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ATTENTION: "REPLACE" directions do not affect the Table of Contents, Therefore no TOC will be issued with the updated material.

TSB2 - TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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# SSES MANUAL

Manual Name: TSB2

Manual Title: TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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SUSQUEHANNA STEAM ELECTRIC STATION  
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SUSQUEHANNA STEAM ELECTRIC STATION  
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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, 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>

(continued)

BASES

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BACKGROUND  
(continued)

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 between PASS and the H<sub>2</sub>O<sub>2</sub> 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 H<sub>2</sub>O<sub>2</sub> 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 H<sub>2</sub>O<sub>2</sub> 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 H<sub>2</sub>O<sub>2</sub> 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.

(continued)

BASES

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BACKGROUND  
(continued)

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.

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 HV-251F015A(B) and the closed system outside containment are the only barriers tested in accordance with the Leakage Rate Test Program. Since these containment penetrations {X-13A and X-13B} include a containment isolation valve outside containment that is tested in accordance with 10 CFR 50 Appendix J requirements 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.

(continued)

BASES

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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) 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.

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 Note 2 of SR 3.6.1.3.1. In this case, the single failure criterion remains applicable to the primary containment purge valve

(continued)

BASES

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APPLICABLE  
SAFETY ANALYSIS  
(continued)

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<sub>2</sub>O<sub>2</sub> 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<sub>2</sub>O<sub>2</sub> Analyzer penetrations is satisfied by virtue of the combination of the associated PCIVs and the closed system formed by the H<sub>2</sub>O<sub>2</sub> Analyzer piping system as discussed in the BACKGROUND section above.

The closed system boundary between PASS and the H<sub>2</sub>O<sub>2</sub> 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<sub>2</sub>O<sub>2</sub> 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)

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LCO

PCIVs form a part of the primary containment boundary. 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

(continued)

BASES

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LCO  
(continued)

automatic isolation signal. The valves covered by this LCO are listed in Table B 3.6.1.3-1.

The normally closed 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.

Purge valves with resilient seals, secondary containment bypass valves, 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, most PCIVs are not required to be

(continued)

BASES

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APPLICABILITY  
(continued)

OPERABLE and the primary containment purge valves are not required to be closed in MODES 4 and 5. Certain valves, however, are required to be OPERABLE to prevent inadvertent reactor vessel draindown. These valves are those whose associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation." (This does not include the valves that isolate the associated instrumentation.)

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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,

(continued)

BASES

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ACTIONS

A.1 and A.2 (continued)

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.

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.

(continued)

BASES

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ACTIONS

A.1 and A.2 (continued)

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.

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

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(continued)

BASES

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ACTIONS

C.1 and C.2 (continued)

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.

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

(continued)

BASES

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ACTIONS

C.1 and C.2 (continued)

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.

(continued)

BASES

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ACTIONS

D.1 and D.2 (continued)

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.

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.

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(continued)

BASES

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ACTIONS  
(continued)

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 in MODE 1, 2, or 3, 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.

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(continued)

BASES

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ACTIONS  
(continued)

H.1 and H.2

If any Required Action and associated Completion Time cannot be met, the unit must be placed in a condition in which the LCO does not apply. If applicable, action must be immediately initiated to suspend operations with a potential for draining the reactor vessel (OPDRVs) to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended or valve(s) are restored to OPERABLE status. If suspending an OPDRV would result in closing the residual heat removal (RHR) shutdown cooling isolation valves, an alternative Required Action is provided to immediately initiate action to restore the valve(s) to OPERABLE status. This allows RHR to remain in service while actions are being taken to restore the valve.

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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. The SR is also modified by Note 1, stating that primary containment purge valves are only required to be closed in MODES 1, 2, and 3. If a LOCA inside primary containment occurs in these MODES, 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 Note 2 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

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SR 3.6.1.3.1 (continued)

a LOCA. Therefore, these valves are allowed to be open for limited periods of time. The 31 day Frequency is consistent with other PCIV requirements discussed in SR 3.6.1.3.2.

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. Since verification of valve position for PCIVs outside primary containment is relatively easy, the 31 day Frequency was chosen to provide added assurance that the PCIVs are in the correct positions.

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 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

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SR 3.6.1.3.3 (continued)

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 31 day Frequency is based on operating experience that has demonstrated the reliability of the explosive charge continuity.

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

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SR 3.6.1.3.5 (continued)

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 of 24 months is sufficient. The acceptance criteria for these valves is defined in the Primary Containment Leakage Rate Testing Program, 5.5.12.

The SR is modified by a Note stating that the primary containment purge valves are only required to meet leakage rate testing requirements in MODES 1, 2, and 3. If a LOCA inside primary containment occurs in these MODES, 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.

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SR 3.6.1.3.7 (continued)

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

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 24 month Frequency was developed considering it is prudent that some of these Surveillances be performed only during a unit outage since isolation of penetrations could eliminate cooling water flow and disrupt the normal operation of some critical components. Operating experience has shown that these components usually pass this Surveillance when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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 24 month Frequency is based on the need to perform some of these Surveillances under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. 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

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SR 3.6.1.3.9 (continued)

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 Frequency of 24 months on a STAGGERED TEST BASIS is considered adequate given the administrative controls on replacement charges and the frequent checks of circuit continuity (SR 3.6.1.3.4).

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. A note is added to this SR which states that these valves are only required to meet this leakage limit in MODES 1, 2, and 3. In the other MODES, 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). A note is added to this SR which states that these valves are only required to meet this leakage limit in MODES 1, 2, and 3. In the other

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SR 3.6.1.3.12 (continued)

conditions, 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<sub>a</sub>, (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.

This SR has been modified by a Note that states that these valves are only required to meet the combined leakage rate in MODES 1, 2, and 3, since this is when the Reactor Coolant System is pressurized and primary containment is required. 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.

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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.

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REFERENCES  
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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)
	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)	Dem mineralized Water	Manual	N/A
	2-41-018 (d)	Dem mineralized 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**  
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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**  
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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	N/A
	249F040 (a) (d)	RCIC Turbine Exhaust	Manual	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	RHR – Shutdown Cooling Suction	Automatic Valve	6.a, 6.b, 6.c (52)	
	HV-251F009	RHR – Shutdown Cooling Suction	Automatic Valve	6.a, 6.b, 6.c (52)	
	HV-251F011 A (b) (d)	RHR – Suppression Pool Cooling	Manual	N/A	
	HV-251F011 B (b) (d)	RHR – Suppression Pool Cooling	Manual	N/A	
	HV-251F015 A (f)	RHR – Shutdown Cooling Return/LPCI Injection	Power Operated	N/A	
	HV-251F015 B (f)	RHR – Shutdown Cooling Return/LPCI Injection	Power Operated	N/A	
	HV-251F016 A (b)	RHR – Drywell Spray	Automatic Valve	2.c, 2.d (90)	
	HV-251F016 B (b)	RHR – Drywell Spray	Automatic Valve	2.c, 2.d (90)	
	HV-251F022	RHR – Reactor Vessel Head Spray	Automatic Valve	2.d, 6.a, 6.b, 6.c (30)	
	HV-251F023	RHR – Reactor Vessel Head Spray	Automatic Valve	2.d, 6.a, 6.b, 6.c (20)	
	HV-251F028 A (b)	RHR – Suppression Pool Cooling/Spray	Automatic Valve	2.c, 2.d (90)	
	HV-251F028 B (b)	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)	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 its 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 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.

## B 3.8 ELECTRICAL POWER SYSTEMS

### B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

#### BASES

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##### BACKGROUND

Each diesel generator (DG) is provided with a storage tank having a fuel oil capacity sufficient to operate that DG for a period of 7 days while the DG is supplying its continuous rated load, as discussed in FSAR, Section 9.5.4 (Ref. 1). The maximum load demand is calculated using the assumption that at least three DGs are available. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

Fuel oil is transferred from storage tank to day tank by a transfer pump associated with each storage tank. Independent pumps and piping preclude the failure of one pump, or the rupture of any pipe, valve, or tank to result in the loss of more than one DG. All outside tanks, pumps, and piping are located underground.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195 (Ref. 3). The fuel oil properties governed by these SRs are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity) and impurity level.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of 7 days of operation. This supply is sufficient to allow the operator to replenish lube oil from outside sources.

Each DG has an air start system with two air receivers (DG E has four air receivers) and each DG air start system provides adequate capacity for five successive start cycles on the DG without recharging the air start receivers. Each bank of two air receivers for DG E has adequate capacity for a minimum of five successive start cycles.

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(continued)

BASES (continued)

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APPLICABLE  
SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 4), and Chapter 15 (Ref. 5), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

Since diesel fuel oil, lube oil, and starting air subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 6).

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LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lube oil supply must be available to ensure the capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated DBA with loss of offsite power. DG day tank fuel oil requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources-Operating," and LCO 3.8.2, "AC Sources-Shutdown."

The starting air system is required to have a minimum capacity for five successive DG start attempts without recharging the air start receivers.

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APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Because stored diesel fuel oil, lube oil, and starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil,

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(continued)

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BASES

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APPLICABILITY  
(continued)

and starting air are required to be within limits when the associated DG is required to be OPERABLE.

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ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) governed by separate Condition entry and application of associated Required Actions.

A.1

In this Condition, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. These circumstances may be caused by events such as:

- a. Full load operation required for an inadvertent start while at minimum required level; or
- b. Feed and bleed operations that may be necessitated by increasing particulate levels or any number of other oil quality degradations.

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of the fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the fact that action will be initiated to obtain replenishment, the availability of fuel oil in the storage tank of the fifth diesel generator that is not required to be OPERABLE, and the low probability of an event during this brief period.

(continued)

BASES

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ACTIONS  
(continued)

B.1

With lube oil sump level not visible in the sight glass, sufficient lube oil to support 7 days of continuous DG operation at full load conditions may not be available. Therefore, the DG is declared inoperable immediately.

C.1

This Condition is entered as a result of a failure to meet the acceptance criterion for particulates. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, since particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and since proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, resampling, and re-analysis of the DG fuel oil.

D.1

With the new fuel oil properties defined in the Bases for SR 3.8.3.3 not within the required limits, a period of 30 days is allowed for restoring the stored fuel oil properties. This period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil, remains acceptable, or to restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combination of these procedures. Even if a DG start and load was required during this time interval and the fuel oil properties were outside limits, there is high likelihood that the DG would still be capable of performing its intended function.

(continued)

BASES

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ACTIONS  
(continued)

E.1

With starting air receiver pressure < 240 psig in one or more air receivers, sufficient capacity for five successive DG start attempts can not be provided by the air start system. However, as long as all receiver pressures are > 180 psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period. Entry into Condition E is not required when air receiver pressure is less than required limits following a successful start while the DG is operating.

F.1

With a Required Action and associated Completion Time of A through E not met, or the stored diesel fuel oil, lube oil, or starting air not within SR limits for reasons other than addressed by Conditions A, B, C, D or E, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support each DG's operation for 7 days at its continuous rated load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.8.3.2

This Surveillance ensures that sufficient lubricating oil inventory is available to support at least 7 days of full load operation for each DG. The sump level requirement is based on the DG manufacturer's consumption values. The acceptance criteria of maintaining a visible level in the sight glass ensures adequate inventory for 7 days of full load operation without the level reaching the manufacturer's recommended minimum level.

A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the plant staff.

SR 3.8.3.3

The tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are as follows:

- a. Sample the new fuel oil following the guidelines of ASTM D4057 (Ref. 7);
- b. Verify, following the guidelines of the tests specified in ASTM D975 (Ref. 7), that the sample has:
  - a Density at 15°C of  $\geq 0.835$  kg/L and  $\leq 0.876$  kg/L or an API Gravity of  $\geq 30$  and  $\leq 38$
  - a Kinematic Viscosity at 40°C of  $\geq 1.9$  centistokes and  $\leq 4.1$  centistokes
  - A Flash Point of  $\geq 52^\circ\text{C}$

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.3.3 (continued)

- c. Verify that the new fuel oil has a clear and bright appearance when tested following the guidelines of ASTM D4176 procedure (Ref. 7), or has  $\leq 0.05\%$  (vol) water and sediment when tested following the guidelines of ASTM D1796 (Ref. 7). Note that if dye is used in the diesel fuel oil, the water and sediment test must be performed.

Failure to meet any of the limits for key properties of new fuel oil prior to addition to the storage tank is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks.

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Specification 5.5.9 and Reference 7 are met for new fuel oil when tested following the guidelines of ASTM D975 (Ref. 7). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs.

Fuel oil degradation during long term storage shows up as an increase in particulate, mostly due to oxidation. The presence of particulate does not mean that the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure.

Particulate concentrations should be determined following the guidelines of ASTM D2276 (Ref. 7), appropriately modified to increase the range to  $> 10$  mg/l. This method involves a gravimetric determination of total particulate concentration in the fuel oil. This limit is 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. The Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Frequency intervals.

SR 3.8.3.4

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of five engine start cycles without recharging.

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.3.4 (continued)

The pressure specified in this SR is intended to reflect the lowest value at which the five starts can be accomplished. The air starting system capacity for each start cycle is calculated based on the following:

1. each cranking cycle duration should be approximately three seconds, or
2. consist of two to three engine revolutions, or
3. air start requirements per engine start provided by the engine manufacturer,

whichever air start requirement is larger.

This Surveillance is modified by a Note which does not require the SR to be met when the associated DG is running. This is acceptable because once the DG is started the safety function of the air start system is performed.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

SR 3.8.3.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every 31 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.3.5 (continued)

provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during performance of the Surveillance.

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REFERENCES

1. FSAR, Section 9.5.4.
  2. Regulatory Guide 1.137.
  3. ANSI N195, 1976.
  4. FSAR, Chapter 6.
  5. FSAR, Chapter 15.
  6. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
  7. ASTM Standard: D4057; D975; D4176; D1796; and D2276.
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