BASES

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3/4.6.5 DRYWELL ~~POST-LOCA~~ VACUUM ~~BREAKERS~~ RELIEF

LIMITING CONDITION FOR OPERATION

3.6.5 All drywell post-LOCA vacuum breakers shall be OPERABLE and closed.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3.

ACTION:

a. With one drywell post-LOCA vacuum breaker inoperable for opening but known to be closed, restore the inoperable vacuum breaker to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With one drywell post-LOCA vacuum breaker open, restore the open vacuum breaker to the closed position within 1 hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

c. With the position indicator of an OPERABLE drywell post-LOCA vacuum breaker inoperable, verify the vacuum breaker to be closed at least once per 24 hours by local indication. Otherwise declare the vacuum breaker inoperable. (See Note 1)

SURVEILLANCE REQUIREMENTS

4.6.5 Each drywell post-LOCA vacuum breaker shall be:

a. Verified closed at least once per 7 days.

b. Demonstrated OPERABLE:

1. At least once per 31 days by:

a) Cycling the vacuum breaker and isolation valve(s) through at least one complete cycle of full travel.

b) Verifying the position indicator OPERABLE by observing expected valve movement during the cycling test. (See Note 1)

2. At least once per 18 months by:

a) Verifying the pressure differential required to open the vacuum breaker, from the closed position, to be less than or equal to 1.0 psid, and (See Note 1)

b) Verifying the position indicator OPERABLE by performance of a CHANNEL CALIBRATION. (See Note 1)

3/4.6.5 DRYWELL VACUUM RELIEF

LIMITING CONDITION FOR OPERATION

3.6.5 Both drywell post-LOCA vacuum relief subsystems and both drywell purge vacuum relief subsystems shall be OPERABLE with associated vacuum breakers and isolation valves closed.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3

ACTION:

a. With one of the drywell post-LOCA vacuum relief subsystems and/or one of the drywell purge vacuum relief subsystems inoperable for opening but known to be closed, restore the inoperable subsystem(s) to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With two of the post-LOCA vacuum relief subsystems inoperable for opening but known to be closed, provided that both of the drywell purge vacuum relief subsystems are OPERABLE, restore the inoperable subsystems to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

c. With two of the post-LOCA vacuum relief subsystems and one of the drywell purge vacuum relief subsystems inoperable for opening but known to be closed, restore one inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

d. With one of the drywell isolation vacuum breakers open, restore the open vacuum breaker to the closed position within 1 hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

e. With the position indicator of an OPERABLE drywell vacuum breaker or associated isolation valve of the drywell vacuum relief subsystems inoperable, verify the vacuum breaker or isolation valve to be closed at least once per 24 hours by local indication. Otherwise be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.5 Each post-LOCA and purge system vacuum breaker and associated isolation valve shall be:

a. Verified closed at least once per 7 days.

Replace With Attached Page

SURVEILLANCE REQUIREMENTS (Continued)

3. By verifying the OPERABILITY of the vacuum breaker isolation valve differential pressure actuation instrumentation with the opening setpoint of -1.0 to 0.0 psid (Drywell minus Containment) by performance of a:

   a) CHANNEL CHECK at least once per 24 hours,

   b) CHANNEL FUNCTIONAL TEST at least once per 31 days, and

   c) CHANNEL CALIBRATION at least once per 18 months.

Note 1: Until restart after the first refueling outage, the following requirements shall apply:

3.6.5

c. With the position indicator of an OPERABLE drywell post-LOCA isolation valve for a vacuum breaker inoperable, verify the isolation valve to be closed at least once per 24 hours by local indication. Otherwise declare the isolation valve inoperable.

4.6.5.b.1

b. Verifying the position indicator for the vacuum breaker isolation valve OPERABLE by observing expected valve movement during the cycling test.

4.6.5.b.2

At least once per 18 months by:

   a) Verifying the pressure differential required to open the vacuum breaker, from the closed position, to be less than or equal to 1.0 psid, and

   b) Verifying the position indicator for the vacuum breaker isolation valve OPERABLE by performance of a CHANNEL CALIBRATION.

SURVEILLANCE REQUIREMENTS (continued)

b. Demonstrated OPERABLE:

1. At least once per 31 days by:

   a) Cycling the vacuum breaker and associated isolation valve through at least one complete cycle of full travel.

   b) Verifying the position indicators OPERABLE by observing expected vacuum breaker and associated isolation valve movements during the cycling test.

2. At least once per 18 months by:

   a) Verifying the pressure differential required to open the vacuum breaker, from the closed position, to be less than or equal to 1.0 psid, and

   b) Verifying the position indicators of the vacuum breaker and associated isolation valve OPERABLE by performance of CHANNEL CALIBRATIONs.

3. By verifying the OPERABILITY of the isolation valve differential pressure actuation instrumentation with the opening setpoint of 0.0 to 1.0 psid for the drywell purge subsystems and -1.0 to 0.0 psid for the post-LOCA vacuum relief subsystems (Drywell minus Containment) by performance of a:

   a) CHANNEL CHECK at least once per 24 hours,

   b) CHANNEL FUNCTIONAL TEST at least once per 31 days, and

   c) CHANNEL CALIBRATION at least once per 18 months.

3/4.6.4 CONTAINMENT AND DRYWELL ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment and is consistent with the requirements of GDC 54 through 57 of Appendix A to 10 CFR Part 50. 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 LOCA.

The operability of the drywell isolation valves ensures that the drywell atmosphere will be directed to the suppression pool for the full spectrum of pipe breaks inside the drywell. Since the allowable value of drywell leakage is so large, individual drywell penetration leakage is not measured. By checking valve operability on any penetration which could contribute a large fraction of the design leakage, the total leakage is maintained at less than the design value.

Table 3.6.4-1 lists the Containment and Drywell Isolation Valves in four sections. Section 1 contains the Automatic Isolation Valves which are those valves that receive an automatic isolation signal from Table 3.3.2-1 instrumentation and are located on the Containment or Drywell penetrations. The valves included in Section 2 are Manual Isolation Valves which receive a remote manual signal from a handswitch and are located on the Containment or Drywell Penetrations. Some of the valves in Section 2 may receive automatic signals, but not automatic isolation signals from instrumentation in Table 3.3.2-1. The valves included in Section 3 are those which do not receive isolation signals from instrumentation lised in Table 3.3.2-1 and do not utilize a remote manual handswitch. Section 3 includes check valves, local manual operated valves and power operated valves that do not utilize a handswitch. Section 4 of Table 3.6.4-1 contains test connection valves.

The maximum isolation times for containment and drywell automatic isolation valves are the times used in the FSAR accident analysis for valves with analytical closing times. For automatic isolation valves not having analytical closing times, closing times are derived by applying margins to previous valve closing test data obtained by using ASME Section XI criteria. Maximum closing times for these valves was determined by using a factor of two times the allowable (from previous test closure to next test closure) ASME Section XI margin and adding this to the previous test closure time.

3/4.6.5 DRYWELL ~~POST LOCA~~ VACUUM RELIEF ~~BREAKERS~~

See Attached Insert

~~The post-LOCA drywell vacuum breaker system is provided to relieve the vacuum in the drywell due to steam condensation following blow-down. Containment air is drawn through the vacuum breaker check valves in the two branches of the separate post-LOCA vacuum relief line and in a branch of each drywell~~

DRYWELL ~~PURGE~~ ~~LOCA~~ VACUUM ~~BREAKERS~~ RELIEF (Continued) See Attached Insert

~~purge compressor discharge line. Vacuum relief initiates at a differential pressure of one psi.~~ This vacuum relief, in conjunction with the rest of the drywell purge system, is necessary to insure that the post LOCA drywell H_2 concentration does not exceed 4% by volume.

Following vacuum relief, the drywell purge system pressurizes the drywell, forcing noncondensibles through the horizontal vents and into the containment at a rate designed to maintain the H_2 concentration below the flammable limits.

~~There are two 100% vacuum relief systems so that the plant may continue operation with one system out of service for a limited period of time.~~

3/4.6.6 SECONDARY CONTAINMENT

Secondary containment is designed to minimize any ground level release of radioactive material which may result from an accident. The Auxiliary Building and Enclosure Building provide secondary containment during normal operation when the containment is sealed and in service. When the reactor is in COLD SHUTDOWN or REFUELING, the containment may be open and the Auxiliary Building and Enclosure Building then become the only containment.

The maximum isolation times for secondary containment automatic isolation dampers/valves are the times used in the FSAR accident analysis for dampers/valves with analytical closing times. For automatic isolation valves not having analytical closing times, closing times are derived by applying margins to previous valve closing test data obtained by using ASME Section XI criteria. Maximum closing times for these valves was determined by using a factor of two times the allowable (from previous test closure to next test closure) ASME Section XI margin and adding this to the previous test closure time.

Establishing and maintaining a vacuum in the Auxiliary Building and Enclosure Building with the standby gas treatment system once per 18 months, along with the surveillance of the doors, latches, dampers, valves, blind flanges, and rupture discs is adequate to ensure that there are no violations of the integrity of the secondary containment.

The OPERABILITY of the standby gas treatment systems ensures that sufficient iodine removal capability will be available in the event of a LOCA. The reduction in containment iodine inventory reduces the resulting site boundary radiation doses associated with containment leakage. The operation of this system and resultant iodine removal capacity are consistent with the assumptions used in the LOCA analyses. Continuous operation of the system with the heaters OPERABLE for 10 hours over a 31-day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters.

(Insert for Bases Pages B3/4 6-7 and 6-8)

BASES

3/4.6.5 DRYWELL VACUUM RELIEF

The safety related functions of the four drywell vacuum relief subsystems are drywell isolation, proper operation of the drywell purge compressors and OPERABILITY in a large break LOCA to control weir wall overflow drag and impact loads. The drywell isolation and drywell purge OPERABILITY functions are discussed in Bases 3/4.6.4 and 3/4.6.7, respectively. Drywell vacuum relief is not required for hydrogen dilution or to protect drywell structural integrity in a design basis accident.

To provide drywell vacuum relief, containment air is drawn through subsystems associated with three 10 inch lines penetrating the drywell. Two drywell post-LOCA vacuum relief subsystems are in a parallel arrangement connected to one of the three 10 inch vacuum relief lines penetrating the drywell. Each drywell post-LOCA vacuum relief subsystem consists of a motor operated isolation valve in series with a check valve. OPERABILITY of either drywell post-LOCA vacuum relief subsystem assures OPERABILITY of the associated 10 inch vacuum relief line penetrating the drywell. Each of the two remaining 10 inch vacuum relief lines penetrating the drywell contains a drywell purge vacuum relief subsystem. Each drywell purge vacuum relief subsystem consists of a series arrangement of a motor operated isolation valve and two check valves. Vacuum relief initiates at a differential pressure across the check valves of one psi.

Rapid weir wall overflow in a large break LOCA could cause drag and impact loadings to essential equipment and systems in the drywell above the weir wall. Drywell negative pressure analysis for rapid weir wall overflow in a large break LOCA assumes a vacuum breaker capability of $A/\sqrt{K} = 0.38$ ft.^{2} thus requiring a minimum of two 10 inch drywell vacuum relief paths.

OPERABILITY requirements for the four drywell vacuum relief subsystems in relationship to continued plant operation are based on maintaining at least two of the three 10 inch drywell vacuum relief paths OPERABLE. However, to ensure that essential equipment is returned to service in a timely manner, continued plant operation is limited with only one 10 inch drywell vacuum relief line out of service. Plant operation is further limited when two of the three 10 inch lines are out of service to ensure prompt response to restore equipment to service or to place the plant in a condition where the equipment is not required. Plant operation is also limited with a drywell isolation vacuum breaker in the open position in order to help assure that design drywell bypass leakage is not potentially exceeded. Position indication is required to be OPERABLE on all drywell vacuum breakers and motor operated isolation valves to help identify potential drywell bypass leakage paths.

Surveillance requirements and intervals were chosen to reflect the importance associated with the drywell vacuum relief function and are based on good engineering judgement using previous accepted testing methods.