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10 CFR 50.90

RS-07-005

January 8, 2007

U. S. Nuclear Regulatory Commission
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Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and 50-457

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. 50-454 and 50-455

Subject: Application for License Amendment: Implementation of WCAP-14333 and WCAP-15376, Reactor Trip System Instrumentation and Engineered Safety Feature Actuation System Instrumentation Test Times, Completion Times and Surveillance Test Intervals

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) hereby requests an amendment to Appendix A, Technical Specifications (TS) of Facility Operating License Nos. NPF-72, NPF-77, NPF 37, and NPF-66 for Braidwood Station, Units 1 and 2, and Byron Station, Units 1 and 2, respectively.

The proposed amendment would revise the TS requirements for selected Reactor Trip System (RTS) instrumentation, Engineered Safety Feature Actuation System (ESFAS) instrumentation, and Containment Ventilation Isolation instrumentation to adopt Completion Time, test bypass time, and Surveillance Test Interval changes. These changes are based on Westinghouse Electric Company LLC topical reports WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," and WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times."

These proposed changes are consistent with the NRC-approved Technical Specification Task Force (TSTF) Travelers TSTF-411, Revision 1, "Surveillance Test Interval Extension for Components of the Reactor Protection System (WCAP-15376-P)" and TSTF-418, Revision 2, "RPS and ESFAS Test Times and Completion Times (WCAP-14333)," except as noted in Attachment 1.

This request is subdivided as follows:

Attachment 1 provides an evaluation of the proposed changes.

Attachments 2A and 2B contain the marked-up TS pages with the proposed changes indicated for Braidwood Station and Byron Station, respectively.

Attachments 3A and 3B contain retyped TS pages with the proposed changes incorporated for Braidwood Station and Byron Station, respectively.

Attachments 4A and 4B provide a retyped copy of the affected TS Bases pages for Braidwood Station and Byron Station, respectively. These pages are provided for information only.

Attachment 5 provides a summary of regulatory commitments.

Attachment 6 provides a proprietary version of the Applicability Determination for WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1.

Attachment 7 provides an affidavit for withholding signed by Westinghouse Electric Company, LLC, the owner of proprietary information provided in Attachment 6.

Attachment 8 provides a non-proprietary version of the Applicability Determinations.

The proposed changes have been reviewed by the Plant Operations Review Committees at each of the stations and approved by the respective Nuclear Safety Review Boards in accordance with the requirements of the EGC Quality Assurance Program.

Attachment 6 contains information proprietary to Westinghouse Electric Company LLC. Therefore, EGC requests that this information be withheld from public disclosure in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," paragraph (b)(4), and 10 CFR 9.17, "Agency records exempt from public disclosure," paragraph (a)(4). Attachment 7 provides an affidavit that sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses with specificity the considerations listed in 10 CFR 2.390, paragraph (b)(4). Attachment 8 provides a non-proprietary version of the document.

EGC requests approval of the proposed amendments by January 8, 2008. Once approved, the amendments shall be implemented within 120 days. This implementation period will provide adequate time for the affected station documents to be revised using the appropriate change control mechanisms.

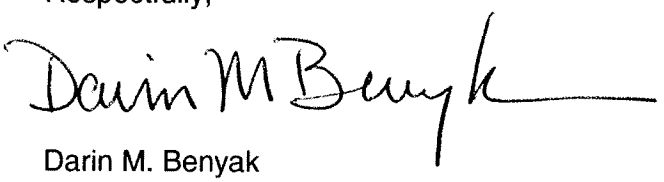
EGC has also evaluated and discussed with the NRC Project Manager, the potential benefits of a pre-application meeting with the NRC. Based upon these discussions, EGC is submitting this LAR without a pre-application meeting. However, EGC is prepared to expeditiously respond and resolve any questions from the NRC concerning the LAR.

In accordance with 10 CFR 50.91(b), EGC is notifying the State of Illinois of this application for changes to the TS by transmitting a copy of this letter and its attachments to the designated State Official.

If you have any questions or require additional information, please contact Mr. John L. Schrage at (630) 657-2821.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 8th day of January 2007.

Respectfully,



Darin M. Benyak
Manager - Licensing

Attachments:

Attachment 1	Evaluation of Proposed Changes
Attachment 2A	Braidwood Station Marked-Up Technical Specification Pages
Attachment 2B	Byron Station Marked-Up Technical Specification Pages
Attachment 3A	Braidwood Station Retyped Technical Specification Pages
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Attachment 5	Summary of Regulatory Commitments
Attachment 6	WCAP-14333 and WCAP-15376 Applicability Determination (Proprietary)
Attachment 7	Westinghouse Electric Company LLC Application for Withholding and Affidavit
Attachment 8	WCAP-14333 and WCAP-15376 Applicability Determination (Non-Proprietary)

cc: Regional Administrator - Region III, NRC
NRC Senior Resident Inspector - Braidwood Station
NRC Senior Resident Inspector - Byron Station

ATTACHMENT 1
Evaluation of Proposed Changes

ATTACHMENT 1
Evaluation of Proposed Changes

1.0 DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) hereby requests an amendment to Appendix A, Technical Specifications (TS) of Facility Operating License Nos. NPF-72, NPF-77, NPF 37, and NPF-66 for Braidwood Station, Units 1 and 2, and Byron Station Units 1 and 2, respectively.

The proposed amendment revises the TS requirements for selected Reactor Trip System (RTS) instrumentation, Engineered Safety Feature Actuation System (ESFAS) instrumentation, and Containment Ventilation Isolation instrumentation to adopt Completion Time (CT), test bypass time, and Surveillance Test Interval (STI) changes. These changes have been approved by the NRC in Topical Reports WCAP-14333-P-A, "Probabilistic Risk Analysis of the RPS [Reactor Protection System] and ESFAS Test Times and Completion Times," Revision 1 (hereafter referred to as WCAP-14333), dated October 1998 (Reference 1), and WCAP-15376-P-A, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," Revision 1 (hereafter referred to as WCAP-15376), dated March 2003 (Reference 2).

The proposed changes will:

- Increase the CTs for several Required Actions in TS 3.3.1, "RTS Instrumentation," and TS 3.3.2, "ESFAS Instrumentation;"
- Increase the bypass test times allowed by several Required Actions' Notes in TSs 3.3.1 and 3.3.2; and
- Increase STIs in several Surveillance Requirements (SRs) in TSs 3.3.1, 3.3.2, and 3.3.6, "Containment Ventilation Isolation Instrumentation."

These proposed changes are consistent with the NRC-approved Technical Specification Task Force (TSTF) Travelers TSTF-411, Revision 1, "Surveillance Test Interval Extension for Components of the Reactor Protection System (WCAP-15376-P)," (Reference 3) and TSTF-418, Revision 2, "RPS and ESFAS Test Times and Completion Times (WCAP-14333)" (Reference 4), except as described in Section 4.6, "Deviations from Approved TSTF 411 Revision 1 and TSTF 418 Revision 2."

The proposed relaxations will allow additional time to perform maintenance and test activities, enhance safety, provide additional operational flexibility, and reduce the potential for forced outages related to compliance with the current RTS and ESFAS instrumentation TSs. Industry information has shown that a significant number of trips that have occurred are related to instrumentation test and maintenance activities, indicating that these activities should be completed with caution, and sufficient time should be available to complete these activities in an orderly and effective manner.

2.0 BACKGROUND

Since 1983, NRC and industry representatives (i.e., the Westinghouse Owners Group [WOG]) have worked to develop guidelines for improving the content and quality of nuclear power plant TSs. In August 1983, an NRC task group was formed to investigate problems with surveillance testing that is required by TSs, and to recommend approaches to make improvements. This effort resulted in NUREG-1024, "Technical Specifications – Enhancing Safety Impact," which provided recommendations to: 1) review the basis for test frequencies; 2) ensure that the tests promote safety and do not degrade equipment; and 3) review surveillance tests so that they do not unnecessarily burden personnel.

In December 1984, the Technical Specifications Improvement Project (TSIP) was established to provide a framework for rewriting and improving the Standard Technical Specifications (STS). The results of the TSIP were documented in NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements." The TSIP study concluded that, while some testing at power is essential, safety can be improved, equipment degradation decreased, and unnecessary personnel burden prevented by reducing the amount of testing performed at power.

In February 1983, the WOG submitted Topical Report WCAP-10271-P, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection System," (hereafter referred to as WCAP-10271), which provided a methodology to be used to justify revisions to a plant's TS. The WOG Technical Specification Optimization Program (TOP) evaluated changes to surveillance test intervals and allowed outage times for the analog channels, logic cabinets, master and slave relays, and reactor trip breakers. The methodology evaluated increasing surveillance intervals, increases in test and maintenance out-of-service times and bypassing portions of the RPS during test and maintenance. The WOG stated in WCAP-10271 that plant staff devote significant time and effort to perform, review, document, and track surveillance activities that, in many instances, may not be required on the basis of the high reliability of the equipment. The justification for the changes was the small impact that the changes would have on plant risk.

In WCAP-10271, the WOG performed fault tree analyses to calculate the reactor trip unavailability considering surveillance intervals and test and maintenance times. The sensitivity to variations in surveillance intervals and test and maintenance times was also evaluated with respect to maintaining or revising current surveillance intervals. The WOG concluded that the results of the analyses for the RPS were adequate to justify a revision of the STS. The NRC approved WCAP-10271-P by safety evaluation report (SE), with provisions, dated February 21, 1985. The TSs approved in WCAP-10271 were incorporated into the STS in NUREG-1431, "Standard Technical Specifications, Westinghouse Plants," Revision 0, dated September 1992. The NRC SE for WCAP-10271 approved the following changes for plant-specific TS:

1. Increase the STIs for RTS analog channel operational tests from once per month to once per quarter;
2. Increase the time in which an inoperable RTS analog channel may be maintained in an untripped condition from 1 hour to 6 hours;

3. Increase the time an inoperable RTS analog channel may be bypassed to allow testing of another channel in the same function from 2 hours to 4 hours. Also, the channel test may be done in the bypass mode leaving the inoperable channel in tripped condition; and

4. Allow testing of the RTS analog channels in a bypass condition instead of a tripped condition.

The NRC approved the implementation of these changes at Braidwood Station Units 1 and 2 in License Amendment 44 (Reference 5) and at Byron Station Units 1 and 2 in License Amendment 55 (Reference 6), with the exception of item 4 (i.e., allowance to test the RTS analog channels in a bypass condition instead of a tripped condition). Braidwood Station and Byron Station are not equipped with installed bypass test capability. When reviewing risk metric results, the current licensing basis for both Braidwood Station and Byron Station is that of a "TOP" plant.

Subsequent to the NRC-approval of WCAP-10271, the WOG submitted WCAP-14333, Revision 0 for NRC review, including draft TSs, based on NUREG-1431, Revision 1. WCAP-14333 proposed further relaxation of the TS changes approved by WCAP-10271 with the following proposed changes to plant TSs:

1. Increase the bypass times and the CTs for both the solid state and relay protection system RPS and ESFAS designs: (i) for the analog channels the CT increased from 6 hours to 72 hours, and the bypass time from 4 hours to 12 hours, and (ii) for the logic cabinets, master and slave relay CTs were increased from 6 hours to 24 hours.

2. Revise the action statement for an inoperable slave relay to increase the CT for maintenance to 24 hours, with an additional 6 hours for the mode change.

3. For cases where the logic cabinets and the trip breakers both cause their train to be inoperable when in test or maintenance, allow the reactor trip breakers to be bypassed for the period of time equivalent to the bypass time for the logic cabinets, provided that both are tested at the same time and provided the plant design is such that both the reactor trip breaker and the logic cabinet cause their associated electrical trains (i.e., buses) to be inoperable during test or maintenance.

The WCAP-14333 report indicated that the proposed TS changes resulted in a small increase in core damage frequency, with a maximum increase from pre-TOP values of approximately 3.1% from internal events. The increase in core damage frequency from TOP values, for the same logic configuration, was 1.0%.

On July 15, 1998, the NRC issued an SE approving WCAP-14333 for reference in license applications, subject to the condition that licensees confirm the applicability of the WCAP to their plant, and that licensees address RG 1.177, Tier 2 and Tier 3 analyses, including the incorporation of applicable Configuration Risk Management Program (CRMP) insights.

Southern Nuclear Operating Company submitted a License Amendment Request (LAR) on October 13, 1999, for Vogtle Units 1 and 2 to adopt the relaxations that were generically approved in WCAP-14333. As a result of the NRC review of this application,

incremental conditional large early release probability (ICLERP) values were developed generically for all WOG plants. The NRC approved the WCAP-14333 changes for Vogtle Station Units 1 and 2 in License Amendments 116 and 94, respectively.

By letter dated November 8, 2000, the WOG transmitted WCAP-15376, Revision 0 to the NRC for review and approval. WCAP-15376 expanded upon the groundwork laid by WCAP-14333, but used updated component failure probability data and revised the fault tree models, as discussed in WCAP-15376, Section 8.3. With these modifications, the changes previously approved in WCAP-14333 were quantified as the base case for WCAP-15376. Section 8.4 of WCAP-15376 provides the risk metrics for this change and demonstrates that the acceptance criteria of Regulatory Guide (RG) 1.174 and RG 1.177 are satisfied. By letter dated December 20, 2002, the NRC issued an SE approving WCAP-15376 for reference in license applications, subject to stated conditions.

The approach used in WCAP-14333 and WCAP-15376 is consistent with the approach established in the TOP program. This includes the fault tree models, signals, component reliability database, and most of the test and maintenance assumptions. The methodology used in the WCAP-10271 studies was applied to a representative set of RTS and ESFAS functions using the Vogtle probabilistic risk assessment (PRA) model and revised unavailability data. The work documented in WCAP-14333 uses a different common cause failure modeling approach for analog channels and includes more realistic assumptions related to the component unavailability due to maintenance activities based on a survey of WOG plants. Operator actions to either manually trip the reactor or initiate safety injection are also modeled in WCAP-14333. In addition, WCAP-14333 credited the start of the auxiliary feedwater pump from the anticipated transient without scram (ATWS) mitigating system actuation circuitry (AMSAC).

The AMSAC is included in the Braidwood Station and Byron Station Maintenance Rule Program as a non-risk significant system with an assigned reliability criterion. The AMSAC is calibrated every 18 months.

The relaxations that are justified in WCAP-14333 are summarized below:

TABLE 1
Summary of WCAP-14333 RTS and ESFAS Completion Time and Bypass Test Time Changes for the Solid State Protection System

Component	Completion Time	Bypass Test Time
Analog Channels	6 + 6 hours to 72 + 6 hours	4 hours to 12 hours
Logic Train	6 + 6 hours to 24 + 6 hours	No relaxation*
Actuation relays	6 + 6 hours to 24 + 6 hours	No relaxation*

*No relaxation beyond TOP (WCAP-10271 and its supplements)

ATTACHMENT 1
Evaluation of Proposed Changes

WCAP-15376 provides the technical justification for the following RTS Instrumentation (TS 3.3.1) and ESFAS Instrumentation (TS 3.3.2) TS changes:

TABLE 2
Summary of WCAP-15376 RTS and ESFAS STI and CT Changes for the Solid State Protection System

Component	Surveillance Test Intervals	Completion Times and Bypass Times
Logic Train	2 months to 6 months	No changes
Master Relays	2 months to 6 months	No changes
Analog Channels	3 months to 6 months	No changes
Reactor Trip Breakers	2 months to 4 months	AOT: 1 hour to 24 hours; Bypass Time: 2 hours to 4 hours

3.0 PROPOSED CHANGES

The following categories of changes are proposed for Technical Specifications 3.3.1, 3.3.2, and 3.3.6:

a) The allowed Completion Time to restore an inoperable RTS or ESFAS analog channel, before it must be placed in the tripped condition, or bypassed condition for Containment Pressure High - 3, is increased from 6 hours to 72 hours;

b) The allowed time for an inoperable RTS or ESFAS analog channel to be bypassed for testing other analog channels is increased from 4 to 12 hours;

c) The allowed Completion Time to restore an inoperable train of Solid State Protection System (SSPS) logic (TS 3.3.1 and TS 3.3.2) or actuation relays (TS 3.3.2), before the plant must be shut down, is increased from 6 hours to 24 hours;

d) The allowed time for one reactor trip breaker (RTB) train to be bypassed for RTB surveillance testing is increased from 2 hours to 4 hours;

e) The allowed Completion Time to restore an inoperable RTB train, before the plant must be shut down, is increased from 1 hour to 24 hours;

f) The surveillance test interval for the RTB Trip Actuating Device Operational Test (TADOT) in TS 3.3.1 is increased from 31 days on a STAGGERED TEST BASIS to 62 days on a STAGGERED TEST BASIS;

g) The surveillance test interval for the SSPS Actuation Logic Test and Master Relay Test in TS 3.3.1, 3.3.2, and 3.3.6 is increased from 31 days on a STAGGERED TEST BASIS to 92 days on a STAGGERED TEST BASIS;

h) The Channel Operational Test (COT) surveillance test interval in TS 3.3.1 and TS 3.3.2 is increased from 92 days to 184 days;

Technical Specification mark-ups for the above changes are provided in Attachments 2A and 2B for Braidwood Station, Units 1 and 2 and Byron Station, Units 1 and 2, respectively. Retyped TS pages are provided in Attachments 3A and 3B. The specific changes proposed in Attachments 2A/2B and 3A/3B are the following:

1. Revise the bypass testing Note and extend Completion Times for TS 3.3.1 Condition D for the following function:

   Power Range Neutron Flux - High {RTS Function 2.a}.

2. Revise the current bypass testing Note and extend the Completion Times for TS 3.3.1 Required Actions E.1 and E.2 for the following functions:

   - *Power Range Neutron Flux - Low {RTS Function 2.b};*
   - *Power Range Neutron Flux - [High Positive Rate {RTS Function 3}];*
   - *Overtemperature ΔT {RTS Function 6};*
   - *Overpower ΔT {RTS Function 7};*
   - *Pressurizer Pressure -High {RTS Function 8.b};*
   - *Steam Generator Water Level Low-Low {RTS Functions 14.a and 14.b}.*

3. Revise the current bypass testing Note and extend the Completion Times for TS 3.3.1 Required Actions K.1 and K.2 for the following functions:

   - *Pressurizer Pressure - Low {RTS Function 8.a};*
   - *Pressurizer Water Level - High {RTS Function 9};*
   - *Reactor Coolant Flow - Low {RTS Function 10};*
   - *Undervoltage RCPs {RTS Function 12};*
   - *Underfrequency RCPs {RTS Function 13}.*

4. Revise the current bypass testing Note and extend the Completion Times for TS 3.3.1 Required Actions L.1 and L.2 for the following functions:

   - *Turbine Trip - Emergency Trip Header Pressure {RTS Function 15.a};*
   - *Turbine Trip – Turbine Throttle Valve Closure {RTS Function 15.b}.*

5. Extend the Completion Times for TS 3.3.1 Required Actions M.1 and M.2 for the following functions:

   - *Safety Injection (SI) Input from ESFAS {RTS Function 16}*
   - *Automatic Trip Logic {RTS Function 20}.*

6. Add a new Condition R to retain the Required Actions and Completion Times of current TS 3.3.1, Condition K and revise the Condition description to describe the RTS function name for the following function:

   Reactor Coolant Pump (RCP) Breaker Position (per train) {RTS Function 11}.

7. Revise the current bypass testing Note 1, delete bypass Note 2, and extend the Completion Times for TS 3.3.1, Condition N Required Actions N.1 and N.2 for the following function:

   Reactor Trip Breakers (RTB) {RTS Function 18}.

8. Extend SR 3.3.1.4, Trip Actuating Device Operational Test (TADOT) STI, for the RTB.

9. Extend SR 3.3.1.5, SSPS ACTUATION LOGIC TEST STI, for the RTS Instrumentation.

10. Extend SR 3.3.1.7 and SR 3.3.1.8 COT STI, for the RTS Instrumentation.

11. Revise Table 3.3.1-1 to reflect new Condition R (i.e., change number 6 above).

12. Extend the Completion Times for TS 3.3.2 Required Actions C.1, C.2.1, and C.2.2 for the following functions:

    - *Automatic Actuation Logic and Actuation Relays (SSPS) for:*
      - *Safety Injection {ESFAS Function 1.b};*
      - *Containment Spray {ESFAS Function 2.b};*
      - *Containment Isolation - Phase A Isolation {ESFAS Function 3.a.(2)};*
      - *Containment Isolation - Phase B Isolation {ESFAS Function 3.b.(2)};*
      - *Switchover to Containment Sump {ESFAS Function 7.a};*

13. Revise the current bypass testing Note and extend the Completion Times for TS 3.3.2 Required Actions D.1, D.2.1, and D.2.2 for the following functions:

    - *Safety Injection on:*
      - *Containment Pressure - High 1 {ESFAS Function 1.c};*
      - *Pressurizer Pressure - Low {ESFAS Function 1.d};*
      - *Steam Line Pressure - Low {ESFAS Function 1.e};*
    - *Steam Line Isolation on:*
      - *Containment Pressure - High 2 {ESFAS Function 4.c};*
      - *Steam Line Pressure - Low {ESFAS Function 4.d.(1)};*
      - *Steam Line Pressure Negative Rate - High {ESFAS Function 4.d.(2)};*
    - *Turbine Trip and Feedwater Isolation, Steam Generator (SG) Water Level – High High {ESFAS Functions [5.b.(1) and 5.b.(2)};*
    - *Auxiliary Feedwater Initiation on SG Water Level – Low Low {ESFAS Functions 6.b.(1) and 6.b.(2)}.*

14. Revise the current bypass testing Note and extend the Completion Times for TS 3.3.2 Required Actions E.1, E.2.1, and E.2.2 for the following functions:

    - *Containment Spray Initiation on Containment Pressure - High 3 {ESFAS Function 2.c};*
    - *Containment Isolation - Phase B Isolation on Containment Pressure - High 3 {ESFAS Function 3.b.(3)}.*

15. Extend the Completion Times for TS 3.3.2 Required Actions G.1, G.2.1, and G.2.2 for the following functions:

    - *Automatic Actuation Logic and Actuation Relays (SSPS) for:*
        - *Steam Line Isolation {ESFAS Function 4.b};*
        - *Turbine Trip and Feedwater Isolation {ESFAS Function 5.a};*
        - *Auxiliary Feedwater {ESFAS Function 6.a};*

16. Revise the current bypass testing Note and extend the Completion Times for TS 3.3.2 Required Actions I.1 and I.2 for the following function:

    Auxiliary Feedwater Initiation on Undervoltage Reactor Coolant Pump, {ESFAS Function 6.e}.

17. Revise the current bypass testing Note and extended the Completion Times for TS 3.3.2 Required Actions K.1, K.2.1 and K.2.2 for the following function:

    Switchover to Containment Sump, Refueling Water Storage Tank Level (RWST) Level – Low {RTS Function 7.b}.

18. Extend the SR 3.3.2.4 and SR 3.3.2.5 SSPS, "Actuation Logic Test," and Master Relay Test," STIs for the ESFAS Instrumentation.

19. Extend the SR 3.3.2.6 COT STI for the ESFAS Instrumentation.

20. Renumber SR 3.3.2.6 and 3.3.2.7 to maintain consistency with NUREG-1431 STS convention for numbering of SRs.

21. Extend the SR 3.3.6.2 and SR 3.3.6.3 SSPS, "Actuation Logic Test," and Master Relay Test," STIs for the Containment Ventilation Instrumentation and add clarifying notes.

The corresponding TS Bases are also revised to be consistent with the above changes and provided in Attachments 4A and 4B.

4.0 TECHNICAL ANALYSIS

WCAP-14333 provides the justification for increasing the bypass times for testing and the CTs in the RTS and ESFAS instrumentation TS. The proposed changes adopt the NRC-approved changes in TSTF-418, Rev. 2, "RPS and ESFAS Test Times and Completion Times (WCAP-14333)," hereafter referred to as TSTF-418.

WCAP-15376 provides the justification for increasing the Allowed Outage Time (AOT)/CT and the bypass test time for the reactor trip breakers, and increasing the STIs

for the RTBs, master relays, logic cabinets, and analog channels. The proposed changes adopt the NRC-approved TSTF-411, Rev. 1, "Surveillance Test Interval Extension for Components of the Reactor Protection System," hereafter referred to as TSTF-411.

The CT is defined as part of the limiting condition for operation (LCO) in the improved STSs. The AOT is a general reference to time to accomplish a TS Required Action. To have more specific meaning, AOT can refer to additional time for repair, bypass, shutdown, etc. A CT has a broader meaning than an AOT, by also defining the time for other required actions such as equipment status or plant mode changes. The CT is intended to allow sufficient time to repair failed equipment while minimizing the risk associated with the loss of the component function. An extension of the CT increases the unavailability of a component due to the increased time the component is down for maintenance. The CT risk is reflected in the core damage frequency (CDF) and the large early release frequency (LERF) by adjusting the component unavailability due to maintenance. The proposed CT extensions for the RTB will provide additional time to complete test and maintenance activities while at power, potentially reducing the number of forced outages related to compliance with reactor trip breaker CTs, and provide consistency with the CTs for the logic cabinets. For CTs, the designated CTs may not provide adequate time for repair, but longer CTs may incur a relatively larger risk. Note that the STS replaced the term AOT with CT, which has a broader meaning than AOT by also defining the time for other required actions such as equipment status or plant mode changes.

By contrast, STIs are intervals for surveillance tests scheduled periodically, as required by the TS. Such tests are performed to ensure that safety-related equipment continues to be operable and failures are detectable, thereby limiting the fault exposure time. The primary risk contribution attributed to increasing an STI comes from the increased probability of a component failure between scheduled STIs and, therefore, the probability that the component will be inoperable during the surveillance interval. The extension of an STI affects the yearly risk, which is represented by the CDF and LERF. An STI extension can affect the yearly risk in several ways:

- Reduce the risk by decreasing the number of test-caused reactor trips by limiting the opportunity for test-caused errors. This occurs simply because increasing the STI decreases the amount of testing for a given time.
- Reduce the risk by decreasing the unavailability of the RPS components by reducing the test frequency.
- Increase the risk by increasing the fault exposure time as described above. This is attributable to the fact that the increased STI increases the interval during which the equipment is subject to failure during standby. As the fault exposure time increases, there is a greater probability that failures during standby will not be detected for RPS components involved with the STI extension.

For an STI, the idea is to strike a balance between more frequent testing (which can adversely impact safety either through errors during testing, spurious actuations, misconfiguration, or equipment wearout) and extended intervals (which can increase fault exposure times). The designated CTs may not provide adequate time for repair, but longer CTs may incur a relatively larger risk. A risk-informed approach to CTs and

STIs, in conjunction with engineering evaluations, can provide insights that allow CTs and STIs to be optimized without significantly increasing plant risk.

In order to model the CTs in the fault trees to determine the impact of the changes on signal unavailabilities, several parameters were specified for component test and maintenance unavailabilities. These are the test frequencies and durations discussed in Section 5.1 of WCAP-14333, the maintenance frequencies and durations discussed in Section 5.2 of WCAP-14333, and the test and maintenance activities discussed in Section 7.2 of WCAP-15376.

Both WCAP-14333 and WCAP-15376 use probabilistic risk assessment to justify plant-specific changes to the TSs in accordance with RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Current Licensing Bases," dated July 1998, and RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," dated August 1998. In these documents, and in the NRC SEs that approved these documents, there are references to Tier 1, Tier 2, and Tier 3 analyses.

A Tier 1 analysis uses PRA for the plant to assess the impact of the proposed change on the CDF, incremental conditional core damage probability (ICCDP), LERF, and ICLERP.

A Tier 2 analysis considers potential risk-significant plant operating conditions and addresses the need to preclude potentially risk-significant plant equipment outage configurations should additional equipment outages occur during the required action CT period of time.

A Tier 3 analysis addresses the plant-specific Configuration Risk Management Program (CRMP), including the risk-informed assessment for outages and the Structures, Systems, and Components (SSCs) that are controlled by the program. An acceptable program is one that, during normal plant operations, ensures the risk impact of out-of-service equipment is evaluated prior to performing maintenance and uncovers risk-significant plant equipment outage configurations in a timely manner. Tier 3 confirms that CRMP insights will be incorporated into the station's decision-making process before taking equipment out of service prior to or during the required action CT period of time.

Tier 1 is addressed in the NRC review of, and the SE approval of the two WCAPs. Tiers 2 and 3 are addressed in the plant specific applications of the WCAPs.

4.1 Tier 1, WCAP-14333 and WCAP-15376 Risk Insights

4.1.1 WCAP-14333 Risk Insights

WCAP-14333 originally provided only the impact of the requested changes on core damage frequency (ΔCDF) for two-out-of-four (2/4) and two-out-of-three (2/3) actuation logic. In response to an NRC request for additional information (RAI) associated with the review of WCAP-14333, the WOG submitted letter OG-96-110 (Reference 7). The response to NRC RAI questions 11 and 13 in Reference 7 provided the impact of the requested changes on ICCDP for various components in maintenance and the change in LERF (ΔLERF) for 2/4 and 2/3 actuation logic. Also, in response to an NRC RAI during the review of Southern Nuclear's amendment request implementing these changes for

Vogtle Units 1 and 2, Southern Nuclear provided ICLERPs for various components while in maintenance.

The impact of the proposed changes on CDF and LERF are provided in TSTF-418, Table 1.3, which presents the same information as that contained in Table 8.4 of WCAP-14333, TSTF-418, Table 1.4, and in the response to RAI Question 13 in Reference 7. The CDF and LERF values are provided for pre-TOP, TOP, and the WCAP-14333 proposed changes. The ΔCDF and ΔLERF values are also provided referenced to pre-TOP and TOP conditions. The results of a sensitivity analysis are also provided. The results of the sensitivity analysis credit a 0.5/year reduction in reactor trip frequency due to fewer analog channel tests (i.e., the trip reduction originally postulated for the WCAP-10271 channel operational test interval increase from monthly to quarterly). The ΔCDF and ΔLERF values are provided for both 2/4 and 2/3 logic. The ICCDP and ICLERP values are provided on Table 1.5 of TSTF-418. The ICCDP and ICLERP values are only provided for 2/3 logic, but the results envelop the 2/4 logic.

4.1.2 WCAP-15376 Risk Insights

Risk analysis results for WCAP-15376 are discussed in Section 8.4 of that topical report. Comparisons are presented in Tables 8.29 (i.e., ΔCDF) and 8.32 (i.e., ΔLERF) to a base case, which represents the changes previously approved under WCAP-14333. In response to an NRC RAI associated with the review of WCAP-15376, the WOG submitted letter OG-02-002 (Reference 8), which provided the impact of the requested CT (i.e., 24 hour CT plus 6 hours to reach MODE 3, for a total of 30 hours) on ICCDP and ICLERP for an RTB in preventive maintenance (PM), or in corrective maintenance (CM), with the associated logic train inoperable, for the bounding 2/3 logic. Since these incremental risk metrics are met for a 30-hour maintenance time, they will also be met for a 4-hour bypass test time.

4.1.3 WCAP-14333 and WCAP-15376 Combined Risk Metric Results

4.1.3.1 ICCDP and ICLERP

The WCAP-14333 values for ICCDP and ICLERP are situational in nature, depending on the particular component under test or maintenance. As indicated in Table 3 below, the WCAP-14333 values for ICCDP for various cases of equipment in test or maintenance range from 4.4E-07 to 5.5E-10, relative to the acceptance criteria of <5.0E-07/year. Similarly, the values for ICLERP range from 3.0E-08/year to 1.1E-11/year, relative to the acceptance criterion of <5.0E-08/year. Therefore, the RG 1.177 acceptance criteria for these incremental risk metrics are satisfied for the changes proposed in WCAP-14333.

4.1.3.2 ΔCDF and ΔLERF

The ΔCDF and ΔLERF values for implementation of the proposed changes described in WCAP-15376 are cumulative from the current licensing basis for Braidwood Station, Units 1 and 2 and Byron Station, Units 1 and 2 (i.e., WCAP-10271).

Based upon the cumulative ΔLERF values in Table 3 for the change from WCAP-10271 to WCAP-15376 (i.e., including the ΔLERF associated with WCAP-14333), the RG 1.174 acceptance criterion is satisfied (i.e., a cumulative ΔLERF

of 5.1E-08 for 2/4 logic (i.e., 2.0E-08 plus 3.1E-08) and 7.9E-08/year for 2/3 logic (i.e., 2.2E-08 plus 5.7E-08), relative to the acceptance criterion of <1.0E-07/year).

With respect to ΔCDF, the cumulative values for 2/4 logic and 2/3 logic are slightly higher than the RG 1.174 acceptance criterion (i.e., a cumulative ΔCDF of 1.2E-06/year for 2/4 logic and 1.5E-06/year for 2/3 logic, relative to the acceptance criterion of <1.0E-06/year).

To address this issue, Section 8.4.4 of WCAP-15376 provides an analysis that discusses the cumulative ΔCDF from pre-TOP to WCAP-15376 conditions, using the sensitivity analysis values from Table 8.4 of WCAP-14333 for 2/4 logic and 2/3 logic, combined with the ΔCDF values from Table 8.29 of WCAP-15376 for 2/4 and 2/3 logic. The results of this analysis are provided in Table 8.33 of WCAP-15376. Table 8.33 indicates that the cumulative ΔCDF, for the 2/4 logic, from the pre-TOP condition to the WCAP-15376 condition is 5.7E-07/year, which is within the ΔCDF acceptance criterion of <1.0E-06/year.

WCAP-15376, Table 8.33 also indicates that the cumulative ΔCDF value, for the 2/3 logic, from the pre-TOP condition to the WCAP-15376 condition in is 1.1E-06/year. This value slightly exceeds the ΔCDF acceptance criterion. However, as indicated above, the ΔCDF value of 1.1E-06/year includes the cumulative impact of changing from the pre-TOP to WCAP-15376 conditions. Pre-TOP conditions are delineated in Table 1.1 of WCAP-15376. Since both Braidwood Station, Units 1 and 2 and Byron Station, Units 1 and 2 are only changing from TOP to WCAP-15376 conditions, the impact of the proposed STI and CT conditions will result in less of a ΔCDF than the change from pre-TOP to WCAP-15376 values, thus satisfying the RG 1.174 acceptance criterion. In addition, the avoided shutdown risk associated with the extended CTs that is discussed in Section 8.4 of WCAP-14333 and Section 8.7 of WCAP-15376 provides additional justification for the acceptability of the ΔCDF value.

TABLE 3
Combined Risk Metric Results

Risk Metric	RG 1.174/1.177 Acceptance Criterion	Change from WCAP-10271 to WCAP-14333		Change from WCAP-14333 to WCAP-15376	
ΔCDF	< 1.0 E-06	2/4 Logic 3.5 E-07	2/3 Logic 6.1 E-07	2/4 Logic 8.0 E-07	2/3 Logic 8.5 E-07
ICCDP	< 5.0 E-07	Ranges from 4.4 E-07 (logic train in maintenance) to 5.5 E-10 (SG level channel in test)		RTB in PM: 3.2 E-07 RTB in CM: 3.2 E-07	
ΔLERF	< 1.0 E-07	2/4 Logic 2.0 E-08	2/3 Logic 2.2 E-08	2/4 Logic 3.1 E-08	2/3 Logic 5.7 E-08
ICLERP	< 5.0 E-08	Ranges from 3.0 E-08 (logic train in maintenance) to 1.1 E-11 (SG level channel in test)		RTB in PM: 2.4 E-08 RTB in CM: 2.4 E-08	

4.2 Tier 2, Avoidance of Risk Significant Plant Configurations

Tier 2 requires an examination of the need to impose additional restrictions when operating under the proposed Completion Times in order to avoid risk-significant equipment outage configurations. Not surprisingly, the resulting Tier 2 restrictions to be imposed for the two topical reports are very similar.

4.2.1 WCAP-14333 Tier 2 Restrictions

Consistent with the guidance in Regulatory Position C.2.3 in RG 1.177, Westinghouse performed an evaluation of equipment according to its contribution to plant risk while the equipment covered by the proposed Completion Time changes is out of service for test or maintenance. This evaluation was documented in the response to RAI Question 18 in Westinghouse letter OG-96-110 (Reference 7). Westinghouse performed an importance analysis for 25 top events in the event trees for each of the test or maintenance configurations associated with the proposed TS changes. This analysis determined the system importances for plant configurations with no ongoing test and maintenance activities (i.e., all components available) and for plant configurations with ongoing test or maintenance activities individually on the analog channels, logic trains, master relays, and slave relays. With test or maintenance activities in progress, the analysis assumed that the corresponding component or train will be unavailable. The system importances for these configurations are provided in Table Q18.1 of Reference 7. The importances were compared between the cases with individual components unavailable and all

components available. For the cases of the analog channels, master relays, and slave relays, the importance rankings among the affected systems did not change. For the case of an SSPS logic train in maintenance, several systems had a relatively significant increase in their importance ranking. Those systems were auxiliary feedwater (AFW), reactor trip, high pressure injection, low pressure injection, and containment cooling.

In addition, as discussed in Section 4.1.1 above, the response to RAI Question 11 in Reference 7 documented ICCDP values for the various test and maintenance configurations that the plant may enter for the subject Completion Time extensions. This information is provided in Table Q11.1 of Reference 7. The same conclusion is drawn from the information presented in Table Q 11.1, i.e., the only configuration that significantly impacts core damage frequency is that with a logic train inoperable.

Based on the information provided in Tables Q11.1 and Table Q18.1 from Reference 7, the only plant configuration with an appreciable impact on CDF or a significant impact on the relative importance of other systems is the configuration with one logic train inoperable. Therefore, the Tier 2 limitations are appropriate only when a logic train is inoperable. There are no Tier 2 limitations when a slave relay, master relay, or analog channel is inoperable.

Consistent with the WCAP-14333 SE requirement to include Tier 2 insights into the decision-making process before taking equipment out of service, restrictions on concurrent removal of certain equipment when a logic train is inoperable for maintenance will be established. These restrictions do not apply when a logic train is being tested under the 4-hour bypass Note of TS 3.3.1 Condition M, TS 3.3.2 Condition C, or TS 3.3.2 Condition G. Entry into these Conditions is not a typical, pre-planned evolution during power operation, other than for surveillance testing.

Since these Conditions are typically entered due to equipment failure, it follows that some of the following Tier 2 restrictions may not be met at the time of Condition entry. If this situation were to occur during the extended 24-hour Completion Time, the Tier 3 CRMP discussed below will assess the emergent condition and direct activities to restore the inoperable logic train and exit the Condition or fully implement the Tier 2 restrictions or perform a plant shutdown, as appropriate from a risk management perspective. EGC will establish administrative controls at Braidwood Station and Byron Station to implement the following restrictions during the mode of applicability for the specified equipment. The establishment of these administrative controls are considered commitments, are noted as such, and are summarized in Attachment 5:

1. To preserve ATWS mitigation capability, activities that degrade the availability of the AFW system, AMSAC, or turbine trip should not be scheduled when a logic train is inoperable for maintenance. **[Regulatory Commitment]**

2. To preserve Loss of Coolant Accident (LOCA) mitigation capability, one complete Emergency Core Cooling System (ECCS) train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance. **[Regulatory Commitment]**

3. To preserve reactor trip and safeguards actuation capability, activities that cause RTS and ESFAS master relays or slave relays in the available train

to be unavailable and activities that cause RTS and ESFAS channels to be unavailable should not be scheduled when a logic train is inoperable for maintenance, with the exception of ESFAS Function 2.c, "Containment Spray, Containment Pressure High-3," and ESFAS Function 3.b.(3), "Containment Isolation, Phase B Isolation, Containment Pressure High-3." TS 3.3.2, Condition E requires that both of these functions be placed in bypass when inoperable. **[Regulatory Commitment]**

4. Activities that result in the inoperability of electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the AFW system, AMSAC, turbine trip, one complete train of ECCS, and the available reactor trip and ESFAS actuation functions should not be scheduled when a logic train is inoperable for maintenance. That is, one complete train of a function that supports a complete train of a function noted above must be available. **[Regulatory Commitment]**

Note that the containment cooling system was shown to have a relatively significant increase in importance ranking in Table Q18.1 when a logic train is inoperable. However, in the Braidwood Station and Byron Station PRA models, containment cooling has a negligible impact on core damage frequency. Therefore, increasing the availability of the containment cooling system will not offset or counter the inoperable logic train and no Tier 2 limitations are appropriate for this system.

4.2.2 WCAP-15376 Tier 2 Restrictions

Recommended Tier 2 restrictions for WCAP-15376 are provided in Section 8.5 of that topical report when a RTB train is inoperable for maintenance. These restrictions do not apply when a RTB train is being tested under the 4-hour bypass Note for proposed TS 3.3.1 Condition N. Entry into this Condition is not a typical, pre-planned evolution during power operation, other than for surveillance testing.

Since this Condition is typically entered due to equipment failure, it follows that some of the following Tier 2 restrictions may not be met at the time of Condition entry. If this situation were to occur during the extended 24-hour Completion Time, the Tier 3 CRMP discussed below will assess the emergent condition and direct activities to restore the inoperable RTB train and exit the Condition or fully implement the Tier 2 restrictions or perform a plant shutdown, as appropriate from a risk management perspective. EGC will establish administrative controls at Braidwood and Byron Stations to implement the following restrictions. These administrative controls are considered commitments, are noted as such, and are summarized in Attachment 5.

1. The probability of failing to trip the reactor on demand will increase when a RTB train is removed from service, therefore, systems designed for mitigating an ATWS event should be maintained available. Therefore, activities that degrade the availability of the auxiliary feedwater system, AMSAC, or turbine trip should not be scheduled when an RTB train is inoperable for maintenance. **[Regulatory Commitment]**

2. Due to the increased dependence on the available reactor trip train when one logic train or one RTB train is inoperable for maintenance, activities

that cause RTS and ESFAS master relays or slave relays in the available train to be unavailable, and activities that cause RTS and ESFAS channels to be unavailable, should not be scheduled when an RTB train is inoperable for maintenance, with the exception of ESFAS Function 2.c, "Containment Spray, Containment Pressure High-3," and ESFAS Function 3.b.(3), "Containment Isolation, Phase B Isolation, Containment Pressure High-3." TS 3.3.2, Condition E requires that both of these functions be placed in bypass when inoperable. **[Regulatory Commitment]**

3. Activities that result in the inoperability of electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the AFW system, AMSAC, turbine trip, one complete train of ECCS, and the available reactor trip and ESFAS actuation functions should not be scheduled when an RTB train is inoperable for maintenance. That is, one complete train of a function that supports a complete train of a function noted above must be available. **[Regulatory Commitment]**

4.3 Tier 3, Risk-Informed Configuration Risk Management

Tier 3 requires a proceduralized process to assess the risk associated with both planned and unplanned work activities. The objective of the third tier is to ensure that the risk impact of out-of-service equipment is evaluated prior to performing any maintenance activity. As stated in Section 2.3 of RG 1.177, "a viable program would be one that is able to uncover risk-significant plant equipment outage configurations in a timely manner during normal plant operation." The third-tier requirement is an extension of the second-tier requirement, but addresses the limitation of not being able to identify all possible risk-significant plant configurations in the Tier 2 evaluation.

EGC has developed and implemented a CRMP at Braidwood Station and Byron Station. The CRMP is governed by station procedures that ensure the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity. This program requires an integrated review to uncover risk-significant plant equipment outage configurations in a timely manner both during the work management process and for emergent conditions during normal plant operation. Appropriate consideration is given to equipment unavailability, operational activities like testing or load dispatching, and weather conditions. Byron and Braidwood Stations currently have the capability to perform a configuration dependent assessment of the overall impact on risk of proposed plant configurations prior to, and during, the performance of maintenance activities that remove equipment from service. Risk is re-assessed if an equipment failure/malfunction or emergent condition produces a plant configuration that has not been previously assessed.

For planned maintenance activities, an assessment of the overall risk of the activity on plant safety, including benefits to system reliability and performance, is currently performed prior to scheduled work. The assessment includes the following considerations.

- Maintenance activities that affect redundant and diverse SSCs that provide backup for the same function are minimized.
- The potential for planned activities to cause a plant transient are reviewed and work on SSCs that would be required to mitigate the transient are avoided.
- Work is not scheduled that is highly likely to exceed a TS or Technical Requirements Manual (TRM) Completion Time requiring a plant shutdown. For activities that are expected to exceed 50% of a TS Completion Time, compensatory measures and contingency plans are considered to minimize SSC unavailability and maximize SSC reliability.
- For Maintenance Rule high risk significant SSCs, the impact of the planned activity on the unavailability performance criteria is evaluated.
- As a final check, a quantitative risk assessment is performed to ensure that the activity does not pose any unacceptable risk. This evaluation is performed using the impact on both CDF and LERF. The results of the risk assessment are classified by a color code based on the increased risk of the activity as shown in Table 4.

TABLE 4
Risk Assessment Classification Scheme

Color	Meaning	Plant Impact and Required Action
Green	Non-risk significant	Small impact on plant risk. Requires no specific actions.
Yellow	Non-risk significant with non-quantitative factors applied	Impact on plant risk. Limit unavailability time or take compensatory actions to reduce plant risk.
Orange	Potentially risk-significant	Significant impact on plant risk. Requires senior management review and approval prior to entering this condition. Requires compensatory measures to reduce risk including contingency plans. All entries will be of short duration.
Red	Risk-significant	Not entered voluntarily. If this condition occurs, immediate and significant actions taken to alleviate the problem.

Emergent work is reviewed by shift operations to ensure that the work does not invalidate the assumptions made during the work management process. EGC's PRA risk management procedure has been implemented at Byron and Braidwood Stations. This procedure defines the requirements for ensuring that the PRA model used to

evaluate on-line maintenance activities is an accurate model of the current plant design and operational characteristics. Plant modifications and procedure changes are monitored, assessed, and dispositioned. Evaluation of changes in plant configuration or PRA model features are dispositioned by implementing PRA model changes or by the qualitative assessment of the impact of the change on the PRA assessment tool. Changes that have potential risk impact are recorded in an update requirements evaluations (URE) log for consideration in the next periodic PRA model update.

Maintenance Rule Program

The reliability and availability of the RTS and ESFAS instrumentation is monitored under the Maintenance Rule Program. If the pre-established reliability or availability performance criteria is exceeded for an instrumentation component, that component is considered for 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," paragraph (a)(1) actions, requiring increased management attention and goal setting in order to restore performance (i.e., reliability and availability) to an acceptable level. The performance criteria are risk-based and, therefore, are a means to manage the overall risk profile of the plant. An accumulation of large core damage probabilities over time is precluded by the performance criteria.

Plant modifications and procedure changes are monitored, assessed and dispositioned. Evaluation of changes in plant configuration or PRA model features are dispositioned by implementing PRA model changes or by qualitatively assessing the impact of the changes on the CRMP assessment tool. Procedures exist for the control and application of CRMP assessment tools, and include a description of the process when the plant configuration of concern is outside the scope of the CRMP assessment tool.

Change Control

The CRMP is referenced and maintained as an administrative program in the Braidwood Station and Byron Station Technical Requirements Manual (TRM). Changes to the TRM are subject to the requirements of 10 CFR 50.59, "Changes, Tests, and Experiments." The goals of a CRMP are to ensure that risk-significant plant configurations will not be inadvertently entered for planned maintenance activities, and appropriate actions will be taken should unforeseen events place the plant in a risk-significant configuration during the maintenance activity.

4.4 NRC SE Conditions, WCAP-14333 and WCAP-15376

4.4.1 NRC SE Conditions, WCAP-14333

WCAP-14333 provides justification for (1) an increase in the bypass times for testing and the CTs for both the SSPS and relay protection for RPS and ESFAS instrumentation, and (2) a revised action statement for an inoperable slave relay. Section 4.0 of the NRC SE that approved WCAP-14333 specified the following conditions and limitations of the applicability of the WCAP on a plant-specific basis:

1. Confirm the applicability of WCAP-14333 analyses to the plant.
2. Address the Tier 2 and Tier 3 analyses:

a. Confirm that the necessary restrictions will be placed on concurrent equipment outages in order to avoid risk significant configurations, and

b. Describe the provisions of the plant's CRMP consistent with the guidance of draft RG 1065 (DG-1065) for assessing risk associated with various planned and unplanned work activities.

4.4.2 NRC SE Conditions, WCAP-15376

WCAP-15376 provides justification for an increase in the (1) bypass times for testing and CTs for RTBs, and (2) STIs for components of the RPS. Section 5.0 of the NRC SE that approved WCAP-15376 specified the following conditions and limitations on the applicability of the WCAP on a plant-specific basis:

1. Confirm the applicability of the WCAP-15376 analysis, including component failure probabilities, to each plant, and perform a plant-specific assessment of containment failures and address any design or performance differences that may affect the proposed changes.

2. Address the Tier 2 and Tier 3 analyses, including risk significant configuration insights, and confirm that these insights are incorporated into the plant-specific CRMP.

3. Evaluate the risk impact of concurrent testing of one logic cabinet and associated RTB on a plant-specific basis to ensure conformance with WCAP-15376, RG 1.174, and RG 1.177, and confirm the applicability to the plant-specific configuration.

4. To ensure consistency with the reference plant, confirm the applicability of the model assumptions for human reliability in WCAP-15376 to the plant-specific configuration.

5. For future digital upgrades with increased scope, integration and architectural differences beyond that of Eagle 21, the NRC staff finds that generic applicability of WCAP-15376 to future digital systems not clear and should be considered on a plant specific basis.

In addition to these five NRC SE conditions, the WOG provided a response to an NRC RAI question (i.e., RAI Question 18) in letter OG-01-058 (Reference 9), indicating that licensees requesting plant-specific application of the WCAP would review the plant-specific setpoint calculation methodology and assumptions to determine the impact of extending the STI of the COT from 92 to 184 days.

4.4.3 WCAP-14333 and WCAP-15376 SE Condition 1, Confirmation of Topical Report Applicability

As guidance to address NRC SE Condition 1 for both WCAPs, Westinghouse issued implementation guidelines for licensees to confirm that the WCAP analyses are applicable to a specific plant. A licensee is expected to confirm the applicability of the topical report to their plant, including component failure probabilities, and to perform a plant-specific assessment of containment failures and address any design or performance differences that may affect the proposed changes. This condition is

addressed below in three parts. The first part confirms the applicability of the topical reports, the second part addresses the applicability of component failure probabilities, and the third part addresses the containment failure issue.

1. Applicability of the WCAP-14333 and WCAP-15376 Analyses

   To demonstrate the applicability of the WCAP-14333 and WCAP-15376 analyses for Braidwood Station, Units 1 and 2 and Byron Station, Units 1 and 2, a comparison between the key generic analysis parameters and assumptions, and plant specific parameters and design is provided in Attachment 6. Tables 1 through 4 in Attachment 6 provide a list of the key analysis parameters and assumptions along with the plant specific parameters and design.

   The information in Tables 1 through 4 is related to plant specific signals that are available to actuate reactor trip and engineered safety features, and test and maintenance information for the components of the reactor protection system. Information is also provided in Tables 1 and 2 on the current calculated CDF, LERF, and the contribution to CDF from ATWS events for both Braidwood Station and Byron Station. The current plant CDF and LERF values are used to show that these values meet the RG 1.174 criteria for determining that small increases in CDF and LERF are acceptable. The ATWS contribution to CDF is necessary to understand the importance of the ATWS event to the plant's risk, since the proposed changes can impact reactor trip signal availability.

2. Applicability of the Component Failure Probabilities

   In addition to the information provided in Tables 1 through 4 in Attachment 6, the WCAP-15376 Implementation Guideline also requires the confirmation that component failure probabilities developed as part of WCAP-15376 are applicable to Braidwood Station and Byron Station. For SSPS plants (i.e., Braidwood Station and Byron Station), this includes the master relay and safeguards driver card failure probabilities. The failure probabilities used in the WCAP-15376 analysis for these components are provided on Table 8.6 of WCAP-15376. The data that was used to develop these failure rates for SPSS plants is provided on Tables 8.2 and 8.3 of WCAP-15376. The WCAP-15376 Implementation Guideline also states that the plants that provided component failure data in support of the WCAP analysis (i.e., as identified in Tables 8.2 and 8.3 of WCAP-15376), can use this information to address this Condition. As indicated in Tables 8.2 and 8.3 of WCAP-15376, failure data for SSPS Master Relays and SSPS Safeguards Driver Cards from both Braidwood Station and Byron Station was provided, and utilized to calculate the overall component failure probability inputs into the WCAP-15376 analysis. In addition, EGC has evaluated subsequent failure data (i.e., since the provision of the failure data for WCAP-15376) for SSPS Master Relays and SSPS Safeguards Driver Cards from both Braidwood Station and Byron Station. This data indicates no Loss of System Function (LOSF) failures at Braidwood Station and Byron Station since November 1996

and January 1999, respectively. This further validates the confirmation that component failure probabilities developed as part of WCAP-15376 are applicable to Braidwood Station and Byron Station.

3. Containment Failure Assessment

For the Braidwood Station and Byron Station containments, the WCAP-15376 Implementation Guideline indicated that containment failure modes typically considered in PRA include containment isolation failure, containment bypasses from Inter-System LOCA (ISLOCA), Steam Generator Tube Rupture (SGTR), and Steam Generator (SG) tube creep rupture; and containment failure from steam explosion, hydrogen burns, direct containment heating, and containment steam overpressurization. The significant contributors to LERF for large dry containment and subatmospheric designs are typically containment isolation failure and containment bypasses. For ice condensers, additional failure modes, such as direct containment heating and hydrogen burns, need to be considered. The LERF analysis completed to support this program was based on a large dry containment with LERF contributions from containment isolation failure, and containment bypasses from ISLOCA and SGTR events, excluding SG tube creep rupture. Most large dry and subatmospheric containment plants should be consistent with the LERF analysis; therefore, the WCAP results should be applicable to these plants. Note that SG tube creep rupture is generally a small contributor to LERF. Therefore, the signal unavailability changes will only have a small impact on LERF related to this contributor.

Plants that that have not addressed their PRA peer review findings with respect to containment issues may not be consistent with this LERF analysis. For these plants, the PRA peer review findings related to LERF contributors should be considered when demonstrating consistency with the LERF analysis and the applicability of WCAP-15376.

The Braidwood and Byron PRA LERF model is consistent with the description and attributes of the LERF model used for WCAP-15376. An EGC review of the Braidwood and Byron PRA peer review findings indicates that there were no A or B Fact & Observations associated with the LERF model.

4.4.4 WCAP-14333 and WCAP-15376 SE Condition 2

NRC SE Condition 2 for both topical reports is addressed in the Tier 2 and Tier 3 discussions provided above in Sections 4.2 and 4.3.

4.4.5 WCAP-15376 SE Condition 3

With respect to the risk impact of concurrent testing of one logic cabinet and associated RTB (i.e., as required by WCAP-15376 SE Condition 3), the response to NRC RAI Question 4 in Reference 8 provided the ICCDP for concurrent testing of one logic cabinet and associated RTB for a total time of 30 hours. The 30 hours is comprised of a Completion Time of 24 hours plus 6 hours to reach Mode 3.

The ICCDP for 30 hours of unavailability for this configuration is 3.2E-07. This value meets the RG 1.177 acceptance criterion of less than 5E-07. Since this ICCDP value is based on the logic train and reactor trip breaker being out of service for 30 hours at the same time, bypassing one logic train and associated RTB train for the proposed 4 hours for testing will also meet the RG 1.177 ICCDP criterion. This analysis is addressed on a plant-specific basis by demonstrating that the WCAP-15376 analysis is applicable to Braidwood Station Units 1 and 2 and Byron Station Units 1 and 2. The applicability of WCAP-15376 to Braidwood Station and Byron Station is discussed in Section 4.4.3 above, and is described in Attachment 6.

4.4.6 WCAP-15376 SE Condition 4

EGC has reviewed the key human reliability assumptions for operator actions in WCAP-15376 and compared them to operator actions at Braidwood Station and Byron Station. Attachment 6, Table 5, "WCAP-15376 Implementation Guidelines: Applicability of the Human Reliability Analysis," describes the results of this EGC review. Table 5 identifies the plant procedures that are in place at Braidwood Station and Byron Station for operator action that results in a success path (i.e., a backup to the automatic function) prior to the action becoming ineffective for event mitigation. Based on these procedures, EGC has determined that the model assumptions for human reliability in WCAP-15376 are applicable to Braidwood Station and Byron Station.

4.4.7 WCAP-15376 SE Condition 5

This condition does not apply to either Braidwood Station or Byron Station at the present time.

4.4.8 WCAP-15376 RAI Question 18 Commitment

In response to RAI Question 18, the WOG indicated that plant-specific RTS and ESFAS setpoint uncertainty calculations and assumptions, including instrument drift, would be reviewed to determine the impact of extending the Surveillance Frequency of the COT from 92 days to 184 days (Reference 9).

The rack drift term used in the current Braidwood Station and Byron Station setpoint study is based on the 92-day interval for COTs. As part of the TOP license amendments that revised the COT STI from monthly to quarterly (References 5 and 6), Commonwealth Edison Company (i.e., the predecessor to EGC) implemented programs at Braidwood Station and Byron Station to evaluate setpoint drift. These programs were consistent with the WOG position documented in the NRC-approved "Westinghouse Owners Group Guidelines for Preparing Submittals Requesting Revision of Reactor Protection System Technical Specifications, Revision 1." As a result of those programs, Commonwealth Edison determined that the values used in the Braidwood Station and Byron Station setpoint studies properly accounted for drift due to extended STIs.

Based upon the results of the drift evaluation programs described above, EGC does not anticipate any impact in extending the STIs from 92 days to 184 days. However, EGC, will trend and evaluate as-found and as-left data for the three representative trip functions analyzed in WCAP-15376 (i.e., OTDT, SG level, and pressurizer pressure) for two years (4 data points) following implementation of the proposed changes. This is identified as a Commitment and is summarized in Attachment 5. **[Regulatory Commitment]**

4.5 Plant-Specific Evaluations for Functions not Evaluated Generically

4.5.1 TS 3.3.2 ESFAS Function 7.b, Refueling Water Storage Tank (RWST) Level - Low Low Coincident with Safety Injection (SI); Condition K,

The Reviewers Note provided in Insert 7 of TSTF-411 Revision 1 and Insert 14 of TSTF-418 Revision 2 states that ESFAS Function 7.b, Refueling Water Storage Tank (RWST) Level - Low Low Coincident with Safety Injection (SI), was not included in the generic analyses approved in WCAP-10271, as supplemented, WCAP-14333, or WCAP-15376. In order to apply the various relaxations justified in WCAP-10271, WCAP-14333, and WCAP-15376 to plant specific functions not evaluated generically, a plant specific evaluation of those functions must be performed.

As stated in Section 11.0 of WCAP-14333 and WCAP-15376, plant-specific evaluations have been completed to demonstrate that the changes in WCAP-10271 and its supplements are applicable to functions not generically evaluated, including ESFAS Function 7.b. The analyses performed in WCAP-14333 and WCAP-15376 were applicable to representative RTS and ESFAS trip functions, which are a subset of the comprehensive set of trip functions included in WCAP-10271 and its supplements. Therefore, the changes approved in WCAP-14333 and WCAP-15376 are also applicable to those plant-specific functions with NRC-approved evaluations performed to apply the changes in WCAP-10271 and its supplements. As recognized in Section 11.0 of both WCAP-14333 and WCAP-15376, as well as in NRC-approved traveler TSTF-418 Revision 2, plants that have performed analyses to demonstrate the applicability of WCAP-10271 to plant-specific functions should not be required to perform additional plant-specific evaluations for these functions.

In Reference 10, Commonwealth Edison (i.e., the predecessor of EGC) submitted a plant-specific evaluation of ESFAS Function 7.b for Braidwood and Byron Stations as part of a license amendment request to implement the changes proposed by WCAP-10271 and its supplements.

The purpose of this plant-specific evaluation was to determine the change in availability when the generic AOT and STI relaxations described in WCAP-10271 were applied to ESFAS function 7.b. The results of the evaluation indicated that the decrease in availability was 12% or less for the automatic function. This corresponds to the lowest values calculated for any functional units in the generic WCAP-10271 program. For ESFAS Function 7.b, as the final switchover is manually initiated, since the Emergency Operating Procedures include steps to verify the automatic function has occurred, the decrease in automatic function availability has no impact upon the ultimate success of the switchover.

The NRC approved the plant specific evaluation for ESFAS Function 7.b in References 5 and 6, for Braidwood Station and Byron Station, respectively (i.e., Item 3.3-3(5) in the NRC SE). The NRC SE stated that the proposed extension of the CT for ESAFS Function 7.b from one hour to six hours is in accordance with the conclusions of the SE approving WCAP-10271, Supplement 2, Revision 1. As such, the proposed changes for ESFAS Function 7.b to implement WCAP-14333 and WCAP-15376 do not require an additional plant-specific evaluation.

Based on the above, the 72-hour maintenance CT for Required Action K.1 and the 12-hour bypass test allowance, both from WCAP-14333 are applied to TS 3.3.2 Condition K. The CT for Required Actions K.2.1 and K.2.2 are extended, consistent with the current CTs. The 184-day COT STI extension from WCAP-15376 is applied to ESFAS Function 7.b.

4.6 Deviations from Approved TSTF 411 Revision 1 and TSTF 418 Revision 2

4.6.1 Retention of Current Requirements associated with lack of Installed Bypass Test Capability

Braidwood and Byron Stations are not equipped with installed bypass test capability for analog channels. The bypass test notes in TSTF-418 specific to this capability have not been incorporated in the applicable proposed sections of the Braidwood and Byron Station TS (i.e., TS 3.3.1 Conditions D, E, K, and L, and TS 3.3.2 Conditions D, E, I, and K).

4.6.2 Retention of Current Requirements for TS 3.3.9, Boron Dilution Protection System

Current TS 3.3.9, "Boron Dilution Protection System," is retained without change. The instrumentation has been modified such that the COT relaxation in WCAP-15376 is no longer applicable to the logic function.

4.6.3 TS 3.3.1 Condition D, One Power Range Neutron Flux-High Channel inoperable

TS 3.3.1 Condition D is structured to retain the Current Licensing Basis for Braidwood Station and Byron Station. This TS configuration was reviewed and approved by the NRC in an SE dated February 13, 2001. This SE approved Amendment 110 for Braidwood Station and Amendment 116 for Byron Station that incorporated Current TS Required Actions D.1 and D.2. NUREG-1431 STS Required Actions D.1.2 and D.2.2 were not incorporated, since these Required Actions were adequately addressed by the Quadrant Power Tilt Ratio (QPTR) TS (i.e., LCO 3.2.4 and SRs 3.2.4.1 and 3.2.4.2). The revised Condition D captures the approved changes (i.e., bypass time of 12 hours, maintenance time before tripping of 72 hours), while retaining the same Required Action for an inoperable Power Range Neutron Flux-High channel.

4.6.4 TS 3.3.1 Condition R, One Reactor Coolant Pump (RCP) Breaker Position channel (per train) inoperable (current TS 3.3.1 Condition K, One Channel Inoperable applicable to RTS Function 11)

The current CTs for RTS Function 11, "Reactor Coolant Pump (RCP) Breaker Position" have been retained in proposed Condition R. This function was not generically evaluated in WCAP-14333, and EGC has not evaluated this function on a plant-specific basis.

The proposed Condition has also been reworded to adopt the terminology of NUREG-1431 STS Condition L, which specifically identifies the Condition as applicable to the Reactor Coolant Pump (RCP) Breaker Position function.

4.6.5 TS 3.3.1 Condition N, One RTB Train inoperable

The changes in TSTF-418 Revision 2 regarding the TS 3.3.1 Condition for RTBs are superseded by the changes in TSTF-411 Revision 1. Insert 6 in TSTF-411 Revision 1, Option 3 indicates that if WCAP-14333 and WCAP-15376 are both implemented, the Condition for RTBs will contain only one Note, with 4-hours to bypass an RTB train for surveillance testing. The proposed TS 3.3.1 Condition N implements this guidance.

4.6.6 TS 3.3.2, ESFAS Function 7.b, Refueling Water Storage Tank (RWST) Level - Low Low Coincident with Safety Injection (SI); Condition K,

The proposed changes to TS 3.3.2 Conditions K associated with ESFAS Function 7.b are based on the plant-specific evaluation discussed in Section 4.5.1 above.

4.6.7 TS 3.3.5, Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

Current TS 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation," for Braidwood and Byron Stations is retained. This function was not generically evaluated in WCAP-14333, and EGC has not evaluated this function on a plant-specific basis.

4.6.8 TS 3.3.7, Control Room Filtration Actuation System Instrumentation

Current TS 3.3.7, "Control Room (VC) Filtration Actuation System Instrumentation," for Braidwood Station and Byron Station does not include SRs for Automatic Actuation Logic and Actuation Relays. The only Solid State Protection System (SSPS) entries in TS Table 3.3.7-1 for actuation logic and master relays are already contained in TS Table 3.3.2-1 for the Safety Injection function (i.e., ESFAS function 1.b, "Automatic Actuation Logic and Actuation Relays," in TS 3.3.2). This TS configuration was reviewed and approved by the NRC in an SE dated December 22, 1998. This SE approved the Braidwood and Byron Station conversion to the Improved TS (ITS) (i.e., Amendments 98 and 106 for Braidwood and Byron Station, respectively). Therefore, the TSTF-418 changes to TS 3.3.7 are not required for Braidwood and Byron Stations.

4.6.9 Retention of Current TS Requirements:

SR 3.3.2.2, "Perform COT," applicable to ESFAS Function 6.f, "Auxiliary Feedwater Pump Suction Transfer on Suction Pressure – Low"

Current SR 3.3.2.2 COT, with an STI of 31 days, applicable to ESFAS Function 6.f, "Auxiliary Feedwater Pump Suction Transfer on Suction Pressure – Low" is retained. This SR was retained in the conversion of the Braidwood and Byron Stations TS to ITS (Amendments 96 and 108, respectively) as a more restrictive site-specific difference.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC, (EGC), requests an amendment to Appendix A, Technical Specifications (TS), of Facility Operating License Nos. NPF-72, NPF-77, NPF 37, and NPF-66 for Braidwood Station, Units 1 and 2, and Byron Station, Units 1 and 2, respectively. The proposed amendment would revise Technical Specification (TS) 3.3.1, "Reactor Trip System (RTS) Instrumentation," TS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," and TS 3.3.6, "Containment Ventilation Isolation Instrumentation," to adopt the Completion Times (CTs), test bypass times, and Surveillance Frequency changes approved by NRC in WCAP-14333-P-A, Revision 1, October 1998 and WCAP-15376-P-A, Revision 1, March 2003. This amendment application is consistent with NRC-approved Technical Specification Task Force (TSTF) Travelers TSTF-411 Revision 1, "Surveillance Test Interval Extensions for Components of the Reactor Protection System (WCAP-15376-P)," and TSTF-418 Revision 2, "RPS and ESFAS Test Times and Completion Times (WCAP-14333)."

According to 10 CFR 50.92(c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or
2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or
3. Involve a significant reduction in a margin of safety.

In support of this determination, an evaluation of each of the three criteria set forth in 10 CFR 50.92 is provided below regarding the proposed license amendment.

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

Overall protection system performance will remain within the bounds of the previously performed accident analyses since no hardware changes are proposed. The same RTS and ESFAS instrumentation will continue to be used. The protection systems will

continue to function in a manner consistent with the plant design basis. These changes to the TS do not result in a condition where the design, material, and construction standards that were applicable prior to the change are altered.

The proposed changes will not modify any system interface. The proposed changes will not affect the probability of any event initiators. There will be no degradation in the performance of or an increase in the number of challenges imposed on safety-related equipment assumed to function during an accident situation. There will be no change to normal plant operating parameters or accident mitigation performance. The proposed changes will not alter any assumptions or change any mitigation actions in the radiological consequence evaluations in the Updated Final Safety Analysis Report.

The determination that the results of the proposed changes are acceptable was established in the NRC Safety Evaluations prepared for WCAP-14333-P-A, (issued by letter dated July 15, 1998) and for WCAP-15376-P-A, (issued by letter dated December 20, 2002). Implementation of the proposed changes will result in an insignificant risk impact. Applicability of these conclusions has been verified through plant-specific reviews and implementation of the generic analysis results in accordance with the respective NRC Safety Evaluation conditions.

The proposed changes to the CTs, test bypass times, and Surveillance Frequencies reduce the potential for inadvertent reactor trips and spurious engineered safeguard features actuations, and therefore do not increase the probability of any accident previously evaluated. The proposed changes do not change the response of the plant to any accidents and have an insignificant impact on the reliability of the RTS and ESFAS signals. The RTS and ESFAS will remain highly reliable and the proposed changes will not result in a significant increase in the risk of plant operation. This is demonstrated by showing that the impact on plant safety, as measured by the increase in core damage frequency (CDF) is less than 1.0E-06 per year and the increase in large early release frequency (LERF) is less than 1.0E- 07 per year. In addition, for the CT changes, the incremental conditional core damage probabilities (ICCDP) and incremental conditional large early release probabilities (ICLERP) are less than 5.0E-07 and 5.0E-08, respectively. These changes meet the acceptance criteria in Regulatory Guides (RGs) 1.174 and 1.177. Therefore, since the RTS and ESFAS will continue to perform their functions with high reliability, as originally assumed, and the increase in risk, as measured by ΔCDF, ΔLERF, ICCDP, ICLERP risk metrics, is within the acceptance criteria of existing regulatory guidance, there will not be a significant increase in the consequences of any accidents.

The proposed changes do not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, or configuration of the facility or the manner in which the plant is operated and maintained. The proposed changes do not alter or prevent the ability of structures, systems, and components from performing their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. The proposed changes do not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of any accident previously evaluated. The proposed changes are consistent with safety analysis assumptions and resultant consequences.

Therefore, this change does not increase the probability or consequences of any accident previously evaluated.

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

There are no hardware changes nor are there any changes in the method by which any safety-related plant system performs its safety function. The proposed changes will not affect the normal method of plant operation. No performance requirements will be affected or eliminated. The proposed changes will not result in physical alteration to any plant system nor will there be any change in the method by which any safety-related plant system performs its safety function. There will be no setpoint changes or changes to accident analysis assumptions.

No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of these changes. There will be no adverse effect or challenges imposed on any safety-related system as a result of these changes.

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

3. The proposed changes do not involve a significant reduction in a margin of safety?

The proposed changes do not affect the acceptance criteria for any analyzed event nor is there a change to any Safety Analysis Limit. There will be no effect on the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions. There will be no impact on the departure from nucleate boiling limits, fuel centerline temperature, or any other margin of safety. The radiological dose consequence acceptance criteria listed in the NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," will continue to be met.

Redundant RTS and ESFAS trains are maintained, and diversity with regard of the signals that provide reactor trip and engineered safety features actuation is also maintained. All signals credited as primary or secondary, and all operator actions credited in the accident analyses will remain the same. The proposed changes will not result in plant operation in a configuration outside the design basis. The calculated impact on risk is insignificant and meets the acceptance criteria contained in RGs 1.174 and 1.177. Although there was no attempt to quantify any positive human factors benefit due to increased CTs and bypass test times, it is expected that there would be a net benefit due to a reduced potential for spurious reactor trips and actuations associated with testing.

Implementation of the proposed changes is expected to result in an overall improvement in safety, as follows:

- Reduced testing will result in fewer inadvertent reactor trips, less frequent actuation of ESFAS components, less frequent distraction of operations personnel without significantly affecting RTS and ESFAS reliability.
- Improvements in the effectiveness of the operating staff in monitoring and controlling plant operation will be realized. This is due to less frequent distraction of the operators and shift supervisor to attend to instrumentation Required Actions with short CTs.
- Longer repair times associated with increased CTs will lead to higher quality repairs and improved reliability.
- The CT extensions for the reactor trip breakers will provide additional time to complete test and maintenance activities while at power, potentially reducing the number of forced outages related to compliance with reactor trip breaker CT, and provide consistency with the CT for the logic trains.

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

Based on the above analysis, EGC has concluded that the proposed amendment involves no significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

The regulatory bases and guidance documents associated with the systems discussed in this license amendment request are the following:

General design criteria (GDC) 2 requires that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without the loss of the capability to perform their safety functions.

GDC 4 requires that structures, systems, and components (SSCs) important to safety be designed to accommodate the effects of, and to be compatible with, the environmental conditions associated with the normal operation, maintenance, testing, and postulated accidents, including Loss of Coolant Accidents (LOCAs). These SSCs shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, discharging fluids that may result from equipment failures, and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

GDC 13 requires that instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems.

GDC 20 requires that the protection system(s) shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.

GDC 21 requires that the protection system(s) shall be designed for high functional reliability and testability.

GDC 22 through GDC 25 and GDC 29 require various design attributes for the protection system(s), including independence, safe failure modes, separation from control systems, requirements for reactivity control malfunctions, and protection against anticipated operational occurrences.

RG 1.22 discusses an acceptable method of satisfying GDC 20 and GDC 21 regarding the periodic testing of protection system actuation functions. These periodic tests should duplicate, as closely as practicable, the performance that is required of the actuation devices in the event of an accident.

10 CFR 50.55a(h) requires that the protection systems meet **IEEE 279-1971**. **Section 4.2 of IEEE 279-1971** discusses the general functional requirement for protection systems to assure they satisfy the single failure criterion.

There will be no changes to the RTS or ESFAS instrumentation design such that compliance with any of the regulatory requirements and guidance documents above would come into question. The above evaluations confirm that the plant will continue to comply with all applicable regulatory requirements.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

EGC has evaluated this proposed license amendment consistent with the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments." EGC has determined that this proposed change meets the criteria for categorical exclusion set forth in paragraph (c)(9) of 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," and has determined that no irreversible consequences exist in accordance with paragraph (b) of 10 CFR 50.92, "Issuance of amendment." This determination is based on the fact that this change is being processed as an amendment to the license issued pursuant to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or which changes an inspection or surveillance requirement and the amendment meets the following specific criteria:

1. The amendment involves no significant hazards consideration.

As demonstrated in Section 4.1 above, "No Significant Hazards Consideration," the proposed change does not involve any significant hazards consideration.

2. There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed changes will adopt NRC-approved Completion Times (CTs), test bypass times, and Surveillance Test Interval changes for the Reactor Trip System instrumentation and Engineered Safeguards Actuation System instrumentation. The proposed changes do not result in an increase in power level, and do not increase the production nor alter the flow path or method of disposal of radioactive waste or byproducts; thus, there will be no change in the amounts of radiological effluents released offsite.

Based on the above evaluation, the proposed change will not result in a significant change in the types or significant increase in the amounts of any effluent released offsite.

3. There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed change will not result in any changes to the configuration of the facility. The proposed changes to adopt NRC-approved Completion Times (CTs), test bypass times, and Surveillance Test Interval changes for the Reactor Trip System instrumentation and Engineered Safeguards Actuation System will not cause a change in the level of controls or methodology used for the processing of radioactive effluents or handling of solid radioactive waste, nor will the proposed amendment result in any change in the normal radiation levels in the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from this change.

7.0 PRECEDENT

The proposed license amendment incorporates, into the Braidwood Station and Byron Station TS, changes that are similar to NRC-approved LARs for the following licensees:

- Callaway Plant, Unit 1 on January 31, 2005
- Wolf Creek Generating Station on January 31, 2005
- Diablo Canyon Power Plant, Unit No.1 and Unit No.2 on January 31, 2005
- Comanche Peak Steam Electric Station, Units 1 and 2 on January 31, 2005
- D.C. Cook Nuclear Plant, Units 1 and 2 for WCAP-15376 changes only on May 23, 2003
- South Texas Project, Units 1 and 2 for WCAP-14333 changes only on March 19, 2002
- Vogtle Electric Generating Plant, Units 1 and 2 for WCAP-14333 changes on December 22, 2000 and for WCAP-15376 changes on September 1, 2006.

8.0 REFERENCES

1. WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," October 1998.
2. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," March 2003.
3. Technical Specification Task Force (TSTF) Traveler TSTF-411, Revision 1, "Surveillance Test Interval Extension for Components of the Reactor Protection System (WCAP-15376-P)."
4. TSTF-418, Revision 2, "RPS and ESFAS Test Times and Completion Times (WCAP-14333)."
5. Letter from R. R. Assa (NRC) to D. L. Farrar (Commonwealth Edison Company) dated December 16, 1993, transmitting Amendment 44 to Facility Operating License NPF-72 and NPF-77 for Braidwood Station, Units 1 and 2: Implementation of Quarterly Surveillance Test Intervals for the ESFAS Instrumentation, in accordance with WCAP-10271.
6. Letter from J. B. Hickman (NRC) to D. L. Farrar (Commonwealth Edison Company) dated October 4, 1993, transmitting Amendment 55 to Facility Operating License NPF-37 and NPF-66 for Byron Station, Units 1 and 2: Implementation of Quarterly Surveillance Test Intervals for the ESFAS Instrumentation, in accordance with WCAP-10271.
7. Letter from N. J. Stringfellow (Westinghouse Owners Group) to NRC dated December 20, 1996, transmitting Westinghouse Owners Group letter OG-96-110, Response to Request for Additional Information Regarding WCAP-14333.
8. Letter from R. H. Bryan (Westinghouse Owners Group) to NRC dated January 8, 2002, transmitting Westinghouse Owners Group letter OG-02-002, Response to Request for Additional Information Regarding WCAP-15376.
9. Letter from R. H. Bryan (Westinghouse Owners Group) to NRC dated September 28, 2001, transmitting Westinghouse Owners Group letter OG-01-058.
10. Letter from T. W. Simpkin (Commonwealth Edison Company) to T. E. Murley (NRC) dated August 5, 1992 transmitting Application for Amendment to Facility Operating License NPF-37, NPF-66, NPF-72, and NPF-77: Implementation of quarterly Surveillance Test Intervals for the ESFAS Instrumentation, in accordance with WCAP-10271.

ATTACHMENT 2A

Braidwood Station
Units 1 and 2

NRC Docket Nos. 50-456 and 50-457

Facility Operating License Nos. NPF-72 and NPF-77

Marked-up Technical Specification Pages

3.3.1-2
3.3.1-3
3.3.1-4
3.3.1-5
3.3.1-6
3.3.1-7
3.3.1-9
3.3.1-10
3.3.1-14
3.3.2-2
3.3.2-3
3.3.2-4
3.3.2-5
3.3.2-7
3.3.6-3

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	----------NOTE---------- While this LCO is not met for Function 18, 19, or 20 in MODE 5, making the Rod Control System capable of rod withdrawal is not permitted. ----------	
	C.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	C.2.1 Initiate action to fully insert all rods.	48 hours
	AND	
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing and setpoint adjustment of other channels. ----------	
	D.1 Place channel in trip.	~~6~~ 72 hours
	OR	
	D.2 Be in MODE 3.	~~12~~ 78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing of other channels. ----------	
	E.1 Place channel in trip.	~~6~~ 72 hours
	OR	
	E.2 Be in MODE 3.	~~12~~ 78 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	2 hours
	OR	
	F.2 Increase THERMAL POWER to > P-10.	2 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1 Suspend operations involving positive reactivity additions.	Immediately
	AND	
	G.2 Reduce THERMAL POWER to < P-6.	2 hours
H. One Source Range Neutron Flux channel inoperable.	H.1 Suspend operations involving positive reactivity additions.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. Two Source Range Neutron Flux channels inoperable.	I.1 Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	J.1 Restore channel to OPERABLE status. OR J.2.1 Initiate action to fully insert all rods. AND J.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
K. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- K.1 Place channel in trip. OR K.2 Reduce THERMAL POWER to < P-7.	12 6 hours 72 12 hours 78

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. One Turbine Trip channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------	12
	L.1 Place channel in trip.	72 hours
	OR	
	L.2 Reduce THERMAL POWER to < P-8.	78 hours
M. One train inoperable.	----------NOTE---------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ----------	
	M.1 Restore train to OPERABLE status.	24 hours
	OR	
	M.2 Be in MODE 3.	30 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. One RTB train inoperable.	----------NOTES---------- 1. One train may be bypassed for up to 8 hours for surveillance testing, provided the other train is OPERABLE. 2. One RTB may be bypassed for up to 2 hours for maintenance on undervoltage or shunt trip mechanisms, provided the other train is OPERABLE. ----------	
	N.1 Restore train to OPERABLE status.	1 hour
	OR	
	N.2 Be in MODE 3.	7 hours
O. One or more channels inoperable.	O.1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	O.2 Be in MODE 3.	7 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
P. One or more channels inoperable.	P.1 Verify interlock is in required state for existing unit conditions. OR P.2 Be in MODE 2.	1 hour 7 hours
Q. One trip mechanism inoperable for one RTB.	Q.1 Restore inoperable trip mechanism to OPERABLE status. OR Q.2 Be in MODE 3.	48 hours 54 hours

INSERT 3.3.1.R

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform CHANNEL CHECK.	12 hours

(continued)

INSERT 3.3.1.R

CONDITION	REQUIRED ACTION		COMPLETION TIME
R. One Reactor Coolant Pump (RCP) Breaker Position channel(per train) inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------		
	R.1	Place channel in trip.	6 hours
	OR		
	R.2	Reduce THERMAL POWER to < P-7.	12 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.4	----------NOTE---------- This Surveillance must be performed on the RTBB prior to placing the bypass breaker in service. ---------- Perform TADOT.	~~31~~ 62 days on a STAGGERED TEST BASIS
SR 3.3.1.5	Perform ACTUATION LOGIC TEST.	~~31~~ 92 days on a STAGGERED TEST BASIS
SR 3.3.1.6	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 75% RTP. ---------- Calibrate excore channels to agree with incore measurements.	92 EFPD
SR 3.3.1.7	----------NOTE---------- Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3. ---------- Perform COT.	~~92~~ 184 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.8	----------NOTE---------- This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions. ----------	
	Perform COT.	-----NOTE---- Only required when not performed within previous 92 days ---------- Prior to reactor startup AND Four hours after reducing power below P-10 for power and intermediate instrumentation AND Four hours after reducing power below P-6 for source range instrumentation AND Every 92 days thereafter

(continued)

Table 3.3.1-1 (page 2 of 6)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6.	Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3.1-17)
7.	Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3.1-18)
8.	Pressurizer Pressure					
	a. Low	1[e]	4	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1875 psig
	b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≤ 2393 psig
9.	Pressurizer Water Level-High	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.5% of instrument span
10.	Reactor Coolant Flow-Low (per loop)	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.3% of loop minimum measured flow
11.	Reactor Coolant Pump (RCP) Breaker Position (per train)	1[e]	4	K	SR 3.3.1.13	NA

(continued)

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One train inoperable.	C.1 --------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ---------- Restore train to OPERABLE status.	24 hours
	OR	
	C.2.1 Be in MODE 3.	30 hours
	AND	
	C.2.2 Be in MODE 5.	60 hours
D. One channel inoperable.	D.1 --------NOTE-------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ---------- Place channel in trip.	72 hours
	OR	
	D.2.1 Be in MODE 3.	78 hours
	AND	
	D.2.2 Be in MODE 4.	84 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Containment Pressure channel inoperable.	E.1 --------NOTE-------- One additional channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing. ---------- Place channel in bypass.	~~6~~ 72 hours
	OR	
	E.2.1 Be in MODE 3.	~~12~~ 78 hours
	AND	
	E.2.2 Be in MODE 4.	~~18~~ 84 hours
F. One channel or train inoperable.	F.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	F.2.1 Be in MODE 3.	54 hours
	AND	
	F.2.2 Be in MODE 4.	60 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One train inoperable.	G.1 --------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ---------- Restore train to OPERABLE status.	24 ~~6~~ hours
	OR	
	G.2.1 Be in MODE 3.	30 ~~12~~ hours
	AND	
	G.2.2 Be in MODE 4.	36 ~~18~~ hours
H. One channel inoperable.	H.1 --------NOTE-------- One channel may be bypassed for up to 2 hours for surveillance testing provided the other channel is OPERABLE. ---------- Place channel in trip.	1 hour
	OR	
	H.2.1 Be in MODE 3.	7 hours
	AND	
	H.2.2 Be in MODE 4.	13 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. One channel inoperable.	I.1 --------NOTE-------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip. OR	6 hours
	I.2 Be in MODE 3.	12 hours
J. One or more trains inoperable.	J.1 Declare associated auxiliary feedwater pump inoperable.	Immediately
K. One channel inoperable.	K.1 --------NOTE-------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip. OR	6 hours
	K.2.1 Be in MODE 3. AND	12 hours
	K.2.2 Be in MODE 5.	42 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.4	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.5	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.6	Perform COT.	92 days
SR 3.3.2.7	----------NOTE---------- Verification of relay setpoints not required. ---------- Perform TADOT.	92 days
SR 3.3.2.8	Perform SLAVE RELAY TEST.	18 months
SR 3.3.2.9	----------NOTE---------- Verification of setpoint not required. ---------- Perform TADOT.	18 months

(continued)

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.6-1 to determine which SRs apply for each Containment Ventilation Isolation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.6.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2	Perform ACTUATION LOGIC TEST. (92)	31 days on a STAGGERED TEST BASIS
SR 3.3.6.3	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.4	Perform COT.	92 days
SR 3.3.6.5	Perform SLAVE RELAY TEST.	18 months
SR 3.3.6.6	Perform CHANNEL CALIBRATION.	18 months

INSERT 3.3.6.2 NOTE

INSERT 3.3.6.3 NOTE

INSERT SR 3.3.6.2 Note

---------- NOTE ----------
This Surveillance is only applicable to the actuation logic of the ESFAS Instrumentation.

INSERT SR 3.3.6.3 Note

---------- NOTE ----------
This Surveillance is only applicable to the master relays of the ESFAS Instrumentation.

ATTACHMENT 2B

Byron Station
Units 1 and 2

NRC Docket Nos. 50-454 and 50-455

Facility Operating License Nos. NPF-37 and NPF-66

Marked-up Technical Specification Pages

3.3.1-2
3.3.1-3
3.3.1-4
3.3.1-5
3.3.1-6
3.3.1-7
3.3.1-9
3.3.1-10
3.3.1-14
3.3.2-2
3.3.2-3
3.3.2-4
3.3.2-5
3.3.2-7
3.3.6-3

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	----------NOTE---------- While this LCO is not met for Function 18, 19, or 20 in MODE 5, making the Rod Control System capable of rod withdrawal is not permitted. ----------	
	C.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	C.2.1 Initiate action to fully insert all rods.	48 hours
	AND	
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing and setpoint adjustment of other channels. ----------	
	D.1 Place channel in trip.	6 hours
	OR	
	D.2 Be in MODE 3.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing of other channels. ----------	
	E.1 Place channel in trip.	~~6~~ 72 hours
	OR	
	E.2 Be in MODE 3.	~~12~~ 78 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	2 hours
	OR	
	F.2 Increase THERMAL POWER to > P-10.	2 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1 Suspend operations involving positive reactivity additions.	Immediately
	AND	
	G.2 Reduce THERMAL POWER to < P-6.	2 hours
H. One Source Range Neutron Flux channel inoperable.	H.1 Suspend operations involving positive reactivity additions.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. Two Source Range Neutron Flux channels inoperable.	I.1 Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	J.1 Restore channel to OPERABLE status. OR J.2.1 Initiate action to fully insert all rods. AND J.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
K. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing of other channels. ---------- K.1 Place channel in trip. OR K.2 Reduce THERMAL POWER to < P-7.	 ~~6~~ 72 hours ~~12~~ 78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. One Turbine Trip channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to ~~4 hours~~ 12 for surveillance testing of other channels. ---------- L.1 Place channel in trip. OR L.2 Reduce THERMAL POWER to < P-8.	6 hours 72 12 hours 78
M. One train inoperable.	----------NOTE---------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ---------- M.1 Restore train to OPERABLE status. OR M.2 Be in MODE 3.	6 hours 24 12 hours 30

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. One RTB train inoperable.	----------NOTES---------- 1. One train may be bypassed for up to 2 hours for surveillance testing, provided the other train is OPERABLE. 2. One RTB may be bypassed for up to 2 hours for maintenance on undervoltage or shunt trip mechanisms, provided the other train is OPERABLE. ----------	
	N.1 Restore train to OPERABLE status.	1 hour
	OR	
	N.2 Be in MODE 3.	7 hours
O. One or more channels inoperable.	O.1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	O.2 Be in MODE 3.	7 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
P. One or more channels inoperable.	P.1 Verify interlock is in required state for existing unit conditions. OR P.2 Be in MODE 2.	1 hour 7 hours
Q. One trip mechanism inoperable for one RTB.	Q.1 Restore inoperable trip mechanism to OPERABLE status. OR Q.2 Be in MODE 3.	48 hours 54 hours

INSERT 3.3.1.R

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform CHANNEL CHECK.	12 hours

(continued)

INSERT 3.3.1.R

CONDITION	REQUIRED ACTION	COMPLETION TIME
R. One Reactor Coolant Pump (RCP) Breaker Position channel(per train) inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------	
	R.1 Place channel in trip.	6 hours
	OR	
	R.2 Reduce THERMAL POWER to < P-7.	12 hours

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.1.4	----------NOTE---------- This Surveillance must be performed on the RTBB prior to placing the bypass breaker in service. ---------- Perform TADOT.	~~31~~ 62 days on a STAGGERED TEST BASIS
SR 3.3.1.5	Perform ACTUATION LOGIC TEST.	~~31~~ 92 days on a STAGGERED TEST BASIS
SR 3.3.1.6	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 75% RTP. ---------- Calibrate excore channels to agree with incore measurements.	92 EFPD
SR 3.3.1.7	----------NOTE---------- Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3. ---------- Perform COT.	~~92~~ 184 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.8	----------NOTE---------- This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions. ----------	
	Perform COT.	-----NOTE---- Only required when not performed within previous ~~92~~ 184 days ---------- Prior to reactor startup AND Four hours after reducing power below P-10 for power and intermediate instrumentation AND Four hours after reducing power below P-6 for source range instrumentation AND Every ~~92~~ 184 days thereafter

(continued)

Table 3.3.1-1 (page 2 of 6)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6.	Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3.1-17)
7.	Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3.1-18)
8.	Pressurizer Pressure					
	a. Low	1[e]	4	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1875 psig
	b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≤ 2393 psig
9.	Pressurizer Water Level-High	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.5% of instrument span
10.	Reactor Coolant Flow-Low (per loop)	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.3% of loop minimum measured flow
11.	Reactor Coolant Pump (RCP) Breaker Position (per train)	1[e]	4	K	SR 3.3.1.13	NA

(continued)

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One train inoperable.	C.1 --------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ---------- Restore train to OPERABLE status.	6 hours
	OR	
	C.2.1 Be in MODE 3.	12 hours
	AND	
	C.2.2 Be in MODE 5.	42 hours
D. One channel inoperable.	D.1 --------NOTE-------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip.	6 hours
	OR	
	D.2.1 Be in MODE 3.	12 hours
	AND	
	D.2.2 Be in MODE 4.	18 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Containment Pressure channel inoperable. (12)	E.1 --------NOTE-------- One additional channel may be bypassed for up to (4) hours for surveillance testing. ---------- Place channel in bypass.	(72) 6 hours
	OR	
	E.2.1 Be in MODE 3.	(78) 12 hours
	AND	
	E.2.2 Be in MODE 4.	(84) 18 hours
F. One channel or train inoperable.	F.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	F.2.1 Be in MODE 3.	54 hours
	AND	
	F.2.2 Be in MODE 4.	60 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One train inoperable.	G.1 --------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ---------- Restore train to OPERABLE status.	24 hours
	OR	
	G.2.1 Be in MODE 3.	30 hours
	AND	
	G.2.2 Be in MODE 4.	36 hours
H. One channel inoperable.	H.1 --------NOTE-------- One channel may be bypassed for up to 2 hours for surveillance testing provided the other channel is OPERABLE. ---------- Place channel in trip.	1 hour
	OR	
	H.2.1 Be in MODE 3.	7 hours
	AND	
	H.2.2 Be in MODE 4.	13 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. One channel inoperable.	I.1 --------NOTE-------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip. OR I.2 Be in MODE 3.	6 hours 12 hours
J. One or more trains inoperable.	J.1 Declare associated auxiliary feedwater pump inoperable.	Immediately
K. One channel inoperable.	K.1 --------NOTE-------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip. OR K.2.1 Be in MODE 3. AND K.2.2 Be in MODE 5.	6 hours 12 hours 42 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.4	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.5	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.6	Perform COT.	92 days
SR 3.3.2.7	----------NOTE---------- Verification of relay setpoints not required. ---------- Perform TADOT.	92 days
SR 3.3.2.8	Perform SLAVE RELAY TEST.	18 months
SR 3.3.2.9	----------NOTE---------- Verification of setpoint not required. ---------- Perform TADOT.	18 months

(continued)

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.6-1 to determine which SRs apply for each Containment Ventilation Isolation Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.6.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.3	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.4	Perform COT.	92 days
SR 3.3.6.5	Perform SLAVE RELAY TEST.	18 months
SR 3.3.6.6	Perform CHANNEL CALIBRATION.	18 months

92

INSERT 3.3.6.2 NOTE

INSERT 3.3.6.3 NOTE

INSERT SR 3.3.6.2 Note

---------- NOTE ----------
This Surveillance is only applicable to the actuation logic of the ESFAS Instrumentation.

INSERT SR 3.3.6.3 Note

---------- NOTE ----------
This Surveillance is only applicable to the master relays of the ESFAS Instrumentation.

ATTACHMENT 3A

Braidwood Station
Units 1 and 2

NRC Docket Nos. 50-456 and 50-457

Facility Operating License Nos. NPF-72 and NPF-77

Retyped Technical Specification Pages

3.3.1-2
3.3.1-3
3.3.1-4
3.3.1-5
3.3.1-6
3.3.1-7
3.3.1-8
3.3.1-9
3.3.1-10
3.3.1-14
3.3.2-2
3.3.2-3
3.3.2-4
3.3.2-5
3.3.2-7
3.3.6-3

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	----------NOTE---------- While this LCO is not met for Function 18, 19, or 20 in MODE 5, making the Rod Control System capable of rod withdrawal is not permitted. ----------	
	C.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	C.2.1 Initiate action to fully insert all rods.	48 hours
	AND	
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. ----------	
	D.1 Place channel in trip.	72 hours
	OR	
	D.2 Be in MODE 3.	78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
	E.1 Place channel in trip.	72 hours
	OR	
	E.2 Be in MODE 3.	78 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	2 hours
	OR	
	F.2 Increase THERMAL POWER to > P-10.	2 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1 Suspend operations involving positive reactivity additions.	Immediately
	AND	
	G.2 Reduce THERMAL POWER to < P-6.	2 hours
H. One Source Range Neutron Flux channel inoperable.	H.1 Suspend operations involving positive reactivity additions.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. Two Source Range Neutron Flux channels inoperable.	I.1 Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	J.1 Restore channel to OPERABLE status. OR J.2.1 Initiate action to fully insert all rods. AND J.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
K. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ---------- K.1 Place channel in trip. OR K.2 Reduce THERMAL POWER to < P-7.	 72 hours 78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. One Turbine Trip channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
	L.1 Place channel in trip.	72 hours
	OR	
	L.2 Reduce THERMAL POWER to < P-8.	78 hours
M. One train inoperable.	----------NOTE---------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ----------	
	M.1 Restore train to OPERABLE status.	24 hours
	OR	
	M.2 Be in MODE 3.	30 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. One RTB train inoperable.	----------NOTES---------- One train may be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. ----------	
	N.1 Restore train to OPERABLE status.	24 hours
	OR	
	N.2 Be in MODE 3.	30 hours
O. One or more channels inoperable.	O.1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	O.2 Be in MODE 3.	7 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
P. One or more channels inoperable.	P.1 Verify interlock is in required state for existing unit conditions. OR P.2 Be in MODE 2.	1 hour 7 hours
Q. One trip mechanism inoperable for one RTB.	Q.1 Restore inoperable trip mechanism to OPERABLE status. OR Q.2 Be in MODE 3.	48 hours 54 hours
R. One Reactor Coolant Pump (RCP) Breaker Position channel(per train) inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- R.1 Place channel in trip. OR R.2 Reduce THERMAL POWER to < P-7.	 6 hours 12 hours

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.1.2	----------NOTES---------- 1. Adjust NIS channel if absolute difference is > 2%. 2. Not required to be performed until 12 hours after THERMAL POWER is ≥ 15% RTP. --- Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.	24 hours
SR 3.3.1.3	----------NOTES---------- 1. Adjust NIS channel if absolute difference is ≥ 3%. 2. Only required to be performed with THERMAL POWER > 15% RTP. --- Compare results of the incore measurements to NIS AFD.	Prior to exceeding 75% RTP after each refueling AND 31 Effective Full Power Days (EFPD) thereafter

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.4	----------NOTE---------- This Surveillance must be performed on the RTBB prior to placing the bypass breaker in service. ---------- Perform TADOT.	62 days on a STAGGERED TEST BASIS
SR 3.3.1.5	Perform ACTUATION LOGIC TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.1.6	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 75% RTP. ---------- Calibrate excore channels to agree with incore measurements.	92 EFPD
SR 3.3.1.7	----------NOTE---------- Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3. ---------- Perform COT.	184 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.8	----------NOTE---------- This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions. ----------	
	Perform COT.	-----NOTE---- Only required when not performed within previous 184 days ---------- Prior to reactor startup AND Four hours after reducing power below P-10 for power and intermediate instrumentation AND Four hours after reducing power below P-6 for source range instrumentation AND Every 184 days thereafter

(continued)

Table 3.3.1-1 (page 2 of 6)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6.	Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3.1-17)
7.	Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3.1-18)
8.	Pressurizer Pressure					
	a. Low	1[e]	4	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1875 psig
	b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≤ 2393 psig
9.	Pressurizer Water Level-High	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.5% of instrument span
10.	Reactor Coolant Flow-Low (per loop)	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.3% of loop minimum measured flow
11.	Reactor Coolant Pump (RCP) Breaker Position (per train)	1[e]	4	R	SR 3.3.1.13	NA

(continued)

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One train inoperable.	C.1	--------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ----------	
		Restore train to OPERABLE status.	24 hours
	OR		
	C.2.1	Be in MODE 3.	30 hours
	AND		
	C.2.2	Be in MODE 5.	60 hours
D. One channel inoperable.	D.1	--------NOTE-------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
		Place channel in trip.	72 hours
	OR		
	D.2.1	Be in MODE 3.	78 hours
	AND		
	D.2.2	Be in MODE 4.	84 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. One Containment Pressure channel inoperable.	E.1	--------NOTE-------- One additional channel may be bypassed for up to 12 hours for surveillance testing. ----------	
		Place channel in bypass.	72 hours
	OR		
	E.2.1	Be in MODE 3.	78 hours
	AND		
	E.2.2	Be in MODE 4.	84 hours
F. One channel or train inoperable.	F.1	Restore channel or train to OPERABLE status.	48 hours
	OR		
	F.2.1	Be in MODE 3.	54 hours
	AND		
	F.2.2	Be in MODE 4.	60 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. One train inoperable.	G.1	--------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ----------	
		Restore train to OPERABLE status.	24 hours
	OR		
	G.2.1	Be in MODE 3.	30 hours
	AND		
	G.2.2	Be in MODE 4.	36 hours
H. One channel inoperable.	H.1	--------NOTE-------- One channel may be bypassed for up to 2 hours for surveillance testing provided the other channel is OPERABLE. ----------	
		Place channel in trip.	1 hour
	OR		
	H.2.1	Be in MODE 3.	7 hours
	AND		
	H.2.2	Be in MODE 4.	13 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
I. One channel inoperable.	I.1	--------NOTE-------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
		Place channel in trip.	72 hours
	OR		
	I.2	Be in MODE 3.	78 hours
J. One or more trains inoperable.	J.1	Declare associated auxiliary feedwater pump inoperable.	Immediately
K. One channel inoperable.	K.1	--------NOTE-------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
		Place channel in trip.	72 hours
	OR		
	K.2.1	Be in MODE 3.	78 hours
	AND		
	K.2.2	Be in MODE 5.	108 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.4	Perform ACTUATION LOGIC TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.2.5	Perform MASTER RELAY TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.2.6	----------NOTE---------- Verification of relay setpoints not required. ---------- Perform TADOT.	92 days
SR 3.3.2.7	Perform COT.	184 days
SR 3.3.2.8	Perform SLAVE RELAY TEST.	18 months
SR 3.3.2.9	----------NOTE---------- Verification of setpoint not required. ---------- Perform TADOT.	18 months

(continued)

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.6-1 to determine which SRs apply for each Containment Ventilation Isolation Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.6.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2	---------- NOTE ---------- This Surveillance is only applicable to the actuation logic of the ESFAS Instrumentation. ---------- Perform ACTUATION LOGIC TEST.	92 days on a STAGGERED TEST BASIS
R 3.3.6.3	---------- NOTE ---------- This Surveillance is only applicable to the master relays of the ESFAS Instrumentation. ---------- Perform MASTER RELAY TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.6.4	Perform COT.	92 days
SR 3.3.6.5	Perform SLAVE RELAY TEST.	18 months
SR 3.3.6.6	Perform CHANNEL CALIBRATION.	18 months

ATTACHMENT 3B

Byron Station
Units 1 and 2

NRC Docket Nos. 50-454 and 50-455

Facility Operating License Nos. NPF-37 and NPF-66

Retyped Technical Specification Pages

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	----------NOTE---------- While this LCO is not met for Function 18, 19, or 20 in MODE 5, making the Rod Control System capable of rod withdrawal is not permitted. ----------	
	C.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	C.2.1 Initiate action to fully insert all rods.	48 hours
	AND	
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. ----------	
	D.1 Place channel in trip.	72 hours
	OR	
	D.2 Be in MODE 3.	78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------		
	E.1	Place channel in trip.	72 hours
	OR		
	E.2	Be in MODE 3.	78 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1	Reduce THERMAL POWER to < P-6.	2 hours
	OR		
	F.2	Increase THERMAL POWER to > P-10.	2 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1	Suspend operations involving positive reactivity additions.	Immediately
	AND		
	G.2	Reduce THERMAL POWER to < P-6.	2 hours
H. One Source Range Neutron Flux channel inoperable.	H.1	Suspend operations involving positive reactivity additions.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. Two Source Range Neutron Flux channels inoperable.	I.1 Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	J.1 Restore channel to OPERABLE status. OR J.2.1 Initiate action to fully insert all rods. AND J.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
K. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ---------- K.1 Place channel in trip. OR K.2 Reduce THERMAL POWER to < P-7.	 72 hours 78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. One Turbine Trip channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
	L.1 Place channel in trip.	72 hours
	OR	
	L.2 Reduce THERMAL POWER to < P-8.	78 hours
M. One train inoperable.	----------NOTE---------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ----------	
	M.1 Restore train to OPERABLE status.	24 hours
	OR	
	M.2 Be in MODE 3.	30 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. One RTB train inoperable.	----------NOTES---------- One train may be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. ----------	
	N.1 Restore train to OPERABLE status.	24 hour
	OR	
	N.2 Be in MODE 3.	30 hours
O. One or more channels inoperable.	O.1 Verify interlock is in required state for existing unit conditions.	1 hour
	OR	
	O.2 Be in MODE 3.	7 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
P. One or more channels inoperable.	P.1	Verify interlock is in required state for existing unit conditions.	1 hour
	OR		
	P.2	Be in MODE 2.	7 hours
Q. One trip mechanism inoperable for one RTB.	Q.1	Restore inoperable trip mechanism to OPERABLE status.	48 hours
	OR		
	Q.2	Be in MODE 3.	54 hours
R. One Reactor Coolant Pump (RCP) Breaker Position channel(per train) inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------		
	R.1	Place channel in trip.	6 hours
	OR		
	R.2	Reduce THERMAL POWER to < P-7.	12 hours

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.1.2	----------NOTES---------- 1. Adjust NIS channel if absolute difference is > 2%. 2. Not required to be performed until 12 hours after THERMAL POWER is ≥ 15% RTP. --- Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.	24 hours
SR 3.3.1.3	----------NOTES---------- 1. Adjust NIS channel if absolute difference is ≥ 3%. 2. Only required to be performed with THERMAL POWER > 15% RTP. --- Compare results of the incore measurements to NIS AFD.	Prior to exceeding 75% RTP after each refueling AND 31 Effective Full Power Days (EFPD) thereafter

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.4	----------NOTE---------- This Surveillance must be performed on the RTBB prior to placing the bypass breaker in service. ---------- Perform TADOT.	62 days on a STAGGERED TEST BASIS
SR 3.3.1.5	Perform ACTUATION LOGIC TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.1.6	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 75% RTP. ---------- Calibrate excore channels to agree with incore measurements.	92 EFPD
SR 3.3.1.7	----------NOTE---------- Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3. ---------- Perform COT.	184 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.8	----------NOTE---------- This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions. ----------	
	Perform COT.	-----NOTE---- Only required when not performed within previous 184 days ---------- Prior to reactor startup AND Four hours after reducing power below P-10 for power and intermediate instrumentation AND Four hours after reducing power below P-6 for source range instrumentation AND Every 184 days thereafter

(continued)

Table 3.3.1-1 (page 2 of 6)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6.	Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3.1-17)
7.	Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3.1-18)
8.	Pressurizer Pressure					
	a. Low	1[e]	4	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1875 psig
	b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≤ 2393 psig
9.	Pressurizer Water Level-High	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.5% of instrument span
10.	Reactor Coolant Flow-Low (per loop)	1[e]	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.3% of loop minimum measured flow
11.	Reactor Coolant Pump (RCP) Breaker Position (per train)	1[e]	4	R	SR 3.3.1.13	NA |

(continued)

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One train inoperable.	C.1	--------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ----------	
		Restore train to OPERABLE status.	24 hours
	OR		
	C.2.1	Be in MODE 3.	30 hours
	AND		
	C.2.2	Be in MODE 5.	60 hours
D. One channel inoperable.	D.1	--------NOTE-------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
		Place channel in trip.	72 hours
	OR		
	D.2.1	Be in MODE 3.	78 hours
	AND		
	D.2.2	Be in MODE 4.	84 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. One Containment Pressure channel inoperable.	E.1	--------NOTE-------- One additional channel may be bypassed for up to 12 hours for surveillance testing. ----------	
		Place channel in bypass.	72 hours
	OR		
	E.2.1	Be in MODE 3.	78 hours
	AND		
	E.2.2	Be in MODE 4.	84 hours
F. One channel or train inoperable.	F.1	Restore channel or train to OPERABLE status.	48 hours
	OR		
	F.2.1	Be in MODE 3.	54 hours
	AND		
	F.2.2	Be in MODE 4.	60 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. One train inoperable.	G.1	--------NOTE-------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. ----------	
		Restore train to OPERABLE status.	24 hours
	OR		
	G.2.1	Be in MODE 3.	30 hours
	AND		
	G.2.2	Be in MODE 4.	36 hours
H. One channel inoperable.	H.1	--------NOTE-------- One channel may be bypassed for up to 2 hours for surveillance testing provided the other channel is OPERABLE. ----------	
		Place channel in trip.	1 hour
	OR		
	H.2.1	Be in MODE 3.	7 hours
	AND		
	H.2.2	Be in MODE 4.	13 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
I. One channel inoperable.	I.1	--------NOTE-------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
		Place channel in trip.	72 hours
	OR		
	I.2	Be in MODE 3.	78 hours
J. One or more trains inoperable.	J.1	Declare associated auxiliary feedwater pump inoperable.	Immediately
K. One channel inoperable.	K.1	--------NOTE-------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------	
		Place channel in trip.	72 hours
	OR		
	K.2.1	Be in MODE 3.	78 hours
	AND		
	K.2.2	Be in MODE 5.	108 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.4	Perform ACTUATION LOGIC TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.2.5	Perform MASTER RELAY TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.2.6	----------NOTE---------- Verification of relay setpoints not required. ---------- Perform TADOT.	92 days
SR 3.3.2.7	Perform COT.	184 days
SR 3.3.2.8	Perform SLAVE RELAY TEST.	18 months
SR 3.3.2.9	----------NOTE---------- Verification of setpoint not required. ---------- Perform TADOT.	18 months

(continued)

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.6-1 to determine which SRs apply for each Containment Ventilation Isolation Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.6.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2	---------- NOTE ---------- This Surveillance is only applicable to the actuation logic of the ESFAS Instrumentation. ---------- Perform ACTUATION LOGIC TEST.	92 days on a STAGGERED TEST BASIS
R 3.3.6.3	---------- NOTE ---------- This Surveillance is only applicable to the master relays of the ESFAS Instrumentation. ---------- Perform MASTER RELAY TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.6.4	Perform COT.	92 days
SR 3.3.6.5	Perform SLAVE RELAY TEST.	18 months
SR 3.3.6.6	Perform CHANNEL CALIBRATION.	18 months

ATTACHMENT 4A

Braidwood Station
Units 1 and 2

NRC Docket Nos. 50-456 and 50-457

Facility Operating License Nos. NPF-72 and NPF-77

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BASES

ACTIONS (continued)

When the number of inoperable channels in a trip Function exceed those specified in all related Conditions associated with a trip Function, then the unit is outside the safety analysis. Therefore, LCO 3.0.3 must be immediately entered if applicable in the current MODE of operation.

Consistent with the requirement in References 13 and 14 to include Tier 2 insights into the decision-making process before taking equipment out of service, restrictions on concurrent removal of certain equipment when a logic train or a RTB train is inoperable for maintenance are included (note that these restrictions do not apply when a logic train or RTB train is being tested under the bypass Note). Entry into the Condition(s) is not a typical, pre-planned evolution during power operation, other than for surveillance testing. Since the Condition(s) is typically entered due to equipment failure, it follows that some of the following restrictions may not be met at the time of Condition entry. If this situation were to occur during the 24-hour Completion Time of the Required Action(s) for restoration, the Configuration Risk Management Program will assess the emergent condition and direct activities to restore the inoperable logic train or RTB train and exit the Condition(s) or fully implement these restrictions or perform a plant shutdown, as appropriate from a risk management perspective. The following restrictions will be observed:

1. To preserve Anticipated Transient Without Scram (ATWS) mitigation capability, activities that degrade the availability of the auxiliary feedwater (AFW) system, ATWS Mitigation System Actuation Circuitry (AMSAC), or turbine trip should not be scheduled when a logic train or RTB train is inoperable for maintenance.

2. To preserve Loss of Coolant Accident (LOCA) mitigation capability, one complete Emergency Core Coolant System (ECCS) train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance.

3. To preserve reactor trip and safeguards actuation capability, activities that cause master relays or slave relays in the available train to be unavailable and activities that cause RTS channels to be unavailable should not be scheduled when a logic train or RTB train is inoperable for maintenance.

BASES

ACTIONS (continued)

4. Activities that result in the inoperability of electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the AFW system, AMSAC, turbine trip, one complete train of ECCS, and the available reactor trip and ESFAS actuation functions should not be scheduled when a logic train or RTB train is inoperable for maintenance. That is, one complete train of a function that supports a complete train of a function noted above must be available.

A.1

Condition A applies to all RTS protection Functions. Condition A addresses the situation where one or more required channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.1-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

B.1 and B.2

Condition B applies to the Manual Reactor Trip in MODE 1 or 2. This action addresses the train orientation of the SSPS for this Function. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 48 hours. In this Condition, the remaining OPERABLE channel is adequate to perform the safety function.

The Completion Time of 48 hours is reasonable considering that there are two automatic actuation trains and another manual initiation channel OPERABLE, and the low probability of an event occurring during this interval.

If the Manual Reactor Trip Function cannot be restored to OPERABLE status within the allowed 48 hour Completion Time, 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 additional hours (54 hours total time). The 6 additional hours to reach MODE 3 is reasonable, based on operating experience, to reach MODE 3 from full power operation in an orderly manner and without challenging plant systems. With the unit in MODE 3, Action C would apply to any inoperable Manual Reactor Trip Function if the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

BASES

ACTIONS (continued)

C.1 and C.2

Condition C applies to the following reactor trip Functions in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods are not fully inserted:

- Manual Reactor Trip;
- RTBs;
- RTB Undervoltage and Shunt Trip Mechanisms; and
- Automatic Trip Logic.

This action addresses the train orientation of the SSPS for these Functions. With one channel or train inoperable, the inoperable channel or train must be restored to OPERABLE status within 48 hours. If the affected Function(s) cannot be restored to OPERABLE status within the allowed 48 hour Completion Time, the unit must be placed in a MODE in which the requirement does not apply. To achieve this status, the action must be initiated within the same 48 hours to ensure that all rods are fully inserted, and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The additional hour provides sufficient time to accomplish the action in an orderly manner. With rods fully inserted and the Rod Control System incapable of rod withdrawal, these Functions are no longer required.

The Completion Time is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function, and given the low probability of an event occurring during this interval.

BASES

ACTIONS (continued)

A Note to the ACTIONS restricts the transition from MODE 5 with the Rod Control System not capable of rod withdrawal and all rods fully inserted, to MODE 5 with the Rod Control System capable of rod withdrawal or all rods not fully inserted for Functions 18, 19, and 20 while complying with the ACTIONS (i.e., while the LCO is not met). LCO 3.0.4 typically allows entry into MODES or other specified conditions in the Applicability while in MODE 5, however, the restriction of this Note is necessary to assure an OPERABLE RTS function prior to commencing operation with the Rod Control System capable of rod withdrawal or all rods not fully inserted.

D.1 and D.2

Condition D applies to the Power Range Neutron Flux-High Function.

The NIS power range detectors provide input to the Rod Control System and the SG Water Level Control System and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 13.

As an alternative to the above Action, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes 72 hours for channel corrective maintenance and an additional 6 hours for the MODE reduction as required by Required Action D.2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours while performing routine surveillance testing of other channels. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 13.

BASES

ACTIONS (continued)

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux-Low;
- Overtemperature ΔT;
- Overpower ΔT;
- Power Range Neutron Flux-High Positive Rate;
- Pressurizer Pressure-High; and
- SG Water Level-Low Low.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 13.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 13.

BASES

ACTIONS (continued)

F.1 and F.2

Condition F applies to the Intermediate Range Neutron Flux trip when THERMAL POWER is above the P-6 setpoint and below the P-10 setpoint and one channel is inoperable. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range detector performs the monitoring Functions. If THERMAL POWER is greater than the P-6 setpoint but less than the P-10 setpoint, 2 hours is allowed to reduce THERMAL POWER below the P-6 setpoint or increase to THERMAL POWER above the P-10 setpoint. The provisions of LCO 3.0.4 allow entry into a MODE or other specified condition in the Applicability as directed by the Required Actions. Therefore, a MODE change is permitted with one channel inoperable whenever Required Action F.2 is used. The NIS Intermediate Range Neutron Flux channels must be OPERABLE when the power level is above the capability of the source range, P-6, and below the capability of the power range, P-10. If THERMAL POWER is greater than the P-10 setpoint, the NIS power range detectors perform the monitoring and protection functions and the intermediate range is not required. The Completion Times allow for a slow and controlled power adjustment above P-10 or below P-6 and take into account the redundant capability afforded by the redundant OPERABLE channel, and the low probability of its failure during this period. This action does not require the inoperable channel to be tripped because the Function uses one-out-of-two logic. Tripping one channel would trip the reactor. Thus, the Required Actions specified in this Condition are only applicable when channel failure does not result in reactor trip.

BASES

ACTIONS (continued)

G.1 and G.2

Condition G applies to two inoperable Intermediate Range Neutron Flux trip channels in MODE 2 when THERMAL POWER is above the P-6 setpoint and below the P-10 setpoint. Required Actions specified in this Condition are only applicable when channel failures do not result in reactor trip. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range detector performs the monitoring Functions. With no intermediate range channels OPERABLE, the Required Actions are to suspend operations involving positive reactivity additions immediately. This will preclude any power level increase since there are no OPERABLE Intermediate Range Neutron Flux channels. The operator must also reduce THERMAL POWER below the P-6 setpoint within two hours. Below P-6, the Source Range Neutron Flux channels will be able to monitor the core power level. The Completion Time of 2 hours will allow a slow and controlled power reduction to less than the P-6 setpoint and takes into account the low probability of occurrence of an event during this period that may require the protection afforded by the NIS Intermediate Range Neutron Flux trip.

H.1

Condition H applies to one inoperable Source Range Neutron Flux trip channel when in MODE 2, below the P-6 setpoint. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the two channels inoperable, operations involving positive reactivity additions shall be suspended immediately.

This will preclude any power escalation. With only one source range channel OPERABLE, core protection is severely reduced and any actions that add positive reactivity to the core must be suspended immediately.

BASES

ACTIONS (continued)

I.1

Condition I applies to two inoperable Source Range Neutron Flux trip channels when in MODE 2, below the P-6 setpoint, and in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With both source range channels inoperable, the RTBs must be opened immediately. With the RTBs open, the core is in a more stable condition.

J.1 and J.2

Condition J applies to one inoperable source range channel in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the source range channels inoperable, 48 hours is allowed to restore it to an OPERABLE status. If the channel cannot be returned to an OPERABLE status, action must be initiated within the same 48 hours to ensure that all rods are fully inserted, and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The allowance of 48 hours to restore the channel to OPERABLE status, and the additional hour, are justified in Reference 7.

BASES

ACTIONS (continued)

K.1 and K.2

Condition K applies to the following reactor trip Functions:

- Pressurizer Pressure-Low;
- Pressurizer Water Level-High;
- Reactor Coolant Flow-Low;
- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 setpoint. These Functions do not have to be OPERABLE below the P-7 setpoint. The 72 hours allowed to place the channel in the tripped condition is justified in Reference 13. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition K.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 13.

BASES

ACTIONS (continued)

L.1 and L.2

Condition L applies to Turbine Trip on Emergency Trip Header Pressure or on Turbine Throttle Valve Closure. With one channel inoperable, the inoperable channel must be placed in the trip condition within 72 hours. If placed in the tripped condition, this results in a partial trip condition requiring only one additional channel to initiate a reactor trip. If the channel cannot be restored to OPERABLE status or placed in the trip condition, then power must be reduced below the P-8 setpoint within the next 6 hours. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 13.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 13.

M.1 and M.2

Condition M applies to the SI Input from ESFAS reactor trip and the RTS Automatic Trip Logic in MODES 1 and 2. These actions address the train orientation of the RTS for these Functions. With one train inoperable, 24 hours are allowed to restore the train to OPERABLE status (Required Action M.1) or the unit must be placed in MODE 3 within the next 6 hours. The Completion Time of 24 hours (Required Action M.1) is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function and given the low probability of an event during this interval. The 24 hours allowed to restore the inoperable RTS Automatic Trip Logic train to OPERABLE status is justified in Reference 13. The Completion Time of 30 hours (Required Action M.2) is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows bypassing one train up to 4 hours for surveillance testing, provided the other train is OPERABLE.

BASES

ACTIONS (continued)

The 4 hour time limit for testing the RTS Automatic Trip Logic train may include testing the RTB also, if both the Logic test and the RTB test are conducted within the 4 hour time limit. The 4 hour time limit is justified in Reference 13.

N.1 and N.2

Condition N applies to the RTBs in MODES 1 and 2. These actions address the train orientation of the RTS for the RTBs. With one train inoperable, 24 hours are allowed for train corrective maintenance to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the next 6 hours. The 24 hour Completion Time is justified in Reference 14. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Placing the unit in MODE 3 results in Action C entry while RTB(s) are inoperable.

The Required Actions have been modified by a Note. The Note allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. The 4 hour time limit is justified in Reference 14.

O.1 and O.2

Condition O applies to the P-6 and P-10 interlocks. With one or more channels inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition by observation of the associated permissive annunciator window within 1 hour or the unit must be placed in MODE 3 within the next 6 hours. Verifying the interlock status manually accomplishes the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. The 1 hour and 6 hour Completion Times are equal to the time allowed by LCO 3.0.3 for

BASES

ACTIONS (continued)

shutdown actions in the event of a complete loss of RTS Function.

P.1 and P.2

Condition P applies to the P-7, P-8, and P-13 interlocks. With one or more channels inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition by observation of the associated permissive annunciator window within 1 hour or the unit must be placed in MODE 2 within the next 6 hours. These actions are conservative for the case where power level is being raised. Verifying the interlock status manually accomplishes the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 2 from full power in an orderly manner and without challenging plant systems.

Q.1 and Q.2

Condition Q applies to the RTB Undervoltage and Shunt Trip Mechanisms, or diverse trip features, in MODES 1 and 2. With one of the diverse trip features inoperable, it must be restored to an OPERABLE status within 48 hours or the unit must be placed in a MODE where the requirement does not apply. This is accomplished by placing the unit in MODE 3 within the next 6 hours (54 hours total time). The Completion Time of 6 hours is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

With the unit in MODE 3, Action C would apply to any inoperable RTB trip mechanism. The affected RTB shall not be bypassed while one of the diverse features is inoperable except for the time required to perform maintenance to one of the diverse features. The allowable time for performing maintenance of the diverse features is 2 hours for the reasons stated under Condition N.

The Completion Time of 48 hours for Required Action Q.1 is reasonable considering that in this Condition there is one remaining diverse feature for the affected RTB, and one OPERABLE RTB capable of performing the safety function and given the low probability of an event occurring during this interval.

BASES

ACTIONS (continued)

R.1 and R.2

Condition R applies to the RCP Breaker Position reactor trip Function. There is one breaker position device per RCP breaker. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within the 6 hours, then THERMAL POWER must be reduced below the P-7 setpoint within the next 6 hours. This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-7 setpoint because other RTS Functions provide core protection below the P-7 setpoint. The 6 hours allowed to restore the channel to OPERABLE status and the 6 additional hours allowed to reduce THERMAL POWER to below the P-7 setpoint are justified in Reference 11.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4-hour time limit is justified in Reference 7.

SURVEILLANCE REQUIREMENTS

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 (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 3.3.1.1

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 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.

SR 3.3.1.2

SR 3.3.1.2 compares the calorimetric heat balance calculation to the NIS channel output every 24 hours. If the calorimetric exceeds the NIS channel output by > 2% RTP, the NIS is not declared inoperable, but must be adjusted. If the NIS channel output cannot be properly adjusted, the channel is declared inoperable.

Two Notes modify SR 3.3.1.2. The first Note indicates that the NIS channel output shall be adjusted consistent with the calorimetric results if the absolute difference between the NIS channel output and the calorimetric is > 2% RTP. The second Note clarifies that this Surveillance is required only if reactor power is ≥ 15% RTP and that 12 hours is allowed for performing the first Surveillance after reaching 15% RTP. At lower power levels, calorimetric data are inaccurate.

The Frequency of every 24 hours is adequate. It is based on plant operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate the change in the absolute difference between NIS and heat balance calculated powers rarely exceeds 2% in any 24 hour period.

In addition, control room operators periodically monitor

BASES

SURVEILLANCE REQUIREMENTS (continued)

redundant indications and alarms to detect deviations in channel outputs.

SR 3.3.1.3

SR 3.3.1.3 compares the incore system to the NIS channel output prior to exceeding 75% RTP after each refueling and every 31 Effective Full Power days (EFPD) thereafter. If the absolute difference is ≥ 3%, the NIS channel is still OPERABLE, but must be readjusted.

If the NIS channel cannot be properly readjusted, the channel is declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the Overtemperature ΔT Function.

Two Notes modify SR 3.3.1.3. Note 1 indicates that the excore NIS channel shall be adjusted if the absolute difference between the incore and excore AFD is ≥ 3%. Note 2 clarifies that the Surveillance is required only if reactor power is > 15% RTP.

The Frequency of once prior to exceeding 75% RTP following each refueling outage considers that the core may be changed during a refueling outage such that the previous comparison, prior to the refueling outage, is no longer completely valid. The Frequency also considers that the comparison accuracy increases with power level such that the comparison is preferred to be performed at as high a power level as possible. An initial performance at ≤ 75% RTP provides a verification prior to attaining full power.

The Frequency of every 31 EFPD is adequate. It is based on plant 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.

SR 3.3.1.4

SR 3.3.1.4 is the performance of a TADOT every 62 days on a STAGGERED TEST BASIS. This test shall verify OPERABILITY by actuation of the end devices.

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

provided for performing such a test at power. The independent test for bypass breakers is included in SR 3.3.1.13. The bypass breaker test shall include a local shunt trip. A Note has been added to indicate that this test must be performed on the bypass breaker prior to placing it in service.

The Frequency of every 62 days on a STAGGERED TEST BASIS is justified in Reference 14.

SR 3.3.1.5

SR 3.3.1.5 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested every 92 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. The Frequency of every 92 days on a STAGGERED TEST BASIS is justified in Reference 14.

SR 3.3.1.6

SR 3.3.1.6 is a calibration of the excore channels to agree with the incore measurements. If the measurements do not agree, the excore channels are not declared inoperable but must be calibrated to agree with the incore 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.

A Note modifies SR 3.3.1.6. The Note states that this Surveillance is required only if reactor power is $\geq$ 75% RTP and that 24 hours is allowed for performing the first surveillance after reaching 75% 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.7

SR 3.3.1.7 is the performance of a COT every 184 days. A COT is performed on each required channel to ensure the entire channel will perform the intended Function. 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 calculated normal uncertainties consistent with the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current plant specific setpoint methodology.

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis (Ref. 7) when applicable.

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.

The Frequency of 184 days is justified in Reference 14.

SR 3.3.1.8

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. The Frequency is modified by a Note that allows this surveillance to be satisfied if it has been performed within 184 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 "4 hours after reducing power below P-10" (applicable to intermediate and power range low channels) and "4 hours after reducing power below P-6"

BASES

SURVEILLANCE REQUIREMENTS (continued)

(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 184 days thereafter applies if the unit remains in the MODE of Applicability after the initial performances of prior to reactor startup and four hours after reducing power below P-10 or P-6. 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 or < P-6 for more than 4 hours, then the testing required by this surveillance must be performed prior to the expiration of the 4 hour limit. Four hours is a reasonable time 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) for periods > 4 hours.

SR 3.3.1.9

SR 3.3.1.9 is the performance of a TADOT every 92 days, as justified in Reference 7.

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.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the plant specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the calculated normal uncertainties consistent with 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.

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, and obtaining detector plateau curves, evaluating those curves, and comparing the curves to the manufacturer's data. The CHANNEL CALIBRATION for the source range, intermediate range, and power range neutron detectors consists of obtaining the detector plateau or preamp discriminator curves, evaluating those curves, and comparing the 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 plant 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.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a COT of RTS interlocks every 18 months.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 3.3.1.13

SR 3.3.1.13 is the performance of a TADOT of the Manual Reactor Trip, RCP Breaker Position, and the SI Input from ESFAS. 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 Reactor Trip Bypass Breakers. The Reactor Trip Bypass Breaker test shall include testing of the automatic undervoltage trip.

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.

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

SR 3.3.1.14

SR 3.3.1.14 is the performance of a TADOT of Turbine Trip Functions. This TADOT is performed prior to reactor startup. A Note states that this Surveillance is required if it has not been performed once within the previous 31 days. Verification of the Trip Setpoint does not have to be performed for this Surveillance. Performance of this test will ensure that the Turbine Trip Function is OPERABLE prior to taking the reactor critical. This test cannot be performed with the reactor at power and must therefore be performed prior to reactor startup.

SR 3.3.1.15

SR 3.3.1.15 verifies that the individual channel/train actuation 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 UFSAR, Section 7.2 (Ref. 9). Individual component response times are not modeled in the analyses.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 reaches the required functional state.

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 Function set to one, with the resulting measured response time compared to the appropriate UFSAR 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 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) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. Reference 8 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.

Reference 12 provides the basis and 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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. 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 3.3.1.15 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. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

BASES

REFERENCES

1. UFSAR, Chapter 7.

2. UFSAR, Chapter 6.

3. UFSAR, Chapter 15.

4. IEEE-279-1971.

5. Technical Requirements Manual.

6. WCAP-12523, "RTS/ESFAS Setpoint Methodology Study," October 1990.

7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

8. WCAP-13632, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," August 1995.

9. UFSAR, Section 7.2.

10. WCAP-12583, "Westinghouse Setpoint Methodology For Protection Systems, Byron/Braidwood Stations," May 1990.

11. ComEd NES-EIC-20.04, Revision 0, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy," October 14, 1997.

12. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," October 1998.

13. WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," October 1998.

14. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," March 2000.

BASES

ACTIONS (continued)

When the number of inoperable channels in a trip function exceeds those specified in all related Conditions associated with a trip function, then the unit is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered if applicable in the current MODE of operation.

Consistent with the requirement in References 15 and 16 to include Tier 2 insights into the decision-making process before taking equipment out of service, restrictions on concurrent removal of certain equipment when a logic train is inoperable for maintenance are included (note that these restrictions do not apply when a logic train is being tested under the bypass Note). Entry into the Condition(s) is not a typical, pre-planned evolution during power operation, other than for surveillance testing. Since the Condition(s) is typically entered due to equipment failure, it follows that some of the following restrictions may not be met at the time of Condition entry. If this situation were to occur during the 24-hour Completion Time of the Required Action(s) for restoration, the Configuration Risk Management Program will assess the emergent condition and direct activities to restore the inoperable logic train and exit the Condition(s) or fully implement these restrictions or perform a plant shutdown, as appropriate from a risk management perspective. The following restrictions will be observed:

1. To preserve Anticipated Transient Without Scram (ATWS) mitigation capability, activities that degrade the availability of the auxiliary feedwater (AFW) system, ATWS Mitigation System Actuation Circuitry (AMSAC), or turbine trip should not be scheduled when a logic train is inoperable for maintenance.

2. To preserve Loss of Coolant Accident (LOCA) mitigation capability, one complete Emergency Core Coolant System (ECCS) train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance.

3. To preserve reactor trip and safeguards actuation capability, activities that cause master relays or slave relays in the available train to be unavailable and activities that cause ESFAS channels to be unavailable should not be scheduled when a logic train is inoperable for maintenance, with the exception of ESFAS Function 2.c, "Containment Spray, Containment Pressure High-3," and ESFAS Function 3.b.(3), "Containment Isolation, Phase B Isolation, Containment

BASES

ACTIONS (continued)

Pressure High-3." TS 3.3.2, Condition E requires that both of these functions be placed in bypass when inoperable.

4. Activities that result in the inoperability of electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the AFW system, AMSAC, turbine trip, one complete train of ECCS, and the available reactor trip and ESFAS actuation functions should not be scheduled when a logic train is inoperable for maintenance. That is, one complete train of a function that supports a complete train of a function noted above must be available.

A.1

Condition A applies to all ESFAS protection functions. Condition A addresses the situation where one or more required channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.2-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

B.1, B.2.1, and B.2.2

Condition B applies to manual initiation of:

- SI;
- Containment Spray;
- Phase A Isolation; and
- Phase B Isolation.

This action addresses the train orientation of the SSPS for the functions listed above. If one channel is inoperable, 48 hours is allowed to return it to an OPERABLE status. Note that for containment spray and Phase B isolation, failure of one or both switches in one channel renders the channel inoperable. Condition B, therefore, encompasses both situations. The specified Completion Time is reasonable considering that there are two automatic actuation trains and another manual initiation train OPERABLE for each Function, and the low probability of an event occurring during this interval. If the train cannot

BASES

ACTIONS (continued)

be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (54 hours total time) and in MODE 5 within an additional 30 hours (84 hours total time).

The allowable 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.

C.1, C.2.1, and C.2.2

Condition C applies to the automatic actuation logic and actuation relays for the following functions:

- SI;
- Containment Spray;
- Phase A Isolation;
- Phase B Isolation; and
- Automatic Switchover to Containment Sump.

This action addresses the train orientation of the SSPS and the master and slave relays. If one train is inoperable, 24 hours are allowed to restore the train to OPERABLE status. The 24 hours allowed for restoring the inoperable train to OPERABLE status is justified in Reference 15. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (30 hours total time) and in MODE 5 within an additional 30 hours (60 hours total time). The 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.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. This allowance is based on the reliability analysis assumption of

BASES

ACTIONS (continued)

WCAP-10271-P-A (Ref. 7) that 4 hours is the average time required to perform train surveillance.

D.1, D.2.1, and D.2.2

Condition D applies to:

- Containment Pressure-High 1;
- Pressurizer Pressure-Low;
- Steam Line Pressure-Low;
- Containment Pressure-High 2;
- Steam Line Pressure-Negative Rate-High;
- SG Water Level-Low Low; and
- SG Water Level-High High (P-14).

If one channel is inoperable, 72 hours are allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Generally, this Condition applies to functions that operate on two-out-of-three logic or a two-out-of-four logic. Therefore, failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements. The 72 hours allowed to restore the channel to OPERABLE status or to place it in the tripped condition is justified in Reference 15.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 72 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 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. In MODE 4, these Functions are no longer required OPERABLE.

BASES

ACTIONS (continued)

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 12 hours for surveillance testing of other channels. The 12 hours allowed for testing is justified in Reference 15.

E.1, E.2.1, and E.2.2

Condition E applies to:

- Containment Spray Containment Pressure-High 3; and
- Containment Phase B Isolation Containment Pressure-High 3.

None of these signals has input to a control function. Thus, two-out-of-three logic is necessary to meet acceptable protective requirements. However, a two-out-of-three design would require tripping a failed channel. This is undesirable because a single failure would then cause spurious containment spray initiation. Spurious spray actuation is undesirable because of the cleanup problems presented. Therefore, these channels are designed with two-out-of-four logic so that a failed channel may be bypassed rather than tripped. Note that one channel may be bypassed and still satisfy the single failure criterion. Furthermore, with one channel bypassed, a single instrumentation channel failure will not spuriously initiate containment spray.

BASES

ACTIONS (continued)

To avoid the inadvertent actuation of containment spray and Phase B containment isolation, the inoperable channel should not be placed in the tripped condition. Instead it is bypassed. Restoring the channel to OPERABLE status, or placing the inoperable channel in the bypass condition within 72 hours, is sufficient to assure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed in a trip condition). The Completion Time is further justified based on the low probability of an event occurring during this interval. The Completion Time is further justified based on the low probability of an event occurring during this interval. Failure to restore the inoperable channel to OPERABLE status, or place it in the bypassed condition within 72 hours, requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 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. In MODE 4, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows one additional channel to be bypassed for up to 12 hours for surveillance testing. Placing a second channel in the bypass condition for up to 12 hours for testing purposes is acceptable based on the results of Reference 15.

BASES

ACTIONS (continued)

F.1, F.2.1, and F.2.2

Condition F applies to:

- Manual Initiation of Steam Line Isolation; and
- P-4 Interlock.

For the Manual Initiation and the P-4 Interlock Functions, this action addresses the train orientation of the SSPS. If a train or channel is inoperable, 48 hours is allowed to return it to OPERABLE status. The specified Completion Time is reasonable considering the nature of these Functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, 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 in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

G.1, G.2.1 and G.2.2

Condition G applies to the automatic actuation logic and actuation relays for the Steam Line Isolation, Turbine Trip and Feedwater Isolation, and AF actuation Functions.

BASES

ACTIONS (continued)

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, 24 hours are allowed to restore the train to OPERABLE status. The 24 hours allowed to restore the inoperable train to OPERABLE status is justified in Reference 15. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to 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 the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

H.1, H.2.1, and H.2.2

Condition H applies to Loss of Offsite Power. For this Function, if one channel is inoperable, 1 hour is allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within an hour requires the unit be placed in MODE 3 within the following 6 hours (total of 7 hours) and MODE 4 within the next 6 hours (total of 13 hours).

BASES

ACTIONS (continued)

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, the Function is no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 2 hours for surveillance testing of other channels. The 1 hour allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 2 hours allowed for testing, are deemed acceptable based on engineering judgement.

I.1 and I.2

Condition I applies to the Undervoltage Reactor Coolant Pump Function.

If one channel is inoperable, 72 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition on the affected train where one-out-of-three logic will result in actuation. The 72 hours allowed to restore the channel to OPERABLE status or to place it in the tripped condition is justified in Reference 15. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 72 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of 78 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 12 hours for surveillance testing of other channels. The 72 hours allowed to place the inoperable channel in the tripped condition, and the 12 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 15.

BASES

ACTIONS (continued)

J.1

Condition J applies to the Auxiliary Feedwater Pump Suction Transfer on Suction Pressure-Low Function. With one train inoperable, the associated auxiliary feedwater pump must be immediately declared inoperable. This requires entry into applicable Conditions and Required Actions of LCO 3.7.5, "AF System."

K.1, K.2.1, and K.2.2

Condition K applies to the RWST Level-Low Low Coincident with Safety Injection Function.

RWST Level-Low Low Coincident with SI provides actuation of switchover to the containment sump. Note that this Function requires the bistables to energize to perform their required action.

This Condition applies to a Function that operates on two-out-of-four logic. Therefore, failure of one channel places the Function in a two-out-of-three configuration. One channel must be tripped to place the Function in a one-out-of-three configuration that satisfies redundancy requirements.

If the channel cannot be returned to OPERABLE status or placed in the tripped condition within 72 hours, the unit must be brought to MODE 3 within the following 6 hours and MODE 5 within the next 30 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 5, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above.

The Required Actions are modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours for surveillance testing of other channels. This is acceptable based on the results of Reference 15.

BASES

ACTIONS (continued)

L.1, L.2.1 and L.2.2

Condition L applies to the P-11 and P-12 interlocks.

With one or more channels inoperable, the operator must verify that the interlock is in the required state for the existing unit condition. This action manually accomplishes the function of the interlock. Determination must be made within 1 hour. The 1 hour Completion Time is equal to the time allowed by LCO 3.0.3 to initiate shutdown 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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.

Agreement criteria are determined 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.

SR 3.3.2.2

SR 3.3.2.2 is the performance of a COT every 31 days. 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.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the calculated normal uncertainty consistent with the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current plant specific setpoint methodology.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis (Ref. 7) when applicable.

The Frequency is adequate based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.3

SR 3.3.2.3 is the performance of a TADOT every 31 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.

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.

SR 3.3.2.4

SR 3.3.2.4 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested every 92 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. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and that there is an intact voltage signal path to the master relay coils. The Frequency of every 92 days on a STAGGERED TEST BASIS is justified in Reference 16.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.5

SR 3.3.2.5 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 92 days on a STAGGERED TEST BASIS. The time allowed for the testing (4 hours) is justified in Reference 7. The frequency of 92 days is justified in Reference 16.

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 Undervoltage RCP Function. The Function is tested up to, and including, the master relay coils.

The test also includes trip devices that provide actuation signals directly to the SSPS. 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.

SR 3.3.2.7

SR 3.3.2.7 is the performance of a COT.

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.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the calculated normal uncertainty consistent with the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current plant specific setpoint methodology.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of Reference 16.

The Frequency of 184 days is justified in Reference 16.

SR 3.3.2.8

SR 3.3.2.8 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 18 months. The Frequency of 18 months is based on the reliability analyses described in References 12, 13, and 14. These reliability analyses were performed for the Westinghouse Type AR relays and for the Potter & Brumfield MDR Series relays used for the slave and auxiliary relays in the ESFAS circuit.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.9

SR 3.3.2.9 is the performance of a TADOT. This test is a check of the Manual Actuation Functions and P-4 Reactor Trip Interlock. It is performed every 18 months. Each Manual Actuation Function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.). The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions have no associated setpoints.

SR 3.3.2.10

SR 3.3.2.10 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 plant 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.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.11 and SR 3.3.2.12

These SRs ensure 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 UFSAR, Section 7.3, (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 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 UFSAR 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 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) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. Reference 8 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Reference 11 provides the basis and 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.

ESF RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS with the exception of Function 6.d. 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. Function 6.d is associated with the start of the motor-driven auxiliary feedwater pump only (Train A). Therefore, a Frequency of 18 months is specified. The 18 month Frequency is consistent with the typical refueling cycle and is based on plant operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

BASES

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 7.

3. UFSAR, Chapter 15.

4. IEEE-279-1971.

5. Technical Requirements Manual.

6. WCAP-12523, "RTS/ESFAS Setpoint Methodology Study," October 1990.

7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

8. WCAP-13632 Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," August 1995.

9. UFSAR, Section 7.3.

10. WCAP-12583, "Westinghouse Setpoint Methodology For Protection Systems, Byron/Braidwood Stations," May 1990.

11. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," October 1998.

12. WCAP-13877, Revision 2-P, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," October 1999.

13. WCAP-13878-P, Revision 2, "Reliability Assessment of Potter & Brumfield MDR Series Relays," October 1999.

14. WCAP-13900, Revision 0, "Extension of Slave Relay Surveillance Test Intervals," April 1994.

15. WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," October 1998.

16. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," March 2000.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

Agreement criteria are determined 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.

SR 3.3.6.2

SR 3.3.6.2 is the performance of an ACTUATION LOGIC TEST. 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. In addition, the master relay coil is tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils. This test is performed every 92 days on a STAGGERED TEST BASIS. The Surveillance interval is justified in Reference 6.

The SR has been modified by a Note stating that the Surveillance is only applicable to the actuation logic of the ESFAS Instrumentation.

SR 3.3.6.3

SR 3.3.6.3 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 92 days on a STAGGERED TEST BASIS. The Surveillance interval is justified in Reference 6.

The SR has been modified by a Note stating that the Surveillance is only applicable to the master relays of the ESFAS Instrumentation..

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.6

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 Frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

1. 10 CFR 50.67.

2. NUREG-1366, December 1992.

3. WCAP-13877, Revision 2-P, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," October 1999.

4. WCAP-13878-P, Revision 2, "Reliability Assessment of Potter & Brumfield MDR Series Relays," October 1999.

5. WCAP-13900, Revision 0, "Extension of Slave Relay Surveillance Test Intervals," April 1994.

6. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," March 2000.

ATTACHMENT 4B

Byron Station
Units 1 and 2

NRC Docket Nos. 50-454 and 50-455

Facility Operating License Nos. NPF-37 and NPF-66

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BASES

ACTIONS (continued)

When the number of inoperable channels in a trip Function exceed those specified in all related Conditions associated with a trip Function, then the unit is outside the safety analysis. Therefore, LCO 3.0.3 must be immediately entered if applicable in the current MODE of operation.

Consistent with the requirement in References 13 and 14 to include Tier 2 insights into the decision-making process before taking equipment out of service, restrictions on concurrent removal of certain equipment when a logic train or an RTB train is inoperable for maintenance are included (note that these restrictions do not apply when a logic train or RTB train is being tested under the 4-hour bypass Note). Entry into the Condition(s) is not a typical, pre-planned evolution during power operation, other than for surveillance testing. Since the Condition(s) is typically entered due to equipment failure, it follows that some of the following restrictions may not be met at the time of Condition entry. If this situation were to occur during the 24-hour Completion Time of the Required Action(s), the Configuration Risk Management Program will assess the emergent condition and direct activities to restore the inoperable logic train or RTB train and exit the Condition(s) or fully implement these restrictions or perform a plant shutdown, as appropriate from a risk management perspective. The following restrictions will be observed:

1. To preserve Anticipated Transient Without Scram (ATWS) mitigation capability, activities that degrade the availability of the auxiliary feedwater system, ATWS Mitigation System Actuation Circuitry (AMSAC), or turbine trip should not be scheduled when a logic train or RTB train is inoperable for maintenance.

2. To preserve Loss of Coolant Accident (LOCA) mitigation capability, one complete Emergency Core Coolant System (ECCS) train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance.

3. To preserve reactor trip and safeguards actuation capability, activities that cause master relays or slave relays in the available train to be unavailable and activities that cause RTS channels to be unavailable should not be scheduled when a logic train or RTB train is inoperable for maintenance.

BASES

ACTIONS (continued)

4. Activities that result in the inoperability of electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the AFW system, AMSAC, turbine trip, one complete train of ECCS, and the available reactor trip and ESFAS actuation functions should not be scheduled when a logic train or RTB train is inoperable for maintenance. That is, one complete train of a function that supports a complete train of a function noted above must be available.

A.1

Condition A applies to all RTS protection Functions. Condition A addresses the situation where one or more required channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.1-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

B.1 and B.2

Condition B applies to the Manual Reactor Trip in MODE 1 or 2. This action addresses the train orientation of the SSPS for this Function. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 48 hours. In this Condition, the remaining OPERABLE channel is adequate to perform the safety function.

The Completion Time of 48 hours is reasonable considering that there are two automatic actuation trains and another manual initiation channel OPERABLE, and the low probability of an event occurring during this interval.

If the Manual Reactor Trip Function cannot be restored to OPERABLE status within the allowed 48 hour Completion Time, 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 additional hours (54 hours total time). The 6 additional hours to reach MODE 3 is reasonable, based on operating experience, to reach MODE 3 from full power operation in an orderly manner and without challenging plant systems. With the unit in MODE 3, Action C would apply to any inoperable Manual Reactor Trip Function if the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

BASES

ACTIONS (continued)

C.1 and C.2

Condition C applies to the following reactor trip Functions in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods are not fully inserted:

- Manual Reactor Trip;
- RTBs;
- RTB Undervoltage and Shunt Trip Mechanisms; and
- Automatic Trip Logic.

This action addresses the train orientation of the SSPS for these Functions. With one channel or train inoperable, the inoperable channel or train must be restored to OPERABLE status within 48 hours. If the affected Function(s) cannot be restored to OPERABLE status within the allowed 48 hour Completion Time, the unit must be placed in a MODE in which the requirement does not apply. To achieve this status, the action must be initiated within the same 48 hours to ensure that all rods are fully inserted, and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The additional hour provides sufficient time to accomplish the action in an orderly manner. With rods fully inserted and the Rod Control System incapable of rod withdrawal, these Functions are no longer required.

The Completion Time is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function, and given the low probability of an event occurring during this interval.

BASES

ACTIONS (continued)

A Note to the ACTIONS restricts the transition from MODE 5 with the Rod Control System not capable of rod withdrawal and all rods fully inserted, to MODE 5 with the Rod Control System capable of rod withdrawal or all rods not fully inserted for Functions 18, 19, and 20 while complying with the ACTIONS (i.e., while the LCO is not met). LCO 3.0.4 typically allows entry into MODES or other specified conditions in the Applicability while in MODE 5, however, the restriction of this Note is necessary to assure an OPERABLE RTS function prior to commencing operation with the Rod Control System capable of rod withdrawal or all rods not fully inserted.

D.1 and D.2

Condition D applies to the Power Range Neutron Flux-High Function.

The NIS power range detectors provide input to the Rod Control System and the SG Water Level Control System and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 13.

As an alternative to the above Action, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes 72 hours for channel corrective maintenance, and an additional 8 hours for the MODE reduction as required by Required Action D.2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours while performing routine surveillance testing of other channels. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 13.

BASES

ACTIONS (continued)

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux-Low;
- Overtemperature ΔT;
- Overpower ΔT;
- Power Range Neutron Flux-High Positive Rate;
- Pressurizer Pressure-High; and
- SG Water Level-Low Low.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 13.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 13.

BASES

ACTIONS (continued)

F.1 and F.2

Condition F applies to the Intermediate Range Neutron Flux trip when THERMAL POWER is above the P-6 setpoint and below the P-10 setpoint and one channel is inoperable. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range detector performs the monitoring Functions. If THERMAL POWER is greater than the P-6 setpoint but less than the P-10 setpoint, 2 hours is allowed to reduce THERMAL POWER below the P-6 setpoint or increase to THERMAL POWER above the P-10 setpoint. The provisions of LCO 3.0.4 allow entry into a MODE or other specified condition in the Applicability as directed by the Required Actions. Therefore, a MODE change is permitted with one channel inoperable whenever Required Action F.2 is used. The NIS Intermediate Range Neutron Flux channels must be OPERABLE when the power level is above the capability of the source range, P-6, and below the capability of the power range, P-10. If THERMAL POWER is greater than the P-10 setpoint, the NIS power range detectors perform the monitoring and protection functions and the intermediate range is not required. The Completion Times allow for a slow and controlled power adjustment above P-10 or below P-6 and take into account the redundant capability afforded by the redundant OPERABLE channel, and the low probability of its failure during this period. This action does not require the inoperable channel to be tripped because the Function uses one-out-of-two logic. Tripping one channel would trip the reactor. Thus, the Required Actions specified in this Condition are only applicable when channel failure does not result in reactor trip.

BASES

ACTIONS (continued)

G.1 and G.2

Condition G applies to two inoperable Intermediate Range Neutron Flux trip channels in MODE 2 when THERMAL POWER is above the P-6 setpoint and below the P-10 setpoint. Required Actions specified in this Condition are only applicable when channel failures do not result in reactor trip. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range detector performs the monitoring Functions. With no intermediate range channels OPERABLE, the Required Actions are to suspend operations involving positive reactivity additions immediately. This will preclude any power level increase since there are no OPERABLE Intermediate Range Neutron Flux channels. The operator must also reduce THERMAL POWER below the P-6 setpoint within two hours. Below P-6, the Source Range Neutron Flux channels will be able to monitor the core power level. The Completion Time of 2 hours will allow a slow and controlled power reduction to less than the P-6 setpoint and takes into account the low probability of occurrence of an event during this period that may require the protection afforded by the NIS Intermediate Range Neutron Flux trip.

H.1

Condition H applies to one inoperable Source Range Neutron Flux trip channel when in MODE 2, below the P-6 setpoint. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the two channels inoperable, operations involving positive reactivity additions shall be suspended immediately.

This will preclude any power escalation. With only one source range channel OPERABLE, core protection is severely reduced and any actions that add positive reactivity to the core must be suspended immediately.

BASES

ACTIONS (continued)

I.1

Condition I applies to two inoperable Source Range Neutron Flux trip channels when in MODE 2, below the P-6 setpoint, and in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With both source range channels inoperable, the RTBs must be opened immediately. With the RTBs open, the core is in a more stable condition.

J.1 and J.2

Condition J applies to one inoperable source range channel in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the source range channels inoperable, 48 hours is allowed to restore it to an OPERABLE status. If the channel cannot be returned to an OPERABLE status, action must be initiated within the same 48 hours to ensure that all rods are fully inserted, and the Rod Control System must be placed in a condition incapable of rod withdrawal within the next hour. The allowance of 48 hours to restore the channel to OPERABLE status, and the additional hour, are justified in Reference 7.

BASES

ACTIONS (continued)

K.1 and K.2

Condition K applies to the following reactor trip Functions:

- Pressurizer Pressure-Low;
- Pressurizer Water Level-High;
- Reactor Coolant Flow-Low;
- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 setpoint. These Functions do not have to be OPERABLE below the P-7 setpoint. The 72 hours allowed to place the channel in the tripped condition is justified in Reference 13. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition K.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 13.

BASES

ACTIONS (continued)

L.1 and L.2

Condition L applies to Turbine Trip on Emergency Trip Header Pressure or on Turbine Throttle Valve Closure. With one channel inoperable, the inoperable channel must be placed in the trip condition within 72 hours. If placed in the tripped condition, this results in a partial trip condition requiring only one additional channel to initiate a reactor trip. If the channel cannot be restored to OPERABLE status or placed in the trip condition, then power must be reduced below the P-8 setpoint within the next 6 hours. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 13.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 13.

M.1 and M.2

Condition M applies to the SI Input from ESFAS reactor trip and the RTS Automatic Trip Logic in MODES 1 and 2. These actions address the train orientation of the RTS for these Functions. With one train inoperable, 24 hours are allowed to restore the train to OPERABLE status (Required Action M.1) or the unit must be placed in MODE 3 within the next 6 hours. The Completion Time of 24 hours (Required Action M.1) is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function and given the low probability of an event during this interval. The 24 hours allowed to restore the inoperable RTS Automatic Trip Logic train to OPERABLE status is justified in Reference 13. The Completion Time of 30 hours (Required Action M.2) is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows bypassing one train up to 4 hours for surveillance testing, provided the other train is OPERABLE.

BASES

ACTIONS (continued)

The 4 hour time limit for testing the RTS Automatic Trip Logic train may include testing the RTB also, if both the Logic test and the RTB test are conducted within the 4 hour time limit. The 4 hour time limit is justified in Reference 13.

N.1 and N.2

Condition N applies to the RTBs in MODES 1 and 2. These actions address the train orientation of the RTS for the RTBs. With one train inoperable, 24 hours are allowed for train corrective maintenance to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the next 6 hours. The 24 hour Completion Time is justified in Reference 14. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Placing the unit in MODE 3 results in Action C entry while RTB(s) are inoperable.

The Required Actions have been modified by a Note. The Note allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other channel is OPERABLE The 4 hour time limit is justified in Reference 14.

O.1 and O.2

Condition O applies to the P-6 and P-10 interlocks. With one or more channels inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition by observation of the associated permissive annunciator window within 1 hour or the unit must be placed in MODE 3 within the next 6 hours. Verifying the interlock status manually accomplishes the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. The 1 hour and 6 hour Completion Times are equal to the time allowed by LCO 3.0.3 for shutdown actions in the event of a complete loss of RTS Function.

BASES

ACTIONS (continued)

P.1 and P.2

Condition P applies to the P-7, P-8, and P-13 interlocks. With one or more channels inoperable for one-out-of-two or two-out-of-four coincidence logic, the associated interlock must be verified to be in its required state for the existing unit condition by observation of the associated permissive annunciator window within 1 hour or the unit must be placed in MODE 2 within the next 6 hours. These actions are conservative for the case where power level is being raised. Verifying the interlock status manually accomplishes the interlock's Function. The Completion Time of 1 hour is based on operating experience and the minimum amount of time allowed for manual operator actions. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 2 from full power in an orderly manner and without challenging plant systems.

Q.1 and Q.2

Condition Q applies to the RTB Undervoltage and Shunt Trip Mechanisms, or diverse trip features, in MODES 1 and 2. With one of the diverse trip features inoperable, it must be restored to an OPERABLE status within 48 hours or the unit must be placed in a MODE where the requirement does not apply. This is accomplished by placing the unit in MODE 3 within the next 6 hours (54 hours total time). The Completion Time of 6 hours is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

With the unit in MODE 3, Action C would apply to any inoperable RTB trip mechanism. The affected RTB shall not be bypassed while one of the diverse features is inoperable except for the time required to perform maintenance to one of the diverse features. The allowable time for performing maintenance of the diverse features is 2 hours for the reasons stated under Condition N.

The Completion Time of 48 hours for Required Action Q.1 is reasonable considering that in this Condition there is one remaining diverse feature for the affected RTB, and one OPERABLE RTB capable of performing the safety function and given the low probability of an event occurring during this interval.

BASES

ACTIONS (continued)

R.1 and R.2

Condition R applies to the RCP Breaker Position reactor trip Function. There is one breaker position device per RCP breaker. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within the 6 hours, then THERMAL POWER must be reduced below the P-7 setpoint within the next 6 hours. This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-7 setpoint because other RTS Functions provide core protection below the P-7 setpoint. The 6 hours allowed to restore the channel to OPERABLE status and the 6 additional hours allowed to reduce THERMAL POWER to below the P-7 setpoint are justified in Reference 11.

SURVEILLANCE REQUIREMENTS

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 (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 3.3.1.1

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

instrumentation continues to operate properly between each CHANNEL CALIBRATION. Agreement criteria are determined 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.

SR 3.3.1.2

SR 3.3.1.2 compares the calorimetric heat balance calculation to the NIS channel output every 24 hours. If the calorimetric exceeds the NIS channel output by > 2% RTP, the NIS is not declared inoperable, but must be adjusted. If the NIS channel output cannot be properly adjusted, the channel is declared inoperable.

Two Notes modify SR 3.3.1.2. The first Note indicates that the NIS channel output shall be adjusted consistent with the calorimetric results if the absolute difference between the NIS channel output and the calorimetric is > 2% RTP. The second Note clarifies that this Surveillance is required only if reactor power is ≥ 15% RTP and that 12 hours is allowed for performing the first Surveillance after reaching 15% RTP. At lower power levels, calorimetric data are inaccurate.

The Frequency of every 24 hours is adequate. It is based on plant operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate the change in the absolute difference between NIS and heat balance calculated powers rarely exceeds 2% in any 24 hour period.

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.3

SR 3.3.1.3 compares the incore system to the NIS channel output prior to exceeding 75% RTP after each refueling and every 31 Effective Full Power days (EFPD) thereafter. If the absolute difference is $\geq$ 3%, the NIS channel is still OPERABLE, but must be readjusted.

If the NIS channel cannot be properly readjusted, the channel is declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the Overtemperature ΔT Function.

Two Notes modify SR 3.3.1.3. Note 1 indicates that the excore NIS channel shall be adjusted if the absolute difference between the incore and excore AFD is $\geq$ 3%. Note 2 clarifies that the Surveillance is required only if reactor power is > 15% RTP.

The Frequency of once prior to exceeding 75% RTP following each refueling outage considers that the core may be changed during a refueling outage such that the previous comparison, prior to the refueling outage, is no longer completely valid. The Frequency also considers that the comparison accuracy increases with power level such that the comparison is preferred to be performed at as high a power level as possible. An initial performance at $\leq$ 75% RTP provides a verification prior to attaining full power.

The Frequency of every 31 EFPD is adequate. It is based on plant 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.

SR 3.3.1.4

SR 3.3.1.4 is the performance of a TADOT every 62 days on a STAGGERED TEST BASIS. This test shall verify OPERABILITY by actuation of the end devices.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 3.3.1.13. The bypass breaker test shall include a local shunt trip. A Note has been added to indicate that this test must be performed on the bypass breaker prior to placing it in service.

The Frequency of every 62 days on a STAGGERED TEST BASIS is justified in Reference 14.

SR 3.3.1.5

SR 3.3.1.5 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested every 92 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. The Frequency of every 92 days on a STAGGERED TEST BASIS is justified in Reference 14.

SR 3.3.1.6

SR 3.3.1.6 is a calibration of the excore channels to agree with the incore measurements. If the measurements do not agree, the excore channels are not declared inoperable but must be calibrated to agree with the incore measurements. If the excore channels cannot be adjusted, the channels are declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the Overtemperature ΔT Function.

BASES

SURVEILLANCE REQUIREMENTS (continued)

A Note modifies SR 3.3.1.6. The Note states that this Surveillance is required only if reactor power is ≥ 75% RTP and that 24 hours is allowed for performing the first surveillance after reaching 75% 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.

SR 3.3.1.7

SR 3.3.1.7 is the performance of a COT every 184 days. A COT is performed on each required channel to ensure the entire channel will perform the intended Function. 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 calculated normal uncertainties consistent with the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current plant specific setpoint methodology.

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis (Ref. 7) when applicable.

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.

The Frequency of 184 days is justified in Reference 14.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.8

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. The Frequency is modified by a Note that allows this surveillance to be satisfied if it has been performed within 184 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 "4 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 184 days thereafter applies if the unit remains in the MODE of Applicability after the initial performances of prior to reactor startup and four hours after reducing power below P-10 or P-6. 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 or < P-6 for more than 4 hours, then the testing required by this surveillance must be performed prior to the expiration of the 4 hour limit. Four hours is a reasonable time 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) for periods > 4 hours.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.9

SR 3.3.1.9 is the performance of a TADOT every 92 days, as justified in Reference 7.

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.

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 plant specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the calculated normal uncertainties consistent with 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.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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, and obtaining detector plateau or preamp discriminator curves, evaluating those curves, and comparing the curves to the manufacturer's data. The CHANNEL CALIBRATION for the source range and intermediate range neutron detectors consists of obtaining the detector discriminator curves, evaluating those curves, and comparing the 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 plant 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.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a COT of RTS interlocks every 18 months.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.13

SR 3.3.1.13 is the performance of a TADOT of the Manual Reactor Trip, RCP Breaker Position, and the SI Input from ESFAS. 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 Reactor Trip Bypass Breakers. The Reactor Trip Bypass Breaker test shall include testing of the automatic undervoltage trip.

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.

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

SR 3.3.1.14

SR 3.3.1.14 is the performance of a TADOT of Turbine Trip Functions. This TADOT is performed prior to reactor startup. A Note states that this Surveillance is required if it has not been performed once within the previous 31 days. Verification of the Trip Setpoint does not have to be performed for this Surveillance. Performance of this test will ensure that the Turbine Trip Function is OPERABLE prior to taking the reactor critical. This test cannot be performed with the reactor at power and must therefore be performed prior to reactor startup.

SR 3.3.1.15

SR 3.3.1.15 verifies that the individual channel/train actuation 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 UFSAR, Section 7.2 (Ref. 9). Individual component response times are not modeled in the analyses.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 reaches the required functional state.

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 Function set to one, with the resulting measured response time compared to the appropriate UFSAR 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 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) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. Reference 8 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Reference 12 provides the basis and 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. 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 3.3.1.15 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. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

BASES

REFERENCES

1. UFSAR, Chapter 7.

2. UFSAR, Chapter 6.

3. UFSAR, Chapter 15.

4. IEEE-279-1971.

5. Technical Requirements Manual.

6. WCAP-12523, "RTS/ESFAS Setpoint Methodology Study," October 1990.

7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

8. WCAP-13632, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," August 1995.

9. UFSAR, Section 7.2.

10. WCAP-12583, "Westinghouse Setpoint Methodology For Protection Systems, Byron/Braidwood Stations," May 1990.

11. ComEd NES-EIC-20.04, Revision 0, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy," October 14, 1997.

12. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," October 1998.

13. WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," October 1998.

14. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," March 2000.

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BASES

ACTIONS (continued)

When the number of inoperable channels in a trip function exceeds those specified in all related Conditions associated with a trip function, then the unit is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered if applicable in the current MODE of operation.

Consistent with the requirement in References 15 and 16 to include Tier 2 insights into the decision-making process before taking equipment out of service, restrictions on concurrent removal of certain equipment when a logic train is inoperable for maintenance are included (note that these restrictions do not apply when a logic train is being tested under the bypass Note). Entry into the Condition(s) is not a typical, pre-planned evolution during power operation, other than for surveillance testing. Since the Condition(s) is typically entered due to equipment failure, it follows that some of the following restrictions may not be met at the time of Condition entry. If this situation were to occur during the 24-hour Completion Time of the Required Action(s) for restoration, the Configuration Risk Management Program will assess the emergent condition and direct activities to restore the inoperable logic train and exit the Condition(s) or fully implement these restrictions or perform a plant shutdown, as appropriate from a risk management perspective. The following restrictions will be observed:

1. To preserve Anticipated Transient Without Scram (ATWS) mitigation capability, activities that degrade the availability of the auxiliary feedwater (AFW) system, ATWS Mitigation System Actuation Circuitry (AMSAC), or turbine trip should not be scheduled when a logic train is inoperable for maintenance.

2. To preserve Loss of Coolant Accident (LOCA) mitigation capability, one complete Emergency Core Coolant System (ECCS) train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance.

3. To preserve reactor trip and safeguards actuation capability, activities that cause master relays or slave relays in the available train to be unavailable and activities that cause ESFAS channels to be unavailable should not be scheduled when a logic train is inoperable for maintenance, with the exception of ESFAS Function 2.c, "Containment Spray, Containment Pressure High-3," and ESFAS Function 3.b.(3), "Containment Isolation, Phase B Isolation, Containment

BASES

ACTIONS (continued)

Pressure High-3." TS 3.3.2, Condition E requires that both of these functions be placed in bypass when inoperable.

4. Activities that result in the inoperability of electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the AFW system, AMSAC, turbine trip, one complete train of ECCS, and the available reactor trip and ESFAS actuation functions should not be scheduled when a logic train is inoperable for maintenance. That is, one complete train of a function that supports a complete train of a function noted above must be available.

A.1

Condition A applies to all ESFAS protection functions. Condition A addresses the situation where one or more required channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.2-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

B.1, B.2.1, and B.2.2

Condition B applies to manual initiation of:

- SI;
- Containment Spray;
- Phase A Isolation; and
- Phase B Isolation.

This action addresses the train orientation of the SSPS for the functions listed above. If one channel is inoperable, 48 hours is allowed to return it to an OPERABLE status. Note that for containment spray and Phase B isolation, failure of one or both switches in one channel renders the channel inoperable. Condition B, therefore, encompasses both situations. The specified Completion Time is reasonable considering that there are two automatic actuation trains and another manual initiation train OPERABLE for each Function, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a

BASES

ACTIONS (continued)

MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (54 hours total time) and in MODE 5 within an additional 30 hours (84 hours total time).

The allowable 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.

C.1, C.2.1, and C.2.2

Condition C applies to the automatic actuation logic and actuation relays for the following functions:

- SI;
- Containment Spray;
- Phase A Isolation;
- Phase B Isolation; and
- Automatic Switchover to Containment Sump.

This action addresses the train orientation of the SSPS and the master and slave relays. If one train is inoperable, 24 hours are allowed to restore the train to OPERABLE status. The 24 hours allowed for restoring the inoperable train to OPERABLE status is justified in Reference 15. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (30 hours total time) and in MODE 5 within an additional 30 hours (60 hours total time). The 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.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. This allowance is based on the reliability analysis assumption of

BASES

ACTIONS (continued)

WCAP-10271-P-A (Ref. 7) that 4 hours is the average time required to perform train surveillance.

D.1, D.2.1, and D.2.2

Condition D applies to:

- Containment Pressure-High 1;
- Pressurizer Pressure-Low;
- Steam Line Pressure-Low;
- Containment Pressure-High 2;
- Steam Line Pressure-Negative Rate-High;
- SG Water Level-Low Low; and
- SG Water Level-High High (P-14).

If one channel is inoperable, 72 hours are allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Generally, this Condition applies to functions that operate on two-out-of-three logic or a two-out-of-four logic. Therefore, failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements. The 72 hours allowed to restore the channel to OPERABLE status or to place it in the tripped condition is justified in Reference 16.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 72 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 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. In MODE 4, these Functions are no longer required OPERABLE.

BASES

ACTIONS (continued)

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 12 hours for surveillance testing of other channels. The 12 hours allowed for testing is justified in Reference 15.

E.1, E.2.1, and E.2.2

Condition E applies to:

- Containment Spray Containment Pressure-High 3; and
- Containment Phase B Isolation Containment Pressure-High 3.

None of these signals has input to a control function. Thus, two-out-of-three logic is necessary to meet acceptable protective requirements. However, a two-out-of-three design would require tripping a failed channel. This is undesirable because a single failure would then cause spurious containment spray initiation. Spurious spray actuation is undesirable because of the cleanup problems presented. Therefore, these channels are designed with two-out-of-four logic so that a failed channel may be bypassed rather than tripped. Note that one channel may be bypassed and still satisfy the single failure criterion. Furthermore, with one channel bypassed, a single instrumentation channel failure will not spuriously initiate containment spray.

BASES

ACTIONS (continued)

To avoid the inadvertent actuation of containment spray and Phase B containment isolation, the inoperable channel should not be placed in the tripped condition. Instead it is bypassed. Restoring the channel to OPERABLE status, or placing the inoperable channel in the bypass condition within 72 hours, is sufficient to assure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed in a trip condition). The Completion Time is further justified based on the low probability of an event occurring during this interval. The Completion Time is further justified based on the low probability of an event occurring during this interval. Failure to restore the inoperable channel to OPERABLE status, or place it in the bypassed condition within 72 hours, requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 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. In MODE 4, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows one additional channel to be bypassed for up to 12 hours for surveillance testing. Placing a second channel in the bypass condition for up to 12 hours for testing purposes is acceptable based on the results of Reference 15.

BASES

ACTIONS (continued)

F.1, F.2.1, and F.2.2

Condition F applies to:

- Manual Initiation of Steam Line Isolation; and
- P-4 Interlock.

For the Manual Initiation and the P-4 Interlock Functions, this action addresses the train orientation of the SSPS. If a train or channel is inoperable, 48 hours is allowed to return it to OPERABLE status. The specified Completion Time is reasonable considering the nature of these Functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, 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 in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

G.1, G.2.1 and G.2.2

Condition G applies to the automatic actuation logic and actuation relays for the Steam Line Isolation, Turbine Trip and Feedwater Isolation, and AF actuation Functions.

BASES

ACTIONS (continued)

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, 24 hours are allowed to restore the train to OPERABLE status. The 24 hours allowed to restore the train to OPERABLE status is justified in Reference 15. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to 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 the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

H.1, H.2.1, and H.2.2

Condition H applies to Loss of Offsite Power. For this Function, if one channel is inoperable, 1 hour is allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within an hour requires the unit be placed in MODE 3 within the following 6 hours (total of 7 hours) and MODE 4 within the next 6 hours (total of 13 hours).

BASES

ACTIONS (continued)

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, the Function is no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 2 hours for surveillance testing of other channels. The 1 hour allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 2 hours allowed for testing, are deemed acceptable based on engineering judgement.

I.1 and I.2

Condition I applies to the Undervoltage Reactor Coolant Pump Function.

If one channel is inoperable, 72 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition on the affected train where one-out-of-three logic will result in actuation. The 72 hours allowed to restore the channel to OPERABLE status or to place it in the tripped condition is justified in Reference 15. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 72 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed 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 unit systems. In MODE 3, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 12 hours for surveillance testing of other channels. The 72 hours allowed to place the inoperable channel in the tripped condition, and the 12 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 15.

BASES

ACTIONS (continued)

J.1

Condition J applies to the Auxiliary Feedwater Pump Suction Transfer on Suction Pressure-Low Function. With one train inoperable, the associated auxiliary feedwater pump must be immediately declared inoperable. This requires entry into applicable Conditions and Required Actions of LCO 3.7.5, "AF System."

K.1, K.2.1, and K.2.2

Condition K applies to the RWST Level-Low Low Coincident with Safety Injection Function.

RWST Level-Low Low Coincident with SI provides actuation of switchover to the containment sump. Note that this Function requires the bistables to energize to perform their required action.

This Condition applies to a Function that operates on two-out-of-four logic. Therefore, failure of one channel places the Function in a two-out-of-three configuration. One channel must be tripped to place the Function in a one-out-of-three configuration that satisfies redundancy requirements.

If the channel cannot be returned to OPERABLE status or placed in the tripped condition within 72 hours, the unit must be brought to MODE 3 within the following 6 hours and MODE 5 within the next 30 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 5, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above.

The Required Actions are modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours for surveillance testing of other channels. This is acceptable based on the results of Reference 15.

BASES

ACTIONS (continued)

L.1, L.2.1 and L.2.2

Condition L applies to the P-11 and P-12 interlocks.

With one or more channels inoperable, the operator must verify that the interlock is in the required state for the existing unit condition. This action manually accomplishes the function of the interlock. Determination must be made within 1 hour. The 1 hour Completion Time is equal to the time allowed by LCO 3.0.3 to initiate shutdown 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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.

Agreement criteria are determined 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.

SR 3.3.2.2

SR 3.3.2.2 is the performance of a COT every 31 days. 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.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the calculated normal uncertainty consistent with the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current plant specific setpoint methodology.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis (Ref. 7) when applicable.

The Frequency is adequate based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.3

SR 3.3.2.3 is the performance of a TADOT every 31 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.

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.

SR 3.3.2.4

SR 3.3.2.4 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested every 92 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. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and that there is an intact voltage signal path to the master relay coils. The Frequency of every 92 days on a STAGGERED TEST BASIS is justified in Reference 16.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.5

SR 3.3.2.5 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 92 days on a STAGGERED TEST BASIS. The time allowed for the testing (4 hours) is justified in Reference 7. The frequency of 92 days is justified in Reference 16.

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 Undervoltage RCP Function. The Function is tested up to, and including, the master relay coils.

The test also includes trip devices that provide actuation signals directly to the SSPS. 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.

SR 3.3.2.7

SR 3.3.2.7 is the performance of a COT.

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.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the calculated normal uncertainty consistent with the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current plant specific setpoint methodology.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The "as found" and "as left" values must also be recorded and reviewed for consistency with the assumptions of Reference 16.

The Frequency of 184 days is justified in Reference 16.

SR 3.3.2.8

SR 3.3.2.8 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 18 months. The Frequency of 18 months is based on the reliability analyses described in References 12, 13, and 14. These reliability analyses were performed for the Westinghouse Type AR relays and for the Potter & Brumfield MDR Series relays used for the slave and auxiliary relays in the ESFAS circuit.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.9

SR 3.3.2.9 is the performance of a TADOT. This test is a check of the Manual Actuation Functions and P-4 Reactor Trip Interlock. It is performed every 18 months. Each Manual Actuation Function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.). The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions have no associated setpoints.

SR 3.3.2.10

SR 3.3.2.10 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 plant 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.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.11 and SR 3.3.2.12

These SRs ensure 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 UFSAR, Section 7.3, (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 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 UFSAR 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 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) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. Reference 8 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Reference 11 provides the basis and 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.

ESF RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS with the exception of Function 6.d. 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. Function 6.d is associated with the start of the motor-driven auxiliary feedwater pump only (Train A). Therefore, a Frequency of 18 months is specified. The 18 month Frequency is consistent with the typical refueling cycle and is based on plant operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

BASES

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 7.

3. UFSAR, Chapter 15.

4. IEEE-279-1971.

5. Technical Requirements Manual.

6. WCAP-12523, "RTS/ESFAS Setpoint Methodology Study," October 1990.

7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

8. WCAP-13632 Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," August 1995.

9. UFSAR, Section 7.3.

10. WCAP-12583, "Westinghouse Setpoint Methodology For Protection Systems, Byron/Braidwood Stations," May 1990.

11. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," October 1998.

12. WCAP-13877, Revision 2-P, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," October 1999.

13. WCAP-13878-P, Revision 2, "Reliability Assessment of Potter & Brumfield MDR Series Relays," October 1999.

14. WCAP-13900, Revision 0, "Extension of Slave Relay Surveillance Test Intervals," April 1994.

15. WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," October 1998.

16. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," March 2000.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

Agreement criteria are determined 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.

SR 3.3.6.2

SR 3.3.6.2 is the performance of an ACTUATION LOGIC TEST. 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. In addition, the master relay coil is tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils. This test is performed every 92 days on a STAGGERED TEST BASIS. The Surveillance interval is justified in Reference 6.

The SR has been modified by a Note stating that the Surveillance is only applicable to the actuation logic of the ESFAS Instrumentation.

SR 3.3.6.3

SR 3.3.6.3 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 92 days on a STAGGERED TEST BASIS. The Surveillance interval is justified in Reference 6.

The SR has been modified by a Note stating that the Surveillance is only applicable to the master relays of the ESFAS Instrumentation..

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.6

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 Frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

1. 10 CFR 100.11.

2. NUREG-1366, December 1992.

3. WCAP-13877, Revision 2-P, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," October 1999.

4. WCAP-13878-P, Revision 2, "Reliability Assessment of Potter & Brumfield MDR Series Relays," October 1999.

5. WCAP-13900, Revision 0, "Extension of Slave Relay Surveillance Test Intervals," April 1994.

6. WCAP-15376-P-A, Revision 1, “Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times,” March 2000.

ATTACHMENT 5
Summary of Regulatory Commitments

The following table identifies those actions committed to by EGC for Braidwood Station and Byron Station as part of the License Amendment Request. Any other statements in this submittal are provided for information purposes and are not regulatory commitments.

Commitment	Committed Date	Due Date/Event	
		One-Time Action (Yes/No)	Programmatic (Yes/No)
EGC will implement administrative controls to ensure that activities that degrade the availability of the auxiliary feedwater system, AMSAC, or turbine trip should not be scheduled when a logic train or an RTB train is inoperable for maintenance.	Administrative controls in place within 120 days of NRC approval.	Yes	Yes
EGC will implement administrative controls to ensure that one complete ECCS train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance.	Administrative controls in place within 120 days of NRC approval.	Yes	Yes
EGC will implement administrative controls to ensure that activities that cause RTS and ESFAS master relays or slave relays in the available train to be unavailable, and activities that cause RTS and ESFAS analog channels to be unavailable, should not be scheduled when a logic train or an RTB train is inoperable for maintenance, with the exception of ESFAS Functions 2.c and 3.b.(3).	Administrative controls in place within 120 days of NRC approval.	Yes	Yes
EGC will implement administrative controls to ensure that activities that result in the inoperability of electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the AFW system, AMSAC, turbine trip, one complete train of ECCS, and the available reactor trip and ESFAS actuation functions should not be scheduled when a logic train or an RTB train is inoperable for maintenance. That is, one complete train of a function that supports a complete train of a function noted above must be available	Administrative controls in place within 120 days of NRC approval.	Yes	Yes

ATTACHMENT 5
Summary of Regulatory Commitments

Commitment	Committed Date	Due Date/Event	
		One-Time Action (Yes/No)	Programmatic (Yes/No)
EGC will trend and evaluate as-found and as-left data for three trip functions (i.e., OTDT, SG level, and pressurizer pressure) for two years (4 data points) following implementation of the proposed changes.	Administrative process in place within 120 days of NRC approval.	Yes	Yes

ATTACHMENT 6

Applicability Determination (Proprietary)

WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

ATTACHMENT 7
Westinghouse Electric Company LLC
Application for Withholding and Affidavit

Westinghouse Electric Company
Nuclear Services
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

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

Direct tel: (412) 374-4643
Direct fax: (412) 374-4011
e-mail: greshaja@westinghouse.com

Our ref: CAW-06-2218

November 20, 2006

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Implementation Guidelines for WCAP-15376-P-A, Rev. 1, Entitled, "WCAP-15376 Implementation Guideline Approach to Address the Conditions and Limitations in the NRC's Safety Evaluation" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-06-2218 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Exelon Generating Company, LLC.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-06-2218, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

J. A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Enclosures

cc: Jon Thompson (NRC O-7E1A)

bcc: J. A. Gresham (ECE 4-7A) 1L
R. Bastien, 1L (Nivelles, Belgium)
C. Brinkman, 1L (Westinghouse Electric Co., 12300 Twinbrook Parkway, Suite 330, Rockville, MD 20852)
RCPL Administrative Aide (ECE 4-7A) 1L, 1A (letter and affidavit only)
J. Bunecicky (ECE 560E)

CAW-06-2218

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared J. A. Gresham, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

J. A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Sworn to and subscribed
before me this 20th day
of November, 2006

Sharon L. Fiori
Notary Public

Notarial Seal
Sharon L. Fiori, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires January 29, 2007
Member, Pennsylvania Association Of Notaries

(1) I am Manager, Regulatory Compliance and Plant Licensing, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse "Application for Withholding" accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in the Implementation Guidelines for WCAP-15376-P-A, Rev. 1, Entitled, "WCAP-15376 Implementation Guideline Approach to Address the Conditions and Limitations in the NRC's Safety Evaluation" (Proprietary) on behalf of the Westinghouse Owners Group by Westinghouse, being transmitted by Exelon Generating Company, LLC letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted for use by the Westinghouse Owners Group for Byron Nuclear Power Plant Units 1 & 2 and for Braidwood Nuclear Power Plant Units 1 & 2 is expected to be applicable for other licensee submittals.

This information is part of that which will enable Westinghouse to:

(a) Provide risk-informed assessment of the RTS and ESFAS to extend the interval for surveillance testing.

(b) Provide licensing defense services.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for purposes of extending surveillance testing intervals.

(b) Westinghouse can sell support and defense of extending surveillance testing intervals.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar assessments and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

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ATTACHMENT 8

Applicability Determination (Non-Proprietary)

WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

Table 1
WCAP-14333 Implementation Guidelines:
Applicability of the Analysis General Parameters

Parameter	WCAP-14333 Analysis Assumptions	Plant Specific Parameter
Logic Cabinet Type (1)	Relay and SSPS	SSPS
Component Test Intervals (2)		
• Analog channels	3 months	3 months
• Logic cabinets (SSPS)	2 months	2 months
• Logic cabinets (Relay)	1 month	N/A
• Master Relays (SSPS)	2 months	2 months
• Master Relays (Relay)	1 month	N/A
• Slave Relays	3 months	≥ 3 months
• Reactor trip breakers	2 months	2 months
Analog Channel Calibrations (3)		
• Done at-power	Yes	Yes
• Interval	18 months	18 months
Typical At-Power Maintenance Intervals (4)		
• Analog channels	24 months	> 24 months (infrequent)
• Logic cabinets (SSPS)	18 months	≥ 18 months
• Logic cabinets (Relays)	12 months	N/A
• Master Relays (SSPS)	Infrequent (5)	Infrequent
• Master Relays (Relays)	Infrequent (5)	N/A
• Slave Relays	Infrequent (5)	Infrequent
• Reactor trip breakers	12 months	≥ 18 months

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

Table 1
WCAP-14333 Implementation Guidelines:
Applicability of the Analysis General Parameters

Parameter	WCAP-14333 Analysis Assumptions	Plant Specific Parameter
AMSAC (6)	Credited for AFW pump start	Credited for AFW pump start
Total Transient Event Frequency (7)	3.6	1.5 for both Byron/Braidwood
ATWS Contributions to CDF (current PRA model) (8)	8.4E-06	6.8E-07/yr (Byron) 6.1E-07/yr (Braidwood)
Total CDF from Internal Events (current PRA model) (9)	5.8E-05	5.8E-05/yr (Byron) 5.5E-05/yr (Braidwood)
Total CDF from Internal Events (IPE) (10)	Not Applicable	4.0E-05/yr (Byron) 2.8E-05/yr (Braidwood)

Notes for Table 1:

1. Indicate type of logic cabinet: SSPS or Relay (both are included in WCAP-14333)
2. Fill in applicable test intervals. If the test intervals are equal to or greater than those used in WCAP-14333, the analysis is applicable to your plant.
3. Indicate if channel calibration is done at-power and, if so, fill in the interval. If channel calibrations are not done at-power or if the calibration interval is equal to or greater than that used in WCAP-14333, the analysis is applicable to your plant.
4. Fill in the applicable typical maintenance intervals or fill in "equal to or greater than" or "less than". If the maintenance intervals are equal to or greater than those used in WCAP-14333, the analysis is applicable to your plant.
5. Only corrective maintenance is done on the master and slave relays. The maintenance interval on typical relays is relatively long, that is, experience has shown they do typically completely fail. Failure of slave relays usually involves failure of individual contacts. Fill in "infrequent" if this is consistent with your plant experience. If not, fill in the typical maintenance interval. If "infrequent" slave relay failures are the norm, then the WCAP-14333 analysis is applicable to your plant.
6. Indicate if AMSAC will initiate AFW pump start. If yes, then the WCAP-14333 analysis is applicable to your plant.
7. Include total frequency for initiators requiring a reactor trip to be generated for event mitigation. This is required to assess the importance of ATWS events to CDF. Do not include events initiated by a reactor trip.
8. Fill in the ATWS contribution to core damage frequency (from at-power, internal events). This is required to determine if the ATWS event is a large contributor to CDF.

Notes for Table 1:

9. Fill in the total CDF from internal events (including internal flooding) for the most recent PRA model update. This is required for comparison to the NRC's risk-informed CDF acceptance guidelines.
10. Fill in the total CDF from internal events from the IPE model (submitted to the NRC in response to Generic Letter 88-20). If this value differs from the most recent PRA model update CDF provide a concise list of reasons, in bulletized form, describing the differences between the models that account for the change in CDF.
11. If your analog channel test interval is 1 month, the STI increase justified and approved by the NRC in WCAP-10271 has not been implemented in your plant, even so, this analysis still remains applicable.

Byron/Braidwood Plant-Specific Notes:

1. Total transient event frequency is from Table 1-2a and b of Reference 8.
2. ATWS Contribution to CDF is based on the Unit 1 with CC HX 0 aligned to Unit 1 configuration (i.e., the case A11 for Braidwood and B11 for Byron). This is described in the table below:

	Base CDF	FV of ATWS-FLAG	ATWS Contribution
Braidwood A11 Case	5.46E-05	1.1%	6.1E-07
Byron B11 Case	5.79E-05	1.2%	6.78E-07

3. Total CDF from Internal Events is from Reference 5.

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

Table 2[1] **WCAP-15376 Implementation Guidelines:** Applicability of the Analysis General Parameters		
Parameter	**WCAP-15376 Analysis Assumption**	**Plant Specific Parameter**

Notes for Table 2:

[1] This is Table 1 from the WCAP-15376 Implementation Guideline.

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

Table 3[2] **WCAP-14333 and WCAP-15376 Implementation Guidelines:** Applicability of the Analysis Reactor Trip Actuation Signals		
Event	**WCAP-14333 and WCAP-15376 Analysis Assumption**	**(Plant) Specific Parameter[1]**

Notes for Table 3:

[2] This is Table 2 from the WCAP-15376 Implementation Guideline.

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

Table 4[3] **WCAP-14333 and WCAP-15376 Implementation Guidelines:** Applicability of the Analysis Engineered Safety Features Actuation Signals			
Safety Function	Event	WCAP-14333 and WCAP-15376 Analysis Assumption	(Plant) Specific Parameter (1)

Notes for Table 4:

Byron/Braidwood Plant-Specific Notes:

[3] This is Table 3 from the WCAP-15376 Implementation Guideline.

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

Table 5[4] **WCAP-15376 Implementation Guidelines:** Applicability of the Human Reliability Analysis		
Operator Action	**Operator Action that results in a success path (backup to the automatic function) prior to the action becoming ineffective to mitigate the event? (1)**	**Are Plant Procedures in Place for the Action? (1)**

[4] This is Table 4 from the WCAP-15376 Implementation Guideline.

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

Byron/Braidwood Plant-Specific Notes on Table 5			
Operator Action	**Are Plant Procedures in Place for the Action? (1)**	**Procedures**	**PRA Basic Events**

ATTACHMENT 8
Applicability Determination (Non-Proprietary)
WCAP-14333-P-A, Revision 1 and WCAP-15376-P-A, Revision 1

APPLICABILITY DETERMINATION REFERENCES

1. WCAP-15376 Implementation Guideline Approach to Address the Conditions and Limitations in the NRC's Safety Evaluation.
2. WCAP-14333 Implementation Guidelines Technical Requirements
3. WCAP-15376, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times" documented in WCAP-15376-P, Revision 0
4. WCAP-14333, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times" documented in WCAP-14333-P-A, Revision 1
5. BB PRA-014, "Byron/Braidwood PRA – Quantification Notebook," Rev. 5E, 07/15/05.
6. BB PRA-005.16, "Byron/Braidwood PRA System Notebook - Reactor Protection/Engineered Safety Features Actuation (RPS/ESFAS)," Revision 0, Addendum 2.
7. EC Number 360637, "Evaluation of Automatic Reactor Trip Signals for Selected Transient Analyses," Rev. 0.
8. BB PRA-001, "Byron/Braidwood PRA Notebook – Initiating Event Analysis," Revision 2.
9. BB PRA-004, "Byron/Braidwood PRA Notebook – Human Reliability Analysis (HRA)," Revision 6.
10. Byron/Braidwood UFSAR, Chapter 7.2 (Reactor Trip System) and 7.3 (Engineered Safety Features Actuation System).