

ATTACHMENT 4

MARKED-UP TECHNICAL SPECIFICATION BASES PAGE CHANGES

INSERTS FOR TECHNICAL SPECIFICATIONS BASES

INSERT 1

The Frequency may be based on factors such as operating experience, equipment reliability, or plant risk, and is controlled under the Surveillance Frequency Control Program.


BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.1.1 (continued)

Using the ITC accounts for Doppler reactivity in this calculation because the reactor is subcritical, and the fuel temperature will be changing at the same rate as the RCS.

~~The Frequency of 24 hours is based on the generally slow change in required boron concentration and the low probability of an accident occurring without the required SDM. This allows time for the operator to collect the required data, which includes performing a boron concentration analysis, and complete the calculation.~~

Insert 1 

REFERENCES

1. UFSAR, Section 3.1.22.
2. UFSAR, Chapter 15.
3. Regulatory Guide 1.183, July 2000.


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BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.2.1 (continued)

measured value must take place within the first 60 effective full power days (EFPD) after each fuel loading. This allows sufficient time for core conditions to reach steady state, but prevents operation for a large fraction of the fuel cycle without establishing a benchmark for the design calculations. ~~The required subsequent Frequency of 31 EFPD, following the initial 60 EFPD after entering MODE 1, is acceptable, based on the slow rate of core changes due to fuel depletion and the presence of other indicators (QPTR, AFD, etc.) for prompt indication of an anomaly.~~

Insert 1 

REFERENCES

1. UFSAR, Sections 3.1.22, 3.1.24, and 3.1.25.
 2. UFSAR, Chapter 15.
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BASES

ACTIONS

D.1.1 and D.1.2 (continued)

described in the Bases or LCO 3.1.1. The required Completion Time of 1 hour for initiating boration is reasonable, based on the time required for potential xenon redistribution, the low probability of an accident occurring, and the steps required to complete the action. This allows the operator sufficient time to align the required valves and start the boric acid pumps. Boration will continue until the required SDM is restored.

D.2

If more than one rod is found to be misaligned or becomes misaligned because of bank movement, the unit conditions fall outside of the accident analysis assumptions. Since automatic bank sequencing would continue to cause misalignment, the unit must be brought to a MODE or Condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours.

The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
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SR 3.1.4.1

Verification that individual rod positions are within alignment limits ~~at a Frequency of 12 hours~~ provides a history that allows the operator to detect a rod that is beginning to deviate from its expected position. If an individual rod position is not within the alignment limit of the group step counter demand position, a determination must be made whether the problem is the actual rod position or the indicated rod position. If the actual rod position is not within the alignment limit, follow the Conditions and Required Actions in Specification 3.1.4. If the indicated, not actual, rod position is not within the alignment limit, follow the Conditions and Required Actions of Specification 3.1.7, Rod Position Indication. ~~The specified Frequency takes into account other rod position information that is continuously available to the operator in the control room, so that during actual rod motion, deviations can immediately be detected.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.1.4.2

Verifying each rod is OPERABLE would require that each rod be tripped. However, in MODES 1 and 2, tripping each rod would result in radial or axial power tilts, or oscillations. Exercising each individual rod ~~every 92 days~~ provides increased confidence that all rods continue to be OPERABLE without exceeding the alignment limit, even if they are not regularly tripped. Moving each rod by 10 steps will not cause radial or axial power tilts, or oscillations, to occur. ~~The 92 day Frequency takes into consideration other information available to the operator in the control room and SR 3.1.4.1, which is performed more frequently and adds to the determination of OPERABILITY of the rods.~~ Between required performances of SR 3.1.4.2 (determination of rod OPERABILITY by movement), if a rod(s) is discovered to be immovable, but remains trippable, the rod(s) is considered to be OPERABLE. At any time, if a rod(s) is immovable, a determination of the trippability (OPERABILITY) of the rod(s) must be made, and appropriate action taken.

Insert 1



SR 3.1.4.3

Verification of rod drop times allows the operator to determine that the maximum rod drop time permitted is consistent with the assumed rod drop time used in the safety analysis. Measuring rod drop times prior to reactor criticality, after reactor vessel head removal, ensures that the reactor internals and rod drive mechanism will not interfere with rod motion or rod drop time, and that no degradation in these systems has occurred that would adversely affect rod motion or drop time. This testing is performed with all RCPs operating and the average moderator temperature $\geq 500^{\circ}\text{F}$ to simulate a reactor trip under actual conditions. For this surveillance, a fully withdrawn position of 230 steps is used in order to provide consistent test conditions to facilitate trending. This rod position is not necessarily the same as the cycle-dependent fully withdrawn rod position specified in the COLR and will yield conservative drop times relative to the COLR position. The surveillance procedure limits for rod drop time ensure that the Surveillance Requirement criterion and the Safety Analysis Limit are met.

This Surveillance is performed during a unit outage, due to the unit conditions needed to perform the SR and the potential for an unplanned unit transient if the Surveillance were performed with the reactor at power.

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown banks are within their insertion limits prior to an approach to criticality ensures that when the reactor is critical, or being taken critical, the shutdown banks will be available to shut down the reactor, and the required SDM will be maintained following a reactor trip. This SR and Frequency ensure that the shutdown banks are withdrawn before the control banks are withdrawn during a unit startup.

Since the shutdown banks are positioned manually by the control room operator, a verification of shutdown bank position ~~at a Frequency of 12 hours~~, after the reactor is taken critical, is adequate to ensure that they are within their insertion limits. Also, ~~the 12 hour Frequency takes into account other information available in the control room for the purpose of monitoring the status of shutdown rods.~~

Insert 1 

REFERENCES

1. UFSAR, Sections 3.1.6, 3.1.22, and 3.1.24.
 2. 10 CFR 50.46.
 3. UFSAR, Chapter 15.
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BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.6.1

This Surveillance is required to ensure that the reactor does not achieve criticality with the control banks below their insertion limits.

The estimated critical position (ECP) depends upon a number of factors, one of which is xenon concentration. If the ECP was calculated long before criticality, xenon concentration could change to make the ECP substantially in error. Verifying the predicted critical rod bank position within 4 hours prior to criticality avoids a large error from changes in xenon concentration, but allows the operator some flexibility to schedule the verification with other startup activities.

SR 3.1.6.2

~~Verification of the control bank insertion limits at a Frequency of 12 hours is sufficient to detect control banks that may be approaching the insertion limits since, normally, very little rod motion occurs in 12 hours.~~

Insert 1 

SR 3.1.6.3

When control banks are maintained within their insertion limits as checked by SR 3.1.6.2 above, it is unlikely that their sequence and overlap will not be in accordance with requirements provided in the COLR. ~~A Frequency of 12 hours is consistent with the insertion limit check above in SR 3.1.6.2.~~

Insert 1 

REFERENCES

1. UFSAR, Sections 3.1.6, 3.1.22, and 3.1.24.
 2. 10 CFR 50.46.
 3. UFSAR, Chapter 15.
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SR 3.1.7.1 (continued)

calibration from that point forward. The CHANNEL CALIBRATION also verifies all alarms and indications, such as the Rod Bottom lights. The CHANNEL CALIBRATION does not include the coil stack, as it cannot be adjusted. The indicated RPI position is adjusted as needed to compensate for thermal drift. ~~The 18 month Frequency has been shown by operating experience to be adequate.~~

Insert 1 

REFERENCES

1. UFSAR, Section 3.1.9.
 2. UFSAR, Chapter 15.
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BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.9.1

The power range and intermediate range neutron detectors must be verified to be OPERABLE in MODE 2 by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." A CHANNEL OPERATIONAL TEST is performed on each power range and intermediate range channel prior to initiation of the PHYSICS TESTS. This will ensure that the RTS is properly aligned to provide the required degree of core protection during the performance of the PHYSICS TESTS. Performance of the normally scheduled COT is sufficient to ensure the equipment is OPERABLE. LCO 3.3.1 requires a COT on the power range and intermediate range channels every 92 days. These Frequencies have been determined to be sufficient for verification that the equipment is working properly. Because initiation of PHYSICS TESTS does not affect the ability of the equipment to perform its function or the RTS trip capability, and does not invalidate the previous Surveillances, requiring the testing to be performed at a fixed time prior to the initiation of PHYSICS TESTS has no benefit.

SR 3.1.9.2

Verification that the RCS lowest loop T_{avg} is $\geq 531^{\circ}\text{F}$ will ensure that the unit is not operating in a condition that could invalidate the safety analyses. ~~Verification of the RCS temperature at a Frequency of 30 minutes during the performance of the PHYSICS TESTS will ensure that the initial conditions of the safety analyses are not violated.~~

Insert 1 

SR 3.1.9.3

Verification that the THERMAL POWER is $\leq 5\%$ RTP will ensure that the unit is not operating in a condition that could invalidate the safety analyses. ~~Verification of the THERMAL POWER at a Frequency of 30 minutes during the performance of PHYSICS TESTS will ensure that the initial conditions of the safety analyses are not violated.~~

Insert 1 

SR 3.1.9.4

The SDM is verified by performing a reactivity balance calculation, considering the following reactivity effects:

- a. RCS boron concentration;
- b. Rod bank position;

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SR 3.1.9.4 (continued)

- c. RCS average temperature;
- d. Fuel burnup based on gross thermal energy generation;
- e. Xenon concentration;
- f. Samarium concentration;
- g. Isothermal temperature coefficient (ITC), when below the point of adding heat (POAH);
- h. Moderator Defect when above the POAH; and
- i. Doppler Defect when above the POAH.

Using the ITC accounts for Doppler reactivity in this calculation when the reactor is subcritical or critical but below the POAH, and the fuel temperature will be changing at the same rate as the RCS.

Insert 1

~~The Frequency of 24 hours is based on the generally slow change in required boron concentration and on the low probability of an accident occurring without the required SDM.~~

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.
 2. 10 CFR 50.59.
 3. Regulatory Guide 1.68, Revision 2, August, 1978.
 4. ANSI/ANS-19.6.1-1997, August 22, 1997.
 5. Letter from W.L. Stewart to NRC, "Virginia Electric and Power Company, Surry Power Station, Units 1 and 2, North Anna Power Station, Units 1 and 2, Modification of Startup Physics Testing Program Inspector Follow-Up Item 280, 281/88-29-01," dated 12/8/89.
 6. VEP-FRD-42-A, "Reload Nuclear Design Methodology." X
 7. WCAP-11618, including Addendum 1, April 1989.
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BASES

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(continued)

verification after a power level is achieved for extended operation that is 10% higher than that power at which F_0 was last measured.

SR 3.2.1.1

The nuclear design process includes calculations performed to determine that the core can be operated within the $F_0(Z)$ limits. Because flux maps are taken in steady state conditions, the variations in power distribution resulting from normal operational maneuvers are not present in the flux map data. These variations are, however, conservatively calculated by considering a wide range of unit maneuvers in normal operation. The maximum peaking factor increase over steady state values, calculated as a function of core elevation, Z , is called $N(Z)$.

The limit with which $F_0^M(Z)$ is compared varies inversely with power above 50% RTP and $N(Z)$ and directly with a function called $K(Z)$ provided in the COLR.

Performing this Surveillance in MODE 1 prior to exceeding 75% RTP ensures that the $F_0^M(Z)$ limit is met when RTP is achieved, because peaking factors generally decrease as power level is increased.

If THERMAL POWER has been increased by $\geq 10\%$ RTP since the last determination of $F_0^M(Z)$, another evaluation of this factor is required 12 hours after achieving equilibrium conditions at this higher power level (to ensure that $F_0^M(Z)$ values are being reduced sufficiently with power increase to stay within the LCO limits).

~~The Frequency of 31 EFPD is adequate to monitor the change of power distribution with core burnup because such changes are slow and well controlled when the unit is operated in accordance with the Technical Specifications (TS).~~

Insert 1 

Flux map data are taken for multiple core elevations. $F_0^M(Z)$ evaluations are not applicable for the following axial core regions, measured in percent of core height:

- a. Lower core region, from 0 to 15% inclusive; and
- b. Upper core region, from 85 to 100% inclusive.

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SR 3.2.2.1

The value of $F_{\Delta H}^N$ is determined by using the movable incore detector system to obtain a flux distribution map. A data reduction computer program then calculates the maximum value of $F_{\Delta H}^N$ from the measured flux distributions. The $F_{\Delta H}^N$ limit contains an allowance of 1.04 to account for measurement uncertainty.

After each refueling, $F_{\Delta H}^N$ must be determined in MODE 1 prior to exceeding 75% RTP. This requirement ensures that $F_{\Delta H}^N$ limits are met at the beginning of each fuel cycle.

~~The 31 EFPD Frequency is acceptable because the power distribution changes relatively slowly over this amount of fuel burnup. Accordingly, this Frequency is short enough that the $F_{\Delta H}^N$ limit cannot be exceeded for any significant period of operation.~~

Insert 1 

REFERENCES

1. VEP-NFE-2-A, "VEPCO Evaluation of the Control Rod Ejection Transient."
 2. UFSAR, Section 3.1.22.
 3. 10 CFR 50.46.
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BASES

LCO
(continued)

The AFD limits are provided in the COLR. Figure B 3.2.3-1 shows typical RPDC AFD limits. The AFD limits for RPDC do not depend on the target flux difference. However, the target flux difference may be used to minimize changes in the axial power distribution.

Violating this LCO on the AFD could produce unacceptable consequences if a Condition 2, 3, or 4 event occurs while the AFD is outside its specified limits.

The LCO is modified by a Note which states that AFD shall be considered outside its limit when two or more OPERABLE excore channels indicate AFD to be outside its limit.

APPLICABILITY

The AFD requirements are applicable in MODE 1 greater than or equal to 50% RTP when the combination of THERMAL POWER and core peaking factors are of primary importance in safety analysis.

For AFD limits developed using RPDC methodology, the value of the AFD does not affect the limiting accident consequences with THERMAL POWER < 50% RTP and for lower operating power MODES.

ACTIONS

A.1

As an alternative to restoring the AFD to within its specified limits, Required Action A.1 requires a THERMAL POWER reduction to < 50% RTP. This places the core in a condition for which the value of the AFD is not important in the applicable safety analyses. A Completion Time of 30 minutes is reasonable, based on operating experience, to reach 50% RTP without challenging unit systems.

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SR 3.2.3.1

This Surveillance verifies that the AFD, as indicated by the NIS excore channel, is within its specified limits. ~~The Surveillance Frequency of 7 days is adequate considering that the AFD is monitored by a computer and any deviation from requirements is alarmed.~~

Insert 1 

BASES

ACTIONS

B.1 (continued)

4 hours is reasonable, based on operating experience regarding the amount of time required to reach the reduced power level without challenging unit systems.

SURVEILLANCE
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SR 3.2.4.1

SR 3.2.4.1 is modified by two Notes. Note 1 allows QPTR to be calculated with three power range channels if THERMAL POWER is $\leq 75\%$ RTP and the input from one Power Range Neutron Flux channel is inoperable. Note 2 allows performance of SR 3.2.4.2 in lieu of SR 3.2.4.1.

This Surveillance verifies that the QPTR, as indicated by the Nuclear Instrumentation System (NIS) excore channels, is within its limits. ~~The Frequency of 7 days takes into account other information and alarms available to the operator in the control room.~~

Insert 1 

For those causes of QPT that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance verifies that the QPTR, as determined using the movable incore detectors, is within its limits. This Surveillance may be performed in lieu of SR 3.2.4.1, as provided by a SR 3.2.4.1 Note. SR 3.2.4.2 is modified by a Note, which states that it is not required until 12 hours after the inputs from one or more Power Range Neutron Flux channels are inoperable and the THERMAL POWER is $> 75\%$ RTP. Therefore, this Surveillance is only required to be performed when one or more Power Range Neutron Flux channels are inoperable, but may be performed to satisfy the routine monitoring of QPTR.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased. Performing SR 3.2.4.2 ~~at a Frequency of 12 hours~~ provides an accurate alternative means for ensuring that any tilt remains within its limits.

(continued)

BASES

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SR 3.2.4.2 (continued)

QPTR is determined using the movable incore detectors performing a full core incore flux map or by monitoring two sets of four thimble locations with quarter core symmetry. The two sets of four symmetric thimbles is a set of eight unique detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8. The symmetric thimble flux map can be used to generate symmetric thimble tilt. This can be compared to a reference symmetric thimble tilt, taken from the most recent full core flux map used to normalize the excore detectors, to calculate QPTR. If a full core flux map is used to determine QPTR, the measured incore tilt values from the full core flux map are compared to those from the most recent full core flux map used to normalize the excore detectors. The difference between these tilt values is the QPTR for the current core conditions. Therefore, the movable incore detectors can be used to confirm that QPTR is within limits.

Insert 1 

REFERENCES

1. 10 CFR 50.46.
 2. VEP-NFE-2-A, "VEPCO Evaluation of the Control Rod Ejection Transient."
 3. UFSAR, Section 3.1.22.
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The SRs for each RTS Function are identified by the SRs column of Table 3.3.1-1 for that Function.

A Note has been added to the SR Table stating that Table 3.3.1-1 determines which SRs apply to which RTS Functions.

Note that each channel of process protection supplies both trains of the RTS. When testing Channel I, Train A and Train B must be examined. Similarly, Train A and Train B must be examined when testing Channel II, Channel III, and Channel IV. The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

SR 3.3.1.1

Performance of the CHANNEL CHECK ~~once every 12 hours~~ ensures that gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

The Frequency is based on operating experience that ~~demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.~~

Insert 1 

BASES

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REQUIREMENTS
(continued)

SR 3.3.1.2

SR 3.3.1.2 compares the calorimetric heat balance calculation to the power range channel output ~~every 24 hours~~. If the calorimetric heat balance calculation results exceeds the power range channel output by more than +2% RTP, the power range channel is not declared inoperable, but must be adjusted. The power range channel output shall be adjusted consistent with the calorimetric heat balance calculation results if the calorimetric calculation exceeds the power range channel output by more than +2% RTP. If the power range channel output cannot be properly adjusted, the channel is declared inoperable.

If the calorimetric is performed at part power (< 85% RTP), adjusting the power range channel indication in the increasing power direction will assure a reactor trip below the safety analysis limit (< 118% RTP). Making no adjustment to the power range channel in the decreasing power direction due to a part power calorimetric assures a reactor trip consistent with the safety analyses.

This allowance does not preclude making indicated power adjustments, if desired, when the calorimetric heat balance calculation power is less than the power range channel output. To provide close agreement between indicated power and to preserve operating margin, the power range channels are normally adjusted when operating at or near full power during steady-state conditions. However, discretion must be exercised if the power range channel output is adjusted in the decreasing power direction due to a part power calorimetric (< 85% RTP). This action may introduce a non-conservative bias at higher power levels which may result in an NIS reactor trip above the safety analysis limit (> 118% RTP). The cause of the non-conservative bias is the decreased accuracy of the calorimetric at reduced power conditions. The primary error contributor to the instrument uncertainty for a secondary side power calorimetric measurement is the feedwater flow measurement, which is typically a ΔP measurement across a feedwater venturi. While the measurement uncertainty remains constant in ΔP as power decreases, when translated into flow, the uncertainty increases as a square term. Thus a 1% flow error at 100% power can approach a 10% flow error at 30% RTP even though the ΔP error has not changed. The ultrasonic flow meter provides more accurate feedwater flow measurement than the existing venturis. Feedwater flow measurement from the

(continued)

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SR 3.3.1.2 (continued)

ultrasonic flow meter may be used to compute the secondary side power calorimetric. If feedwater ultrasonic flow meter data is used for the calorimetric at reduced flow, the accuracy is also reduced however not as significantly as with the feedwater venturi data. An evaluation of extended operation at part power conditions would conclude that it is prudent to administratively adjust the setpoint of the Power Range Neutron Flux-High bistables when: (1) the power range channel output is adjusted in the decreasing power direction due to a part power calorimetric below 85% RTP; or (2) for a post refueling startup. The evaluation of extended operation at part power conditions would also conclude that the potential need to adjust the indication of the Power Range Neutron Flux in the decreasing power direction is quite small, primarily to address operation in the intermediate range about P-10 (nominally 10% RTP) to allow the enabling of the Power Range Neutron Flux-Low Setpoint and the Intermediate Range Neutron Flux reactor trips. Before the Power Range Neutron Flux-High bistables are reset to $\leq 109\%$ RTP, a calorimetric must be performed and the power range channels must be adjusted such that the high flux bistables will trip at $\leq 109\%$ RTP. Consideration must be given to calorimetric uncertainty, and its impact on decalibration of the power range channels.

The Note clarifies that this Surveillance is required only if reactor power is $\geq 15\%$ RTP and that 12 hours are allowed for performing the first Surveillance after reaching 15% RTP. A power level of 15% RTP is chosen based on plant stability, i.e., automatic rod control capability and turbine generator synchronized to the grid.

The Frequency of every 24 hours is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate that a difference between calorimetric heat balance calculation and the power range channel output of more than +2% RTP is not expected in any 24 hour period.

In addition, control room operators periodically monitor redundant indications and alarms to detect deviations in channel outputs.

Insert 1

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(continued)

SR 3.3.1.3

SR 3.3.1.3 compares the incore system to the NIS channel output ~~every 31 EFPD~~. If the absolute difference is $\geq 3\%$, the NIS channel is still OPERABLE, but it must be readjusted. The excore NIS channel shall be adjusted if the absolute difference between the incore and excore AFD is $\geq 3\%$. The adjustment is a recalibration of the upper and lower Power Range detectors to incorporate the results of the flux map.

If the NIS channel cannot be properly readjusted, the channel is declared inoperable. This Surveillance is performed to verify the $f(\Delta I)$ input to the overtemperature ΔT Function.

A Note clarifies that the Surveillance is required only if reactor power is $\geq 15\%$ RTP and that 72 hours is allowed for performing the first Surveillance after reaching 15% RTP.

~~The Frequency of every 31 EFPD is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Also, the slow changes in neutron flux during the fuel cycle can be detected during this interval.~~

← Insert 1

SR 3.3.1.4

SR 3.3.1.4 is the performance of a TADOT ~~every 31 days on a STAGGERED TEST BASIS~~. This test shall verify OPERABILITY by actuation of the end devices. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

The RTB test shall include separate verification of the undervoltage and shunt trip mechanisms. Independent verification of RTB undervoltage and shunt trip Function is not required for the bypass breakers. No capability is provided for performing such a test at power. The independent test for bypass breakers is included in SR 3.3.1.14. The test of the bypass breaker is a local shunt trip actuation. A Note has been added to indicate that this
(continued)

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SR 3.3.1.4 (continued)

test must be performed on the bypass breaker. The local manual shunt trip of the RTB bypass shall be conducted immediately after placing the bypass breaker into service.

This test must be conducted prior to the start of testing on the RTS or maintenance on a RTB. This checks the mechanical operation of the bypass breaker.

~~The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.~~

Insert 1 →

SR 3.3.1.5

SR 3.3.1.5 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested ~~every 31 days on a STAGGERED TEST BASIS,~~ using the semiautomatic tester. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function, including operation of the P-7 permissive which is a logic function only. The ~~Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.~~

Insert 1 →

SR 3.3.1.6

SR 3.3.1.6 is the performance of a TADOT ~~and is performed every 92 days, as justified in Reference 7.~~ A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

(continued)

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SR 3.3.1.6 (continued)

The SR is modified by a Note that excludes verification of setpoints from the TADOT. Since this SR applies to RCP undervoltage and underfrequency relays, setpoint verification requires elaborate bench calibration and is accomplished during the CHANNEL CALIBRATION.

Regarding RCP Underfrequency Testing, it should be noted that test circuits have not been installed on Unit 1, therefore, such testing can only be performed on Unit 2.

Insert 1

SR 3.3.1.7

~~SR 3.3.1.7 is the performance of a COT every 92 days.~~

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

The nominal trip setpoints must be within the Allowable Values specified in Table 3.3.1-1.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology.

SR 3.3.1.7 is modified by a Note that provides a 4 hour delay in the requirement to perform this Surveillance for source range instrumentation when entering MODE 3 from MODE 2. This Note allows a normal shutdown to proceed without a delay for testing in MODE 2 and for a short time in MODE 3 until the RTBs are open and SR 3.3.1.7 is no longer required to be performed. If the unit is to be in MODE 3 with the RTBs closed for > 4 hours this Surveillance must be performed prior to 4 hours after entry into MODE 3.

Insert 1

~~The Frequency of 92 days is justified in Reference 7.~~

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(continued)

SR 3.3.1.8 the frequency specified in the Surveillance Frequency Control Program

SR 3.3.1.8 is the performance of a COT as described in SR 3.3.1.7, except it is modified by a Note that this test shall include verification that the P-6 and P-10 interlocks are in their required state for the existing unit condition. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The Frequency is modified by a Note that allows this surveillance to be satisfied if it has been performed within ~~92 days~~ of the Frequencies prior to reactor startup and four hours after reducing power below P-10 and P-6. The Frequency of "prior to startup" ensures this surveillance is performed prior to critical operations and applies to the source, intermediate and power range low instrument channels. The Frequency of "12 hours after reducing power below P-10" (applicable to intermediate and power range low channels) and "4 hours after reducing power below P-6" (applicable to source range channels) allows a normal shutdown to be completed and the unit removed from the MODE of Applicability for this surveillance without a delay to perform the testing required by this surveillance. The Frequency of ~~every 92 days thereafter~~ applies if the unit remains in the MODE of Applicability after the initial performances of prior to reactor startup and twelve and four hours after reducing power below P-10 or P-6, respectively. The MODE of Applicability for this surveillance is < P-10 for the power range low and intermediate range channels and < P-6 for the source range channels. Once the unit is in MODE 3, this surveillance is no longer required. If power is to be maintained < P-10 for more than 12 hours or < P-6 for more than 4 hours, then the testing required by this surveillance must be performed prior to the expiration of the time limit.

Twelve hours and four hours are reasonable times to complete the required testing or place the unit in a MODE where this surveillance is no longer required. This test ensures that the NIS source, intermediate, and power range low channels are OPERABLE prior to taking the reactor critical and after reducing power into the applicable MODE (< P-10 or < P-6)

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.1.8 (continued)

for periods > 12 and 4 hours, respectively. Verification of the surveillance is accomplished by observing the permissive annunciator windows on the Main Control board.

← Insert 1

SR 3.3.1.9

SR 3.3.1.9 is a comparison of the excore channels to the incore channels. If the measurements do not agree, the excore channels are not declared inoperable but must be calibrated to agree with the incore detector measurements.

If the excore channels cannot be adjusted, the channels are declared inoperable. This Surveillance is performed to verify the $f(\Delta I)$ input to the overtemperature ΔT Function.

Two notes modify SR 3.3.1.9. Note 1 indicates that the excore NIS channels shall be adjusted if the absolute difference between the incore and excore is $\geq 3\%$. Note 2 states that this Surveillance is required only if reactor power is $\geq 50\%$ RTP and that 72 hours is allowed for performing the first surveillance after reaching 50% RTP.

~~The Frequency of 92 EFPD is adequate. It is based on industry operating experience, considering instrument reliability and operating history data for instrument drift.~~

Insert 1 →

SR 3.3.1.10

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology.

~~The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.~~

Insert 1 →

(continued)

BASES

SURVEILLANCE
REQUIREMENTS


SR 3.3.1.10 (continued)

SR 3.3.1.10 is modified by a Note stating that this test shall include verification that the time constants are adjusted to the prescribed values where applicable.

SR 3.3.1.11

SR 3.3.1.11 is the performance of a CHANNEL CALIBRATION, as described in SR 3.3.1.10, ~~every 18 months~~. This SR is modified by a Note stating that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the power range neutron detectors consists of a normalization of the detectors based on a power calorimetric and flux map performed above 15% RTP. The CHANNEL CALIBRATION for the source range and intermediate range neutron detectors consists of obtaining the detector plateau or preamp discriminator curves, evaluating those curves, and comparing those curves to the manufacturer's data. This Surveillance is not required for the NIS power range detectors for entry into MODE 2 or 1, and is not required for the NIS intermediate range detectors for entry into MODE 2, because the unit must be in at least MODE 2 to perform the test for the intermediate range detectors and MODE 1 for the power range detectors. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed on the 18 month Frequency.~~

Insert 1



SR 3.3.1.12

SR 3.3.1.12 is the performance of a CHANNEL CALIBRATION, as described in SR 3.3.1.10, ~~every 18 months~~. Whenever a sensing element is replaced, the next required CHANNEL CALIBRATION of the resistance temperature detector (RTD) sensors is accomplished by an inplace cross calibration that compares the other sensing elements with the recently installed sensing element.

This test will verify the dynamic compensation for flow from the core to the RTDs. The $OT\Delta T$ function is lead/lag compensated and the $OP\Delta T$ function is rate/lag compensated.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.1.12 (continued)

Insert 1

~~The Frequency is justified by the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.~~

SR 3.3.1.13

SR 3.3.1.13 is the performance of a COT of RTS interlocks ~~every 18 months~~. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

Insert 1

~~The Frequency is based on the known reliability of the interlocks and the multichannel redundancy available, and has been shown to be acceptable through operating experience.~~

SR 3.3.1.14

SR 3.3.1.14 is the performance of a TADOT of the Manual Reactor Trip, RCP Breaker Position, and the SI Input from ESFAS. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. ~~This TADOT is performed every 18 months~~. The test shall independently verify the OPERABILITY of the undervoltage and shunt trip mechanisms for the Manual Reactor Trip Function for the Reactor Trip Breakers and undervoltage trip mechanism for the Reactor Trip Bypass Breakers. The Reactor Trip Bypass Breaker test shall include testing of the automatic undervoltage trip.

Insert 1

~~The Frequency is based on the known reliability of the Functions and the multichannel redundancy available, and has been shown to be acceptable through operating experience.~~

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.1.16 (continued)

time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements" (Ref. 10) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verification for other sensor types must be demonstrated by test.

WCAP-14036-P-A Revision 1 "Elimination of Periodic Protection Channel Response Time Tests" (Ref. 11) provides the basis and the methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time. The allocations for sensor, signal conditioning and actuation logic response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. Specific components identified in the WCAP may be replaced without verification testing. One example where response time could be affected is replacing the sensing assembly of a transmitter.

~~As appropriate, each channel's response must be verified every 18 months on a STAGGERED TEST BASIS. Testing of the final actuation devices is included in the testing. Response times cannot be determined during unit operation because equipment operation is required to measure response times.~~

Insert 1 →

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.1.16 (continued)

~~Experience has shown that these components usually pass this surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

SR 3.3.1.16 is modified by a Note stating that neutron detectors are excluded from RTS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Response of neutron flux signal portion of the channel time shall be measured from the detector or input of the first electronic component in the channel. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

REFERENCES

1. UFSAR, Chapter 7.
 2. UFSAR, Chapter 6.
 3. UFSAR, Chapter 15.
 4. IEEE-279-1971.
 5. 10 CFR 50.49.
 6. RTS/ESFAS Setpoint Methodology Study (Technical Report EE-0116).
 7. WCAP-10271-P-A, Supplement 1, Rev. 1, June 1990 and WCAP-14333-P-A, Rev. 1, October 1998.
 8. Technical Requirements Manual.
 9. Regulatory Guide 1.105, Revision 3, "Setpoints for Safety Related Instrumentation."
 10. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 1996.
 11. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," December 1995.
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BASES

ACTIONS

J.1, J.2.1, and J.2.2 (continued)

actions in the event of a complete loss of ESFAS function. If the interlock is not in the required state (or placed in the required state) for the existing unit condition, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of these interlocks.

SURVEILLANCE
REQUIREMENTS

The SRs for each ESFAS Function are identified by the SRs column of Table 3.3.2-1.

A Note has been added to the SR Table to clarify that Table 3.3.2-1 determines which SRs apply to which ESFAS Functions.

Note that each channel of process protection supplies both trains of the ESFAS. When testing channel I, train A and train B must be examined. Similarly, train A and train B must be examined when testing channel II, channel III, and channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

SR 3.3.2.1

Performance of the CHANNEL CHECK ~~once every 12 hours~~ ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.2.1 (continued)

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including indication and reliability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

~~The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.~~

Insert 1



SR 3.3.2.2

SR 3.3.2.2 is the performance of an ACTUATION LOGIC TEST. ~~The SSPS is tested every 31 days on a STAGGERED TEST BASIS,~~ using the semiautomatic tester. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. This verifies that the logic modules are OPERABLE. ~~The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.~~

Insert 1



SR 3.3.2.3

SR 3.3.2.3 is the performance of a MASTER RELAY TEST. The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. ~~This test is performed every 31 days on a STAGGERED TEST BASIS. The time allowed for the surveillance interval is justified in Reference 8.~~

Insert 1



SR 3.3.2.4

SR 3.3.2.4 is the performance of a COT.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.2.4 (continued)

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.2-1. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least one per refueling interval with applicable extensions.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology.

The COT for the Containment Pressure Channel includes exercising the transmitter by applying either a vacuum or pressure to the appropriate side of the transmitter.

~~The Frequency of 92 days is justified in Reference 8.~~

Insert 1



SR 3.3.2.5

SR 3.3.2.5 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation MODE is either allowed to function, or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation MODE is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing the slave relay. ~~This test is performed every 92 days. The Frequency is adequate, based on industry operating experience, considering instrument reliability and operating history data.~~

Insert 1



This SR is modified by a Note that allows an exception for testing of relays which could induce a unit transient, an inadvertent reactor trip or ESF actuation, or cause the inoperability of two or more ESF components.

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.3.2.6

SR 3.3.2.6 is the performance of a TADOT ~~every 92 days~~. This test is a check of the Loss of Offsite Power Function. The Function is tested up to, and including, the master relay coils. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least one per refueling interval with applicable extensions.

The SR is modified by a Note that excludes verification of setpoints for relays. Relay setpoints require elaborate bench calibration and are verified during CHANNEL CALIBRATION. ~~The Frequency is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.~~

Insert 1



SR 3.3.2.7

SR 3.3.2.7 is the performance of a TADOT. This test is a check of the Manual Actuation Functions, AFW pump start on trip of all MFW pumps and the P-4 interlock Function, including turbine trip, automatic SI block, and seal-in of feedwater isolation by SI. ~~It is performed every 18 months.~~

Each Manual Actuation Function is tested up to, and including, the master relay coils. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least one per refueling interval with applicable extensions. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.). The turbine trip (P-4) is independently verified for both trains. ~~The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle and allows testing to be performed during shutdowns when necessary.~~ However, the P-4 input signals to SSPS actuation logic are normally tested in conjunction with RTB testing under SR 3.3.1.4 on a 31-day staggered test basis.

Insert 1



(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.2.7 (continued)

The SR is modified by a Note that excludes verification of setpoints during the TADOT for manual initiation or interlock Functions. The manual initiation Functions have no associated setpoints.

SR 3.3.2.8

SR 3.3.2.8 is the performance of a CHANNEL CALIBRATION.

~~A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling.~~ CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology. ~~The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.~~

Insert 1



This SR is modified by a Note stating that this test should include verification that the time constants are adjusted to the prescribed values where applicable.

SR 3.3.2.9

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing acceptance criteria are included in the Technical Requirements Manual (Ref. 9).

Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.2.9 (continued)

Insert 1



~~ESF RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.~~

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 1005 psig in the SGs.

REFERENCES

1. UFSAR, Chapter 6.
 2. UFSAR, Chapter 7.
 3. UFSAR, Chapter 15.
 4. IEEE-279-1971.
 5. 10 CFR 50.49.
 6. RTS/ESFAS Setpoint Methodology Study (Technical Report EE-0116).
 7. NUREG-1218, April 1988.
 8. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990 and WCAP-14333-P-A, Rev. 1, October 1998.
 9. Technical Requirements Manual.
 10. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 1996.
 11. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," December 1995.
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BASES

ACTIONS
(continued)

C.1

Condition C applies when one or more Functions have two inoperable required channels (i.e., two channels inoperable in the same Function). Required Action C.1 requires restoring one channel in the Function(s) to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur.

D.1 and D.2

If the Required Action and associated Completion Time of Condition D is not met the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and MODE 4 within 12 hours.

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

SURVEILLANCE
REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.3 apply to each PAM instrumentation Function in Table 3.3.3-1 with the exception that SR 3.3.3.3 is not required to be performed on containment isolation valve position indication. SR 3.3.3.4 is required for the containment isolation valve position indication. †

SR 3.3.3.1

Performance of the CHANNEL CHECK ~~once every 31 days~~ ensures that a gross instrumentation failure has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.3.1 (continued)

approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

As specified in the SR, a CHANNEL CHECK is only required for those channels that are normally energized.

~~The Frequency of 31 days is based on operating experience that demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.~~

Insert 1 →

SR 3.3.3.2

Not Used

+

SR 3.3.3.3

~~A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter with the necessary range and accuracy. This SR is modified by a Note that excludes neutron detectors. Whenever a sensing element is replaced, the next required CHANNEL CALIBRATION of the CET sensors is accomplished by an inplace cross calibration that compares the other sensing elements with the recently installed sensing element. The Frequency is based on operating experience and consistency with the typical industry refueling cycle.~~

Insert 1 →

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.3.3.4

SR 3.3.3.4 is the performance of a TADOT of containment isolation valve position indication. This TADOT is performed every 18 months. The test shall independently verify the OPERABILITY of containment isolation valve position indication against the actual position of the valves.

~~The Frequency is based on the known reliability of the Functions, and has been shown to be acceptable through operating experience.~~

Insert 1 

REFERENCES

1. Technical Report PE-0013.
2. Regulatory Guide 1.97, May 1983.
3. NUREG-0737, Supplement 1, "TMI Action Items."
4. Technical Requirements Manual

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BASES

ACTIONS

A Remote Shutdown System function is inoperable when the function is not accomplished by at least one designed Remote Shutdown System channel that satisfies the OPERABILITY criteria for the channel's Function. These criteria are outlined in the LCO section of the Bases.

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. Separate Condition entry is allowed for each Function. The Completion Time(s) of the inoperable channel(s)/train(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A addresses the situation where one or more required Functions of the Remote Shutdown System are inoperable. This includes the control and transfer switches for any required function.

The Required Action is to restore the required Function to OPERABLE status within 30 days. The Completion Time is based on operating experience and the low probability of an event that would require evacuation of the control room.

B.1 and B.2

If the Required Action and associated Completion Time of Condition A is not met, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.3.4.1

Performance of the CHANNEL CHECK ~~once every 31 days~~ ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.4.1 (continued)

excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including indication and readability. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

As specified in the Surveillance, a CHANNEL CHECK is only required for those channels which are normally energized.

~~The Frequency of 31 days is based upon operating experience which demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.~~

Insert 1



SR 3.3.4.2

SR 3.3.4.2 verifies each required Remote Shutdown System control circuit and transfer switch performs the intended function. This verification is performed from the remote shutdown panel and locally, as appropriate. Operation of the equipment from the remote shutdown panel is not necessary. The Surveillance can be satisfied by performance of a continuity check. This will ensure that if the control room becomes inaccessible, the unit can be maintained in MODE 3 from the remote shutdown panel and the local control stations. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. (However, this Surveillance is not required to be performed only during a unit outage.) Operating experience demonstrates that remote shutdown control channels usually pass the Surveillance test when performed at the 18 month Frequency.~~

Insert 1



BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.3.4.3

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

Whenever a sensing element is replaced, the next required CHANNEL CALIBRATION of the resistance temperature detector (RTD) sensors is accomplished by an in-place cross calibration that compares the other sensing elements with the recently installed sensing element.

Insert 1

~~The Frequency of 18 months is based upon operating experience and consistency with the refueling cycle.~~

REFERENCES

1. UFSAR, Chapter 3.
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BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.5.1

SR 3.3.5.1 is the performance of a TADOT for channels required by LCO 3.3.5.a and LCO 3.3.5.b. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at an 18 month frequency with applicable extensions. ~~This test is performed every 92 days.~~ The test checks trip devices that provide actuation signals directly, bypassing the analog process control equipment.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. Since this SR applies to the loss of voltage and degraded voltage relays for the 4160 VAC emergency buses, setpoint verification requires elaborate bench calibration and is accomplished during the CHANNEL CALIBRATION. Each train or logic channel shall be functionally tested up to and including input coil continuity testing of the ESF slave relay. ~~The Frequency is based on the known reliability of the relays and controls and the multichannel redundancy available, and has been shown to be acceptable through operating experience.~~

Insert 1

SR 3.3.5.2

SR 3.3.5.2 is the performance of a CHANNEL CALIBRATION for channels required by LCO 3.3.5.a and LCO 3.3.5.b.

The setpoints, as well as the response to a loss of voltage and a degraded voltage test, shall include a single point verification that the trip occurs within the required time delay, as shown in Reference 1.

~~A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling.~~ CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. The verification of degraded voltage with a SI signal is not required by LCO 3.3.5.b.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.5.2 (continued)

Insert 1

~~The Frequency of 18 months is based on operating experience and consistency with the typical industry refueling cycle and is justified by the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.~~

SR 3.3.5.3

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis for channels required by LCO 3.3.5.a and LCO 3.3.5.b. Response Time testing acceptance criteria are included in the TRM (Ref. 2).

Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer functions set to one with the resulting measured response time compared to the appropriate TRM response time. Alternately, the response time test can be performed with the time constants set to their nominal value provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

Response time may be verified by actual response time test in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel.

~~ESF RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore,~~

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.5.3 (continued)

Insert 1

~~staggered testing results in response time verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.~~

REFERENCES

1. UFSAR, Section 8.3.
 2. Technical Requirements Manual.
 3. RTS/ESFAS Setpoint Methodology Study (Technical Report EE-0116).
 4. WCAP 14333-P-A, Rev. 1, October 1998.
 5. UFSAR, Chapter 15.
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SURVEILLANCE
REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.6-1 determines which SRs apply to which MCR/ESGR Envelope Isolation Actuation Functions.

SR 3.3.6.1

SR 3.3.6.1 is the performance of a TADOT. This test is a check of the Manual Actuation Functions ~~and is performed every 18 months~~. Each Manual Actuation Function is tested up to, and including, the master relay coils. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.). ~~The Frequency is based on the known reliability of the Function and the redundancy available, and has been shown to be acceptable through operating experience.~~

Insert 1

The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions tested have no setpoints associated with them.

REFERENCES

None

BASES

ACTIONS
(continued)

B.1

If Required Action A.1 is not met within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 2 within 6 hours. In MODE 2, the reduced power condition eliminates the potential for violation of the accident analysis bounds. The Completion Time of 6 hours is reasonable to reach the required unit conditions in an orderly manner.

SURVEILLANCE
REQUIREMENTS

SR 3.4.1.1

~~Since Required Action A.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for pressurizer pressure is sufficient to ensure the pressure can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and to verify operation is within safety analysis assumptions.~~

Insert 1 →

SR 3.4.1.2

~~Since Required Action A.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for RCS average temperature is sufficient to ensure the temperature can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and to verify operation is within safety analysis assumptions.~~

Insert 1 →

SR 3.4.1.3

~~The 12 hour Surveillance Frequency for RCS total flow rate is performed using the installed flow instrumentation. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess potential degradation and to verify operation within safety analysis assumptions.~~

Insert 1 →

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.4.1.4

Measurement of RCS total flow rate by performance of a precision calorimetric heat balance ~~once every 18 months~~ allows the installed RCS flow instrumentation to be calibrated and verifies the actual RCS flow rate is greater than or equal to the minimum required RCS flow rate.

Insert 1

~~The Frequency of 18 months reflects the importance of verifying flow after a refueling outage when the core has been altered, which may have caused an alteration of flow resistance.~~

This SR is modified by a Note that allows entry into MODE 1, without having performed the SR, and placement of the unit in the best condition for performing the SR. The Note states that the SR is not required to be performed until 30 days after $\geq 90\%$ RTP. The 30 day period after reaching 90% RTP is reasonable to establish stable operating conditions, install the test equipment, perform the test, and analyze the results. The Surveillance shall be performed within 30 days after reaching 90% RTP.

REFERENCES

1. UFSAR, Chapter 15.
-
-

BASES

ACTIONS

A.1

If the parameters that are outside the limit cannot be restored, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to MODE 2 with $k_{eff} < 1.0$ within 30 minutes. Rapid reactor shutdown can be readily and practically achieved within a 30 minute period. The allowed time is reasonable, based on operating experience, to reach MODE 2 with $k_{eff} < 1.0$ in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.4.2.1

Insert 1

RCS loop average temperature is required to be verified at or above 541°F every 12 hours. ~~The SR to verify RCS loop average temperatures every 12 hours takes into account indications and alarms that are continuously available to the operator in the control room and is consistent with other routine surveillances which are typically performed once per shift. In addition, operators are trained to be sensitive to RCS temperature during approach to criticality and will ensure that the minimum temperature for criticality is met as criticality is approached.~~

REFERENCES

None.

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.3.1

Verification that operation is within limits is required ~~every 30 minutes~~ when RCS pressure and temperature conditions are undergoing planned changes. ~~This frequency is considered reasonable in view of the control room indication available to monitor RCS status. Also, since temperature rate of change limits are specified in hourly increments, 30 minutes permits assessment and correction for minor deviations within a reasonable time.~~

Insert 1



Surveillance for heatup, cooldown, or ISLH testing may be discontinued when the definition given in the relevant unit procedure for ending the activity is satisfied.

This SR is modified by a Note that only requires this SR to be performed during system heatup, cooldown, and ISLH testing. No SR is given for criticality operations because LCO 3.4.2 contains a more restrictive requirement.

REFERENCES

1. 10 CFR 50, Appendix G.
 2. ASME, Boiler and Pressure Vessel Code, Section III, Appendix G.
 3. ASTM E 185.
 4. 10 CFR 50, Appendix H.
 5. Regulatory Guide 1.99, Revision 2, May 1988.
 6. ASME, Boiler and Pressure Vessel Code, Section XI, Appendix E.
-

BASES

APPLICABILITY In MODES 1 and 2, the reactor is critical and thus has the potential to produce maximum THERMAL POWER. Thus, to ensure that the assumptions of the accident analyses remain valid, all RCS loops are required to be OPERABLE and in operation in these MODES to prevent DNB and core damage.

The decay heat production rate is much lower than the full power heat rate. As such, the forced circulation flow and heat sink requirements are reduced for lower, noncritical MODES as indicated by the LCOs for MODES 3, 4, and 5.

Operation in other MODES is covered by:

- LCO 3.4.5, "RCS Loops—MODE 3";
- LCO 3.4.6, "RCS Loops—MODE 4";
- LCO 3.4.7, "RCS Loops—MODE 5, Loops Filled";
- LCO 3.4.8, "RCS Loops—MODE 5, Loops Not Filled";
- LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation—High Water Level" (MODE 6); and
- LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation—Low Water Level" (MODE 6).

ACTIONS

A.1

If the requirements of the LCO are not met, the Required Action is to reduce power and bring the unit to MODE 3. This lowers power level and thus reduces the core heat removal needs and minimizes the possibility of violating DNBR limits.

The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging safety systems.

SURVEILLANCE
REQUIREMENTS

SR 3.4.4.1

This SR requires verification ~~every 12 hours~~ that each RCS loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal while maintaining the margin to the DNBR limit. ~~The frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RCS loop performance.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.5.1

This SR requires verification ~~every 12 hours~~ that the required loops are in operation. Verification includes flow rate, temperature, and pump status monitoring, which help ensure that forced flow is providing heat removal. ~~The frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RCS loop performance.~~

Insert 1 →

SR 3.4.5.2

SR 3.4.5.2 requires verification of SG OPERABILITY. SG OPERABILITY is verified by ensuring that the secondary side narrow range water level is $\geq 17\%$ for required RCS loops. If the SG secondary side narrow range water level is $< 17\%$, the tubes may become uncovered and the associated loop may not be capable of providing the heat sink for removal of the decay heat. ~~The 12 hour frequency is considered adequate in view of other indications available in the control room to alert the operator to a loss of SG level.~~

Insert 1 →

SR 3.4.5.3

Verification that the required RCP is OPERABLE ensures that safety analyses limits are met. The requirement also ensures that an additional RCP can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power availability to the required RCP. ←

Insert 1

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

REFERENCES

None.

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.6.1

This SR requires verification ~~every 12 hours~~ that the required RCS or RHR loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. ~~The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RCS and RHR loop performance.~~

Insert 1



SR 3.4.6.2

SR 3.4.6.2 requires verification of SG OPERABILITY. SG OPERABILITY is verified by ensuring that the secondary side narrow range water level is $\geq 17\%$. If the SG secondary side narrow range water level is $< 17\%$, the tubes may become uncovered and the associated loop may not be capable of providing the heat sink necessary for removal of decay heat. ~~The 12 hour Frequency is considered adequate in view of other indications available in the control room to alert the operator to the loss of SG level.~~

Insert 1



SR 3.4.6.3

Verification that the required pump is OPERABLE ensures that an additional RCS or RHR pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pump. ~~The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~

Insert 1



This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

REFERENCES

None.

BASES

ACTIONS

C.1 and C.2 (continued)

LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Times reflect the importance of maintaining operation for heat removal.

SURVEILLANCE
REQUIREMENTS

SR 3.4.7.1

This SR requires verification ~~every 12 hours~~ that the required loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RHR loop performance.

SR 3.4.7.2

Insert 1

Verifying that at least one SG is OPERABLE by ensuring its secondary side narrow range water level is $\geq 17\%$ ensures an alternate decay heat removal method via natural circulation in the event that the second RHR loop is not OPERABLE. If both RHR loops are OPERABLE, this Surveillance is not needed. ~~The 12-hour Frequency is considered adequate in view of other indications available in the control room to alert the operator to the loss of SG level.~~

Insert 1

SR 3.4.7.3

Verification that the required RHR pump is OPERABLE ensures that an additional pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required RHR pump. If secondary side water level is $\geq 17\%$ in at least one SG, this Surveillance is not needed. ~~The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~

Insert 1

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

BASES

ACTIONS
(continued)

B.1 and B.2

If no required loop is OPERABLE or the required loop is not in operation, except during conditions permitted by Note 1, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended and action must be initiated immediately to restore an RHR loop to OPERABLE status and operation. The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Time reflects the importance of maintaining operation for heat removal. The action to restore must continue until one loop is restored to OPERABLE status and operation.

SURVEILLANCE
REQUIREMENTS

SR 3.4.8.1

This SR requires verification ~~every 12 hours~~ that the required loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. ~~The frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RHR loop performance.~~

Insert 1 →

SR 3.4.8.2

Verification that the required pump is OPERABLE ensures that an additional pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pump. ~~The frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~

Insert 1 →

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

BASES

ACTIONS

A.1, A.2, A.3 and A.4 (continued)

If the pressurizer water level is not within the limit, action must be taken to bring the unit to a MODE in which the LCO does not apply. To achieve this status, within 6 hours the unit must be brought to MODE 3, with all rods fully inserted and incapable of withdrawal. Additionally, the unit must be brought to MODE 4 within 12 hours. This takes the unit out of the applicable MODES.

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

B.1

If one required group of pressurizer heaters is inoperable, restoration is required within 72 hours. The Completion Time of 72 hours is reasonable considering the anticipation that a demand caused by loss of offsite power would be unlikely in this period. Pressure control may be maintained during this time using the remaining heaters.

C.1 and C.2


If one group of pressurizer heaters are inoperable and cannot be restored in the allowed Completion Time of Required Action B.1, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to MODE 3 within 6 hours and to MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.4.9.1

This SR requires that during steady state operation, pressurizer level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The Surveillance is performed by observing the indicated level. ~~The Frequency of 12 hours corresponds to verifying the parameter each shift. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess level for any deviation and verify that operation is within~~

Insert 1



(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.9.1 (continued)

~~the safety analyses assumption of ensuring that a steam bubble exists in the pressurizer. Alarms are also available for early detection of abnormal level indications.~~

SR 3.4.9.2

The SR is satisfied when the power supplies are demonstrated to be capable of producing the minimum power and the associated pressurizer heaters are verified to be at their required rating. This may be done by testing the power supply output and by performing an electrical check on heater element continuity and resistance. ~~The Frequency of 18 months is considered adequate to detect heater degradation and has been shown by operating experience to be acceptable.~~

Insert 1 

REFERENCES

1. UFSAR, Chapter 15.
 2. NUREG-0737, November 1980.
-
-

BASES

ACTIONS

H.1 and H.2 (continued)

Least MODE 3 within 6 hours and to MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, automatic PORV OPERABILITY is required. See LCO 3.4.12.

SURVEILLANCE
REQUIREMENTS

SR 3.4.11.1

SR 3.4.11.1 requires verification that the pressure in the PORV backup nitrogen system is sufficient to provide motive force for the PORVs to cope with a steam generator tube rupture coincident with loss of the containment Instrument Air system. ~~The Frequency of 7 days is based on operating experience.~~

Insert 1

SR 3.4.11.2

Block valve cycling verifies that the valve(s) can be opened and closed if needed. ~~The basis for the Frequency of 92 days is the ASME Code (Ref. 3).~~

Insert 1

This SR is modified by two Notes. Note 1 modifies this SR by stating that it is not required to be performed with the block valve closed, in accordance with the Required Actions of this LCO. Opening the block valve in this condition increases the risk of an unisolable leak from the RCS since the PORV is already inoperable.

Note 2 modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2.

SR 3.4.11.3

SR 3.4.11.3 requires a complete cycle of each PORV. Operating a PORV through one complete cycle ensures that the PORV can be manually actuated for mitigation of an SGTR. This testing is performed in MODES 3 or 4 to prevent possible RCS pressure transients with the reactor critical. ~~The Frequency of 18 months is based on a typical refueling cycle and industry accepted practice.~~

Insert 1

(continued)

BASES

SURVEILLANCE
REQUIREMENTS


SR 3.4.11.3 (continued)

The Note modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2.

SR 3.4.11.4

Operating the solenoid control valves and check valves on the accumulators ensures the PORV control system actuates properly when called upon. ~~The Frequency of 18 months is based on a typical refueling cycle and the Frequency of the other Surveillances used to demonstrate PORV OPERABILITY.~~

Insert 1



REFERENCES

1. Regulatory Guide 1.32, February 1977.
 2. UFSAR, Section 15.4.
 3. ASME Code for Operation and Maintenance of Nuclear Power Plants.
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BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.12.1, SR 3.4.12.2, and SR 3.4.12.3 (continued)

incapable of injecting into the RCS and the accumulator discharge isolation valves are verified closed with power removed from the isolation valve operator.

SR 3.4.12.3 is modified by a Note stating that the verification is only required when accumulator pressure is greater than the PORV lift setting. With accumulator pressure less than the PORV lift setting, the accumulator cannot challenge the LTOP limits and the isolation valves are allowed to be open.

The LHSI pumps and charging pumps are rendered incapable of injecting into the RCS through removing the power from the pumps by racking the breakers out under administrative control. An alternate method of LTOP control may be employed using at least two independent means to prevent a pump start such that a single failure or single action will not result in an injection into the RCS. This may be accomplished through the pump control switch being placed in pull to lock and at least one valve in the discharge flow path being closed.

~~The Frequency of 12 hours is sufficient, considering other indications and alarms available to the operator in the control room, to verify the required status of the equipment.~~

Insert 1



SR 3.4.12.4

The RCS vent of ≥ 2.07 square inches is proven OPERABLE by verifying its open condition. ~~either:~~

- ~~a. Once every 12 hours for a valve that is not locked.~~
- ~~b. Once every 31 days for a valve that is locked, sealed, or secured in position. A removed pressurizer safety valve or blocked open PORV with its block valve disabled in the open position fits this category.~~

Insert 1



~~The passive vent arrangement must only be open to be OPERABLE. This Surveillance is required to be performed if the vent is being used to satisfy the pressure relief requirements of the LCO 3.4.12b.~~

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.4.12.5

The PORV block valve must be verified open ~~every 72 hours~~ to provide the flow path for each required PORV to perform its function when actuated. The valve may be remotely verified open in the main control room. In addition, the PORV keyswitch must be verified to be in the proper position to provide the appropriated trip setpoints to the PORV actuation logic. This Surveillance is performed if the PORV is used to satisfy the LCO.

The block valve is a remotely controlled, motor operated valve. The power to the valve operator is not required removed, and the manual operator is not required locked in the inactive position. Thus, the block valve can be closed in the event the PORV develops excessive leakage or does not close (sticks open) after relieving an overpressure situation.

~~The 72 hour Frequency is considered adequate in view of other administrative controls available to the operator in the control room, such as valve position indication and alarms, that verify that the PORV block valve remains open and the keyswitch in the proper position.~~

Insert 1



SR 3.4.12.6

SR 3.4.12.6 requires verification that the pressure in the PORV backup nitrogen system is sufficient to provide motive force for the PORVs to cope with an overpressure event. ~~The Frequency of 7 days is based on operating experience.~~

Insert 1



SR 3.4.12.7

Performance of a COT is required ~~every 31 days~~ on each required PORV to verify the PORV is capable of performing its LTOP function and, as necessary, adjust its lift setpoint. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The COT will verify the setpoint is within the allowed maximum limits in this specification. PORV actuation could depressurize the

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.12.7 (continued)

RCS and is not required. ~~The 31 day frequency considers experience with equipment reliability.~~ ← Insert 1

A Note has been added indicating that this SR is not required to be performed until 12 hours after entering a condition in which the PORV is required to be OPERABLE. The Note allows entering the LTOP Applicability prior to performing the SR. The 12-hour frequency considers the unlikelihood of a low temperature overpressure event during this time.

SR 3.4.12.8

Performance of a CHANNEL CALIBRATION on each required PORV actuation channel is required ~~every 18 months~~ to adjust the whole channel so that it responds and the valve opens within the required range and accuracy to known input. ← Insert 1

REFERENCES

1. 10 CFR 50, Appendix G.
 2. Generic Letter 88-11.
 3. UFSAR, Section 5.2.2.2.
 4. 10 CFR 50, Section 50.46.
 5. Generic Letter 90-06.
-
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.13.1 (continued)

the containment sump level. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

~~The 72 hour Frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.~~

Insert 1

SR 3.4.13.2

This SR verifies that primary to secondary LEAKAGE is less than or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.20, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a Note, which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

~~The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.~~ The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

Insert 1

BASES

ACTIONS
(continued)

A.1

Required Action A.1 requires that RCS PIV leakage be restored to within limit within 4 hours. Four hours provides time to reduce leakage in excess of the allowable limit. The 4 hour Completion Time allows the actions and restricts the operation with leaking isolation valves.

B.1 and B.2

If leakage cannot be reduced the unit must be brought to a MODE in which the requirement does not apply. To achieve this status, the unit must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This Action may reduce the leakage and also reduces the potential for a LOCA outside the containment. The allowed Completion Times are reasonable based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.4.14.1

Performance of leakage testing on the affected RCS PIV or isolation valve used to satisfy Required Action A.1 is required to verify that leakage is below the specified limit and to identify each leaking valve. The leakage limit of 0.5 gpm per inch of nominal valve diameter up to 5 gpm maximum applies to each valve. Leakage testing requires a stable pressure condition. Leakage may be measured indirectly (as from the performance of pressure indicators) to satisfy ALARA requirements if supported by calculations verifying that the method is capable of demonstrating valve compliance with the leakage criteria.

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. If the PIVs are not individually leakage tested, one valve may have failed completely and not be detected if the other valve in series meets the leakage requirement. In this situation, the protection provided by redundant valves would be lost.

Insert 1



~~Testing is to be performed every 18 months, a typical refueling cycle, if the unit does not go into MODE 5 for at least 7 days. The 18 month Frequency is consistent with 10 CFR 50.55a(g) (Ref. 7) as contained in the Inservice~~

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.4.14.1 (continued)

~~Testing Program, is within frequency allowed by the American Society of Mechanical Engineers (ASME) Code (Ref. 6), and is based on the need to perform such surveillances under the conditions that apply during an outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.~~

In addition, testing must be performed once after the valve has been opened by flow or exercised to ensure tight reseating. PIVs disturbed in the performance of this Surveillance should also be tested unless documentation shows that an infinite testing loop cannot practically be avoided. Testing must be performed within 24 hours after the valve has been resealed. Within 24 hours is a reasonable and practical time limit for performing this test after opening or reseating a valve.

The leakage limit is to be met at the RCS pressure associated with MODES 1 and 2. This permits leakage testing at high differential pressures with stable conditions not possible in the MODES with lower pressures. If testing cannot be performed at these pressures, testing can be performed at lower pressures and scaled to operating pressure.

Entry into MODES 3 and 4 is allowed if needed to establish the necessary differential pressures and stable conditions to allow for performance of this Surveillance. The Note that allows this provision is complementary to the Frequency of prior to entry into MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months. In addition, this Surveillance is not required to be performed on any RCS PIVs in the RHR System flow path when the RHR System is aligned to the RCS in the shutdown cooling mode of operation. PIVs contained in the RHR shutdown cooling flow path that are required to be tested must be leakage rate tested after RHR is secured and stable unit conditions and the necessary differential pressures are established.

REFERENCES

1. 10 CFR 50.2.
2. 10 CFR 50.55a(c).
3. UFSAR, Section 3.1.48.1.

BASES

ACTIONS

B.1.1, B.1.2, and B.2 (continued)

With a sample obtained and analyzed or water inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of the required containment atmosphere radioactivity monitors.

The 24 hour interval provides periodic information that is adequate to detect leakage. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flow). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable unit conditions are established. The 30 day Completion Time recognizes at least one other form of leakage detection is available.

C.1 and C.2

If a Required Action of Condition A or B cannot be met, the unit must be brought to a MODE in which the requirement does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

D.1

With all required monitors inoperable, no required automatic means of monitoring leakage are available, and immediate unit shutdown in accordance with LCO 3.0.3 is required.

SURVEILLANCE
REQUIREMENTS

SR 3.4.15.1

SR 3.4.15.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity monitor. The check gives reasonable confidence that the channel is operating properly. ~~The Frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.4.15.2

SR 3.4.15.2 requires the performance of a COT ~~every 92 days~~ on the required containment atmosphere radioactivity monitor. The test ensures that the monitor can perform its function in the desired manner. The test verifies the alarm setpoint and relative accuracy of the instrument string. ~~The Frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 3).~~

Insert 1 →

SR 3.4.15.3 and SR 3.4.15.4

These SRs require the performance of a CHANNEL CALIBRATION for each of the RCS leakage detection instrumentation channels. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. ~~The frequency of 18 months is a typical refueling cycle and considers channel reliability. Again,~~ operating experience has proven that this Frequency is acceptable.

Insert 1 →

REFERENCES

1. UFSAR, Chapter 3.
 2. Regulatory Guide 1.45, dated May, 1973.
 3. NUREG-1366, dated December, 1992.
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-

BASES

ACTIONS

A.1 and A.2 (continued)

The DOSE EQUIVALENT I-131 must be restored to within limits within 48 hours. The Completion Time of 48 hours is required, if the limit violation resulted from normal iodine spiking.

B.1

With the gross specific activity in excess of the allowed limit, the unit must be placed in a MODE in which the requirement does not apply.

The change within 6 hours to MODE 3 and RCS average temperature < 500°F lowers the saturation pressure of the reactor coolant below the setpoints of the main steam safety valves and prevents venting the SG to the environment in an SGTR event. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging unit systems.

C.1

If a Required Action and the associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is in the unacceptable region of Figure 3.4.16-1, the reactor must be brought to MODE 3 with RCS average temperature < 500°F within 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.4.16.1

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant ~~at least once every 7 days~~. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity.

(continued)

BASES

ACTIONS
(continued)

to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

B.1

With the DOSE EQUIVALENT XE-133 greater than the LCO limit, DOSE EQUIVALENT XE-133 must be restored to within limit within 48 hours. The allowed Completion Time of 48 hours is acceptable since it is expected that, if there were a noble gas spike, the normal coolant noble gas concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

A Note permits that the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S), relying on Required Action B.1 while the DOSE EQUIVALENT XE-133 LCO limit is not met. This allowance is acceptable due to significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

C.1 and C.2

If the Required Action and associated Completion Time of Condition A or B is not met, or if the DOSE EQUIVALENT I-131 is $> 60.0 \mu\text{Ci/gm}$, the reactor must be brought to MODE 3 within 6 hours and MODE 5 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.

SURVEILLANCE
REQUIREMENTS

SR 3.4.16.1

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the noble gas specific activity of the reactor coolant ~~at least once every 7 days~~. This measurement is the sum of the degassed gamma activities and the gaseous gamma

(continued)

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

activities in the sample taken. This Surveillance provides an indication of any increase in the noble gas specific activity.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. ~~The 7 day Frequency considers the low probability of a gross fuel failure during this time.~~

Insert 1

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes within similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

SR 3.4.16.2

This Surveillance is performed to ensure iodine specific activity remains within the LCO limit during normal operation and following fast power changes when iodine spiking is more apt to occur. ~~The 14 day Frequency is adequate to trend changes in the iodine activity level, considering noble gas activity is monitored every 7 days.~~ The Frequency, between 2 and 6 hours after a power change $\geq 15\%$ RTP within a 1 hour period, is established because the iodine levels peak during this time following the iodine spike initiation; samples at other times would provide accurate results.

Insert 1

BASES

ACTIONS

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

resulting in positive reactivity insertion. The Completion Time of Required Action B.1 allows time for borating the operating loops to a shutdown boration level such that the unit can be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.


SURVEILLANCE
REQUIREMENTS

SR 3.4.17.1

The Surveillance is performed to ensure that the RCS loop isolation valves are open prior to removing power from the isolation valve operator. There is no remote position indication available after power is removed from the valve operators. The valves will maintain their last position when power is removed for the valve operator.

SR 3.4.17.2

The primary function of this Surveillance is to ensure that power is removed from the valve operators, since SR 3.4.4.1 of LCO 3.4.4, "RCS Loops—MODES 1 and 2," ensures that the loop isolation valves are open by verifying ~~every 12 hours~~ that all loops are operating and circulating reactor coolant. ~~The Frequency of 31 days ensures that the required flow will remain available, is based on engineering judgment, and has proven to be acceptable. Operating experience has shown that the failure rate is so low that the 31 day Frequency is justified.~~

Insert 1 

REFERENCES

1. UFSAR, Section 15.2.6.

BASES

ACTIONS

A.1

When THERMAL POWER is \geq the P-7 interlock setpoint 10%, the only acceptable action is to ensure the reactor trip breakers (RTBs) are opened immediately in accordance with Required Action A.1 to prevent operation of the fuel beyond its design limits. Opening the RTBs will shut down the reactor and prevent operation of the fuel outside of its design limits.

SURVEILLANCE
REQUIREMENTS

SR 3.4.19.1

Verification that the power level is $<$ the P-7 interlock setpoint (10%) will ensure that the fuel design criteria are not violated during the performance of the PHYSICS TESTS. ~~The Frequency of once per hour is adequate to ensure that the power level does not exceed the limit. Unit operations are conducted slowly during the performance of PHYSICS TESTS and monitoring the power level once per hour is sufficient to ensure that the power level does not exceed the limit.~~

Insert 1

SR 3.4.19.2

The power range and intermediate range neutron detectors, P-10, and P-13 interlock setpoint must be verified to be OPERABLE and adjusted to the proper value. The Low Power Reactor Trips Block, P-7 interlock, is actuated from either the Power Range Neutron Flux, P-10, or the Turbine Impulse Chamber Pressure, P-13 interlock. The P-7 interlock is a logic Function with train, not channel identity. A COT is performed prior to initiation of the PHYSICS TESTS. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. This will ensure that the RTS is properly aligned to provide the required degree of core protection during the performance of the PHYSICS TESTS. The SR 3.3.1.8 Frequency is sufficient for the power range and intermediate range neutron detectors to ensure that the instrumentation is OPERABLE before initiating PHYSICS TESTS.

BASES

ACTIONS
(continued)

B.1

If one accumulator is inoperable for a reason other than boron concentration, the accumulator must be returned to OPERABLE status within 1 hour. In this Condition, the required contents of two accumulators cannot be assumed to reach the core during a large break LOCA. Due to the severity of the consequences should a large break LOCA occur in these conditions, the 1 hour Completion Time to open the valve, remove power to the valve, or restore the proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable accumulator to OPERABLE status. The Completion Time minimizes the time the unit is exposed to a LOCA under these conditions.

C.1 and C.2

If the accumulator cannot be returned to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to MODE 3 within 6 hours and RCS pressure reduced to ≤ 1000 psig within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

D.1

If more than one accumulator is inoperable, the unit is in a condition outside the accident analyses; therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE
REQUIREMENTS

SR 3.5.1.1

Each accumulator isolation valve should be verified to be fully open ~~every 12 hours~~. This verification ensures that the accumulators are available for injection and ensures timely discovery if a valve should be less than fully open. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve position should not change with power removed, a closed valve could result in not meeting accident analyses assumptions. ~~This Frequency is considered reasonable in view of other administrative controls that ensure a mispositioned isolation valve is unlikely.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.5.1.2 and SR 3.5.1.3

~~Every 12 hours, purged water volume and nitrogen cover pressure are verified for each accumulator. This frequency is sufficient to ensure adequate injection during a LOCA. Because of the static design of the accumulator, a 12 hour frequency usually allows the operator to identify changes before limits are reached. Operating experience has shown this frequency to be appropriate for early detection and correction of off normal trends.~~

Insert 1

SR 3.5.1.4

The boron concentration should be verified to be within required limits for each accumulator ~~every 31 days~~ since the static design of the accumulators limits the ways in which the concentration can be changed. ~~The 31 day frequency is adequate to identify changes that could occur from mechanisms such as stratification or inleakage.~~ Sampling the affected accumulator within 6 hours after a 50% increase of indicated level will identify whether inleakage has caused a reduction in boron concentration to below the required limit. It is not necessary to verify boron concentration if the added water inventory is from the refueling water storage tank (RWST), because the water contained in the RWST is within the accumulator boron concentration requirements. This is consistent with the recommendation of NUREG-1366 (Ref. 3).

Insert 1

Although the run of piping between the two accumulator discharge check valves is credited in demonstrating compliance with Technical Specification 3.5.1 minimum accumulator volume requirement, the minimum boron concentration requirement does not apply to this run of piping. Applicable accident analyses have explicitly considered in-leakage from the RCS, and the resulting reduction in boron concentration in this run of piping, which is not sampled.

SR 3.5.1.5

Verification ~~every 31 days~~ that power is removed from each accumulator isolation valve operator when the RCS pressure is ≥ 2000 psig ensures that an active failure could not result in the closure of an accumulator motor operated isolation valve. If this were to occur, only one accumulator would be available for injection given a single failure

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.5.1.5 (continued)

~~coincident with a LOCA. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that power is removed.~~

Insert 1

This SR allows power to be supplied to the motor operated isolation valves when RCS pressure is < 2000 psig, thus allowing operational flexibility by avoiding unnecessary delays to manipulate the breakers during unit startups or shutdowns.

REFERENCES

1. UFSAR, Chapter 6 and Chapter 15.
 2. 10 CFR 50.46.
 3. NUREG-1366, February 1990.
-
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves in position by removal of power or by key locking the control in the correct position ensures that they cannot change position as a result of an active failure or be inadvertently misaligned. These valves are of the type that can disable the function of both ECCS trains and invalidate the accident analyses. ~~A 12-hour Frequency is considered reasonable in view of other administrative controls that will ensure a mispositioned valve is unlikely.~~

Insert 1



SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve will automatically reposition within the proper stroke time. This Surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position. ~~The 31-day Frequency is appropriate because the valves are operated under administrative control, and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.~~

Insert 1



SR 3.5.2.3

With the exception of the operating charging pump, the ECCS pumps are normally in a standby nonoperating mode. As such, some flow path piping has the potential to develop pockets of entrained gases. Plant operating experience and analysis has shown that after proper system filling (following maintenance or refueling outages), some entrained noncondensable gases remain. These gases will form small voids, which remain stable in the system in both normal and transient operation. Mechanisms postulated to increase the

(continued)

BASES

SURVEILLANCE
REQUIREMENTSSR 3.5.2.3 (continued)

void size are gradual in nature, and the system is operated in accordance with procedures to preclude growth in these voids.

To provide additional assurances that the system will function, a verification is performed ~~every 92 days~~ that the system is sufficiently full of water. The system is sufficiently full of water when the voids and pockets of entrained gases in the ECCS piping are small enough in size and number so as to not interfere with the proper operation of the ECCS. Verification that the ECCS piping is sufficiently full of water can be performed by venting the necessary high point ECCS vents outside containment, using NDE, or using other Engineering-justified means. Maintaining the piping from the ECCS pumps to the RCS sufficiently full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent water hammer, pump cavitation, and pumping of excess noncondensable gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling. ~~The 92 day frequency takes into consideration the gradual nature of the postulated void generation mechanism.~~

Insert 1

SR 3.5.2.4

Periodic surveillance testing of ECCS pumps is required by the ASME Code. This type of testing may be accomplished by measuring the pump developed head at only one point of the pump characteristic curve. This testing is performed at low flow conditions during quarterly tests and near design flow conditions at least once every 24 months, as required by the Code. The quarterly test will detect gross degradation caused by impeller structural damage or other hydraulic component problems, but is not a good indicator of expected pump performance at high flow conditions. Both tests verify that the measured performance is within an acceptable tolerance of the original pump baseline performance. Additionally, the 24-month comprehensive test verifies that the test flow is greater than or equal to the performance assumed in the safety analysis. Due to limitations in system design, the 24-month test is performed during refueling outages. SRs are specified in the Inservice Testing Program, (continued)

BASES

SURVEILLANCE
REQUIREMENTS


SR 3.5.2.4 (continued)

which encompasses the ASME Code. The ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

SR 3.5.2.5 and SR 3.5.2.6

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI signal and that each ECCS pump capable of starting automatically starts on receipt of an actual or simulated SI signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. ~~The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a unit outage and the potential for unplanned unit transients if the Surveillances were performed with the reactor at power.~~

Insert 1



~~The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. The actuation logic is tested as part of ESF Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program.~~

SR 3.5.2.7

Proper throttle valve position is necessary for proper ECCS performance and to prevent pump runout and subsequent component damage. The Surveillance verifies each listed ECCS throttle valve is secured in the correct position. ~~The 18 month Frequency is based on the same reasons as those stated in SR 3.5.2.5 and SR 3.5.2.6.~~


Insert 1



SR 3.5.2.8

Periodic inspections of the containment sump components ensure that they are unrestricted and stay in proper operating condition. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and on the need to have access to the location. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.~~

Insert 1



BASES

ACTIONS
(continued)

B.1

With the RWST inoperable for reasons other than Condition A (e.g., water volume), it must be restored to OPERABLE status within 1 hour.

In this Condition, neither the ECCS nor the Quench Spray System can perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the unit in a MODE in which the RWST is not required. The short time limit of 1 hour to restore the RWST to OPERABLE status is based on this condition simultaneously affecting redundant trains.

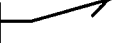
C.1 and C.2

If the RWST cannot be returned to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS


SR 3.5.4.1

The RWST borated water temperature should be verified ~~every 24 hours~~ to be within the limits assumed in the accident analyses band. ~~This Frequency is sufficient to identify a temperature change that would approach either limit and has been shown to be acceptable through operating experience.~~

Insert 1 

SR 3.5.4.2

The RWST water volume should be verified ~~every 7 days~~ to be above the required minimum level in order to ensure that a sufficient initial supply is available for injection and to support continued ECCS and Recirculation Spray System pump operation on recirculation. ~~Since the RWST volume is normally stable and is protected by an alarm, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.5.4.3

The boron concentration of the RWST should be verified every 7 days to be within the required limits. This SR ensures that the reactor will remain subcritical following a LOCA. Further, it assures that the resulting sump pH will be maintained in an acceptable range so that boron precipitation in the core will not occur and the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized. ~~Since the RWST volume is normally stable, a 7 day sampling Frequency to verify boron concentration is appropriate and has been shown to be acceptable through operating experience.~~

Insert 1



REFERENCES

1. UFSAR, Chapter 6 and Chapter 15.
-
-

BASES

APPLICABILITY
(continued)

injection flow is less critical as a result of the lower initial RCS pressure and decay heat removal requirements in these MODES. Therefore, RCP seal injection flow must be limited in MODES 1, 2, and 3 to ensure adequate ECCS performance.

ACTIONS

A.1

With the seal injection flow exceeding its limit, the amount of charging flow available to the RCS may be reduced or, following a LOCA, pump runout could occur. Under this Condition, action must be taken to restore the flow to below its limit. The operator has 4 hours from the time the flow is known to be above the limit to correctly position the manual valves and thus be in compliance with the accident analysis. The Completion Time minimizes the potential exposure of the unit to a LOCA with insufficient injection flow and provides a reasonable time to restore seal injection flow within limits. This time is conservative with respect to the Completion Times of other ECCS LCOs; it is based on operating experience and is sufficient for taking corrective actions by operations personnel.

B.1 and B.2

When the Required Actions cannot be completed within the required Completion Time, a controlled shutdown must be initiated. The Completion Time of 6 hours for reaching MODE 3 from MODE 1 is a reasonable time for a controlled shutdown, based on operating experience and normal cooldown rates, and does not challenge unit safety systems or operators. Continuing the unit shutdown begun in Required Action B.1, an additional 6 hours is a reasonable time, based on operating experience and normal cooldown rates, to reach MODE 4, where this LCO is no longer applicable.

SURVEILLANCE
REQUIREMENTS

SR 3.5.5.1


Verification ~~every 31 days~~ that the manual seal injection throttle valves are adjusted to give a flow within the limit ensures that proper manual seal injection throttle valve position, and hence, proper seal injection flow, is maintained. ~~The Frequency of 31 days is based on engineering~~
(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.5.5.1 (continued)

~~judgment and is consistent with other ECCS valve
Surveillance Frequencies. The Frequency has proven to be
acceptable through operating experience.~~

Insert 1 

As noted, the Surveillance is not required to be performed until 4 hours after the RCS pressure has stabilized within a ± 20 psi range of normal operating pressure. The RCS pressure requirement is specified since this configuration will produce the required pressure conditions necessary to assure that the manual valves are set correctly. The exception is limited to 4 hours to ensure that the Surveillance is timely.

REFERENCES

1. UFSAR, Chapter 6 and Chapter 15.
-
-

BASES

ACTIONS
(continued)

B.1, B.2, and B.3

When Required Action A.1 cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Six hours is a reasonable time, based on operating experience, to reach MODE 3 from full power conditions and to be borated to the required SDM without challenging unit systems or operators. Borating to the required SDM assures that the unit is in a safe condition, without need for any additional boration.

After determining that the BIT is inoperable and the Required Actions of B.1 and B.2 have been completed, the tank must be returned to OPERABLE status within 7 days. These actions ensure that the unit will not be operated with an inoperable BIT for a lengthy period of time. It should be noted, however, that changes to applicable MODES cannot be made until the BIT is restored to OPERABLE status, except as provided by LCO 3.0.4.

C.1

Even though the RCS has been borated to a safe and stable condition as a result of Required Action B.2, either the BIT must be restored to OPERABLE status (Required Action C.1) or the unit must be placed in a condition in which the BIT is not required (MODE 4). The 12 hour Completion Time to reach MODE 4 is reasonable, based on operating experience and normal cooldown rates, and does not challenge unit safety systems or operators.

SURVEILLANCE
REQUIREMENTS

SR 3.5.6.1

will

Verification ~~every 24 hours~~ that the BIT water temperature is at or above the specified minimum temperature ~~is frequent enough to~~ identify a temperature change that would approach the acceptable limit. The solution temperature is also monitored by an alarm that provides further assurance of protection against low temperature. ~~This Frequency has been shown to be acceptable through operating experience.~~

Insert 1 →

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.5.6.2

S

Verification ~~every 7 days~~ that the BIT contained volume is above the required limit ~~is frequent enough~~ to assure that this volume will be available for quick injection into the RCS. The 900 gallon limit corresponds to the BIT being completely full. Methods of verifying that the BIT is completely full include venting from the high point vent, and recirculation flow with the Boric Acid Storage Tanks. If the volume is too low, the BIT would not provide enough borated water to ensure subcriticality during recirculation or to provide additional core shutdown margin following an MSLB. ~~Since the BIT volume is normally stable, a 7 day frequency is appropriate and has been shown to be acceptable through operating experience.~~

Insert 1 →

SR 3.5.6.3

Verification ~~every 7 days~~ that the boron concentration of the BIT is within the required band ensures that the reactor remains subcritical following a LOCA; it limits return to power following an MSLB, and maintains the resulting sump pH in an acceptable range so that boron precipitation will not occur in the core. In addition, the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized.

The BIT is in a recirculation loop that provides continuous circulation of the boric acid solution through the BIT and the boric acid tank (BAT). There are a number of points along the recirculation loop where local samples can be taken. The actual location used to take a sample of the solution is specified in the unit Surveillance procedures. Sampling from the BAT to verify the concentration of the BIT is not recommended, since this sample may not be homogenous and the boron concentration of the two tanks may differ.

The sample should be taken from the BIT or from a point in the flow path of the BIT recirculation loop.

Insert 1 →

REFERENCES

1. UFSAR, Chapter 6 and Chapter 15.
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.6.2.1

Maintaining containment air locks OPERABLE requires compliance with the leakage rate test requirements of TS 5.5.15 Containment Leakage Rate Testing Program. This SR reflects the overall air lock leakage rate testing acceptance criteria with regard to air lock leakage (Type B leakage tests). The acceptance criteria were established during initial air lock and containment OPERABILITY testing. The periodic testing requirements verify that the air lock leakage limits do not exceed the allowed fraction of the overall containment leakage rate required by the Technical Specifications. The Frequency is required by the Containment Leakage Rate Testing Program.

The SR has been modified by two Notes. Note 1 states that an inoperable air lock door does not invalidate the previous successful performance of the overall air lock leakage test. This is considered reasonable since either air lock door is capable of providing a fission product barrier in the event of a DBA. Note 2 has been added to this SR requiring the results to be evaluated against the acceptance criteria which are applicable to SR 3.6.1.1. This ensures that air lock leakage is properly accounted for in determining the combined Type B and C containment leakage rate.

SR 3.6.2.2

The air lock interlock is designed to prevent simultaneous opening of both doors in a single air lock. Since both the inner and outer doors of an air lock are designed to withstand the maximum expected post accident containment pressure, closure of either door will support containment OPERABILITY. Thus, the door interlock feature supports containment OPERABILITY while the air lock is being used for personnel transit in and out of the containment. Periodic testing of this interlock demonstrates that the interlock will function as designed and that simultaneous opening of the inner and outer doors will not inadvertently occur when combined with administrative procedures. ~~Due to the purely mechanical nature of this interlock, and given that the interlock mechanism is not normally challenged when the containment door is used for entry and exit (procedures require strict adherence to single door opening), this test is only required to be performed every 24 months. The 24 month Frequency is based on the need to perform this surveillance under the conditions that apply during a unit~~

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.6.2.2 (continued)

~~outage, and the potential for loss of containment
OPERABILITY if the Surveillance were performed with the
reactor at power. Operating experience has shown these
components usually pass the Surveillance when performed at
the 24 month Frequency. The 24 month Frequency is also based
on engineering judgment and is considered adequate given
that the interlock is not challenged during use of the air
lock.~~

Insert 1



REFERENCES

1. 10 CFR 50, Appendix J, Option B.
 2. UFSAR, Section 6.2.
 3. UFSAR, Chapter 15.
-
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.6.3.1 (continued)

Insert 1

boundary is within design limits. This SR does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those containment isolation valves outside containment and capable of being mispositioned are in the correct position. ~~Since verification of valve position for containment isolation valves outside containment is relatively easy, the 31 day Frequency is based on engineering judgment and was chosen to provide added assurance of the correct positions.~~ The SR specifies that containment isolation valves that are open under administrative controls are not required to meet the SR during the time the valves 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.

The Note applies to valves and blind flanges located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted during MODES 1, 2, 3 and 4 for ALARA reasons. Therefore, the probability of misalignment of these containment isolation valves, once they have been verified to be in the proper position, is small.

SR 3.6.3.2

This SR requires verification that each containment isolation manual valve and blind flange located inside containment and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside of the containment boundary is within design limits. For containment isolation valves inside containment, the Frequency of "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is appropriate since these containment isolation valves are operated under administrative controls and the probability of their misalignment is low. The SR specifies that containment isolation valves that are open under administrative controls are not required to meet the SR during the time they are open. This SR does not apply to
(continued)

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.6.3.5

Automatic containment isolation valves close on a containment isolation signal to prevent leakage of radioactive material from containment following a DBA. This SR ensures that each automatic power operated containment isolation valve will actuate to its isolation position on a containment isolation signal. Check valves which are containment isolation valves are not considered automatic valves for the purpose of this Surveillance as they do not receive a containment isolation signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass this Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

Insert 1 

SR 3.6.3.6

The check valves that serve a containment isolation function are weight or spring loaded to provide positive closure in the direction of flow. This ensures that these check valves will remain closed when the inside containment atmosphere returns to subatmospheric conditions following a DBA. SR 3.6.3.6 verifies the operation of the check valves that are not testable during unit operation. ~~The Frequency of 18 months is based on such factors as the inaccessibility of these valves, the fact that the unit must be shut down to perform the tests, and the successful results of the tests on an 18 month basis during past unit operation.~~

Insert 1 

REFERENCES

1. UFSAR, Chapter 15.
 2. Technical Requirements Manual.
 3. Standard Review Plan 6.2.4.
 4. UFSAR, Section 6.2.4.2.
-
-

BASES

B.1 and B.2

If containment air partial pressure cannot be restored to within limits within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.6.4.1

Verifying that containment air partial pressure is within limits ensures that operation remains within the limits assumed in the containment analysis. ~~The 12 hour Frequency of this SR was developed considering operating experience related to trending of containment pressure variations and pressure instrument drift during the applicable MODES. Furthermore, the 12 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal containment pressure condition.~~

Insert 1



REFERENCES

1. UFSAR, Section 6.2.
 2. 10 CFR 50, Appendix K.
 3. UFSAR, Section 15.4.1.7.
-
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.6.5.1 (continued)

a weighted average is calculated using measurements taken at locations within containment selected to provide a representative sample of the overall containment atmosphere. ~~The 24 hour Frequency of this SR is considered acceptable based on observed slow rates of temperature increase within containment as a result of environmental heat sources (due to the large volume of containment). Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal containment temperature condition.~~

Insert 1 

REFERENCES

1. UFSAR, Section 6.2.
 2. 10 CFR 50.49.
-
-

BASES

ACTIONS

B.1 and B.2 (continued)

within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.6.6.1

Verifying the correct alignment of manual, power operated, and automatic valves, excluding check valves, in the QS System provides assurance that the proper flow path exists for QS System operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they were verified to be in the correct position prior to being secured. This SR does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those valves outside containment and capable of potentially being mispositioned are in the correct position.

SR 3.6.6.2

Insert 1

Verifying that each QS pump's developed head at the flow test point is greater than or equal to the required developed head ensures that QS pump performance is consistent with the safety analysis assumptions. Flow and differential head are normal tests of centrifugal pump performance required by the ASME Code (Ref. 5). Since the QS System pumps cannot be tested with flow through the spray headers, they are tested on recirculation flow. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. The Frequency of this SR is in accordance with the Inservice Testing Program.

SR 3.6.6.3 and SR 3.6.6.4

These SRs ensure that each QS automatic valve actuates to its correct position and each QS pump starts upon receipt of an actual or simulated Containment Pressure high-high signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform these

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.6.6.3 and SR 3.6.6.4 (continued)

Surveillances under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillances were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillances when performed at an 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

← Insert 1

SR 3.6.6.5

With the quench spray inlet valves closed and the spray header drained of any solution, low pressure air or smoke can be blown through test connections or an inspection of the nozzles can be performed. This SR ensures that each spray nozzle is unobstructed and that spray coverage of the containment during an accident is not degraded. Due to the passive nature of the design of the nozzle and the non-corrosive design of the system, a test performed following maintenance which could result in nozzle blockage is considered adequate to detect obstruction of the nozzles.

REFERENCES

1. UFSAR, Section 6.2.
 2. 10 CFR 50.49.
 3. 10 CFR 50, Appendix K.
 4. UFSAR, Section 15.4.1.7.
 5. ASME Code for Operation and Maintenance of Nuclear Power Plants.
-
-

BASES

ACTIONS

E.1 and E.2 (continued)

MODE 5 allows additional time and is reasonable considering that the driving force for a release of radioactive material from the Reactor Coolant System is reduced in MODE 3.

F.1


With an inoperable inside RS subsystem in one train, and an inoperable outside RS subsystem in the other train, only 180° containment spray coverage is available. This condition is outside accident analysis. With three or more RS subsystems inoperable, the unit is in a condition outside the accident analysis. With two inoperable outside RS subsystems, less than 100% of required RS flow is available. Therefore, in all three cases, LCO 3.0.3 must be entered immediately.

SURVEILLANCE
REQUIREMENTS

SR 3.6.7.1

Verifying that the casing cooling tank solution temperature is within the specified tolerances provides assurance that the water injected into the suction of the outside RS pumps will increase the NPSH available as per design. The 24 hour Frequency of this SR was developed considering operating experience related to the parameter variations and instrument drift during the applicable MODES. Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal condition.

SR 3.6.7.2

Insert 1 

~~Verifying the casing cooling tank contained borated water volume provides assurance that sufficient water is available to support the outside RS subsystem pumps during the time they are required to operate. The 7 day Frequency of this SR was developed considering operating experience related to the parameter variations and instrument drift during the applicable MODES. Furthermore, the 7 day Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal condition.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.6.7.3

Verifying the boron concentration of the solution in the casing cooling tank provides assurance that borated water added from the casing cooling tank to RS subsystems will not dilute the solution being recirculated in the containment sump. A Note states that for Unit 2, until the first entry into MODE 4 following the Unit 2 Fall 2002 refueling outage, the casing cooling tank boron concentration acceptance criteria shall be ≥ 2300 ppm and ≤ 2400 ppm. ~~The 7 day Frequency of this SR was developed considering the known stability of stored borated water and the low probability of any source of diluting pure water.~~

← Insert 1

SR 3.6.7.4

Verifying the correct alignment of manual, power operated, and automatic valves, excluding check valves, in the RS System and casing cooling tank provides assurance that the proper flow path exists for operation of the RS System. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified as being in the correct position prior to being secured. This SR does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those valves outside containment and capable of potentially being mispositioned are in the correct position.

← Insert 1

SR 3.6.7.5

Verifying that each RS and casing cooling pump's developed head at the flow test point is greater than or equal to the required developed head ensures that these pumps' performance has not degraded during the cycle. Flow and differential head are normal tests of centrifugal pump performance required by the ASME Code (Ref. 5). Since the RS System pumps cannot be tested with flow through the spray headers, they are tested on recirculation flow. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. The Frequency of this SR is in accordance with the Inservice Testing Program.

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.6.7.6

These SRs ensure that each automatic valve actuates and that the casing cooling pumps start upon receipt of an actual or simulated High-High containment pressure signal. The RS pumps are verified to start with an actual or simulated RWST Level-Low signal coincident with a Containment Pressure-High High signal. The start delay times for the inside RS pumps are also verified. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was considered to be acceptable from a reliability standpoint.~~

Insert 1



SR 3.6.7.7

Periodic inspections of the containment sump components ensure that they are unrestricted and stay in proper operating condition. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and on the need to have access to the location. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.~~

Insert 1



SR 3.6.7.8

This SR ensures that each spray nozzle is unobstructed and that spray coverage of the containment will meet its design bases objective. Either an inspection of the nozzles or an air or smoke test is performed through each spray header. Due to the passive design of the spray header and its normally dry state, a test performed following maintenance which could result in nozzle blockage is considered adequate for detecting obstruction of the nozzles.

REFERENCES

1. UFSAR, Section 6.2.
 2. 10 CFR 50.49.
 3. 10 CFR 50, Appendix K.
-

BASES

ACTIONS
(continued)

on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. The extended interval to reach MODE 5 allows 48 hours for restoration of the Chemical Addition System in MODE 3 and 36 hours to reach MODE 5. This is reasonable when considering the reduced pressure and temperature conditions in MODE 3 for the release of radioactive material from the Reactor Coolant System.

SURVEILLANCE
REQUIREMENTS

SR 3.6.8.1

Verifying the correct alignment of Chemical Addition System manual, power operated, and automatic valves in the chemical addition flow path provides assurance that the system is able to provide additive to the Quench Spray System in the event of a DBA. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. This SR does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those valves outside containment and capable of potentially being mispositioned are in the correct position.

Insert 1

SR 3.6.8.2

To provide effective iodine removal, the containment spray must be an alkaline solution. Since the RWST contents are normally acidic, the volume of the chemical addition tank must provide a sufficient volume of spray additive to adjust pH for all water injected. This SR is performed to verify the availability of sufficient NaOH solution in the Chemical Addition System. ~~The 184 day Frequency was developed based on the low probability of an undetected change in tank volume occurring during the SR interval (the tank is isolated during normal unit operations). Tank level is also indicated and alarmed in the control room, so that there is high confidence that a substantial change in level would be detected.~~

Insert 1

SR 3.6.8.3

This SR provides verification, by chemical analysis, of the NaOH concentration in the chemical addition tank and is sufficient to ensure that the spray solution being injected

(continued)

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

Insert 1

into containment is at the correct pH level. ~~The 184 day Frequency is sufficient to ensure that the concentration level of NaOH in the chemical addition tank remains within the established limits. This is based on the low likelihood of an uncontrolled change in concentration (the tank is normally isolated) and the probability that any substantial variance in tank volume will be detected.~~

SR 3.6.8.4

Insert 1

This SR provides verification that each automatic valve in the Chemical Addition System flow path actuates to its correct position. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

SR 3.6.8.5

Insert 1

To ensure that the correct pH level is established in the borated water solution provided by the Quench Spray System, flow from the Chemical Addition System is verified ~~once every 5 years by draining solution from the RWST and chemical addition tank through the drain lines in the cross-connection between the tanks. This SR provides assurance that the correct amount of NaOH will be metered into the flow path upon Quench Spray System initiation. Due to the passive nature of the chemical addition flow controls, the 5 year Frequency is sufficient to identify component degradation that may affect flow rate.~~

REFERENCES

None

BASES

SURVEILLANCE
REQUIREMENTS


SR 3.7.2.1 (continued)

This test may be conducted in MODE 3 with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.


SR 3.7.2.2

This SR verifies that each MSTV closes on an actual or simulated actuation signal. This Surveillance is normally performed upon returning the plant to operation following a refueling outage. ~~The Frequency of MSTV testing is every 18 months. The 18 month Frequency for testing is based on the refueling cycle. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, this Frequency is acceptable from a reliability standpoint.~~

Insert 1



REFERENCES

1. UFSAR, Section 10.3.
 2. UFSAR, Section 6.2.
 3. UFSAR, Section 15.4.2.
 4. 10 CFR 50.67.
 5. ASME Code for Operation and Maintenance of Nuclear Power Plants.
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BASES

SURVEILLANCE
REQUIREMENTS

SR 3.7.3.1

This SR verifies that the isolation time of each MFIV, MFRV, and MFRBV is ≤ 6.98 seconds and the isolation time for each MFPDV is ≤ 60 seconds. The isolation times are assumed in the accident and containment analyses. This Surveillance is normally performed during a refueling outage.

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

SR 3.7.3.2

This SR verifies that each MFIV, MFRV, MFRBV, and MFPDV can close on an actual or simulated actuation signal. This Surveillance is normally performed upon returning the plant to operation following a refueling outage.

~~The Frequency for this SR is every 18 months. The 18 month Frequency for testing is based on the refueling cycle. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, this Frequency is acceptable from a reliability standpoint.~~

Insert 1 

REFERENCES

1. UFSAR, Section 10.4.3.

✕

BASES

ACTIONS

C.1 and C.2 (continued)


experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.7.4.1

To perform a controlled cooldown of the RCS, the SG PORVs must be able to be opened either remotely or locally and throttled through their full range. This SR ensures that the SG PORVs are tested through a full control cycle at least once per fuel cycle. Performance of inservice testing or use of an SG PORV during a unit cooldown may satisfy this requirement. ~~Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. The Frequency is acceptable from a reliability standpoint.~~

Insert 1



SR 3.7.4.2

The function of the upstream manual isolation valve is to isolate a failed SG PORV. Cycling the upstream manual isolation valve both closed and open demonstrates its capability to perform this function. Performance of inservice testing or use of the upstream manual isolation valve during unit cooldown may satisfy this requirement. ~~Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. The Frequency is acceptable from a reliability standpoint.~~

Insert 1



REFERENCES

1. UFSAR, Section 10.3.
 2. UFSAR, Section 15.4.3.
-
-

BASES

ACTIONS
(continued)

D.1

If all three AFW trains are inoperable in MODE 1, 2, or 3, the unit is in a seriously degraded condition with no safety related means for conducting a cooldown, and only limited means for conducting a cooldown with nonsafety related equipment. In such a condition, the unit should not be perturbed by any action, including a power change, that might result in a trip. The seriousness of this condition requires that action be started immediately to restore one AFW train to OPERABLE status.

Required Action D.1 is modified by a Note indicating that all required MODE changes or power reductions required by the Technical Specifications are suspended until one AFW train is restored to OPERABLE status. In this case, LCO 3.0.3 is not applicable because it could force the unit into a less safe condition.

E.1

In MODE 4, either the reactor coolant pumps or the RHR loops can be used to provide forced circulation. This is addressed in LCO 3.4.6, "RCS Loops—MODE 4." With the required AFW train inoperable, action must be taken to immediately restore the inoperable train to OPERABLE status. The immediate Completion Time is consistent with LCO 3.4.6.

SURVEILLANCE
REQUIREMENTS

SR 3.7.5.1

Verifying the correct alignment for manual, power operated, and automatic valves in the AFW System water and steam supply flow paths provides assurance that the proper flow paths will exist for AFW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position.

~~The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.7.5.2

Verifying that each AFW pump's developed head at the flow test point is greater than or equal to the required developed head ensures that AFW pump performance has not degraded during the cycle. Flow and differential head are normal tests of centrifugal pump performance required by the ASME Code (Ref 2). Because it is sometimes undesirable to introduce cold AFW into the steam generators while they are operating, this testing is typically performed on recirculation flow. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. Performance of inservice testing discussed in the ASME Code (Ref. 2) (only required at 3 month intervals) satisfies this requirement.

This SR is modified by a Note indicating that the SR should be deferred until suitable test conditions are established. This deferral is required because there may be insufficient steam pressure to perform the test.

SR 3.7.5.3

This SR verifies that AFW can be delivered to the appropriate steam generator in the event of any accident or transient that generates an ESFAS, by demonstrating that each automatic valve in the flow path actuates to its correct position on an actual or simulated actuation signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform this ~~Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 18 month Frequency is acceptable based on operating experience and the design reliability of the equipment.~~

Insert 1



This SR is modified by a Note that states the SR is not required in MODE 4. In MODE 4, the heat removal requirements would be less providing more time for operator action to manually align the required valves.

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.7.5.4

This SR verifies that the AFW pumps will start in the event of any accident or transient that generates an ESFAS by demonstrating that each AFW pump starts automatically on an actual or simulated actuation signal in MODES 1, 2, and 3. In MODE 4, the required pump's autostart function is not required. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.~~

Insert 1



This SR is modified by two Notes. Note 1 indicates that the SR be deferred until suitable test conditions are established. This deferral is required because there may be insufficient steam pressure to perform the test. Note 2 states that the SR is not required in MODE 4. In MODE 4, the heat removal requirements would be less providing more time for operator action to manually start the required AFW pump.

SR 3.7.5.5

This SR verifies that the AFW is properly aligned by verifying the flow paths from the ECST to each steam generator prior to entering MODE 3 after more than 30 contiguous days in any combination of MODES 5, 6, or defueled. OPERABILITY of AFW flow paths must be verified before sufficient core heat is generated that would require the operation of the AFW System during a subsequent shutdown. The Frequency is reasonable, based on engineering judgement and other administrative controls that ensure that flow paths remain OPERABLE. To further ensure AFW System alignment, flow path OPERABILITY is verified following extended outages to determine no misalignment of valves has occurred. This SR ensures that the flow path from the ECST to the steam generators is properly aligned.

REFERENCES

1. UFSAR, Section 10.4.3.2.
 2. ASME Code for Operation and Maintenance of Nuclear Power Plants.
-
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.7.6.1

This SR verifies that the ECST contains the required volume of cooling water. ~~The 12 hour Frequency is based on operating experience and the need for operator awareness of unit evolutions that may affect the ECST inventory between checks. Also, the 12 hour Frequency is considered adequate in view of other indications in the control room, including alarms, to alert the operator to abnormal deviations in the ECST level.~~

Insert 1 

REFERENCES

1. UFSAR, Section 9.2.4.
 2. UFSAR, Chapter 6.
 3. UFSAR, Chapter 15.
-
-

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, the limits on secondary specific activity apply due to the potential for secondary steam releases to the atmosphere.

In MODES 5 and 6, the steam generators are not being used for heat removal. Both the RCS and steam generators are depressurized, and primary to secondary LEAKAGE is minimal. Therefore, monitoring of secondary specific activity is not required.

ACTIONS

A.1 and A.2

DOSE EQUIVALENT I-131 exceeding the allowable value in the secondary coolant, is an indication of a problem in the RCS and contributes to increased post accident doses. If the secondary specific activity cannot be restored to within limits within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.7.7.1

This SR verifies that the secondary specific activity is within the limits of the accident analysis. A gamma isotopic analysis of the secondary coolant, which determines DOSE EQUIVALENT I-131, confirms the validity of the safety analysis assumptions as to the source terms in post accident releases. It also serves to identify and trend any unusual isotopic concentrations that might indicate changes in reactor coolant activity or LEAKAGE. ~~The 31-day Frequency is based on the detection of increasing trends of the level of DOSE EQUIVALENT I-131, and allows for appropriate action to be taken to maintain levels below the LCO limit.~~

Insert 1



REFERENCES

1. Regulatory Guide 1.183, July 2000.
 2. UFSAR, Chapter 15.
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.7.8.1 (continued)

valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. ~~The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.~~

Insert 1



SR 3.7.8.2

This SR verifies proper automatic operation of the SW System valves on an actual or simulated actuation signal. The SW System is a normally operating system that cannot be fully actuated as part of normal testing. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.~~

Insert 1



SR 3.7.8.3

This SR verifies proper automatic operation of the SW pumps on an actual or simulated actuation signal. The SW System is a normally operating system that cannot be fully actuated as part of normal testing during normal operation. ~~The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.~~

Insert 1



REFERENCES

1. UFSAR, Section 9.2.1.
2. UFSAR, Section 6.2.2.
3. UFSAR, Section 5.5.4.

BASES

LCO The UHS is required to be OPERABLE. The UHS is considered OPERABLE if it contains a sufficient volume of water at or below the maximum temperature that would allow the SW System to operate for at least 30 days following the design basis LOCA without the loss of net positive suction head (NPSH), and without exceeding the maximum design temperature of the equipment served by the SW System. To meet this condition, the Service Water Reservoir temperature should not exceed 95°F and the level should not fall below 313 ft mean sea level during normal unit operation.

APPLICABILITY In MODES 1, 2, 3, and 4, the UHS is required to support the OPERABILITY of the equipment serviced by the UHS and required to be OPERABLE in these MODES.

In MODE 5 or 6, the OPERABILITY requirements of the UHS are determined by the systems it supports.

ACTIONS

A.1 and A.2

If the UHS is inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours.

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

SURVEILLANCE
REQUIREMENTS

SR 3.7.9.1

This SR verifies that adequate long term (30 day) cooling can be maintained. The specified level also ensures that sufficient NPSH is available to operate the SW pumps. ~~The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES. This SR verifies that the Service Water Reservoir water level is \geq 313 ft mean sea level, USGS datum.~~

Insert 1 

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.7.9.2

This SR verifies that the SW System is available with the maximum accident or normal design heat loads for 30 days following a Design Basis Accident. ~~The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES. This SR verifies that the average water temperature of the Service Water Reservoir is $\leq 95^{\circ}\text{F}$ as measured at the service water pump outlet.~~

Insert 1 

REFERENCES

1. UFSAR, Section 9.2.
 2. Regulatory Guide 1.27, March, 1974.
-
-

BASES

ACTIONS

D.1.1, D.1.2, and D.2 (continued)

An alternative to Required Action D.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

E.1

During movement of recently irradiated fuel assemblies, if a required train of MCR/ESGR EVS train becomes inoperable due to an inoperable MCR/ESGR envelope boundary or two required MCR/ESGR EVS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

F.1

When two required MCR/ESGR EVS trains are inoperable in MODE 1, 2, 3, or 4 for reasons other than an inoperable MCR/ESGR envelope boundary (i.e., Condition B), the MCR/ESGR EVS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE
REQUIREMENTSSR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on the MCR/ESGR EVS are not too severe, testing each required train once every month provides an adequate check of this system. Monthly heater operations dry out any moisture accumulated in the charcoal and HEPA filters from humidity in the ambient air. Each required train must be operated for ≥ 10 continuous hours with the heaters energized. ~~The 31 day Frequency is based on the reliability of the equipment and the one train redundancy.~~

Insert 1 

BASES

ACTIONS

C.1 and C.2 (continued)

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the MCR/ESGR envelope. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

D.1

During movement of recently irradiated fuel assemblies, with less than 100% of the MCR/ESGR ACS cooling equivalent to a single OPERABLE MCR/ESGR ACS subsystem available, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the MCR/ESGR envelope. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

E.1

With less than 100% of the MCR/ESGR ACS cooling equivalent to a single OPERABLE MCR/ESGR ACS subsystem available in MODE 1, 2, 3, or 4, the MCR/ESGR ACS may not be capable of performing its intended function. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE
REQUIREMENTS

SR 3.7.11.1

This SR verifies that the heat removal capability of any one of the three chillers for the unit is sufficient to remove the heat load assumed in the safety analyses in the MCR/ESGR envelope. This SR consists of a combination of testing and calculations. ~~The 18 month on a STAGGERED TEST BASIS Frequency is appropriate since significant degradation of the MCR/ESGR ACS is slow and is not expected over this time period.~~

Insert 1 

REFERENCES

1. UFSAR, Section 9.4.

BASES

ACTIONS

B.1 (continued)

protect control room operators from potential hazards such as radioactive contamination. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the ECCS pump room boundary.

C.1 and C.2

If the ECCS PREACS train(s) or ECCS pump room boundary cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.7.12.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once a month provides an adequate check on this system. Monthly heater operations dry out any moisture that may have accumulated in the charcoal and HEPA filters from humidity in the ambient air. The system must be operated ≥ 10 continuous hours with the heaters energized. ~~The 31 day Frequency is based on the known reliability of equipment and the two train redundancy available.~~

Insert 1 

SR 3.7.12.2

This SR verifies that Safeguards Area exhaust flow and Auxiliary Building Central Exhaust subsystem flow, when actuated from the control room, diverts flow through the Auxiliary Building HEPA filter and charcoal adsorber assembly for the operating train. Exhaust flow is diverted
(continued)

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.7.12.2 (continued)

manually through the filters in case of a DBA requiring their use. ~~The 31 day Frequency is based on the known reliability of equipment and the two train redundancy available.~~

Insert 1 →

SR 3.7.12.3

This SR verifies that the required ECCS PREACS testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing HEPA filter performance, charcoal adsorbers efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test Frequencies and additional information are discussed in detail in the VFTP.

SR 3.7.12.4

This SR verifies that Safeguards Area exhaust flow for the operating Safeguards Area fan is diverted through the filters on an actual or simulated actuation signal. ~~The 18 month Frequency is consistent with that specified in Reference 3.~~

Insert 1 →

SR 3.7.12.5

This SR verifies the integrity of the ECCS pump room enclosure. The ability of the ECCS pump room to maintain a negative pressure, with respect to potentially uncontaminated adjacent areas, is periodically tested in a qualitative manner to verify proper functioning of each train of the ECCS PREACS. During the post accident mode of operation, the ECCS PREACS is designed to maintain a slight negative pressure in the ECCS pump room, with respect to adjacent areas, to prevent unfiltered LEAKAGE. A single train of ECCS PREACS is designed to maintain a negative pressure relative to adjacent areas. ~~The Frequency of 18 months is consistent with the guidance provided in NUREG 0800, Section 6.5.1 (Ref. 5).~~

Insert 1 →

~~This test is conducted with the tests for filter penetration; thus, an 18 month Frequency on a STAGGERED TEST BASIS is consistent with that specified in Reference 3.~~

REFERENCES

1. UFSAR, Section 9.4.
-

BASES

ACTIONS
(continued)

A.1

When the FBVS is inoperable or not in operation during movement of recently irradiated fuel assemblies in the fuel building, action must be taken to place the unit in a condition in which the LCO does not apply. Action must be taken immediately to suspend movement of recently irradiated fuel assemblies in the fuel building. This does not preclude the movement of fuel to a safe position.

SURVEILLANCE
REQUIREMENTS

SR 3.7.15.1

This SR verifies the integrity of the fuel building pressure envelope. The ability of the fuel building to maintain negative pressure with respect to potentially uncontaminated adjacent areas is periodically tested to verify proper function of the FBVS. The FBVS is designed to maintain a slight negative pressure in the fuel building, to prevent unfiltered LEAKAGE. The FBVS is designed to maintain a ≤ -0.125 inches water gauge with respect to atmospheric pressure. ~~The Frequency of 18 months is consistent with the guidance provided in NUREG 0800, Section 6.5.1 (Ref. 5).~~

Insert 1 

REFERENCES

1. UFSAR, Section 9.4.5.
 2. UFSAR, Section 15.4.5.
 3. Regulatory Guide 1.183, July 2000.
 4. 10 CFR 50, Appendix A, GDC-19.
 5. ~~NUREG 0800, Section 6.5.1, Rev. 2, July 1981.~~
-
-

BASES

LCO The fuel storage pool water level is required to be ≥ 23 ft over the top of irradiated fuel assemblies seated in the storage racks. The specified water level preserves the assumptions of the fuel handling accident analysis (Ref. 3). As such, it is the minimum required for fuel storage and movement within the fuel storage pool.

APPLICABILITY This LCO applies during movement of irradiated fuel assemblies in the fuel storage pool, since the potential for a release of fission products exists.

ACTIONS A.1

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply.

When the initial conditions for prevention of an accident cannot be met, steps should be taken to preclude the accident from occurring. When the fuel storage pool water level is lower than the required level, the movement of irradiated fuel assemblies in the fuel storage pool is immediately suspended to a safe position. This action effectively precludes the occurrence of a fuel handling accident. This does not preclude movement of a fuel assembly to a safe position.

If moving irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODES 1, 2, 3, and 4, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTS SR 3.7.16.1

This SR verifies sufficient fuel storage pool water is available in the event of a fuel handling accident. The water level in the fuel storage pool must be checked periodically. ~~The 7 day Frequency is appropriate because the volume in the pool is normally stable. Water level changes are controlled by plant procedures and are acceptable based on operating experience.~~

Insert 1 →

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

of fuel assemblies. The concentration of boron is restored simultaneously with suspending movement of fuel assemblies. Prior to resuming movement of fuel assemblies, the concentration of boron must be restored to within limit. This does not preclude movement of a fuel assembly to a safe position.

If the LCO is not met while moving irradiated fuel assemblies in MODE 5 or 6, LCO 3.0.3 would not be applicable. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTS

SR 3.7.17.1

This SR verifies that the concentration of boron in the fuel storage pool is within the required limit. As long as this SR is met, the analyzed accidents are fully addressed. ~~The 7 day Frequency is appropriate because no major replenishment of pool water is expected to take place over such a short period of time.~~

Insert 1



REFERENCES

1. UFSAR, Section 9.1.2.
 2. UFSAR, Section 4.3.2.7.
 3. UFSAR, Section 3.1.53.
-
-

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.7.19.1

Verifying the correct alignment for manual, power operated, and automatic valves in the CC flow path to the RHR heat exchangers provides assurance that the proper flow paths exist for CC operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position.

Insert 1

~~The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.~~

REFERENCES

1. UFSAR, Section 9.2.2.
-
-

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to the preferred or alternate power sources for Unit 1 or the preferred power source for Unit 2, and that appropriate independence of offsite circuits is maintained. ~~The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.~~

Insert 1

SR 3.8.1.2 and SR 3.8.1.7

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs are modified by a Note (Note 1 for SR 3.8.1.2) to indicate that all EDG starts for these Surveillances may be preceded by an engine prelube period and followed by a warmup period prior to loading.

For the purposes of SR 3.8.1.2 and SR 3.8.1.7 testing, the EDGs are started from standby conditions. Standby conditions for an EDG mean that the diesel engine coolant and oil are being continuously circulated, as required, and temperature is being maintained consistent with manufacturer recommendations.

In order to reduce stress and wear on diesel engines, the manufacturer recommends a modified start in which the starting speed of EDGs is limited, warmup is limited to this lower speed, and the EDGs are gradually accelerated to synchronous speed prior to loading. These start procedures are the intent of Note 2.

SR 3.8.1.7 requires that, ~~at a 184 day Frequency,~~ the EDG starts from standby conditions and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions of the design basis LOCA analysis in the UFSAR, Chapter 15 (Ref. 5).

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

The 10 second start requirement is not applicable to SR 3.8.1.2 (see Note 2) when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.7 applies.

Since SR 3.8.1.7 requires a 10 second start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2.

In addition to the SR requirements, the time for the EDG to reach steady state operation, unless the modified EDG start method is employed, is periodically monitored and the trend evaluated to identify degradation of governor and voltage regulator performance.

~~The 31 day Frequency for SR 3.8.1.2 and the 184 day Frequency for SR 3.8.1.7 are acceptable based on operating experience. These Frequencies provide adequate assurance of EDG OPERABILITY, while minimizing degradation resulting from testing.~~

Insert 1

SR 3.8.1.3

This Surveillance verifies that the EDGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of 90% to 100% of continuous rating (2500 to 2600 kW). A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the EDG is connected to the offsite source.

Although no power factor requirements are established by this SR, the EDG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the EDG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY.

~~The 31 day Frequency for this Surveillance is acceptable based on operating experience.~~

Insert 1

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.3 (continued)

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing bus loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 indicates that this Surveillance should be conducted on only one EDG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A successful EDG start must precede this test to credit satisfactory performance.

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank is at or above the level which is required. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of EDG operation at full load plus 10%.

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

Insert 1

SR 3.8.1.5

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 oil day tanks ~~once every 92 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 EDG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.5 (continued)

Insert 1

~~oil system. The Surveillance Frequencies are consistent with the recommendations of Regulatory Guide 1.137 (Ref. 9). This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.~~

SR 3.8.1.6

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for fuel transfer systems are OPERABLE. Only one fuel oil transfer subsystem is required to support an OPERABLE EDG.

Insert 1

~~The 92 day Frequency corresponds to the testing requirements of pumps as contained in the ASME Code (Ref. 10). The fuel oil transfer system is such that the pumps must be started manually in order to maintain an adequate volume of fuel in the day tank during or following EDG testing, and a 92 day Frequency is appropriate.~~

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Insert 1

~~Transfer of each 4.16 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads for Unit 1 only. The 18 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.9 (continued)

- b. \Tripping its associated single largest post-accident load with the EDG solely supplying the bus.

As required by IEEE-308 (Ref. 11), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Safety Guide 9 (Ref. 3) recommendations for response during load sequence intervals.

The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the EDG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. ~~The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 8).~~

Insert 1



This SR is modified by a Note. The Note ensures that the EDG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9 . This power factor is representative of the actual inductive loading an EDG would see under design basis accident conditions. Under certain conditions, however, the Note allows the surveillance to be conducted at a power factor other than ≤ 0.9 . These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the EDG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency busses, but the excitation levels are in excess of those recommended for the EDG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the EDG excitation limits.

BASES

SURVEILLANCE
(continued)

SR 3.8.1.10

Consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the EDG. It further demonstrates the capability of the EDG to automatically achieve the required voltage and frequency within the specified time.

The EDG autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the EDG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, and not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the EDG systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

~~The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(1), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.~~

Insert 1



This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the EDGs during testing. For the purpose of this testing, the EDGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated, as required, and temperature

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.11 (continued)

injection systems are not capable of being operated at full flow. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the EDG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

~~The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

Insert 1



This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the EDGs during testing. For the purpose of this testing, 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. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE
(continued)

SR 3.8.1.12

This Surveillance demonstrates that EDG noncritical protective functions (e.g., high jacket water temperature) are bypassed on actual or simulated signals from an ESF actuation, a loss of voltage, or a loss of voltage signal concurrent with an ESF actuation test signal, and critical protective functions (engine overspeed and generator differential current) trip the EDG to avert substantial damage to the EDG unit. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The EDG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the EDG.

~~The 18 month Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

Insert 1



This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required EDG from service. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.1.13

Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(3), provides an acceptable method to demonstrate ~~once per 18 months~~ that the EDGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ 2 hours of which is at a load equivalent from 105% to 110% of the continuous duty rating and the remainder of the time at a load equivalent from 90% to 100% of the continuous duty rating of the EDG. The EDG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

The load band is provided to avoid routine overloading of the EDG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY.

~~The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.~~

Insert 1



This Surveillance is modified by three Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or on-site system when they are tied together or operated independently for the Surveillance; as well as

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.13 (continued)

the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Note 3 ensures that the EDG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9 . This power factor is representative of the actual inductive loading an EDG would see under design basis accident conditions. Under certain conditions, however, Note 3 allows the surveillance to be conducted at a power factor other than ≤ 0.9 . These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the EDG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency busses, but the excitation levels are in excess of those recommended for the EDG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the EDG excitation limits.

SR 3.8.1.14

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. ~~The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(5).~~

Insert 1

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the EDG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY. The requirement that the
(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.14 (continued)

diesel has operated for at least 2 hours at full load conditions, or after operating temperatures reach a stabilized state, prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all EDG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.15

Consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and load transfer from the EDG to the offsite source can be made and the EDG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the EDG to reload if a subsequent loss of offsite power occurs. The EDG is considered to be in ready to load status when the EDG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequencing timing relays are reset. EDG loading of the emergency bus is limited to normal energized loads.

Insert 1

~~The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.~~

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation
(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.15 (continued)

of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance is performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.16

Under accident conditions, with a loss of offsite power, safety injection, containment spray, or recirculation spray, loads are sequentially connected to the bus by the automatic load sequencing timing relays. The sequencing timing relays control the permissive and starting signals to motor breakers to prevent overloading of the EDGs due to high motor starting currents. The load sequence time interval tolerances, listed in the Technical Requirements Manual (Ref. 12), ensure that sufficient time exists for the EDG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

Insert 1

~~The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.~~

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.16 (continued)

Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a unit shutdown and startup to determine that unit safety is maintained or enhanced when the Surveillance is performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.17

In the event of a DBA coincident with a loss of offsite power, the EDGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the EDG operation, as discussed in the Bases for SR 3.8.1.10, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the EDG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

~~The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.~~

Insert 1



This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the EDGs during testing. For the purpose of this testing, 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 for EDGs. The reason for Note 2 is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.1.17 (continued)

(e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.18

This Surveillance demonstrates that the EDG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the EDGs are started simultaneously.

Insert 1

~~The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 8).~~

This SR is modified by a Note. The reason for the Note is to minimize wear on the EDG during testing. For the purpose of this testing, 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.

REFERENCES

1. UFSAR, Chapter 3.
2. UFSAR, Chapter 8.
3. Safety Guide 9, March 1971.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.

BASES


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 two EDGs' operation for 7 days at full 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.~~

Insert 1



SR 3.8.3.2

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 in accordance with ASTM D4057-88 (Ref. 6);
- b. Verify in accordance with the tests specified in ASTM D975-89 (Ref. 6) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89 or an API gravity at 60°F of $\geq 27^\times$ and $\leq 39^\times$ when tested in accordance with ASTM D287-82 (Ref. 6), a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point of $\geq 125^\circ\text{F}$; and
- c. Verify that the new fuel oil is checked for water and sediment content within limits when tested in accordance with ASTM D1796-83 (Ref. 6).

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.3.3 (continued)

(seconds of cranking). With receiver pressurized > 150 psig, there is adequate capacity for at least one start. The pressure specified in this SR is intended to reflect the lowest value at which more than one start can be accomplished.

Insert 1

~~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 3.8.3.4

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 92 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 EDG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and 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.~~

Insert 1

REFERENCES

1. UFSAR, Section 9.5.4.2.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.

BASES

ACTIONS

D.1 (continued)

LCO 3.7.10, "MCR/ESGR Emergency Ventilation Systems," LCO 3.7.12, "Emergency Core Cooling System Pump Room Exhaust Air Cleanup System," and LCO 3.7.19, "Component Cooling Water (CC) System," are followed.

SURVEILLANCE
REQUIREMENTS

SR 3.8.4.1

For Station and EDG batteries, verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell) in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. ~~The 7 day Frequency is consistent with manufacturer recommendations and IEEE 450 (Ref. 9).~~

Insert 1 →

SR 3.8.4.2

Visual inspection of both Station and EDG batteries to detect corrosion of the battery cells and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4.

~~The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.~~

Insert 1 →


BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

SR 3.8.4.4 and SR 3.8.4.5

Insert 1 

Station and EDG battery visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR.

SR 3.8.4.6 and SR 3.8.4.7

Insert 1 

SR 3.8.4.6 requires that each Station battery charger be capable of supplying ≥ 270 amps and ≥ 125 V for ≥ 4 hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

SR 3.8.4.7 requires that each EDG battery charger be capable of supplying ≥ 10 amps and ≥ 125 V for ≥ 4 hours. These values are based on the design requirements of the charger.

Insert 1 

~~The Surveillance Frequency for SR 3.8.4.6 is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be~~

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.4.6 and SR 3.8.4.7 (continued)

~~consistent with expected fuel cycle lengths. The spare charger for the Station batteries is required to be tested to the same criteria as the normal charger if it is to be used as a substitute charger.~~

Insert 1

~~The Surveillance Frequency for SR 3.8.4.7 is acceptable given the EDG must not be required to be OPERABLE during the performance of the required test.~~

SR 3.8.4.8

A Station battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

Insert 1

~~The Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests, not to exceed 18 months.~~

This SR is modified by three Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test.

A modified performance discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

It may consist of just two rates; for instance, the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the
(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.4.8 (continued)

performance discharge test. The battery terminal voltage for the modified performance discharge test must remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

Note 2 allows the performance discharge test in lieu of the service test ~~once per 60 months~~.

The reason for Note 3 is that performing the Surveillance on the Station batteries would perturb the electrical distribution system and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.4.9

A battery performance discharge test for Station and EDG batteries is a test of constant current capacity of a battery to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.8. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.9.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.4.9 (continued)

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

Insert 1

~~The Surveillance Frequency for this test is normally 60 months.~~ If the battery shows degradation, or if the battery has reached 85% of its expected life, the Surveillance Frequency is reduced to 18 months. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is $\geq 10\%$ below the manufacturer's rating. The 60 month Frequency is consistent with the recommendations in IEEE-450 (Ref. 9) and the 18 month Frequency is consistent with operating experience.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems for the Station batteries. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines unit safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of the unit shutdown and startup to determine that unit safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment.

BASES

ACTIONS

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

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable prior to declaring the battery inoperable.

B.1

With one or more batteries with one or more battery cell parameters outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding DC electrical power subsystem or EDG DC system must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F for the Station batteries, are also cause for immediately declaring the associated DC electrical power subsystem inoperable. Representative cells will consist of at least 10 cells.

SURVEILLANCE
REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte level of pilot cells. ← Insert 1

SR 3.8.6.2

Insert 1 →

~~The quarterly inspection of specific gravity and voltage is consistent with IEEE 450 (Ref. 3).~~ In addition, within 24 hours of a battery discharge < 110 V or a battery overcharge > 150 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ 110 V, do not constitute a battery discharge provided the battery terminal voltage and float current return to pre-transient values. This inspection is also

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.6.2 (continued)

consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

SR 3.8.6.3

This Surveillance verification that the average temperature of representative cells of the Station batteries is $> 60^{\circ}\text{F}$, is consistent with a recommendation of IEEE-450 (Ref. 3) ~~that states that the temperature of electrolytes in representative cells should be determined on a quarterly basis.~~

Insert 1

Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

Table 3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose level, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra $\frac{1}{4}$ inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote a to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

(continued)

BASES

ACTIONS

A.1 (continued)

b. Entry into Condition A will not be planned concurrent with planned maintenance on another RPS/ESFAS channel that results in that channel being in a tripped condition.

B.1

With one or more required LCO 3.8.7.b inverters inoperable, the reliability of the shared component(s) on the other unit is degraded. In this condition, the associated shared component is declared inoperable within 7 days. Service Water, Main Control Room/Emergency Switchgear Room Emergency Ventilation System, Auxiliary Building Central Exhaust System, and Component Cooling Water are shared systems.

C.1 and C.2

If the inoperable devices or components cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage output ensures that the required power is readily available for the instrumentation of the RTS and ESFAS connected to the AC vital buses. ~~The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.~~

Insert 1 →

REFERENCES

1. UFSAR, Chapter 8.
2. UFSAR, Chapter 6.
3. UFSAR, Chapter 15.

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. ~~The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.~~

Insert 1 

REFERENCES

1. UFSAR, Chapter 6.
 2. UFSAR, Chapter 15.
-
-

BASES

ACTIONS

H.1

Condition H corresponds to a level of degradation in the electrical power distribution system that causes a required safety function to be lost. When more than one inoperable LCO 3.8.9.a electrical power distribution subsystem results in the loss of a required function, the unit is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

SURVEILLANCE
REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical divisions is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. Verification of proper voltage availability for 480 volt buses and load centers may be performed by indirect methods. ~~The 7 day Frequency takes into account the redundant capability of the AC, DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.~~

Insert 1



REFERENCES

1. UFSAR, Chapter 6.
 2. UFSAR, Chapter 15.
 3. Regulatory Guide 1.93, December 1974.
-
-

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5 (continued)

Therefore, Required Action A.2.5 is provided to direct declaring RHR inoperable, which results in taking the appropriate RHR actions.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

SURVEILLANCE
REQUIREMENTS

SR 3.8.10.1

This Surveillance verifies that the required AC, DC, and AC vital bus electrical power distribution subsystems are functioning properly, with all the buses energized. The verification of proper voltage availability on the buses ensures that the required power is readily available for motive as well as control functions for critical system loads connected to these buses. Verification of proper voltage availability for 480 volt buses and load centers may be performed by indirect methods. ~~The 7-day Frequency takes into account the capability of the electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.~~

Insert 1 

REFERENCES

1. UFSAR, Chapter 6.
 2. UFSAR, Chapter 15.
-
-

BASES

ACTIONS

A.3 (continued)

Once actions have been initiated, they must be continued until the boron concentration is restored. The restoration time depends on the amount of boron that must be injected to reach the required concentration.

SURVEILLANCE
REQUIREMENTS

SR 3.9.1.1

This SR ensures that the coolant boron concentration in the RCS, and connected portions of the refueling canal and the refueling cavity, is within the COLR limits. The boron concentration of the coolant in each required volume is determined periodically by chemical analysis. Prior to re-connecting portions of the refueling canal or the refueling cavity to the RCS, this SR must be met per SR 3.0.1. If any dilution activity has occurred while the cavity or canal were disconnected from the RCS, this SR ensures the correct boron concentration prior to communication with the RCS.

~~A minimum Frequency of once every 72 hours is a reasonable amount of time to verify the boron concentration of representative samples. The Frequency is based on operating experience, which has shown 72 hours to be adequate.~~

Insert 1



REFERENCES

1. UFSAR, Section 3.1.22.
-
-

BASES

ACTIONS
(continued)

A.3

Due to the potential of having diluted the boron concentration of the reactor coolant, SR 3.9.1.1 (verification of boron concentration) must be performed to demonstrate that the required boron concentration exists. The Completion Time of 4 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration.

SURVEILLANCE
REQUIREMENTS

SR 3.9.2.1

These valves are to be locked, sealed, or otherwise secured closed to isolate possible dilution paths. The likelihood of a significant reduction in the boron concentration during MODE 6 operations is remote due to the large mass of borated water in the refueling cavity and the fact that the primary grade water flow paths are isolated, precluding a dilution. The boron concentration is checked ~~every 72 hours~~ during MODE 6 under SR 3.9.1.1. The Frequency is based on verifying that the isolation valves are locked, sealed, or otherwise secured within 15 minutes following a boron dilution or makeup activity. This Frequency is based on engineering judgment and is considered reasonable in view of other administrative controls that will ensure that the valve opening is an unlikely possibility.

REFERENCES

1. UFSAR, Section 15.2.4.
-
-

BASES

ACTIONS

B.2 (continued)

The Completion Time of once per 12 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration and ensures that unplanned changes in boron concentration would be identified. The 12 hour Frequency is reasonable, considering the low probability of a change in core reactivity during this time period.

SURVEILLANCE
REQUIREMENTS

SR 3.9.3.1

SR 3.9.3.1 is the performance of a CHANNEL CHECK, which is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that the two indication channels should be consistent with core conditions. Changes in fuel loading and core geometry can result in significant differences between source range channels, but each channel should be consistent with its local conditions.

Insert 1

~~The Frequency of 12 hours is consistent with the CHANNEL CHECK Frequency specified similarly for the same instruments in LCO 3.3.1.~~

SR 3.9.3.2

SR 3.9.3.2 is the performance of a CHANNEL CALIBRATION ~~every 18 months~~. This SR is modified by a Note stating that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the source range neutron flux monitors consists of obtaining the detector plateau or preamp discriminator curves, evaluating those curves, and comparing the curves to the manufacturer's data. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage. ~~Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency.~~

Insert 1

REFERENCES

1. UFSAR, Chapter 3.
 2. UFSAR, Chapter 15.
-
-

BASES

APPLICABILITY
(continued)

and 4, containment penetration requirements are addressed by LCO 3.6.1. In MODES 5 and 6, when movement of irradiated fuel assemblies within containment is not being conducted, the potential for a design basis fuel handling accident does not exist. Additionally, due to radioactive decay, containment closure capability is only required during a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours). A fuel handling accident involving fuel with a minimum decay time of 100 hours prior to movement will result in doses that are within the guideline values specified in Regulatory Guide 1.183 (Ref. 2) even without containment closure capability. Therefore, under these conditions no requirements are placed on containment penetration status.

ACTIONS

A.1

If the containment equipment hatch, air locks, or any containment penetration that provides direct access from the containment atmosphere to the outside atmosphere is not in the required status, including the Containment Purge and Exhaust Isolation System not capable of manual actuation when the purge and exhaust valves are open, the unit must be placed in a condition where the isolation function is not needed. This is accomplished by immediately suspending movement of recently irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

SURVEILLANCE
REQUIREMENTS

SR 3.9.4.1

This Surveillance demonstrates that each of the containment penetrations required to be in its closed position is in that position. The Surveillance on the open purge and exhaust valves will demonstrate that the valves are not blocked from closing. Also the Surveillance will demonstrate that each valve operator has motive power, which will ensure that each valve is capable of being manually closed.

~~The Surveillance is performed every 7 days during movement of recently irradiated fuel assemblies within containment. The Surveillance interval is selected to be commensurate with the normal duration of time to complete fuel handling operations. A surveillance before the start of refueling~~

Insert 1

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.9.4.1 (continued)

~~operations will provide two or three surveillance verifications during the applicable period for this LCO. As such, this Surveillance ensures that a postulated fuel handling accident involving handling recently irradiated fuel that releases fission product radioactivity within the containment will not result in a release of significant fission product radioactivity to the environment in excess of those recommended by Regulatory Guide 1.183 (Ref. 2).~~ ✕

SR 3.9.4.2

This Surveillance demonstrates that each containment purge and exhaust valve actuates to its isolation position on manual initiation. ~~The 18 month Frequency maintains consistency with other similar valve testing requirements.~~ This Surveillance performed during MODE 6 will ensure that the valves are capable of being closed after a postulated fuel handling accident involving handling recently irradiated fuel to limit a release of fission product radioactivity from the containment. The SR is modified by a Note stating that this Surveillance is not required to be met for valves in isolated penetrations. The LCO provides the option to close penetrations in lieu of requiring manual initiation capability.

Insert 1 →

REFERENCES

1. UFSAR, Section 15.4.7.
 2. Regulatory Guide 1.183, July 2000.
-
-

BASES

ACTIONS

A.4, A.5, A.6.1, and A.6.2 (continued)

- c. each penetration providing direct access from the containment atmosphere to the outside atmosphere must be either closed by a manual or automatic isolation valve, blind flange, or equivalent, or verified to be capable of being closed by an OPERABLE Containment Purge and Exhaust Isolation system.

With RHR loop requirements not met, the potential exists for the coolant to boil and release radioactive gas to the containment atmosphere. Performing the actions described above ensures that all containment penetrations are either closed or can be closed so that the dose limits are not exceeded.

The Completion Time of 4 hours allows fixing of most RHR problems and is reasonable, based on the low probability of the coolant boiling in that time.

SURVEILLANCE
REQUIREMENTS

SR 3.9.5.1

This Surveillance demonstrates that the RHR loop is in operation and circulating reactor coolant. The flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability and to prevent thermal and boron stratification in the core. ~~The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator in the control room for monitoring the RHR System.~~

Insert 1 

REFERENCES

1. UFSAR, Section 5.5.4.
-
-

BASES

ACTIONS

B.3, B.4, B.5.1, and B.5.2 (continued)

above ensures that all containment penetrations are either closed or can be closed so that the dose limits are not exceeded.

The Completion Time of 4 hours allows fixing of most RHR problems and is reasonable, based on the low probability of the coolant boiling in that time.

SURVEILLANCE
REQUIREMENTS

SR 3.9.6.1

This Surveillance demonstrates that one RHR loop is in operation and circulating reactor coolant. The flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability and to prevent thermal and boron stratification in the core. In addition, during operation of the RHR loop with the water level lowered to the level of the reactor vessel nozzles, the RHR pump net positive suction head requirements must be met. ~~The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator for monitoring the RHR System in the control room.~~

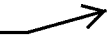
Insert 1



SR 3.9.6.2

Verification that the required pump is OPERABLE ensures that an additional RCS or RHR pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pump. ~~The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~

Insert 1



The SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

REFERENCES

1. UFSAR, Section 5.5.4.

BASES

APPLICABILITY LCO 3.9.7 is applicable when moving irradiated fuel assemblies within containment. The LCO minimizes the possibility of a fuel handling accident in containment that is beyond the assumptions of the safety analysis. If irradiated fuel assemblies are not present in containment, there can be no significant radioactivity release as a result of a postulated fuel handling accident. Requirements for fuel handling accidents in the spent fuel pool are covered by LCO 3.7.16, "Fuel Storage Pool Water Level."

ACTIONS A.1

With a water level of < 23 ft above the top of the reactor vessel flange, all operations involving movement of irradiated fuel assemblies within the containment shall be suspended immediately to ensure that a fuel handling accident cannot occur.

The suspension of fuel movement shall not preclude completion of movement of a component to a safe position.

SURVEILLANCE REQUIREMENTS SR 3.9.7.1

Verification of a minimum water level of 23 ft above the top of the reactor vessel flange ensures that the design basis for the analysis of the postulated fuel handling accident during refueling operations is met. Water at the required level above the top of the reactor vessel flange limits the consequences of damaged fuel rods that are postulated to result from a fuel handling accident inside containment (Ref. 2).

Insert 1

~~The Frequency of 24 hours is based on engineering judgment and is considered adequate in view of the large volume of water and the normal procedural controls of valve positions, which make significant unplanned level changes unlikely.~~

REFERENCES

1. Regulatory Guide 1.183, July 2000. ✓
2. UFSAR, Section 15.4.7. ✓

ATTACHMENT 5

TSTF-425 (NUREG-1431) VS. NORTH ANNA CROSS-REFERENCE

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA UNITS 1 AND 2**

**CROSS REFERENCE NUREG-1431 TS SURVEILLANCE REQUIREMENTS TO
NORTH ANNA TS SURVEILLANCE REQUIREMENTS REMOVED**

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
Shutdown margin		
Verify SDM	SR 3.1.1.1	SR 3.1.1.1
Core Reactivity		
Verify Reactivity	SR 3.1.2.1	SR 3.1.2.1
Rod Position		
Verify Rod Position within Alignment	SR 3.1.4.1	SR 3.1.4.1
Verify Rod Movement	SR 3.1.4.2	SR 3.1.4.2
Shutdown Bank		
Verify Insertion Limits	SR 3.1.5.1	SR 3.1.5.1
Control Bank Insertion limit		
Verify Limits	SR 3.1.6.2	SR 3.1.6.2
Verify Control Bank Rod Overlap	SR 3.1.6.3	SR 3.1.6.3
Rod Position Indication		
Calibration of RPI	SR 3.1.7.1	SR 3.1.7.1
Physics Test Exceptions		
RCS Loop Temperature	SR 3.1.8.2	SR 3.1.9.2
Verify Thermal Power	SR 3.1.8.3	SR 3.1.9.3
Verify SDM	SR 3.1.8.4	SR 3.1.9.4
F_Q(Z) Limits - RAOC		
Verify F _Q (Z) limits	SR 3.2.1.1	SR 3.2.1.1
Verify F _Q ^W (Z) limits	SR 3.2.1.2	----
F_{ΔH}^N Limits		
Verify F _{ΔH} ^N (Z) limits	SR 3.2.2.1	SR 3.2.2.1
AFD Limits - RAOC		
Verify Limit	SR 3.2.3.1	SR 3.2.3.1
QPTR		
Verify QPTR by calculation	SR 3.2.4.1	SR 3.2.4.1
Verify QPTR w/ incore detectors	SR 3.2.4.2	SR 3.2.4.2
RPS Instrumentation		
Perform Channel Check	SR 3.3.1.1	SR 3.3.1.1
Perform Calorimetric – actual power adjust if > 3%	SR 3.3.1.2	SR 3.3.1.2
Compare and Adjust NIS to Incore	SR 3.3.1.3	SR 3.3.1.3
TADOT	SR 3.3.1.4	SR 3.3.1.4 SR 3.3.1.6
Perform Actuation Logic Test	SR 3.3.1.5	SR 3.3.1.5
Calibrate NIS to Incore	SR 3.3.1.6	----
Per from COT - 184 days	SR 3.3.1.7	SR 3.3.1.7
Perform COT	SR 3.3.1.8	SR 3.3.1.8
Perform TADOT – 92 days	SR 3.3.1.9	SR 3.3.1.9

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
Perform Channel Calibration w/time constants	SR 3.3.1.10	SR 3.3.1.10
Perform Channel Calibration w/o neutron detectors	SR 3.3.1.11	SR 3.3.1.11
Perform Channel Calibration w/ RTDs	SR 3.3.1.12	SR 3.3.1.12
Perform COT – 18 months	SR 3.3.1.13	SR 3.3.1.13
Perform TADOT – 18 months	SR 3.3.1.14	SR 3.3.1.14
Perform Response Time	SR 3.3.1.16	SR 3.3.1.16
ESFAS Instrumentation		
Perform Channel Check	SR 3.3.2.1	SR 3.3.2.1
Perform Actuation Logic Test – 92 days	SR 3.3.2.2	SR 3.3.2.2
Perform Actuation Logic Test – 31 days	SR 3.3.2.3	----
Perform Master Relay Test	SR 3.3.2.4	SR 3.3.2.3
Perform COT – 184 days	SR 3.3.2.5	SR 3.3.2.4
Perform Slave Relay Test - 92 days	SR 3.3.2.6	SR 3.3.2.5
Perform TADOT – 92 days	SR 3.3.2.7	SR 3.3.2.6
Perform TADOT – 18 months	SR 3.3.2.8	SR 3.3.2.7
Perform Channel Calibration	SR 3.3.2.9	SR 3.3.2.8
Perform Time Response	SR 3.3.2.10	SR 3.3.2.9
PAM Instrumentation		
PAM Channel Check	SR 3.3.3.1	SR 3.3.3.1
PAM Channel Calibration	SR 3.3.3.2	SR 3.3.3.3
PAM TADOT	----	SR 3.3.3.4
Remote Shutdown System		
Perform Channel Check	SR 3.3.4.1	SR 3.3.4.1
Perform Control and Transfer Switch Test	SR 3.3.4.2	SR 3.3.4.2
Perform Channel Calibration	SR 3.3.4.3	SR 3.3.4.3
Perform TADOT of Reactor Trip Breaker	SR 3.3.4.4	----
LOP EDG Start Instrumentation		
Perform Channel Check	SR 3.3.5.1	----
Perform TADOT	SR 3.3.5.2	SR 3.3.5.1
Perform Channel Calibration	SR 3.3.5.3	SR 3.3.5.2
Perform Response Time Testing	----	SR 3.3.5.3
Containment Purge and Vent Isolation		
Perform Channel Check	SR 3.3.6.1	Note 1
Perform Actuation Logic Test	SR 3.3.6.2	Note 1
Perform Master Relay Test	SR 3.3.6.3	Note 1
Perform Actuation	SR 3.3.6.4	Note 1
Perform Master Relay Test	SR 3.3.6.5	Note 1
Perform COT	SR 3.3.6.6	Note 1
Perform Slave Relay Test	SR 3.3.6.7	Note 1
TADOT	SR 3.3.6.8	Note 1
Channel Calibration	SR 3.3.6.9	Note 1

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
CREFAS		
Channel Check	SR 3.3.7.1	----
COT	SR 3.3.7.2	----
Actuation Logic Test	SR 3.3.7.3	----
Master Relay Test	SR 3.3.7.4	----
Actuation Logic Test	SR 3.3.7.5	----
Master Relay Test	SR 3.3.7.6	----
Slave Relay Test	SR 3.3.7.7	----
TADOT	SR 3.3.7.8	SR 3.3.6.1
Channel Calibration	SR 3.3.7.9	----
FBACS Actuation Instrumentation		
Perform Channel Check	SR 3.3.8.1	Note 1
Perform COT	SR 3.3.8.2	Note 1
Perform Actuation Logic Test	SR 3.3.8.3	Note 1
Perform TADOT	SR 3.3.8.4	Note 1
Perform Channel Calibration	SR 3.3.8.5	Note 1
BDPS		
Perform Channel Check	SR 3.3.9.1	Note 1
Perform COT	SR 3.3.9.2	Note 1
Perform Channel Calibration	SR 3.3.9.3	Note 1
RCS Press Temp & Flow Limits		
Verify Pressurizer Pressure	SR 3.4.1.1	SR 3.4.1.1
Verify RCS Temperature	SR 3.4.1.2	SR 3.4.1.2
Verify RCS total Flow	SR 3.4.1.3	SR 3.4.1.3
Verify RCS Total Flow w/ Heat Balance	SR 3.4.1.4	SR 3.4.1.4
RCS Minimum Temp for Criticality		
Verify each Loop	SR 3.4.2.1	SR 3.4.2.1
RCS Temperature, Pressure,		
Verify Limits	SR 3.4.3.1	SR 3.4.3.1
Loop Operation - Modes 1 and 2		
Verify loop operating	SR 3.4.4.1	SR 3.4.4.1
Loop Operation - Mode 3		
Verify loop operating	SR 3.4.5.1	SR 3.4.5.1
Verify Steam Generator water Level \geq 17%	SR 3.4.5.2	SR 3.4.5.2
Verify Breaker Alignment and Power Available	SR 3.4.5.3	SR 3.4.5.3
Loop Operation - Mode 4		
Verify Loop Operation - Mode 4	SR 3.4.6.1	SR 3.4.6.1
Verify Steam Generator water Level \geq 17%	SR 3.4.6.2	SR 3.4.6.2
Verify Breaker Alignment and Power Available	SR 3.4.6.3	SR 3.4.6.3
Loop Operation - Mode 5 –loops Filled		
Verify loop operating	SR 3.4.7.1	SR 3.4.7.1

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
Verify Steam Generator water Level \geq 17%	SR 3.4.7.2	SR 3.4.7.2
Verify Breaker Alignment and Power Available RHR Pumps	SR 3.4.7.3	SR 3.4.7.3
Verify Loop Operation - Mode 5 –Loops - Not Filled		
Verify RHR Operating	SR 3.4.8.1	SR 3.4.8.1
Verify Breaker Alignment and Power Available RHR Pumps	SR 3.4.8.2	SR 3.4.8.2
Pressurizer		
Verify Water Level	SR 3.4.9.1	SR 3.4.9.1
Verify Heater Capacity of Required Groups	SR 2.4.9.2	SR 3.4.9.2
Verify Heater banks can be Powered for Emergency Power	SR 3.4.9.4	----
Pressurizer PORVS		
Cycle each Block Valve	SR 3.4.11.1	SR 3.4.11.2
Cycle each PORV	SR 3.4.11.2	SR 3.4.11.3
Cycle each SOV Valve and Check Valve on the Air Accumulators in PORV Control Systems	SR 3.4.11.3	SR 3.4.11.4
Verify PORVs and Block Valves can be Powered from Emergency Power Sources	SR 3.4.11.4	----
Verify PORV Backup Nitrogen Supply Pressure	----	SR 3.4.14.1
LTOP Systems		
Verify only one LHSI pump is capable of injecting into the RCS.	SR 3.4.12.1	SR 3.4.12.1
Verify a maximum of one charging pump is capable of injecting into the RCS.	SR 3.4.12.2	SR 3.4.12.2
Verify each accumulator is isolated.	SR 3.4.12.3	SR 3.4.12.3
Verify each RHR suction Valve is open for each Relief Valve	SR 3.4.12.4	----
Verify required RCS vent [2.07] square inches open	SR 3.4.12.5	SR 3.4.12.4
Verify PORV block valve is open for each required PORV.	SR 3.4.12.6	SR 3.4.12.5
Verify Nitrogen pressure	----	SR 3.4.12.6
Verify RHR Suction Isolation Valve is Locked Open for Required RHR Suction Relief Valve.	SR 3.4.12.7	----
COT on PORV	SR 3.4.12.8	SR 3.4.12.7
Channel Calibration	SR 3.4.12.9	SR 3.4.12.8
Operational Leakage		
Verify RCS operational Leakage	SR 3.4.13.1	SR 3.4.13.1
Verify \leq 150 gpd/SG	SR 3.4.13.2	SR 3.4.13.2
RCS PIVs		
Verify leakage from each is \leq 0.5 gpm	SR 3.4.14.1	SR 3.4.14.1
Verify RHR Autoclosure Interlock Prevents Opening	SR 3.4.14.2	---
Verify RHR Autoclosure Interlock Auto Close	SR 3.4.14.3	---
RCS Leakage Detection Instrumentation		
Perform Channel Check	SR 3.4.15.1	SR 3.4.15.1
Perform COT	SR 3.4.15.2	SR 3.4.15.2
Channel Calibration Sump Monitor	SR 3.4.15.3	SR 3.4.15.3
Channel Calibration containment atmosphere radioactivity monitor.	SR 3.4.15.4	SR 3.4.15.4
Channel Calibration containment air cooler.	SR 3.4.15.5	----

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
RCS Specific Activity		
Verify RCS gross specific activity	SR 3.4.16.1	----
Verify reactor coolant Dose Equivalent 1-131	SR 3.4.16.2	SR 3.4.16.2
Determine E Bar	SR 3.4.16.3	----
Verify Xe-133	----	SR 3.4.16.1
RCS Loop Isolation Valves		
Verify power remove from Isolation valve	SR 3.4.17.1	SR 3.4.17.2
RCS Loops Test Exceptions		
Verify power < P-7	SR 3.4.19.1	SR 3.4.19-1
Accumulators		
Verify Accumulator isolation valve open	SR 3.5.1.1	SR 3.5.1.1
Verify borated Water Volume	SR 3.5.1.2	SR 3.5.1.2
Verify N ² Pressure	SR 3.5.1.3	SR 3.5.1.3
Verify Boron Concentration	SR 3.5.1.4	SR 3.5.1.4
Verify Power removed from isolation valve	SR 3.5.1.5	SR 3.5.1.5
ECCS – Operating		
Verify Valve Lineup	SR 3.5.2.1.1	SR 3.5.2.1
Verify Manual Valve Position	SR 3.5.2.1.2	SR 3.5.2.2
Verify Piping Sufficiently Full	SR 3.5.2.1.3	SR 3.5.2.3
Verify Automatic Valve Position	SR 3.5.2.1.5	SR 3.5.2.5
Verify Pump Start	SR 3.5.2.1.6	SR 3.5.2.6
Verify Throttle Valve Position	SR 3.5.2.1.7	SR 3.5.2.7
Inspection Sump Components	SR 3.5.2.1.8	SR 3.5.2.8
RWST		
Verify Water Temperature	SR 3.5.4.1	SR 3.5.4.1
Verify Water Volume	SR 3.5.4.2	SR 3.5.4.2
Verify Boron Concentration	SR 3.5.4.3	SR 3.5.4.3
Seal Injection Flow		
Verify throttle Valve Position	SR 3.5.5.1	SR 3.5.5.1
BIT		
Verify Water Temperature	SR 3.5.6.1	SR 3.5.6.1
Verify Water Volume	SR 3.5.6.2	SR 3.5.6.2
Verify Water Boron Concentration	SR 3.5.6.3	SR 3.5.6.3
Containment Air Locks		
Verify Interlock Operation	SR 3.6.2.2	SR 3.6.2.2
Containment Isolation Valves		
Verify Purge Valves Sealed Closed	SR 3.6.3.1	----
Verify Purge Valves Closed	SR 3.6.3.2	----
Verify Valves Outside Containment in Correct Position	SR 3.6.3.3	SR 3.6.3.1
Verify Isolation Time of Valves	SR 3.6.3.5	----
Cycle Weight Loaded Check Valves	SR 3.6.3.6	----

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
Perform Leak Rate Test of Purge Valves	SR 3.6.3.7	Event Driven
Verify Automatic Valves in Correct Position	SR 3.6.3.8	SR 3.6.3.5
Cycle Non Testable Weight Loaded Check Valves	SR 3.6.3.9	SR 3.6.3.6
Verify Purge Valves Blocked	SR 3.6.3.10	-----
Containment Pressure		
Verify Pressure	SR 3.6B.4.1	SR 3.6.4.1
Containment Air Temperature		
Verify Average Air Temperature	SR 3.6B.5.1	SR 3.6.5.1
Spray Systems		
Verify Valve Position	SR3.6.6D.1	SR 3.6.6.1
Verify Valve Actuation	SR 3.6.6D.3	SR 3.6.6.3
Verify Pump Start on Auto Signal	SR 3.6.6D.4	SR 3.6.6.4
Verify Nozzle are not Obstructed	SR 3.6.6D.5	Event Driven
Recirculation Spray		
Verify Casing Cooling Temperature	SR 3.6.6E.1	SR 3.6.7.1
Verifying Casing Cooling Volume	SR 3.6.6E.2	SR 3.6.7.2
Verify Casing Cooling Boron Concentration	SR 3.6.6E.3	SR 3.6.7.3
Verify Valve Position	SR 3.6.6E.4	SR 3.6.7.4
Verify Actuation of Pumps and Valves	SR 3.6.6E.6	SR 3.6.7.6
Verify Nozzle are not Obstructed	SR 3.6.6E.7	Event Driven
Inspect Sump Components	-----	SR 3.6.7.7
Spray Additive System		
Verify Valve position	SR 3.6.7.1	SR 3.6.8.1
Verify Tank Volume	SR 3.6.7.2	SR 3.6.8.2
Verify Tank Solution Concentration	SR 3.6.7.3	SR 3.6.8.3
Actuate Each Flow Path Valve	SR 3.6.7.4	SR 3.6.8.4
Spray Additive Flow Rate	SR 3.6.7.5	SR 3.6.6.5
Iodine Cleanup System		
Operate train with heaters	SR 3.6.11.1	Note 1
Verify train Actuation	SR 3.6.11.3	Note 1
Verify Filter Bypass Operation	SR 3.6.11.4	Note 1
Main Steam Isolation Valves		
Actuate Valves	SR 3.7.2.2	SR 3.7.2.2
MFIVs and MFRVs		
Actuate Valves	SR 3.7.3.2	SR 3.7.3.2
Atmospheric Dump Valves –		
Cycle Dump Valves	SR 3.7.4.1	SR 3.7.4.1
Cycle Block Valves	SR 3.7.4.2	SR 3.7.4.2
AFW		
Verify Valve Position	SR 3.7.5.1	SR 3.7.5.1
Verify Auto Valve Actuation	SR 3.7.5.3	SR 3.7.5.3

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
Verify Pump Auto Actuation	SR 3.7.5.4	SR 3.7.5.4
Emergency Condensate Storage		
Verify Volume	SR 3.7.6.1	SR 3.7.6.1
Component Cooling		
Verify Valve Position	SR 3.7.7.1	SR 3.7.19.1
Verify Valve Actuation	SR 3.7.7.2	----
Verify Pump Actuation	SR 3.7.7.3	----
Service Water		
Verify Valve Position	SR 3.7.8.1	SR 3.7.8.1
Verify Valve Actuation	SR 3.7.8.2	SR 3.7.8.2
Verify Pump Actuation	SR 3.7.8.3	SR 3.7.8.3
Ultimate Heat Sink		
Verify Water Level	SR 3.7.9.1	SR 3.7.9.1
Verify Water Temperature	SR 3.7.9.2	SR 3.7.9.2
Operate Cooling Tower	SR 3.7.9.3	----
Verify Fan Actuation	SR 3.7.9.4	----
CR Emergency Ventilation		
Operate Heaters	SR 3.7.10.1	SR 3.7.10.1
Verify Train Actuation	SR 3.7.10.3	----
Verify Envelope Pressurization	SR 3.7.10.4	----
CR Air Condition System		
Verify Train Capacity	SR 3.7.11.1	SR 3.7.11.1
ECCS PREACS		
Operate Heaters	SR 3.7.12.1	SR 3.7.12.1
Verify Manual Train Actuation	---	SR 3.7.12.2
Verify Automatic Train Actuation	SR 3.12.3	SR 3.7.12.4
Verify Envelope Negative Pressure	SR 3.12.4	SR 3.7.12.5
Verify Bypass Damper Closure	SR 3.12.5	----
Fuel Building Air Cleanup		
Operate Heaters	SR 3.7.13.1	----
Verify Automatic Train Actuation	SR 3.7.13.3	----
Verify Envelope Negative Pressure	SR 3.7.13.4	SR 3.7.15.1
Verify Bypass Damper Closure	SR 3.7.13.5	----
Penetration Room Air Cleanup System –		
Operate Heaters	SR 3.7.14.1	Note 1
Verify Automatic Train Actuation	SR 3.7.14.3	Note 1
Verify Envelope Pressurization	SR 3.7.14.4	Note 1
Verify Bypass Damper Closure	SR 3.7.14.5	Note 1
Fuel Storage Pool Water Level		
Verify Water Level	SR 3.7.15.1	SR 3.7.16.1
Fuel Storage Pool Boron		

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
Verify Boron Concentration	SR 3.7.16.1	SR 3.7.17.1
Secondary Specific Activity		
Verify Secondary Activity	SR 3.7.18.1	SR 3.7.7.1
AC Sources –Operating		
Verify Breaker Alignment Offsite Circuits	SR 3.8.1.1	SR 3.8.1.1
Verify EDG Starts - Achieves Voltage & Frequency	SR 3.8.1.2	SR 3.8.1.2
Synchronize and Load for > 60 minutes	SR 3.8.1.3	SR 3.8.1.3
Verify Day Tank Level	SR 3.8.1.4	SR 3.8.1.4
Remove Accumulate Water for Day Tank	SR 3.8.1.5	SR 3.8.1.5
Verify Operation of Transfer Pump	SR 3.8.1.6	SR 3.8.1.6
Verify EDG Starts - Achieves Voltage & Frequency in 10 seconds	SR 3.8.1.7	SR 3.8.1.7
Verify Manual Transfer of AC power Sources – Offsite Sources	SR 3.8.1.8	SR 3.8.1.8
Verify Largest Load Rejection	SR 3.8.1.9	SR 3.8.1.9
Verify EDG Does Not Trip with Load Rejection	SR 3.8.1.10	----
Verify De-energize, Load Shed and Re energize Emergency Bus	SR 3.8.1.11	SR 3.8.1.10
Verify EDG Start on ESF Signal	SR 3.8.1.12	SR 3.8.1.11
Verify EDG Noncritical Trips	SR 3.8.1.13	SR 3.8.1.12
Run EDG for 24 Hours	SR 3.8.1.14	SR 3.8.13
Verify EDG Starts - Achieves Voltage & Frequency	SR 3.8.1.15	SR 3.8.14
Verify EDG Synchronizes with offsite power and transfers load	SR 3.8.1.16	SR 3.8.15
Verify Test Mode is Overrode on ESF Signal	SR 3.8.1.17	----
Verify Load Sequencers are with Design Tolerance	SR 3.8.1.18	SR 3.8.16
Verify EDG Start on Loss of Offsite Power	SR 3.8.1.19	SR 3.8.17
Verify when started Simultaneously each EDGs reach rated Voltage and Frequency	SR 3.8.1.20	SR 3.8.18
Diesel FO and Starting Air		
Verify FO Storage Tank Volume	SR 3.8.3.1	SR 3.8.3.1
Verify Lube Oil Inventory	SR 3.8.3.2	----
Verify EDG Start Air Receive Pressure	SR 3.8.3.4	SR 3.8.3.3
Check and Remove Accumulate Water from FO Tanks	SR 3.8.3.5	SR 3.8.3.4
DC Sources Operating		
Verify Battery Terminal Voltage	SR 3.8.4.1	SR 3.8.4.1
Verify Station Battery Chargers Capable of Supplying [x]Amp for [y]Hours	SR 3.8.4.2	SR 3.8.4.6
Perform Battery Service Test	SR 3.8.4.3	SR 3.8.4.8
Verify no Visible Corrosion on Station and EDG Batteries	----	SR 3.8.4.2
Verify no Damage or Abnormal Deterioration of Station and EDG Batteries	----	SR 3.8.4.3
Clean and Coat Station and EDG Battery Terminals		SR 3.8.4.4
Verify Station and EDG Battery Connection Resistance		SR 3.8.4.5
Verify EDG Battery Chargers Capable of Supplying [x]Amp for [y]Hours	----	SR 3.8.4.7

Technical Specification Section Title/Surveillance Description*	TSTF 425	NAPS
Battery Parameters		
Verify each Battery Float Current is \leq [2] amps.	SR 3.8.6.1	SR 3.8.6.1
Verify each Battery Pilot Cell Voltage is \geq [2.07] V	SR 3.8.6.2	SR 3.8.6.2
Verify each Battery Cell Electrolyte Level is \geq to Minimum Design Limits.	SR 3.8.6.3	SR 3.8.6.2
Verify each Battery Pilot Cell Temperature \geq to Minimum Design Limits.	SR 3.8.6.4	SR 3.8.6.3
Verify Each Battery Connected Cell Voltage is \geq [2.07] V.	SR 3.8.6.5	SR 3.8.6.2
Verify Station and EDG Battery Capacity - >80% after Performance Test	SR 3.8.6.6	SR 3.8.4.9
Inverters - Operating		
Verify Correct Inverter Voltage & Alignment to Required AC Vital Buses.	SR 3.8.7.1	SR 3.8.7.1
Inverters - Shutdown		
Verify Correct Inverter Voltage & Alignment to Required AC Vital Buses.	SR 3.8.8.1	SR 3.8.8.1
Distribution System - Operating		
Verify Correct Breaker Alignments and Voltage to AC, DC, and AC Vital Bus Electrical Power Distribution Subsystems.	SR 3.8.9.1	SR 3.8.9.1
Distribution System - Shutdown		
Verify Correct Breaker Alignments and Voltage to AC, DC, and AC Vital Bus Electrical Power Distribution Subsystems.	SR 3.8.10.1	SR 3.8.10.1
Boron Concentration		
Verify Boron Concentration is Within the Limit Specified in COLR	SR 3.9.1.1	SR 3.9.1.1
Primary Grade Water Source Isolation Valves		
Verify Each Valve that Isolates Unborated Water Sources is Secured in the Closed Position	SR 3.9.2.1	Event
Nuclear Instrumentation		
Perform Channel Check	SR 3.9.3.1	SR 3.9.3.1
Perform Channel Calibration	SR 3.9.3.2	SR 3.9.3.2
Containment Penetrations		
Verify each Required Containment Penetration is in the Required Status.	SR 3.9.4.1	SR 3.9.4.1
Verify Each Required Containment Purge and Exhaust Valve Actuates to the Isolation Position on an Actuated or Simulated Actuation Signal.	SR 3.9.4.2	SR 3.9.4.2
RHR and Coolant Circulation - High Water Level		
Verify One Loop is in Operation and Circulating Reactor Coolant at a Flow Rate of > [2800] gpm.	SR 3.9.5.1	SR 3.9.5.1
RHR and Coolant Circulation - Low Water Level		
Verify One Loop is in Operation and Circulating Reactor Coolant at a flow rate of > [2800] gpm.	SR 3.9.6.1	SR 3.9.6.1
Verify Correct Breaker Alignment and Indicated Power Available to the Required RHR Pump that is Not in Operation.	SR 3.9.6.2	SR 3.9.6.2
Refueling Cavity Water Level		
Verify Refueling Cavity Water Level is \geq 23 ft Above The Top of Reactor Vessel Flange.	SR 3.9.7.1	SR 3.9.7.1

Note 1 – This system is not included in the North Anna design or TS.

ATTACHMENT 6

PROPOSED NO SIGNIFICANT HAZARDS CONSIDERATION

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA UNITS 1 AND 2**

PROPOSED NO SIGNIFICANT HAZARDS CONSIDERATION

Description of Amendment Request:

This amendment request involves the adoption of approved changes to the standard technical specifications (STS) for Westinghouse Pressurized Water Reactors (NUREG-1431), to allow relocation of specific TS surveillance frequencies to a licensee-controlled program. The proposed changes are described in Technical Specification Task Force (TSTF) Traveler, TSTF-425, Revision 3 (ADAMS Accession No. ML090850642) related to the Relocation of Surveillance Frequencies to Licensee Control - RITSTF Initiative 5b and are described in the Notice of Availability published in the Federal Register on July 6, 2009 (74 FR 31996).

The proposed changes are consistent with NRC-approved Industry/TSTF Traveler, TSTF-425, Revision 3, "Relocate Surveillance Frequencies to Licensee Control-RITSTF Initiative 5b." The proposed changes relocate surveillance frequencies to a licensee-controlled program, the Surveillance Frequency Control Program (SFCP). The changes are applicable to licensees using probabilistic risk guidelines contained in NRC-approved NEI 04-10, "Risk-Informed Technical Specifications Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies," (ADAMS Accession No. 071360456).

Basis for proposed no significant hazards consideration: As required by 10 CFR 50.91 (a), the Dominion analysis of the issue of no significant hazards consideration is presented below:

1. Do the proposed changes involve a significant increase in the probability or consequences of any accident previously evaluated?

Response: No.

The proposed changes relocate the specified frequencies for periodic surveillance requirements to licensee control under a new Surveillance Frequency Control Program. Surveillance frequencies are not an initiator to any accident previously evaluated. As a result, the probability of any accident previously evaluated is not significantly increased. The systems and components required by the technical specifications for which the surveillance frequencies are relocated are still required to be operable, meet the acceptance criteria for the surveillance requirements, and be capable of performing any mitigation function assumed in the accident analysis. As a result, the consequences of any accident previously evaluated are not significantly increased.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Do the proposed changes create the possibility of a new or different kind of accident from any previously evaluated?

Response: No.

No new or different accidents result from utilizing the proposed changes. The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. In addition, the changes do not impose any new or different requirements. The changes do not alter assumptions made in the safety analysis. The proposed changes are consistent with the safety analysis assumptions and current plant operating practice.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Do the proposed changes involve a significant reduction in the margin of safety?

Response: No.

The design, operation, testing methods, and acceptance criteria for systems, structures, and components (SSCs), specified in applicable codes and standards (or alternatives approved for use by the NRC) will continue to be met as described in the plant licensing basis (including the final safety analysis report and bases to TS), since these are not affected by changes to the surveillance frequencies. Similarly, there is no impact to safety analysis acceptance criteria as described in the plant licensing basis. To evaluate a change in the relocated surveillance frequency, Dominion will perform a probabilistic risk evaluation using the guidance contained in NRC approved NEI 04-10, Rev. 1 in accordance with the TS SFCP. NEI 04-10, Rev. 1, methodology provides reasonable acceptance guidelines and methods for evaluating the risk increase of proposed changes to surveillance frequencies consistent with Regulatory Guide 1.177.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based upon the reasoning presented above, Dominion concludes that the requested changes do not involve a significant hazards consideration as set forth in 10 CFR 50.92(c), Issuance of Amendment.