NEXTera ENERGY SEABROOK

December 31, 2019
Docket No. 50-443
SBK-L-19129

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, DC 20555-0001

Seabrook Station
Submittal of Changes to the Seabrook Station Technical Specification Bases

NextEra Energy Seabrook, LLC submits the enclosed changes to the Seabrook Station Technical Specification Bases. The changes were made in accordance with Technical Specification 6.7.6.j., "Technical Specification (TS) Bases Control Program." Please update the Technical Specification Bases as follows:

REMOVE	INSERT
B 3/4 7-11	B 3/4 7-11
	B 3/4 7-11a
	B 3/4 7-11b
B 3/4 0-1	B 3/4 0-1
B 3/4 0-2	B 3/4 0-2
B 3/4 0-3c	B 3/4 0-3c
	B 3/4 0-3d
	B 3/4 0-3e
	B 3/4 0-3f
B 3/4 4-13	B 3/4 4-13
B 3/4 6-1	B 3/4 6-1
B 3/4 6-4	B 3/4 6-4
B 3/4 7-10	B 3/4 7-10
B 3/4 7-12	B 3/4 7-12
B 3/4 8-4	B 3/4 8-4
	B 3/4 8-4a
B 3/4 8-6	B 3/4 8-6
B 3/4 8-7	B 3/4 8-7
	B 3/4 8-7a
B 3/4 8-17	B 3/4 8-17
B 3/4 8-22	B 3/4 8-22

NextEra Energy Seabrook, LLC

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NEXTera ENERGY SEABROOK

Should you have any questions concerning this submittal, please contact me at (603) 773-7932.

Sincerely,

NextEra Energy Seabrook, LLC

Kenneth Browne
Licensing Manager

cc: D. Lew, NRC Region I Administrator
J. Poole, NRC Project Manager, Project Directorate I-2
P. Cataldo, NRC Senior Resident Inspector

Enclosure to SBK-L-19129

3/4.7.4 SERVICE WATER SYSTEM/ULTIMATE HEAT SINK (Continued)

temperature limit of 70°F provides sufficient time for manual initiation of the cooling tower sprays and fans following the design basis seismic event with a concurrent LOCA during the design extreme ambient temperature conditions. Under this scenario, manual action is sufficient to maintain the cooling tower basin at a temperature that precludes equipment damage during the postulated design basis event.

APPLICABLE SAFETY ANALYSES

The SW system ensures that sufficient cooling capacity is available for continued operation of safety-related equipment during normal and accident conditions. In the event of a LOCA occurring simultaneously with a loss of offsite power, a single SW pump supplying a single train powered from the same emergency bus will provide sufficient capability to dissipate the heat loads. This redundancy ensures that no loss of the cooling function will result should a single failure occur in either train.

The ultimate heat sink for all operating and accident heat loads is normally the Atlantic Ocean. In the event that seawater flow to the SW pump house is restricted (>95 percent blockage) due to seismically induced damage to the circulating water intake and discharge tunnels, the cooling tower serves as the heat sink. Seabrook has a unique design in that the SW pump house and the cooling tower with their associated SW loops each have the capability to mitigate the full spectrum of design-basis accidents, assuming a single failure. These structures are differentiated in part by their protection against the effects of natural phenomena with the circulating water tunnels
lacking qualification to withstand design basis seismic events and the cooling tower lacking protection from the effects of tornados.

LIMITING CONDITION FOR OPERATION (LCO)

Two trains of the ocean SW system and the cooling tower with two loops are required to be operable. Because the tunnels between the Atlantic Ocean and the SW pump house are not designed to seismic Category I requirements, a seismic Category I cooling tower is provided to protect against their failure due to a seismic event. Therefore, each SW loop must have an operable ocean SW pump and an operable cooling tower SW pump. The LCO also requires a portable cooling tower makeup system stored in its design operational readiness state.

APPLICABILITY

The SW system is required to be OPERABLE in MODES 1, 2, 3, and 4 to support OPERABILITY of the equipment serviced by the SW system and required to be OPERABLE in these MODES.

ACTIONS

a. With one ocean SW loop inoperable, action must be taken to restore OPERABLE status within 72 hours. In this condition, the redundant SW loop is OPERABLE but overall system reliability is reduced because a single failure in the OPERABLE SW loop could result in a loss of the SW system function.

3/4.7.4 SERVICE WATER SYSTEM/ULTIMATE HEAT SINK (Continued)

Removal of an ocean SW loop from service does not render supported equipment, such as the emergency diesel generator and primary component cooling water system, inoperable. Action a specifies the actions that are required to maintain the plant is a safe condition. [Reference 2]

When a cooling tower pump is operating, interlocks prevent the train associated ocean SW pumps from starting. To provide additional protection during operation on the cooling tower, the ocean SW pump control switches may be maintained in the pull-to-lock position to prevent inadvertent pump operation. Realigning the SW system to the ocean supply requires manual action, and maintaining the control switches in the pull-to-lock position does not change this required action sequence. Pump operation is not affected by maintaining the control switches in the pull-to-lock position during this period; therefore, OPERABILITY of the SW pumps is not compromised.

b. With one cooling tower SW loop or one cooling tower cell inoperable, Action b provides seven days to restore OPERABLE status. The seven-day allowed outage time is based on a risk evaluation [Reference 1], the low likelihood of occurrence of a seismic event during the time a cooling tower SW loop or cooling tower cell is inoperable, and operability of the ocean SW system.

   Removal of the cooling tower SW loop or one cooling tower cell from service does not render supported equipment, such as the emergency diesel generator and primary component cooling water system, inoperable. Action b specifies the actions that are required to maintain the plant is a safe condition. [Reference 2]

c. Action c provides 72 hours to restore OPERABLE status with two cooling tower SW loops or the cooling tower inoperable. The 72-hour allowed outage time is based on a risk evaluation [Reference 1], the low likelihood of occurrence of a seismic event during the time that the cooling tower is inoperable, and operability of the ocean SW system.

   Removal of the cooling tower or two cooling tower SW loops from service does not render supported equipment, such as the emergency diesel generator and primary component cooling water system, inoperable. Action c specifies the actions that are required to maintain the plant is a safe condition. [Reference 2]

d. Action d provides 24 hours to restore OPERABLE status with two ocean SW loops or the SW pump house inoperable. The 24-hour allowed outage time is based on a risk evaluation in Reference 1, the low likelihood of occurrence of a tornado during the time that the ocean SW system is inoperable, and operability of the cooling tower SW system.

3/4.7.4 SERVICE WATER SYSTEM/ULTIMATE HEAT SINK (Continued)

Removal of the ocean SW loops or SW pump house from service does not render supported equipment, such as the emergency diesel generator and primary component cooling water system, inoperable. Action d specifies the actions that are required to maintain the plant is a safe condition. [Reference 2]

e. With the portable tower makeup pump not stored in its design operational readiness state, Action e provides 72 hours to restore the pump to its required condition. Seventy-two hours is reasonable based on the low probability of an event requiring cooling tower makeup during this period.

SURVEILLANCE REQUIREMENTS (SR)

SR 4.7.4.1.a and 4.7.4.2.a

Verifying the correct alignment of manual, power-operated, and automatic valves provides assurance that the proper flow paths exist for operation of the SW system under accident conditions. This verification includes only those valves in the direct flow paths through safety-related equipment whose position is critical to the proper functioning of the safety-related equipment. Vents, drains, sampling connections, instrument taps, etc., that are not directly in the flow path and are not critical to proper functioning of the safety-related equipment are excluded from this surveillance requirement. This surveillance does not apply to valves that are locked, sealed, or otherwise secured in position because these valves are verified in their correct position prior to locking, sealing, or securing. In addition, this requirement does not apply to valves that cannot be inadvertently misaligned, such as check valves.

An automatic valve may be aligned in other than its accident position provided (1) the valve receives an automatic signal to re-position to its required position in the event of an accident, and (2) the valve is otherwise operable (stroke time within limits, motive force available to re-position the valve, control circuitry energized, and mechanically capable of re-positioning).

SR 4.7.4.3 and 4.7.4.4

The limitations on SW pump house minimum water level and the requirements for cooling tower OPERABILITY are based on providing a 30-day cooling water supply to safety-related equipment without exceeding the safety related equipment design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," March 1974.

SR 4.7.4.4.c.2 verifies that the portable tower makeup pump is stored in its design operational readiness state. The portable cooling tower makeup system, which must be stored in a seismic location, consists of the following:

3/4.0 APPLICABILITY

BASES

Specification 3.0.1 through 3.0.4 establish the general requirements applicable to Limiting Conditions for Operation. These requirements are based on the requirements for Limiting Conditions for Operation stated in the Code of Federal Regulations, 10 CFR 50.36(c)(2):

"Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specification until the condition can be met."

Specification 3.0.1 establishes the Applicability statement within each individual specification as the requirement for when the LCO is required to bet met (i.e., when the unit is in the MODES or other specified conditions of the Applicability statement of each Specification).

Specification 3.0.2 establishes that upon discovery of a failure to meet an LCO, the associated ACTIONS shall be met. The completion time of each ACTION is applicable from the point in time that an ACTION is entered. The ACTIONS establish those remedial measures that must be taken within the specified completion times when the requirements of an LCO are not met. This Specification establishes that:

a. Completion of the ACTIONS within the specified completion times constitutes compliance with a Specification, and

b. Completion of the ACTIONS is not required when an LCO is met within the specified completion time, unless otherwise specified.

There are two basic types of ACTIONS. The first type of ACTION specifies a time limit in which the LCO must be met. This time limit is the completion time to restore an inoperable system or component to OPERABLE status or to restore variables to within specified limits. If this type of ACTION is not completed within the specified completion time, a shutdown may be required to place the unit in a MODE or condition in which the Specification is not applicable. (Whether stated as an ACTION or not, correction of the condition that necessitated entering the ACTION is an action that may always be considered upon entering ACTIONS.) The second type of ACTION specifies the remedial measures that permit continued operation of the unit that is not further restricted by the completion time. In this case, compliance with the ACTIONS provides an acceptable level of safety for continued operation.

Completing the ACTIONS is not required when an LCO is met or is no longer applicable, unless otherwise stated in the individual Specifications.

The completion times of the ACTIONS are also applicable when a system or component is removed from service intentionally. The reason for intentionally relying on the ACTIONS, include, but are not limited to, performance of Surveillances, preventative maintenance, corrective maintenance, or investigation of operational problems. Entering ACTIONs for these reasons must be done in a manner that does not compromise safety. Intentional entry into

ACTIONS should not be made for operational convenience. Additionally, if intentional entry into ACTIONS would result in redundant equipment being inoperable, alternatives should be used instead. Doing so limits the time both subsystems/trains of a safety function are inoperable and limits the time conditions exist which may result in LCO 3.0.3 being entered. Individual Specifications may specify a time limit for performing a Surveillance Requirement when equipment is removed from service or bypassed for testing. In this case, the completion times of the ACTIONS are applicable when this time limit expires, if the equipment remains removed from service or bypassed.

When a change in MODE or other specified condition is required to comply with ACTIONS, the unit may enter a MODE or other specified condition in which another Specification becomes applicable. In this case, the completion times of the associated ACTIONS would apply from the point in time that the new Specification becomes applicable, and the ACTIONS are entered.

Specification 3.0.3 establishes the shutdown ACTION requirements that must be implemented when a Limiting Condition for Operation is not met and the condition is not specifically addressed by the associated ACTION requirements. The purpose of this specification is to delineate the time limits for placing the unit in a safe shutdown MODE when plant operation cannot be maintained within the limits for safe operation defined by the Limiting Conditions for Operation and its ACTION requirements. It is not intended to be used as an operational convenience which permits (routine) voluntary removal of redundant systems or components from service in lieu of other alternatives that would not result in redundant systems or components being inoperable. One hour is allowed to prepare for an orderly shutdown before initiating a change in plant operation. This time permits the operator to coordinate the reduction in electrical generation with the load dispatcher to ensure the stability and availability of the electrical grid. The time limits specified to reach lower MODES of operation permit the shutdown to proceed in a controlled and orderly manner that is well within the specified maximum cooldown rate and within the cooldown capabilities of the facility assuming only the minimum required equipment is OPERABLE. This reduces thermal stresses on components of the primary coolant system and the potential for a plant upset that could challenge safety systems under conditions for which this specification applies.

If remedial measures permitting limited continued operation of the facility under the provisions of the ACTION requirements are completed, the shutdown may be terminated. The time limits of the ACTION requirements are applicable from the point in time there was a failure to meet a Limiting Condition for Operation. Therefore, the shutdown may be terminated if the ACTION requirements have been met or the time limits of the ACTION requirements have not expired, thus providing an allowance for the completion of the required actions.

The time limits of Specification 3.0.3 allow 37 hours for the plant to be in the COLD SHUTDOWN MODE when a shutdown is required during the POWER MODE of operation. If the plant is in a lower MODE of operation when a shutdown is required, the time limit for reaching the next lower MODE of operation applies. However, if a lower MODE of operation is reached in less time than allowed, the total allowable time to reach COLD SHUTDOWN, or other applicable MODE, is not reduced. For example, if HOT STANDBY is reached in 2 hours, the time allowed to reach HOT SHUTDOWN is the next 11 hours because the total time to reach HOT SHUTDOWN is not reduced from the allowable limit of 13 hours.

a. The OPERABILITY of the equipment being returned to service; or

b. The OPERABILITY of other equipment.

The administrative controls ensure the time the equipment is returned to service in conflict with the requirements of the ACTIONS is limited to the time absolutely necessary to perform the allowed required testing. This Specification does not provide time to perform any other preventive or corrective maintenance.

An example of demonstrating the OPERABILITY of the equipment being returned to service is reopening a containment isolation valve that has been closed to comply with Required Actions and must be reopened to perform the required testing.

An example of demonstrating the OPERABILITY of other equipment is taking an inoperable channel or trip system out of the tripped condition to prevent the trip function from occurring during the performance of required testing on another channel in the other trip system. A similar example of demonstrating the OPERABILITY of other equipment is taking an inoperable channel or trip system out of the tripped condition to permit the logic to function and indicate the appropriate response during the performance of required testing on another channel in the same trip system.

Specification 3.0.6 establishes an exception to LCO 3.0.2 for supported systems that have a support system LCO specified in the Technical Specifications (TS). This exception is provided because LCO 3.0.2 would require that the ACTIONS of the associated inoperable supported system LCO be entered solely due to the inoperability of the support system. This exception is justified because the actions that are required to ensure the unit is maintained in a safe condition are specified in the support system LCO's ACTIONS. These ACTIONS may include entering the supported system's ACTIONS or may specify other ACTIONS.

When a support system is inoperable and there is an LCO specified for it in the TS, the supported system(s) are required to be declared inoperable if determined to be inoperable as a result of the support system inoperability. However, it is not necessary to enter into the supported systems' ACTIONs unless directed to do so by the support system's ACTION. The potential confusion and inconsistency of requirements related to the entry into multiple support and supported systems' LCOs' ACTION are eliminated by providing all the actions that are necessary to ensure the unit is maintained in a safe condition in the support system's ACTIONs.

However, there are instances where a support system's ACTION may either direct a supported system to be declared inoperable or direct entry into the ACTIONs for the supported system. This may occur immediately or after some specified delay to perform some other ACTION. Regardless of whether it is immediate or after some delay, when a support system's ACTION directs a supported system to be declared inoperable or directs entry into ACTIONS for a supported system, the applicable ACTIONS shall be entered in accordance with Specification 3.0.1.

Specification 6.7.6.o, "Safety Function Determination Program (SFDP)," ensures loss of safety function is detected and appropriate actions are taken. Upon entry into LCO 3.0.6, an evaluation shall be made to determine if loss of safety function exists. Additionally, other limitations, remedial actions, or compensatory actions may be identified as a result of the support system inoperability and corresponding exception to entering supported system ACTIONs. The SFDP implements the requirements of LCO 3.0.6.

The following examples use Figure B 3.0-1 to illustrate loss of safety function conditions that may result when a TS support system is inoperable. In this figure, the fifteen systems that comprise Train A are independent and redundant to the fifteen systems that comprise Train B. To correctly use the figure to illustrate the SFDP provisions for a cross train check, the figure establishes a relationship between support and supported systems as follows: the figure shows System 1 as a support system for System 2 and System 3; System 2 as a support system for System 4 and System 5; and System 4 as a support system for System 8 and System 9. Specifically, a loss of safety function may exist when a support system is inoperable and:

a. A system redundant to system(s) supported by the inoperable support system is also inoperable (EXAMPLE B 3.0.6-1),
b. A system redundant to system(s) in turn supported by the inoperable supported system is also inoperable (EXAMPLE B 3.0.6-2), or
c. A system redundant to support system(s) for the supported systems (a) and (b) above is also inoperable (EXAMPLE B 3.0.6-3).

For the following examples, refer to Figure B 3.0-1.

EXAMPLE B 3.0.6-1

If System 2 of Train A is inoperable and System 5 of Train B is inoperable, a loss of safety function exists in Systems 5, 10, and 11.

EXAMPLE B 3.0.6-2

If System 2 of Train A is inoperable, and System 11 of Train B is inoperable, a loss of safety function exists in System 11.

EXAMPLE B 3.0.6-3

If System 2 of Train A is inoperable, and System 1 of Train B is inoperable, a loss of safety function exists in Systems 2, 4, 5, 8, 9, 10 and 11.

If an evaluation determines that a loss of safety function exists, the appropriate ACTIONS of the LCO in which the loss of safety function exists are required to be entered.

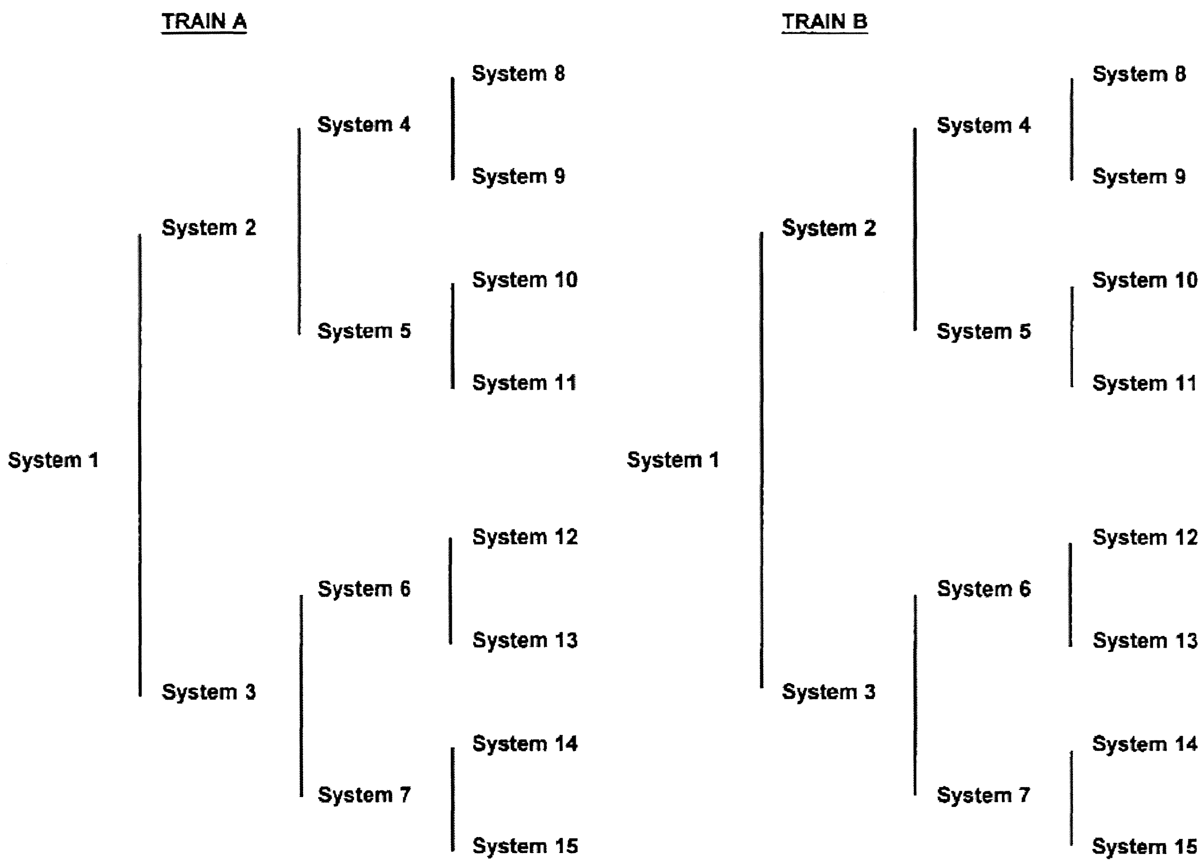

Figure B 3.0-1
Configuration of Trains and Systems

This loss of safety function does not require the assumption of additional single failures or loss of offsite power. Since operations are being restricted in accordance with the ACTIONS of the support system, any resulting temporary loss of redundancy or single failure protection is taken into account. Similarly, the ACTIONS for inoperable offsite circuit(s) and inoperable diesel generator(s) provide the necessary restriction for cross train inoperabilities. This explicit cross train verification for inoperable AC electrical power sources also acknowledges that supported system(s) are not declared inoperable solely as a result of inoperability of a normal or emergency electrical power source (refer to the definition of OPERABILITY).

When loss of safety function is determined to exist, and the SFDP requires entry into the appropriate ACTIONS of the LCO in which the loss of safety function exists, consideration must be given to the specific type of function affected. Where a loss of function is solely due to a single TS support system (e.g., loss of automatic start due to inoperable instrumentation, or loss of pump suction source due to low tank level), the appropriate LCO is the LCO for the support system. The ACTIONS for a support system LCO adequately address the inoperabilities of that system without reliance on entering its supported system LCO. When the loss of function is the result of multiple support systems, the appropriate LCO is the LCO for the supported system.

Specifications 4.0.1 through 4.0.5 establish the general requirements applicable to Surveillance Requirements. These requirements are based on the Surveillance Requirements stated in the Code of Federal Regulations, 10 CFR 50.36(c)(3):

"Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions of operation will be met."

Specifications 4.0.2 and 4.0.3 apply in Chapter 6 only when invoked by a Chapter 6 Specification.

REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.2 OPERATIONAL LEAKAGE (Continued)

Pressure Isolation Valve Leakage

The specified allowed leakage from any RCS pressure isolation valve is sufficiently low to ensure early detection of possible in-series check valve failure. It is apparent that when pressure isolation is provided by two in-series check valves and when failure of one valve in the pair can go undetected for a substantial length of time, verification of valve integrity is required. Since these valves are important in preventing over-pressurization and rupture of the ECCS low pressure piping which could result in a LOCA that bypasses containment, these valves should be tested periodically to ensure low probability of gross failure.

The note that modifies ACTION c requires an evaluation of affected systems if a pressure isolation valve is inoperable. The leakage may have affected system operability or isolation of a leaking flow path with an alternate valve may have degraded the ability of the interconnected system to perform its safety function.

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB leakage is greatest when the RCS is pressurized.

In MODES 5 and 6, leakage limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for leakage.

ACTIONS

Unidentified leakage, identified leakage (excluding primary to secondary leakage), or controlled leakage in excess of the LCO limits must be reduced to within limits within 4 hours. This completion time allows time to verify leakage rates and either identify unidentified leakage or reduce leakage to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

If any pressure boundary leakage exists or primary to secondary leakage is not within limit; or if unidentified leakage, identified leakage, or controlled leakage cannot be reduced to within limits within 4 hours, the reactor must be brought to lower pressure conditions to reduce the severity of the leakage and its potential consequences. It should be noted that leakage past seals and gaskets is not pressure boundary leakage. The reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This action reduces the leakage and also reduces the factors that tend to degrade the pressure boundary. 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. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

3/4.6.1 PRIMARY CONTAINMENT

3/4.6.1.1 CONTAINMENT INTEGRITY

Primary CONTAINMENT INTEGRITY ensures that the release of radioactive materials from the containment atmosphere will be restricted to those leakage paths and associated leak rates assumed in the safety analyses. This restriction, in conjunction with the leakage rate limitation, will limit the SITE BOUNDARY radiation doses to within the dose guidelines of 10 CFR 50.67 during accident conditions.

3/4.6.1.2 CONTAINMENT LEAKAGE

Primary containment OPERABILITY is maintained by limiting leakage to ≤ 1.0 L_a, except prior to the first startup after performing a required Primary Containment Leakage Rate Testing Program leakage test. At this time, applicable leakage limits must be met. The limitations on containment leakage rates ensure that the total containment leakage volume will not exceed the value assumed in the safety analyses at the peak accident pressure, P_a. As an added conservatism, the measured overall integrated leakage rate is further limited to less than or equal to 0.75 L_a during performance of the periodic tests to account for possible degradation of the containment leakage barriers between leakage tests.

The surveillance testing for measuring leakage rates is in accordance with the Containment Leakage Rate Testing Program.

3/4.6.1.3 CONTAINMENT AIR LOCKS

The limitations on closure and leak rate for the containment air locks are required to meet the restrictions on CONTAINMENT INTEGRITY and containment leak rate. Surveillance testing of the air lock seals provides assurance that the overall air lock leakage will not become excessive due to seal damage during the intervals between air lock leakage tests.

In the event the air lock leakage results in exceeding the overall containment leakage rate, the Note directs entry into the ACTION of LCO 3.6.1.2, “Containment Leakage.”

3/4.6.1.4 INTERNAL PRESSURE

The limitations on containment internal pressure ensure that: (1) the containment structure is prevented from exceeding its design negative pressure differential with respect to the annulus atmosphere of 3.5 psi and (2) the containment peak pressure does not exceed the design pressure of 52 psig during LOCA conditions.

The maximum peak pressure expected to be obtained from a LOCA event is 49.6 psig. The limit of 16.2 psia for initial positive containment pressure will limit the total pressure to 49.6 psig which is less than the design pressure and is consistent with the safety analyses.

3/4.6.3 CONTAINMENT ISOLATION VALVES (Continued)

The method of isolating a penetration with an inoperable containment isolation valve must include the use of an isolation barrier that cannot be adversely affected by a single active failure. Barriers that meet this criterion include: (1) a deactivated automatic valves secured in the isolation position, (2) a closed manual valve, and (3) a blind flange. Closed systems within containment do not meet the isolation criterion because they are vulnerable to failures. Isolating a penetration with a deactivated automatic valve may be accomplished using either the inoperable valve, if it can be verified to be fully closed, or the operable automatic valve. Manual valves and blind flanges used to isolate a penetration must be within the penetration's ASME class boundary and qualified to ASME Class 2.

The ACTIONs are modified by two notes. The first Note ensures that appropriate remedial actions are taken, if necessary, if the affected systems are rendered inoperable by an inoperable containment isolation valve. In the event the isolation valve leakage results in exceeding the overall containment leakage rate, the second Note directs entry into the ACTION of LCO 3.6.1.2.

3/4.6.4 COMBUSTIBLE GAS CONTROL

The Hydrogen Mixing Systems are provided to ensure adequate mixing of the containment atmosphere following a LOCA. This mixing action will prevent localized accumulations of hydrogen from exceeding the flammable limit.

3/4.7.3 PRIMARY COMPONENT COOLING WATER SYSTEM (Continued)

An automatic valve may be aligned in other than its accident position provided (1) the valve receives an automatic signal to re-position to its required position in the event of an accident, and (2) the valve is otherwise operable (stroke time within limits, motive force available to re-position the valve, control circuitry energized, and mechanically capable of re-positioning).

The ACTION is modified by a Note indicating that the applicable ACTION of LCO 3.4.1.3, "Reactor Coolant Loops and Coolant Circulation," be entered if an inoperable PCCW train results in an inoperable residual heat removal loop. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.

3/4.7.4 SERVICE WATER SYSTEM/ULTIMATE HEAT SINK

BACKGROUND

The SW system employs two independent and redundant cooling loops. Each loop can be supplied by either of two full-capacity SW pumps (4 pumps total) drawing water from the Atlantic Ocean via a pump house, or alternatively, each loop can be supplied by a full-capacity cooling tower SW pump (2 pumps total) drawing water from a mechanical draft cooling tower. Each of the six pumps is a 100% capacity pump capable of handling all of the necessary heat loads for all normal and design basis events.

The Atlantic Ocean via the SW pump house serves as the normal heat sink. However, a seismically qualified mechanical draft cooling tower is provided as a backup to the ocean cooling water source because the supply from the circulating water tunnels is not seismically qualified. The cooling tower design basis is to provide the necessary ultimate heat sink in the event of a loss of ocean tunnel water flow; however, this source may be used during normal operations subject to the level and temperature limitations of this specification. Switchover from the SW pump house to the cooling tower is accomplished either manually or automatically on a tower actuation (TA) signal. Manual action is required to realign the system from the cooling tower to the ocean SW supply.

A seismic event could result in loss of the ocean supply to the SW system and reliance on operation of the cooling tower. Regulatory Guide (RG) 1.27 requires a heat sink capable of providing cooling for 30 days; however, the cooling tower basin contains sufficient water for only seven days of operation. Consequently, after seven days, the portable cooling tower makeup system provides a reliable makeup source for the cooling tower to meet the 30-day requirement. The normal source of cooling tower makeup, potable water, is not considered since it is not designed to withstand a seismic event.

The seven-day period during which the cooling tower can operate without makeup water provides adequate time to move the portable pump into position, lay the hose, and make the system ready for operation. As a result, the portable pump is not necessarily immediately available for operation when stored in its design operational readiness state. The seven-day period allows ample time to charge the battery, obtain diesel fuel, inflate the trailer tires, and obtain a tow vehicle.

The cooling tower is normally aligned to allow return flow to bypass the tower sprays and return to the basin. Upon receipt of a TA signal, the fans and sprays are manually operated as required. This manual operation, which is governed by procedures, ensures that ice does not buildup on the cooling tower tile fill and fans. The cooling tower basin

3/4.7.4 SERVICE WATER SYSTEM/ULTIMATE HEAT SINK (Continued)

- A diesel-drive driven pump
- 3000 feet of flexible hose and associated couplings
- A suction strainer

An inventory and periodic inspections of the hose confirm the availability and integrity of sufficient flexible hose.

SR 4.7.4.4.d verifies the ability of the cooling tower makeup pump to produce flow of at least 200 gpm in accordance with the Surveillance Frequency Control Program. The minimum capacity of 200 gpm ensures the capability to meet the calculated makeup requirement of 140 gpm at seven days after a LOCA.

The ACTIONs are modified by two Notes. The first Note indicates that the applicable ACTIONs of LCO 3.8.1.1, "AC Sources - Operating," should be entered if an inoperable service water system (SWS) train results in an inoperable diesel generator. The second Note indicates that the applicable ACTIONs of LCO 3.4.1.3, Reactor Coolant Loops and Coolant Circulation," should be entered if an inoperable SWS train results in an inoperable residual heat removal loop. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.

REFERENCES

1. Amendment No. 32 to Facility Operating License NPF-86: Primary Component Cooling Water System Operability Requirements - License Amendment Request 93-01 and Service Water System/Ultimate Heat Sink Operability Requirements - License Amendment Request 93-02 (TAC M85491 and M85750), October 5, 1994. (ML17191A390)
2. Seabrook Station, Unit No. 1 - Final Response to Task Interface Agreement 2017-01, Technical Specification Limiting Conditions for Operation for Service Water System and Ultimate Heat Sink, July 10, 2018 (ML18093B444)

3/4.7.5 (THIS SPECIFICATION NUMBER IS NOT USED)

3/4.7.6 CONTROL ROOM SUBSYSTEMS

CONTROL ROOM EMERGENCY MAKEUP AIR AND FILTRATION SYSTEM (CREMAFS)

BACKGROUND

The control room emergency makeup air and filtration system (CREMAFS) provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity or smoke.

The CREMAFS consists of two independent, redundant trains that recirculate and filter the air in the control room envelope (CRE) and a CRE boundary that limits the inleakage of unfiltered air. Each CREMAFS train consists of a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, doors, barriers, and instrumentation also form part of the system. A second bank of HEPA filters follows the adsorber section to collect carbon fines and provides backup in case of failure of the main HEPA filter bank.

3/4.8.1 AC SOURCES (Continued)

LIMITING CONDITION FOR OPERATION (LCO) (continued)

The AOTs are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

The term, "verify," as used in this context means to administratively check by examining logs or other information to determine if certain components are out of service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

a. ACTION a. is to ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the OPERABILITY of the remaining required offsite circuit on a more frequent basis, i.e., within 1 hour of discovery and at least once every 8 hours thereafter. However, if a second required circuit fails Surveillance Requirement (SR) 4.8.1.1.1a, the second offsite circuit is inoperable, and ACTION e., for two offsite circuits inoperable, would have to be entered.

ACTION a.2, which only applies if the train cannot be powered from an offsite source, is intended to provide assurance that an event coincident with a single failure of the associated DG will not result in a complete loss of safety function of critical redundant required features. These features are powered from the redundant AC electrical power train. Since the emergency feedwater (EFW) system includes only one motor-driven pump, the turbine-driven EFW pump is considered a required redundant feature.

The completion time (also referred to as allowed outage time (AOT)) for ACTION a.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This completion time also allows for an exception to the normal "time zero" for beginning the completion time "clock." In this ACTION, the completion time only begins on discovery that both:

a. The train has no offsite power supplying it loads and
b. A required feature on the other train is inoperable.

If at any time while one offsite circuit is inoperable a redundant required feature subsequently becomes inoperable, this completion time begins to be tracked. Discovering no offsite power to one train of the onsite Class 1E Electrical Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with the other train that has offsite power, results in starting the completion time for the ACTION. Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to Train A and Train B of the onsite Class 1E Distribution System. The 24-hour completion time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 24-hour completion time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue with one offsite power source inoperable for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this condition, however, the remaining OPERABLE offsite circuit and EDGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

3/4.8.1 AC SOURCES (Continued)

LIMITING CONDITION FOR OPERATION (LCO) (continued)

The 72-hour allowed outage time (AOT) takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

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b. When one EDG is inoperable it is necessary to verify the availability of the offsite circuits on a more frequent basis to ensure a highly reliable power source remains. Since the required ACTION only specifies "perform," a failure of SR 4.8.1.1.1a acceptance criteria does not result in onsite Class 1E a required ACTION being not met. However, if a circuit fails to pass SR 4.8.1.1.1a, it is inoperable. Upon offsite circuit inoperability, additional conditions and required ACTIONs must then be entered.

ACTION b. requires performance of ACTION d., which is intended to provide assurance that a loss of offsite power, during the period that a EDG is inoperable, does not result in a complete loss of safety function of critical features/systems. While in this condition (one EDG inoperable), the remaining OPERABLE EDG and offsite circuits are adequate to supply electrical power to the Distribution System. Refer to ACTION d. basis for further discussion.

ACTION b. also requires starting the remaining EDG per SR 4.8.1.1.2a.5) within 24 hours to demonstrate OPERABILITY. Starting the operable EDG does not include operating the unit under load. With one EDG inoperable, operating the one remaining operable EDG in parallel with offsite power for test purposes is not prudent. Operating the EDG under load could increase its vulnerability to failure if offsite power is disturbed or lost. The associated * footnote provides an allowance to avoid unnecessary testing of the remaining EDG to verify OPERABLITY. If the remaining EDG has been successfully operated within the last 24 hours, if currently operating or if it can be determined that the cause of the inoperable EDG does not exist on the OPERABLE EDG, SR 4.8.1.1.2a.5) does not have to be performed. If the cause of inoperability exists on the remaining EDG, the remaining EDG would be declared inoperable upon discovery and ACTION f. would be entered for two EDGs inoperable. Once the failure is repaired, the common cause failure no longer exists, and ACTION f. is satisfied.

3/4.8.1 AC SOURCES (Continued)

LIMITING CONDITION FOR OPERATION (LCO) (continued)

c. Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable, resulting in de-energization. Therefore, ACTION c is modified by a note to indicate that when ACTION c is entered with no AC source to any train, the ACTIONs for LCO 3.8.3.1, Onsite Power Distribution - Operating," must be immediately entered. This allows ACTION c to provide requirements for the loss of one offsite circuit and one DG, without regard to whether a train is de-energized. LCO 3.8.3.1 provides the appropriate restrictions for a de-energized train.

When in ACTION c., individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. Since power system redundancy is provided by two diverse sources of power, however, the reliability of the power systems in this condition may appear higher than the condition of ACTION e. (loss of both required offsite circuits). This difference in reliability is offset by the susceptibility of this power system configuration to a single bus or switching failure.

ACTION c. also directs the performance of ACTION d. and demonstration of the remaining OPERABLE offsite and onsite power sources, similar to the actions specified in ACTION b., however, demonstration of OPERABILITY for the remaining EDG must be performed in 8 hours. If one power source is restored within 12 hours, power operation continues in accordance with either ACTION a. or ACTION b.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue while in ACTION c. for a period that should not exceed 12 hours. The 12-hour AOT takes into account the capacity and capability of the remaining AC sources, a reasonable time for evaluation and repairs, and the low probability of a DBA occurring during this period.

Following the 12-hour AOT, ACTION c. requires that both diesel generators and both offsite circuits be restored to Operable status within 72 hours. The requirement for restoring both diesel generators to OPERABLE status within 72 hours may be extended to 14 days to perform either extended preplanned maintenance (both preventive and corrective) or extended unplanned corrective maintenance work. Prior to exceeding the 72-hour AOT the SEPS must be available and an operational readiness status check performed in accordance with Technical Requirement (TR) 31. Refer to Bases for ACTION b. for additional information and requirements.

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d. ACTION d. is intended to provide assurance that a loss of offsite power condition does not result in a complete loss of safety function of critical features during the period when either an EDG is inoperable (condition addressed in ACTION b.) or when both an EDG and an offsite power source are inoperable (condition addressed in ACTION c.) at the same time. Critical features are designed with redundant safety related trains. Thus, it is necessary to verify OPERABILITY of redundant critical features in a timely manner. The term "verify," as used in this context means to administratively check by examining logs or other information to determine if certain components are out of service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate OPERABILITY of the component.

In addition, when in MODE 1, 2, or 3, the turbine driven emergency feedwater pump must also be verified OPERABLE as well. This requirement ensures a diverse emergency feedwater supply to the steam generators should the remaining offsite and onsite power sources subsequently become inoperable.

Redundant required feature failures consist of inoperable features associated with a train, redundant to the train that has an inoperable EDG (i.e., all required systems, subsystems, trains, components and devices dependent on the remaining OPERABLE EDG must be verified OPERABLE as well). The emergency power supply for the required systems, subsystems, trains, components and devices may be used as the primary basis for determining the redundant features–train relationship. Features whose inoperability has been determined to impact both trains should be considered as Train A and Train B related. Manually operated features should use the same train designation as the electrically powered features in the same flowpath.

Discovering one required EDG inoperable coincident with one or more inoperable required

LIMITING CONDITION FOR OPERATION (LCO) (continued)

support or supported features, or both, that are associated with the OPERABLE EDG, results in starting the AOT for ACTION d. The 4-hour AOT from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

While in this condition, the remaining OPERABLE EDG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Though, on a component basis, single failure protection for the required feature's function may have been lost, however, the safety function has not been lost.

The 4-hour AOT takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature, the capacity and capability of the remaining AC sources, a reasonable time for evaluation and repairs, and the low probability of a DBA occurring during this period.

If at any time during the existence of this condition (one EDG inoperable), a required feature subsequently becomes inoperable, the 4-hour AOT would begin to be tracked.

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e. ACTION e.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions.

The completion time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (ACTION a.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a completion time of 24 hours for two required offsite circuits inoperable based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter completion time of 12 hours is appropriate. These features are powered from redundant AC safety trains. Single train features, such as turbine driven auxiliary feedwater pumps, are not included.

The completion time for ACTION e is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This completion time also allows for an exception to the normal "time zero" for beginning the completion time "clock." In this ACTION, the completion time only begins on discovery that both:

a. All required offsite circuits are inoperable, and

b. A required feature is inoperable.

If at any time while two offsite circuits are inoperable a required feature becomes inoperable, this completion time begins to be tracked.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue with two offsite AC power sources inoperable for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources.

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable that involve one or more EDGs inoperable. However, two factors tend to decrease the severity of this level of degradation:

3/4.8.1 AC SOURCES (Continued)

1. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure, and
2. The time required to detect and restore an unavailable off site power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24-hour AOT provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

According to Reference 6, with the available offsite AC sources, two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with ACTION a.

3/4.8.1 AC SOURCES (Continued)

SURVEILLANCE REQUIREMENTS (SR) (continued)

SR 4.8.1.1.2f.15) demonstrates that while EDG 1A is loaded with its permanently connected loads and auto-connected emergency loads, that emergency bus E5 voltage and frequency remain within steady-state limits after manual energization of the 1500 hp startup feedwater pump (the largest manually-connected load).

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

SR 4.8.1.1.2g

This surveillance demonstrates that the EDG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper voltage and frequency within 10 seconds then steady-state condition when the EDGs are started simultaneously. The time, voltage and frequency for the EDG to reach steady state operation is monitored and the trend evaluated to identify degradation of governor and voltage regulator performance.

The SR also requires that the EDGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations at keep-warm values.

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

MODES 5 AND 6

During operation in MODEs 5 and 6, the required AC sources include one off-site circuit capable of supplying the on-site Class 1E distribution system and an operable emergency diesel generator. These minimum AC sources ensure that (1) the unit can be maintained in the shutdown condition, (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit, and (3) adequate AC power is available to mitigate an event postulated to occur during shutdown.

If the minimum required AC sources are not operable, the action statement requires immediately suspending core alternation, positive reactivity changes, movement of irradiated fuel, and crane operation with loads over the fuel pool. With respect to suspending positive reactivity changes, operations that individually add limited, positive reactivity are acceptable when, combined with other actions that add negative reactivity, the overall net reactivity addition is zero or negative. For example, a positive reactivity addition caused by temperature fluctuations from inventory addition or temperature control fluctuations is acceptable if it is combined with a negative reactivity addition such that the overall, net reactivity addition is zero or negative. Refer to TS Bases 3/4.9.1, Boron Concentration, for limits on boron concentration and water temperature for MODE 6 action statements involving suspension of positive reactivity changes.

Pursuant to LCO 3.0.6, the Onsite Power Distribution ACTION would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the ACTION is modified by a Note to indicate that when the ACTION is entered with no AC power to any required ESF bus, the ACTIONS for LCO 3.8.3.2 must be immediately entered. This Note allows the ACTION in LCO 3.8.1.2 A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.3.2 would provide the appropriate restrictions for the situation involving a de-energized train.

3/4.8.3 ONSITE POWER DISTRIBUTION (continued)

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

- Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded, and
- Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6 provide assurance that:

- Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core,
- Systems needed to mitigate a fuel handling accident are available,
- Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available, and
- Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown and refueling condition.

ACTIONS

MODES 1 through 4

With the OPERABLE electrical buses less than required by LCO 3.8.3.1 and without a loss of safety function, the remaining electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported.

When a required electrical bus is not energized, the associated loads, such as ESF components normally powered from the electrical bus, must also be declared inoperable.

ACTION a is modified by a Note that requires the applicable ACTIONS of LCO 3.8.2.1 "DC Sources - Operating," be entered for DC trains made inoperable by inoperable power distribution subsystems. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. Inoperability of a distribution system can result in loss of charging power to batteries and eventual loss of DC power. This Note ensures that the appropriate attention is given to restoring charging power to batteries, if necessary, after loss of distribution systems.