A	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257100 B	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257101 A	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257101 B	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257102 A	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257102 B	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257103 A	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257103 B	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257104	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257105	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257106	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-257107	Containment Radiation Detection Syst	Automatic Valve	2.b, 2.d, 2.f
	SV-25734 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25734 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25736 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
SV-25736 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d	
SV-25737	Nitrogen Makeup	Automatic Valve	2.b, 2.d, 2.e	

Table B 3.6.1.3-1 Primary Containment Isolation Valve (Page 2 of 10)				
Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Containment Atmospheric Control (continued)	SV-25738	Nitrogen Makeup	Automatic Valve	2.b, 2.d, 2.e
	SV-25740 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25740 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25742 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25742 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25750 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25750 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25752 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25752 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25767	Nitrogen Makeup	Automatic Valve	2.b, 2.d, 2.e
	SV-25774 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25774 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25776 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25776 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25780 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25780 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25782 A (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25782 B (e)	Containment Atmosphere Sample	Automatic Valve	2.b, 2.d
	SV-25789	Nitrogen Makeup	Automatic Valve	2.b, 2.d, 2.e
Containment Instrument Gas	2-26-072 (d)	Containment Instrument Gas	Manual Check	N/A
	2-26-074 (d)	Containment Instrument Gas	Manual Check	N/A
	2-26-152 (d)	Containment Instrument Gas	Manual Check	N/A
	2-26-154 (d)	Containment Instrument Gas	Manual Check	N/A
	2-26-164 (d)	Containment Instrument Gas	Manual Check	N/A
	HV-22603	Containment Instrument Gas	Automatic Valve	2.c, 2.d (20)
	SV-22605	Containment Instrument Gas	Automatic Valve	2.c, 2.d
	SV-22651	Containment Instrument Gas	Automatic Valve	2.c, 2.d
	SV-22654 A	Containment Instrument Gas	Power Operated	N/A
	SV-22654 B	Containment Instrument Gas	Power Operated	N/A
	SV-22661	Containment Instrument Gas	Automatic Valve	2.b, 2.d
SV-22671	Containment Instrument Gas	Automatic Valve	2.b, 2.d	
Core Spray	HV-252F001 A (b)(c)	CS Suction	Power Operated	N/A
	HV-252F001 B (b)(c)	CS Suction	Power Operated	N/A
	HV-252F005 A	CS Injection	Power Operated	N/A
	HV-252F005 B	CS Injection	Power Operated	N/A
	HV-252F006 A	CS Injection	Air Operated Check Valve	N/A
	HV-252F006 B	CS Injection	Air Operated Check Valve	N/A
	HV-252F015 A (b)(c)	CS Test	Automatic Valve	2.c, 2.d (80)
	HV-252F015 B (b)(c)	CS Test	Automatic Valve	2.c, 2.d (80)
	HV-252F031 A (b)(c)	CS Minimum Recirculation Flow	Power Operated	N/A
	HV-252F031 B (b)(c)	CS Minimum Recirculation Flow	Power Operated	N/A

Table B 3.6.1.3-1 Primary Containment Isolation Valve (Page 3 of 10)				
Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Core Spray (continued)	HV-252F037 A	CS Injection	Power Operated (Air)	N/A
	HV-252F037 B	CS Injection	Power Operated (Air)	N/A
	XV-252F018 A	Core Spray	Excess Flow Check Valve	N/A
	XV-252F018 B	Core Spray	Excess Flow Check Valve	N/A
Demin Water	2-41-017 (d)	Demineralized Water	Manual	N/A
	2-41-018 (d)	Demineralized Water	Manual	N/A
HPCI	2-55-038 (d)	HPCI Injection	Manual	N/A
	255F046 (b) (c) (d)	HPCI Minimum Recirculation Flow	Manual Check	N/A
	255F049 (a) (d)	HPCI	Manual Check	N/A
	HV-255F002	HPCI Steam Supply	Automatic Valve	3.a, 3.b, 3.c, 3.e, 3.f, 3.g, (50)
	HV-255F003	HPCI Steam Supply	Automatic Valve	3.a, 3.b, 3.c, 3.e, 3.f, 3.g, (50)
	HV-255F006	HPCI Injection	Power Operated	N/A
	HV-255F012 (b) (c)	HPCI Minimum Recirculation Flow	Power Operated	N/A
	HV-255F042 (b) (c)	HPCI Suction	Automatic Valve	3.a, 3.b, 3.c, 3.e, 3.f, 3.g, (115)
	HV-255F066 (a)	HPCI Turbine Exhaust	Power Operated	N/A
	HV-255F075	HPCI Vacuum Breaker	Automatic Valve	3.b, 3.d, (15)
	HV-255F079	HPCI Vacuum Breaker	Automatic Valve	3.b, 3.d, (15)
	HV-255F100	HPCI Steam Supply	Automatic Valve	3.a, 3.b, 3.c, 3.e, 3.f, 3.g, (6)
	XV-255F024 A	HPCI	Excess Flow Check Valve	N/A
	XV-255F024 B	HPCI	Excess Flow Check Valve	N/A
	XV-255F024 C	HPCI	Excess Flow Check Valve	N/A
XV-255F024 D	HPCI	Excess Flow Check Valve	N/A	
Liquid Radwaste Collection	HV-26108 A1	Liquid Radwaste	Automatic Valve	2.b, 2.d (15)
	HV-26108 A2	Liquid Radwaste	Automatic Valve	2.b, 2.d (15)
	HV-26116 A1	Liquid Radwaste	Automatic Valve	2.b, 2.d (15)
	HV-26116 A2	Liquid Radwaste	Automatic Valve	2.b, 2.d (15)
Nuclear Boiler	241F010 A (d)	Feedwater	Manual Check	N/A
	241F010 B (d)	Feedwater	Manual Check	N/A
	241F039 A (d)	Feedwater Isolation Valve	Manual Check	N/A
	241F039 B (d)	Feedwater Isolation Valve	Manual Check	N/A
	241818 A (d)	Feedwater Isolation Valve	Manual Check	N/A
	241818 B (d)	Feedwater Isolation Valve	Manual Check	N/A

Table B 3.6.1.3-1  
Primary Containment Isolation Valve  
(Page 4 of 10)

Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Nuclear Boiler (continued)	HV-241F016	MSL Drain	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (10)
	HV-241F019	MSL Drain	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (15)
	HV-241F022 A	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F022 B	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F022 C	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F022 D	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F028 A	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F028 B	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F028 C	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F028 D	MSIV	Automatic Valve	1.a, 1.b, 1.c, 1.d, 1.e (5)
	HV-241F032 A	Feedwater Isolation Valve	Power Operated Check Valves	N/A
	HV-241F032 B	Feedwater Isolation Valve	Power Operated Check Valves	N/A
	XV-241F009	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F070 A	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F070 B	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F070 C	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F070 D	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F071 A	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F071 B	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F071 C	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F071 D	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F072 A	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F072 B	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F072 C	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F072 D	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F073 A	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A

Table B 3.6.1.3-1 Primary Containment Isolation Valve (Page 5 of 10)				
Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Nuclear Boiler (continued)	XV-241F073 B	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F073 C	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
	XV-241F073 D	Nuclear Boiler EFCV	Excess Flow Check Valve	N/A
Nuclear Boiler Vessel Instrumentation	XV-24201	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-24202	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F041	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F043 A	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F043 B	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F045 A	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F045 B	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F047 A	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F047B	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F051 A	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F051 B	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F051 C	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F051 D	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F053 A	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F053 B	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F053 C	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F053 D	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F055	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F057	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 A	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
XV-242F059 B	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A	

Table B 3.6.1.3-1  
Primary Containment Isolation Valve  
(Page 6 of 10)

Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Nuclear Boiler Vessel Instrumentation (continued)	XV-242F059 C	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 D	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 E	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 F	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 G	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 H	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 L	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 M	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 N	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 P	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 R	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 S	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 T	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F059 U	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
	XV-242F061	Nuclear Boiler Vessel Instrument	Excess Flow Check Valve	N/A
RB Chilled Water System	HV-28781 A1	RB Chilled Water	Automatic Valve	2.c, 2.d (40)
	HV-28781 A2	RB Chilled Water	Automatic Valve	2.c, 2.d (40)
	HV-28781 B1	RB Chilled Water	Automatic Valve	2.c, 2.d (40)
	HV-28781 B2	RB Chilled Water	Automatic Valve	2.c, 2.d (40)
	HV-28782 A1	RB Chilled Water	Automatic Valve	2.c, 2.d (12)
	HV-28782 A2	RB Chilled Water	Automatic Valve	2.c, 2.d (12)
	HV-28782 B1	RB Chilled Water	Automatic Valve	2.c, 2.d (12)
	HV-28782 B2	RB Chilled Water	Automatic Valve	2.c, 2.d (12)
	HV-28791 A1	RB Chilled Water	Automatic Valve	2.b, 2.d (15)
	HV-28791 A2	RB Chilled Water	Automatic Valve	2.b, 2.d (15)
	HV-28791 B1	RB Chilled Water	Automatic Valve	2.b, 2.d (15)
	HV-28791 B2	RB Chilled Water	Automatic Valve	2.b, 2.d (15)
	HV-28792 A1	RB Chilled Water	Automatic Valve	2.b, 2.d (8)
	HV-28792 A2	RB Chilled Water	Automatic Valve	2.b, 2.d (8)
	HV-28792 B1	RB Chilled Water	Automatic Valve	2.b, 2.d (8)



Table B 3.6.1.3-1  
Primary Containment Isolation Valve  
(Page 7 of 10)

Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))	
RB Chilled Water System (continued)	HV-28792 B2	RB Chilled Water	Automatic Valve	2.b, 2.d (8)	
RBCCW	HV-21313	RBCCW	Automatic Valve	2.c, 2.d (30)	
	HV-21314	RBCCW	Automatic Valve	2.c, 2.d (30)	
	HV-21345	RBCCW	Automatic Valve	2.c, 2.d (30)	
	HV-21346	RBCCW	Automatic Valve	2.c, 2.d (30)	
RCIC	2-49-020 (d)	RCIC Injection	Manual	N/A	
	249F021 (b) (c) (d)	RCIC Minimum Recirculation Flow	Manual Check	N/A	
	249F028 (a) (d)	RCIC Vacuum Pump Discharge	Manual Check	N/A	
	249F040 (a) (d)	RCIC Turbine Exhaust	Manual Check	N/A	
	FV-249F019 (b) (c)	RCIC Minimum Recirculation Flow	Power Operated	N/A	
	HV-249F007	RCIC Steam Supply	Automatic Valve	4.a, 4.b, 4.c, 4.e, 4.f, 4.g (20)	
	HV-249F008	RCIC Steam Supply	Automatic Valve	4.a, 4.b, 4.c, 4.e, 4.f, 4.g (20)	
	HV-249F013	RCIC Injection	Power Operated	N/A	
	HV-249F031 (b) (c)	RCIC Suction	Power Operated	N/A	
	HV-249F059 (a)	RCIC Turbine Exhaust	Power Operated	N/A	
	HV-249F060 (a)	RCIC Vacuum Pump Discharge	Power Operated	N/A	
	HV-249F062	RCIC Vacuum Breaker	Automatic Valve	4.b, 4.d (10)	
	HV-249F084	RCIC Vacuum Breaker	Automatic Valve	4.b, 4.d (10)	
	HV-249F088	RCIC Steam Supply	Automatic Valve	4.a, 4.b, 4.c, 4.e, 4.f, 4.g (12)	
	XV-249F044 A	RCIC	Excess Flow Check Valve	N/A	
	XV-249F044 B	RCIC	Excess Flow Check Valve	N/A	
	XV-249F044 C	RCIC	Excess Flow Check Valve	N/A	
	XV-249F044 D	RCIC	Excess Flow Check Valve	N/A	
	Reactor Recirculation	243F013 A (d)	Recirculation Pump Seal Water	Manual Check	N/A
		243F013 B (d)	Recirculation Pump Seal Water	Manual Check	N/A
HV-243F019		Reactor Coolant Sample	Automatic Valve	2.b (9)	
HV-243F020		Reactor Coolant Sample	Automatic Valve	2.b (2)	
XV-243F003 A		Reactor Recirculation	Excess Flow Check Valve	N/A	
XV-243F003 B		Reactor Recirculation	Excess Flow Check Valve	N/A	
XV-243F004 A		Reactor Recirculation	Excess Flow Check Valve	N/A	
XV-243F004 B	Reactor Recirculation	Excess Flow Check Valve	N/A		

Table B 3.6.1.3-1 Primary Containment Isolation Valve (Page 8 of 10)				
Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Reactor Recirculation (continued)	XV-243F009 A	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F009 B	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F009 C	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F009 D	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F010 A	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F010 B	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F010 C	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F010 D	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F011 A	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F011 B	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F011 C	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F011 D	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F012 A	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F012 B	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F012 C	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F012 D	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F017 A	Recirculation Pump Seal Water	Excess Flow Check Valve	N/A
	XV-243F017 B	Recirculation Pump Seal Water	Excess Flow Check Valve	N/A
	XV-243F040 A	Reactor Recirculation	Excess Flow Check Valve	N/A
	XV-243F040 B	Reactor Recirculation	Excess Flow Check Valve	N/A
XV-243F040 C	Reactor Recirculation	Excess Flow Check Valve	N/A	
XV-243F040 D	Reactor Recirculation	Excess Flow Check Valve	N/A	
XV-243F057 A	Reactor Recirculation	Excess Flow Check Valve	N/A	
XV-243F057 B	Reactor Recirculation	Excess Flow Check Valve	N/A	
Residual Heat Removal	HV-251F004 A (b) (c)	RHR – Suppression Pool Suction	Power Operated	N/A
	HV-251F004 B (b) (c)	RHR – Suppression Pool Suction	Power Operated	N/A
	HV-251F004 C (b) (c)	RHR – Suppression Pool Suction	Power Operated	N/A

Table B 3.6.1.3-1 Primary Containment Isolation Valve (Page 9 of 10)					
Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))	
Residual Heat Removal (continued)	HV-251F004 D(b) (c)	RHR – Suppression Pool Suction	Power Operated	N/A	
	HV-251F007 A (b) (c)	RHR – Minimum Recirculation	Power Operated	N/A	
	HV-251F007 B (b) (c)	RHR – Minimum Recirculation	Power Operated	N/A	
	HV-251F008 (h)	RHR – Shutdown Cooling Suction	Automatic Valve	6.a, 6.b, 6.c (52)	
	HV-251F009 (h)	RHR – Shutdown Cooling Suction	Automatic Valve	6.a, 6.b, 6.c (52)	
	HV-251F011 A (b) (d) (h)	RHR – Suppression Pool Cooling	Manual	N/A	
	HV-251F011 B (b) (d) (h)	RHR – Suppression Pool Cooling	Manual	N/A	
	HV-251F015 A (f) (h)	RHR – Shutdown Cooling Return/LPCI Injection	Power Operated	N/A	
	HV-251F015 B (f) (h)	RHR – Shutdown Cooling Return/LPCI Injection	Power Operated	N/A	
	HV-251F016 A (b) (h)	RHR – Drywell Spray	Automatic Valve	2.c, 2.d (90)	
	HV-251F016 B (b) (h)	RHR – Drywell Spray	Automatic Valve	2.c, 2.d (90)	
	HV-251F022 (h)	RHR – Reactor Vessel Head Spray	Automatic Valve	2.d, 6.a, 6.b, 6.c (30)	
	HV-251F023 (h)	RHR – Reactor Vessel Head Spray	Automatic Valve	2.d, 6.a, 6.b, 6.c (20)	
	HV-251F028 A (b) (h)	RHR – Suppression Pool Cooling/Spray	Automatic Valve	2.c, 2.d (90)	
	HV-251F028 B (b) (h)	RHR – Suppression Pool Cooling/Spray	Automatic Valve	2.c, 2.d (90)	
	HV-251F050 A (g)	RHR – Shutdown Cooling Return/LPCI Injection	Air Operated Check Valve	N/A	
	HV-251F050 B (g)	RHR – Shutdown Cooling Return/LPCI Injection	Air Operated Check Valve	N/A	
	HV-251F103 A (b)	RHR Heat Exchanger Vent	Power Operated	N/A	
	HV-251F103 B (b)	RHR Heat Exchanger Vent	Power Operated	N/A	
	HV-251F122 A (g)	RHR – Shutdown Cooling Return/LPCI Injection	Power Operated (Air)	N/A	
	HV-251F122 B (g)	RHR – Shutdown Cooling Return/LPCI Injection	Power Operated (Air)	N/A	
	PSV-25106 A (b) (d)	RHR- Relief Valve Discharge	Relief Valve	N/A	
	PSV-25106 B (b) (d)	RHR- Relief Valve Discharge	Relief Valve	N/A	
	PSV-251F126 (d) (h)	RHR- Shutdown Cooling Suction	Relief Valve	N/A	
	XV-25109 A	RHR	Excess Flow Check Valve	N/A	
	XV-25109 B	RHR	Excess Flow Check Valve	N/A	
	XV-25109 C	RHR	Excess Flow Check Valve	N/A	
	XV-25109 D	RHR	Excess Flow Check Valve	N/A	
	RWCU	HV-244F001 (a)	RWCU Suction	Automatic Valve	5.a, 5.b, 5.c, 5.d, 5.f, 5.g (30)
		HV-244F004 (a)	RWCU Suction	Automatic Valve	5.a, 5.b, 5.c, 5.d, 5.e, 5.f, 5.g (30)
	XV-24411 A	RWCU	Excess Flow Check Valve	N/A	
	XV-24411 B	RWCU	Excess Flow Check Valve	N/A	

Table B 3.6.1.3-1 Primary Containment Isolation Valve (Page 10 of 10)				
Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
RWCU (continued)	XV-24411 C	RWCU	Excess Flow Check Valve	N/A
	XV-24411 D	RWCU	Excess Flow Check Valve	N/A
	XV-244F046	RWCU	Excess Flow Check Valve	N/A
	HV-24182 A	RWCU Return	Power Operated	N/A
	HV-24182 B	RWCU Return	Power Operated	N/A
SLCS	248F007 (a) (d)	SLCS	Manual Check	N/A
	HV-248F006 (a)	SLCS	Power Operated Check Valve	N/A
TIP System	C51-J004 A (Ball Valve)	TIP Ball Valves	Automatic Valve	7.a, 7.b (5)
	C51-J004 B (Ball Valve)	TIP Ball Valves	Automatic Valve	7.a, 7.b (5)
	C51-J004 C (Ball Valve)	TIP Ball Valves	Automatic Valve	7.a, 7.b (5)
	C51-J004 D (Ball Valve)	TIP Ball Valves	Automatic Valve	7.a, 7.b (5)
	C51-J004 E (Ball Valve)	TIP Ball Valves	Automatic Valve	7.a, 7.b (5)
TIP System (continued)	C51-J004 A (Shear Valve)	TIP Shear Valves	Squib Valve	N/A
	C51-J004 B (Shear Valve)	TIP Shear Valves	Squib Valve	N/A
	C51-J004 C (Shear Valve)	TIP Shear Valves	Squib Valve	N/A
	C51-J004 D (Shear Valve)	TIP Shear Valves	Squib Valve	N/A
	C51-J004 E (Shear Valve)	TIP Shear Valves	Squib Valve	N/A

- (a) Isolation barrier remains filled or a water seal remains in the line post-LOCA, isolation valve is tested with water. Isolation valve leakage is not included in 0.60 L<sub>a</sub> total Type B and C tests.
- (b) Redundant isolation boundary for this valve is provided by the closed system whose integrity is verified by the Leakage Rate Test Program. This footnote does not apply to valve 255F046 (HPCI) when the associated PCIV, HV255F012 is closed and deactivated. Similarly, this footnote does not apply to valve 249F021 (RCIC) when it's associated PCIV, FV249F019 is closed and deactivated.
- (c) Containment Isolation Valves are not Type C tested. Containment bypass leakage is prevented since the line terminates below the minimum water level in the Suppression Chamber. Refer to the IST Program.
- (d) LCO 3.3.3.1, "PAM Instrumentation," Table 3.3.3.1-1, Function 6, (PCIV Position) does not apply since these are relief valves, check valves, manual valves or deactivated and closed.
- (e) The containment isolation barriers for the penetration associated with this valve consists of two PCIVs and a closed system. The closed system provides a redundant isolation boundary for both PCIVs, and its integrity is required to be verified by the Leakage Rate Test Program.
- (f) Redundant isolation boundary for this valve is provided by the closed system whose integrity is verified by the Leakage Rate Test Program.
- (g) These valves are not required to be 10 CFR 50, Appendix J tested since the HV-251F015A(B) valves (see note (h)) and a closed system form the 10 CFR 50, Appendix J boundary. These valves form a high/low pressure interface and are pressure tested in accordance with the pressure test program.
- (h) Isolation barrier remains filled or a water seal remains in the line post-LOCA. Type C testing is not required.

Table B 3.6.1.3-2  
 Secondary Containment Bypass Leakage Isolation Valves  
 (Not PCIVs)  
 (Page 1 of 1)

Plant System	Valve Number	Valve Description	Type of Valve	Isolation Signal LCO 3.3.6.1 Function No. (Maximum Isolation Time (Seconds))
Residual Heat Removal	HV-251F040	RHR – RADWASTE LINE IB ISO VLV	Automatic Valve	2.a, 2.d (45)
	HV-251F049	RHR – DISCH TO RADW OB ISO VLV	Automatic Valve	2.a, 2.d (20)
	2-51-136	RHR - COND TRANSFER OB SCBL CHECK VALVE	Check Valve	N/A
	2-51-137	RHR - COND TRANSFER IB SCBL CHECK VALVE	Check Valve	N/A

B 3.7 PLANT SYSTEMS

B 3.7.1 Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)

BASES

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**BACKGROUND** The RHRSW System is designed to provide cooling water for the Residual Heat Removal (RHR) System heat exchangers, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. The RHRSW System is operated whenever the RHR heat exchangers are required to operate in the shutdown cooling mode or in the suppression pool cooling or spray mode of the RHR System.

The RHRSW System consists of two independent and redundant subsystems. Each subsystem is made up of a header, one pump, a suction source, valves, piping, heat exchanger, and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to maintain safe shutdown conditions. The two subsystems are separated so that failure of one subsystem will not affect the OPERABILITY of the other subsystem. One Unit 1 RHRSW subsystem and the associated (same division) Unit 2 RHRSW subsystem constitute a single RHRSW loop. The two RHRSW pumps in a loop can each, independently, be aligned to either Unit's heat exchanger. The RHRSW System is designed with sufficient redundancy so that no single active component failure can prevent it from achieving its design function. The RHRSW System is described in the FSAR, Section 9.2.6, Reference 1.

Cooling water is pumped by the RHRSW pumps from the UHS through the tube side of the RHR heat exchangers. After removing heat from the RHRSW heat exchanger, the water is discharged to the spray pond (UHS) by way of the UHS return loops. The UHS return loops direct the return flow to a network of sprays that dissipate the heat to the atmosphere or directly to the UHS via a bypass header.

The system is initiated manually from the control room except for the spray array bypass manual valves that are operated locally in the event of a failure of the spray array bypass valves. The system can be started any time the LOCA signal is manually overridden or clears.

BASES

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BACKGROUND  
(continued)

The ultimate heat sink (UHS) system is composed of approximately 3,300,000 cubic foot spray pond and associated piping and spray risers. Each UHS return loop contains a bypass line, a large spray array and a small spray array. The purpose of the UHS is to provide both a suction source of water and a return path for the RHRSW and ESW systems. The function of the UHS is to provide water to the RHRSW and ESW systems at a temperature less than the 97°F design temperature of the RHRSW and ESW systems. UHS temperature is maintained less than the design temperature by introducing the hot return fluid from the RHRSW and ESW systems into the spray loops and relying on spray cooling to maintain temperature. The UHS is designed to supply the RHRSW and ESW systems with all the cooling capacity required during a combination LOCA/LOOP for thirty days without fluid addition. The UHS is described in the FSAR, Section 9.2.7 (Reference 1).

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APPLICABLE  
SAFETY  
ANALYSES

The RHRSW System removes heat from the suppression pool to limit the suppression pool temperature and primary containment pressure following a LOCA. This ensures that the primary containment can perform its function of limiting the release of radioactive materials to the environment following a LOCA. The ability of the RHRSW System to support long term cooling of the reactor or primary containment is discussed in the FSAR, Chapters 6 and 15 (Refs. 2 and 3, respectively). These analyses explicitly assume that the RHRSW System will provide adequate cooling support to the equipment required for safe shutdown. These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

The safety analyses for long term cooling were performed for various RHRSW and UHS configurations combinations of RHR System failures. As discussed in the FSAR, Section 6.2.2 (Ref. 2) for these analyses, manual initiation of the OPERABLE RHRSW subsystem and the associated RHR System is required. The maximum suppression chamber water temperature and pressure are analyzed to be below the design temperature of 220°F and maximum allowable pressure of 53 psig.

The UHS design takes into account the cooling efficiency of the spray arrays and the evaporation losses during design basis environmental conditions. The spray array bypass header provides the flow path for the ESW and RHRSW system to keep the spray array headers from freezing. The small and/or large spray arrays are placed in service to dissipate heat returning from the plant. The UHS return header is comprised of the spray array bypass header, the large spray array, and the small spray array.

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BASES

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APPLICABLE  
SAFETY  
ANALYSES  
(continued)

The spray array bypass header is capable of passing full flow from the RHRSW and ESW systems in each loop. The large spray array is capable of passing full flow from the RHRSW and ESW systems in each loop. The small spray array supports heat dissipation when low system flows are required.

The RHRSW System, together with the UHS, satisfy Criterion 3 of the NRC Policy Statement. (Ref. 4)

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LCO

Two RHRSW subsystems are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads, assuming the worst case single active failure occurs coincident with the loss of offsite power.

An RHRSW subsystem is considered OPERABLE when:

- a. One pump is OPERABLE; and
- b. An OPERABLE flow path is capable of taking suction from the UHS and transferring the water to the RHR heat exchanger and returning it to the UHS at the assumed flow rate, and
- c. An OPERABLE UHS.

The OPERABILITY of the UHS is based on having a minimum water level at the overflow weir of 678 feet 1 inch above mean sea level and a maximum water temperature of 85°F; unless either unit is in MODE 3. If a unit enters MODE 3, the time of entrance into this condition determines the appropriate maximum ultimate heat sink fluid temperature. If the earliest unit to enter MODE 3 has been in that condition for less than twelve (12) hours, the peak temperature to maintain OPERABILITY of the ultimate heat sink remains at 85°F. If either unit has been in MODE 3 for more than twelve (12) hours but less than twenty-four (24) hours, the OPERABILITY temperature of the ultimate heat sink becomes 87°F. If either unit has been in MODE 3 for twenty-four (24) hours or more, the OPERABILITY temperature of the ultimate heat sink becomes 88°F.

In addition, the OPERABILITY of the UHS is based on having sufficient spray capacity in the UHS return loops. Sufficient spray capacity is defined as one large and one small spray array in one loop.

This OPERABILITY definition is supported by analysis and evaluations performed in accordance with the guidance given in Regulatory Guide 1.27.

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BASES

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**APPLICABILITY** In MODES 1, 2, and 3, the RHRSW System and the UHS are required to be OPERABLE to support the OPERABILITY of the RHR System for primary containment cooling (LCO 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," and LCO 3.6.2.4, "Residual Heat Removal (RHR) Suppression Pool Spray") and decay heat removal (LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System-Hot Shutdown"). The Applicability is therefore consistent with the requirements of these systems.

In MODES 4 and 5, the OPERABILITY requirements of the RHRSW System are determined by the RHR shutdown cooling subsystem(s) it supports (LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; LCO 3.9.7, "Residual Heat Removal (RHR) - High Water Level"; and LCO 3.9.8, "Residual Heat Removal (RHR) - Low Water Level").

In MODES 4 and 5, the OPERABILITY requirements of the UHS is determined by the systems it supports.

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**ACTIONS**

The ACTIONS are modified by a Note indicating that the applicable Conditions of LCO 3.4.8, be entered and Required Actions taken if the inoperable RHRSW subsystem results in inoperable RHR shutdown cooling (SDC) (i.e., both the Unit 1 and Unit 2 RHRSW pumps in a loop are inoperable resulting in the associated RHR SDC system being inoperable). This is an exception to LCO 3.0.6 because the Required Actions of LCO 3.7.1 do not adequately compensate for the loss of RHR SDC Function (LCO 3.4.8).

Condition A is modified by a separate note to allow separate Condition entry for each valve. This is acceptable since the Required Action for this Condition provide appropriate compensatory actions.

A.1, A.2 and A.3

With one spray loop bypass valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return loop. As a result, the associated RHRSW subsystem must be declared inoperable.

With one spray loop bypass valve not capable of being opened on demand, a return flow path is not available. As a result, the associated RHRSW subsystems must be declared inoperable.

BASES

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ACTIONS  
(continued)

A.1, A.2 and A.3 (continued)

With one spray array bypass manual valve not capable of being closed, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return path if the spray array bypass valve fails to close. As a result, the associated RHRSW subsystems must be declared inoperable.

With one spray array bypass manual valve not open, a return flow path is not available. As a result, the associated RHRSW subsystems must be declared inoperable.

With one large spray array valve not capable of being opened on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the full required spray cooling capability of the affected UHS return path. With one large spray array valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the small spray array when loop flows are low as the required spray nozzle pressure is not achievable for the small spray array. As a result, the associated RHRSW subsystems must be declared inoperable.

With one small spray array valve not capable of being opened on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return path for low loop flow rates. For a single failure of the large spray array valve in the closed position, design bases LOCA/LOOP calculations assume that flow is reduced on the affected loop within 3 hours after the event to allow use of the small spray array. With one small spray array valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the large spray array for a flow path as the required nozzle pressure is not achievable for the large spray array. As a result, the associated RHRSW subsystems must be declared inoperable.

With any UHS return path valve listed in Tables 3.7.1-1, 3.7.1-2, or 3.7.1-3 inoperable, the UHS return path is no longer single failure proof.

For combinations of inoperable valves in the same loop, the UHS spray capacity needed to support the OPERABILITY of the associated Unit 1 and Unit 2 RHRSW subsystems is affected. As a result, the associated RHRSW subsystems must be declared inoperable.

The 8-hour completion time to establish the flow path provides sufficient time to open a path and de-energize the appropriate valve in the open position.

BASES

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ACTIONS  
(continued)

A.1, A.2 and A.3 (continued)

The 72-hour completion time is based on the fact that, although adequate UHS spray loop capability exists during this time period, both units are affected and an additional single failure results in a system configuration that will not meet design basis accident requirements.

The Completion Time to restore the Unit 2 RHRSW inoperable valves has been extended to 7 days in order to complete the replacement of the Unit 1 480 V ESS Load Center Transformers 1X210 and 1X220. This is a temporary extension of the Completion Time and is applicable during the transformer replacement. In order to cope with the consequences of a LOOP, a LOCA in Unit 2 and the shutdown of Unit 1 during the extended Completion Time, the following compensatory actions are required: 1) the affected loop's spray array bypass valves are in the open position and 2) the affected loop's spray array valves are closed. Upon completion of the transformer replacements, this temporary extension is no longer applicable and will expire on June 15, 2020.

If an additional RHRSW subsystem on either Unit is inoperable, cooling capacity less than the minimum required for response to a design basis event would exist. Therefore, an 8-hour Completion Time is appropriate. The 8-hour Completion Time provides sufficient time to restore inoperable equipment and there is a low probability that a design basis event would occur during this period.

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if one Unit 2 RHRSW subsystem is inoperable. Although designated and operated as a unitized system, the associated Unit 1 subsystem is directly connected to a common header which can supply the associated RHR heat exchanger in either unit. The associated Unit 1 subsystem is considered capable of supporting the associated Unit 2 RHRSW subsystem when the Unit 1 subsystem is OPERABLE and can provide the assumed flow to the Unit 2 heat exchanger. A Completion time of 72 hours, when the associated Unit 1 RHRSW subsystem is not capable of supporting the associated Unit 2 RHRSW subsystem, is allowed to restore the Unit 2 RHRSW subsystem to OPERABLE status. In this configuration, the remaining OPERABLE Unit 2 RHRSW subsystem is adequate to perform the RHRSW heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE RHRSW subsystem could result in loss of RHRSW function. The Completion Time is based on the redundant RHRSW capabilities afforded by the OPERABLE subsystem and the low probability of an event occurring requiring RHRSW during this period.

BASES

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ACTIONS  
(continued)

B.1 (continued)

The Completion Time to restore the Unit 2 RHRSW subsystem has been extended to 7 days in order to complete the replacement of the Unit 1 480 V ESS Load Center Transformers 1X210 and 1X220. This is a temporary extension of the Completion Time and is applicable during the transformer replacement. The Unit 2 RHRSW subsystem remains functional since the subsystem has an operable pump, operable flow path and an operable UHS. Upon completion of the transformer replacements, this temporary extension is no longer applicable and will expire on June 15, 2020.

Additionally, the Completion Time to restore the Unit 2 RHRSW system has been extended to 14 days in order to complete the replacement of a portion of the Unit 1 ESW piping. This is a temporary extension of the Completion Time and is applicable during the Unit 1 ESW piping replacement. When utilizing the temporary Completion Time extension, the 72 hour and 7 day Completion Times do not apply.

In order to cope with the consequences of a LOCA/LOOP in Unit 2 during the extended Completion Time, the following compensatory measure is required: Provisions will be implemented to restore piping integrity to allow use of the Unit 2 RHRSW system within the current LCO Completion Time. Upon completion of the Unit 1 ESW piping replacement, this temporary extension is no longer applicable and will expire on June 25, 2026.

With one RHRSW subsystem inoperable, and the respective Unit 1 RHRSW subsystem capable of supporting the respective Unit 2 RHRSW subsystem, the design basis cooling capacity for both units can still be maintained even considering a single active failure. However, the configuration does reduce the overall reliability of the RHRSW System. Therefore, provided the associated Unit 1 subsystem remains capable of supporting its respective Unit 2 RHRSW subsystem, the inoperable RHRSW subsystem must be restored to OPERABLE status within 7 days. The 7-day Completion Time is based on the remaining RHRSW System heat removal capability.

C.1

Required Action C.1 is intended to ensure that appropriate actions are taken if both Unit 2 RHRSW subsystems are inoperable. Although designated and operated as a unitized system, the associated Unit 1 subsystem is directly connected to a common header which can supply the associated RHR heat exchanger in either unit. With both Unit 2 RHRSW subsystems inoperable, the RHRSW system is still capable of performing its intended design function. However, the loss of an additional RHRSW subsystem on Unit 1 results in the cooling capacity to be less than the minimum required for

BASES

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ACTIONS  
(continued)

C.1 (continued)

response to a design basis event. Therefore, the 8-hour Completion Time is appropriate. The 8-hour Completion Time for restoring one RHRSW subsystem to OPERABLE status, is based on the Completion Times provided for the RHR suppression pool spray function.

With both Unit 2 RHRSW subsystems inoperable, and both of the Unit 1 RHRSW subsystems capable of supporting their respective Unit 2 RHRSW subsystem, if no additional failures occur which impact the RHRSW System, the remaining OPERABLE Unit 1 subsystems and flow paths provide adequate heat removal capacity following a design basis LOCA. However, capability for this alignment is not assumed in long term containment response analysis and an additional single failure in the RHRSW System could reduce the system capacity below that assumed in the safety analysis.

Therefore, continued operation is permitted only for a limited time. One inoperable subsystem is required to be restored to OPERABLE status within 72 hours. The 72 hour Completion Time for restoring one inoperable RHRSW subsystem to OPERABLE status is based on the fact that the alternate loop is capable of providing the required cooling capability during this time period.

D.1 and D.2

If the RHRSW subsystems cannot be restored to OPERABLE status within the associated Completion Times, or the UHS is determined to be inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.7.1.1

This SR verifies the water level to be sufficient for the proper operation of the RHRSW pumps (net positive suction head and pump vortexing are considered in determining this limit). The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.7.1.2

Verification of the UHS temperature, which is the arithmetical average of the UHS temperature near the surface, middle and bottom levels, ensures that the heat removal capability of the ESW and RHRSW Systems are within the assumptions of the DBA analysis. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.1.3

Verifying the correct alignment for each manual, power operated, and automatic valve in each RHRSW subsystem flow path provides assurance that the proper flow paths will exist for RHRSW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be realigned to its accident position. This is acceptable because the RHRSW System is a manually initiated system.

This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.1.4

The UHS spray array bypass valves are required to actuate to the closed position for the UHS to perform its design function. These valves receive an automatic signal to open upon emergency service water (ESW) or residual heat removal service water (RHRSW) system pump start and are required to be operated from the control room or the remote shutdown panel. A spray bypass valve is considered to be inoperable when it cannot be closed on demand. Failure of the spray bypass valve to close on demand puts the UHS at risk to exceed its design temperature. The failure of the spray bypass valve to open on demand makes one return path unavailable, and therefore the associated RHRSW subsystems must be declared inoperable. This SR demonstrates that the valves will move to their required positions when required. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.7.1.5

The UHS return header large spray array valves are required to open in order for the UHS to perform its design function. These valves are manually actuated from either the control room or the remote shutdown panel, under station operating procedure, when the RHRSW system is required to remove energy from the reactor vessel or suppression pool. This SR demonstrates that the valves will move to their required positions when required. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.1.6

The small spray array valves HV-01224A2 and B2 are required to operate in order for the UHS to perform its design function. These valves are manually actuated from the control room or the remote shutdown panel, under station operating procedure, when the RHRSW system is required to remove energy from the reactor vessel or suppression pool. This SR demonstrates that the valves will move to their required positions when required. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.1.7

The spray array bypass manual valves 012287A and B are required to operate in the event of a failure of the spray array bypass valves to close in order for the UHS to perform its design function. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

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REFERENCES

1. FSAR, Section 9.2.
  2. FSAR, Chapter 6.
  3. FSAR, Chapter 15.
  4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
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B 3.7 PLANT SYSTEMS

B 3.7.2 Emergency Service Water (ESW) System

BASES

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**BACKGROUND** The ESW System is designed to provide cooling water for the removal of heat from equipment, such as the diesel generators (DGs), residual heat removal (RHR) pump coolers, and room coolers for Emergency Core Cooling System equipment, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. Upon receipt of a loss of offsite power or loss of coolant accident (LOCA) signal, ESW pumps are automatically started after a time delay.

The ESW System consists of two independent and redundant subsystems. Each of the two ESW subsystems is made up of a header, two pumps, a suction source, valves, piping and associated instrumentation. The two subsystems are separated from each other so an active single failure in one subsystem will not affect the OPERABILITY of the other subsystem. A continuous supply of water is provided to ESW from the Service Water System for the keepfill system. This supply is not required for ESW operability.

Cooling water is pumped from the Ultimate Heat Sink (UHS) by the ESW pumps to the essential components through the two main headers. After removing heat from the components, the water is discharged to the spray pond (UHS) by way of a network of sprays that dissipate the heat to the atmosphere or directly to the UHS via a bypass header.

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**APPLICABLE  
SAFETY  
ANALYSES**

Sufficient water inventory is available for all ESW System post LOCA cooling requirements for a 30 day period with no additional makeup water source available. The ability of the ESW System to support long term cooling is assumed in evaluations of the equipment required for safe reactor shutdown presented in the FSAR, Chapters 4 and 6 (Refs. 1 and 2, respectively).

The ability of the ESW System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in References 1 and 2. The ability to provide onsite emergency AC power is dependent on the ability of the ESW System to cool the DGs. The long term cooling capability of the RHR and core spray pumps is also dependent on the cooling provided by the ESW System.

The ESW System satisfies Criterion 3 of the NRC Policy Statement. (Ref. 3)



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BASES

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LCO The ESW subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one subsystem of ESW is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems of ESW must be OPERABLE. At least one subsystem will operate, if the worst single active failure occurs coincident with the loss of offsite power.

A subsystem is considered OPERABLE when it has two OPERABLE pumps, and an OPERABLE flow path capable of taking suction from the UHS and transferring the water to the appropriate equipment and returning flow to the UHS. If individual loads are isolated, the affected components may be rendered inoperable, but it does not necessarily affect the OPERABILITY of the ESW System. Because each ESW subsystem supplies all four required DGs, an ESW subsystem is considered OPERABLE if it supplies at least three of the four DGs provided no single DG does not have an ESW subsystem capable of supplying flow.

An adequate suction source is not addressed in this LCO since the minimum net positive suction head of the ESW pumps is bounded by the Residual Heat Removal Service Water System requirements (LCO 3.7.1, "Residual Heat Removal System and Ultimate Heat Sink (UHS)").

The ESW return loop requirement, in terms of operable UHS return paths or UHS spray capacity, is also not addressed in this LCO. UHS operability, in terms of the return loop and spray capacity is addressed in the RHRSW/ UHS Technical Specification (LCO 3.7.1, "Residual Heat Removal Service Water System and Ultimate Heat Sink (UHS)").

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APPLICABILITY In MODES 1, 2, and 3, the ESW System is required to be OPERABLE to support OPERABILITY of the equipment serviced by the ESW System. Therefore, the ESW System is required to be OPERABLE in these MODES.

In MODES 4 and 5, the OPERABILITY requirements of the ESW System is determined by the systems it supports.

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ACTIONS The ACTIONS are modified by a Note indicating that the applicable Conditions of LCO 3.8.1, be entered and Required Actions taken if the inoperable ESW subsystem results in inoperable DGs (i.e., the supply from both subsystems of ESW is secured to the same DG). This is an exception to LCO 3.0.6 because the Required Actions of LCO 3.7.2 do not adequately compensate for the loss of a DG (LCO 3.8.1) due to loss of ESW flow.

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BASES

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ACTIONS  
(continued)

A.1

With one ESW pump inoperable in each subsystem, both inoperable pumps must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE ESW pumps are adequate to perform the ESW heat removal function; however, the overall reliability is reduced because a single failure could result in loss of ESW function. The 7 day Completion Time is based on the remaining ESW heat removal capability and the low probability of an event occurring during this time period.

B.1

With one or both ESW subsystems not capable of supplying ESW flow to two or more DGs, the capability to supply ESW to at least three DGs from each ESW subsystem must be restored within 7 days. With the units in this condition, the remaining ESW flow to DGs is adequate to maintain the full capability of all DGs; however, the overall reliability is reduced because a single failure could result in loss of the multiple DGs. The 7 day Completion Time is based on the fact that all DGs remain capable of responding to an event occurring during this time period.

Additionally, the Completion Time to restore the ESW subsystem has been extended to 14 days in order to complete the replacement of a portion of the Unit 1 ESW piping. This is a temporary extension of the Completion Time and is applicable during the Unit 1 ESW piping replacement. In order to cope with the consequences of a LOCA/LOOP in Unit 2 during the extended Completion Time, the following compensatory action is required: Provisions will be implemented to restore piping integrity to allow the use of the inoperable Unit 2 ESW subsystem within the current LCO Completion Time. Upon completion of the Unit 1 ESW piping replacement, this temporary extension is no longer applicable and will expire on June 25, 2026.

C.1

With one ESW subsystem inoperable for reasons other than Condition B, the ESW subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE ESW subsystem is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE ESW subsystem could result in loss of ESW function.

BASES

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ACTIONS  
(continued)

C.1 (continued)

The 7 day Completion Time is based on the redundant ESW System capabilities afforded by the OPERABLE subsystem, the low probability of an accident occurring during this time period, and is consistent with the allowed Completion Time for restoring an inoperable Core Spray Loop, LPCI Pumps and Control Structure Chiller.

Additionally, the Completion Time to restore the ESW subsystem has been extended to 14 days in order to complete the replacement of a portion of the Unit 1 ESW piping. This is a temporary extension of the Completion Time and is applicable during the Unit 1 ESW piping replacement. In order to cope with the consequences of a LOCA/LOOP in Unit 2 during the extended Completion Time, the following compensatory action is required: Provisions will be implemented to restore piping integrity to allow the use of the inoperable Unit 2 ESW subsystem within the current LCO Completion Time. Upon completion of the Unit 1 ESW piping replacement, this temporary extension is no longer applicable and will expire on June 25, 2026.

D.1 and D.2

If the ESW subsystem cannot be restored to OPERABLE status within the associated Completion Time, or both ESW subsystems are inoperable for reasons other than Condition A and B (i.e., three ESW pumps inoperable), the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.7.2.1

Verifying the correct alignment for each manual, power operated, and automatic valve in each ESW subsystem flow path provides assurance that the proper flow paths will exist for ESW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be automatically realigned to its accident position within the required time. This SR does not require any testing or valve manipulation; rather, it involves

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.7.2.1 (continued)

verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

This SR is modified by a Note indicating that isolation of the ESW System to components or systems may render those components or systems inoperable, but does not necessarily affect the OPERABILITY of the ESW System. As such, when all ESW pumps, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the ESW System is still OPERABLE.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.2.2

This SR verifies that the automatic valves of the ESW System will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This is demonstrated by the use of an actual or simulated initiation signal. This SR also verifies the automatic start capability of the ESW pumps in each subsystem.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

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REFERENCES

1. FSAR, Chapter 4.
  2. FSAR, Chapter 6.
  3. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132)
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