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10 CFR 50.90

RS-00-105

November 7, 2000

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

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

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

Subject: Request for Technical Specifications Change to Extend the Surveillance Test Interval for Solid State Protection System Slave Relays from 92 Days to 18 Months

References: (1) Letter from S. A. Richards (U. S. NRC) to H. A. Sepp (Westinghouse Electric Corporation), "Review of Westinghouse Topical Reports WCAP-13877, Revision 2-P-A and WCAP-13878-P-A, Revision 2 on Solid State Protection System (SSPS) Slave Relays," dated July 12, 2000.

(2) Letter from T. H. Essig (U. S. NRC) to L.F. Liberatori (Westinghouse Owners Group), "Review of Westinghouse Owners Group Topical Reports WCAP-13877 Revision 1, WCAP-14129 Revision 1, and WCAP-13900 Revision 0, 'ESFAS Subgroup Relay Test Interval Extension,'" dated October 26, 1998.

A001

(3) Letter from B. A. Boger (U. S. NRC) to T. Green (Westinghouse Owners Group), "Review of Westinghouse Electric Corporation Technical Reports WCAP-13878 Revision 1, WCAP- 14117 Revision 1, and WCAP-13900 Revision 0, 'ESFAS Subgroup Test Interval Extension,'" dated May 31, 1996.

(4) Letter from R. E. Martin (U. S. NRC) to J. A. Scalice (Tennessee Valley Authority), "Issuance of Watts Bar Nuclear Plant, Unit 1, Amendment Number 17 on Slave Relay Surveillance Interval," dated December 30, 1998.

(5) Letter from S. D. Bloom (U. S. NRC) to G. M. Rueger (Pacific Gas and Electric), "Issuance of Amendments for Diablo Canyon Nuclear Power Plant, Unit No. 1 and Unit No. 2," dated August 19, 1996.

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," we are proposing changes to the Technical Specifications (TS) of Facility Operating License Nos. NPF-72, NPF-77, NPF-37 and NPF-66, for the Braidwood Station, Units 1 and 2, and the Byron Station, Units 1 and 2, respectively. The proposed changes extend the TS Surveillance Test Interval (STI) for the Solid State Protection System (SSPS) slave relays. Specifically, the proposed changes extend the STI for the Engineered Safety Features Actuation System (ESFAS) Instrumentation Surveillance Requirement (SR) 3.3.2.7, "Perform Slave Relay Test," and for the Containment Ventilation Isolation Instrumentation SR 3.3.6.5, "Perform Slave Relay Test," from a 92-day STI to an 18-month STI for the Westinghouse Type AR slave relays and for the Potter & Brumfield MDR Series slave relays, or for future replacement slave relay types that meet the acceptance criteria for the reliability assessments performed in accordance with the methodology described in the NRC approved Westinghouse Electric Corporation Topical Reports, WCAP-13877, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," WCAP-13878, "Reliability Assessment of Potter & Brumfield MDR Series Relays," and WCAP-13900, "Extension of Slave Relay Surveillance Testing Intervals."

The Westinghouse Topical Reports, WCAP-13877, WCAP-13878 and WCAP-13900, analyze extending the SSPS slave relay STI for the Westinghouse Type AR slave relays and for the Potter & Brumfield MDR Series slave relays. The methodology for extending the STI for both relay types was approved by the NRC as documented in References 1, 2 and 3. The proposed changes follow the NRC approved methodology for both relay types that are currently utilized in the Braidwood Station and the Byron Station SSPS slave relay applications. The proposed changes are similar to the STI extensions previously approved by the NRC for the Watts Bar and the Diablo Canyon plants, as documented in Reference 4 and Reference 5, respectively. Future slave relay replacement types will meet the acceptance criteria for the reliability assessments performed in accordance with the NRC approved methodology described in WCAP-13877, WCAP-13878 and WCAP-13900.

In Reference 2 and Reference 3, the NRC stated that licensees referencing WCAP-13877, WCAP-13878 and WCAP-13900 in license amendment requests for SSPS slave relay STI extensions should provide certain additional information. Attachment E provides the requested information, specifically plant-specific information that confirms the applicability and acceptability of these generic WCAP reports to the Braidwood Station and the Byron Station.

We request approval of the proposed changes prior to May 1, 2001. The timely implementation of the proposed SSPS slave relay STI extension would support the NRC Task Group recommendations in Generic Letter (GL) 93-05, "Line Item Technical Specification Improvements to Reduce Surveillance Requirements for Testing During Power Operation," and the conclusions in NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," that improving safety, reducing equipment degradation, and reducing unnecessary burden on personnel can be achieved by reducing the amount of non-essential testing at power. This schedule would coincide with the first testing cycle following the Byron Station, Unit 2, spring 2001, refueling outage.

This request is subdivided as follows.

1. Attachment A provides a description and safety analysis of the proposed changes.

2. Attachments B-1 and B-2 include the marked-up TS pages for the proposed changes for the Braidwood Station and the Byron Station, respectively. Attachments B-3 and B-4 include the associated TS pages with the proposed changes incorporated for the Braidwood Station and the Byron Station, respectively. Attachments B-5 and B-6 include the associated TS Bases pages for information only with the proposed changes incorporated for the Braidwood Station and the Byron Station, respectively.

3. Attachment C describes our evaluation performed using the criteria in 10 CFR 50.91(a)(1), "Notice for public comment," which provides information supporting a finding of no significant hazards consideration using the standards in 10 CFR 50.92(c), "Issuance of amendment."

4. Attachment D provides information supporting an environmental assessment and a finding that the proposed changes satisfy the criteria for a categorical exclusion.

5. Attachment E provides the additional information requested by the NRC in Reference 2 and Reference 3.

The proposed changes have been reviewed by the Braidwood Station and the Byron Station Plant Operations Review Committees and the respective Nuclear Safety Review Boards in accordance with the Quality Assurance Program.

Commonwealth Edison Company 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.

Should you have any questions concerning this letter, please contact Ms. Kelly M. Root at (630) 663-7292.

Respectfully,

R. M. Krich
Director, Licensing
Mid-West Regional Operating Group

Affidavit

Attachments:
Attachment A: Description and Safety Analysis of the Proposed Changes
Attachment B-1: Marked-Up TS Pages for Proposed Changes for the Braidwood Station
Attachment B-2: Marked-Up TS Pages for Proposed Changes for the Byron Station
Attachment B-3: Incorporated TS Pages for Proposed Changes for the Braidwood Station
Attachment B-4: Incorporated TS Pages for Proposed Changes for the Byron Station
Attachment B-5: Incorporated TS Bases Pages for the Braidwood Station - Information Only
Attachment B-6: Incorporated TS Bases Pages for the Byron Station - Information Only
Attachment C: Information Supporting a Finding of No Significant Hazards Consideration
Attachment D: Information Supporting an Environmental Assessment
Attachment E: Additional Information

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector - Braidwood Station
NRC Senior Resident Inspector - Byron Station
Office of Nuclear Facility Safety - Illinois Department of Nuclear Safety

STATE OF ILLINOIS	)	
COUNTY OF DUPAGE	)	
IN THE MATTER OF	)	
COMMONWEALTH EDISON (COMED) COMPANY	)	**Docket Nos.**
BRAIDWOOD STATION - UNITS 1 and 2	)	**STN 50-456 and STN 50-457**
BYRON STATION - UNITS 1 and 2	)	**STN 50-454 and STN 50-455**

SUBJECT: **Request for Technical Specifications Change to Extend the Surveillance Test Interval for Solid State Protection System Slave Relays from 92 Days to 18 Months**

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

R. M. Krich
Director, Licensing
Mid-West Regional Operating Group

Subscribed and sworn to before me, a Notary Public in and

for the State above named, this 1 day of

November, 2000.

OFFICIAL SEAL
JEFFERY A BATARA
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES:08/24/02

(OFFICIAL SEAL)

Notary Public

ATTACHMENT A

DESCRIPTION AND SAFETY ANALYSIS OF THE PROPOSED CHANGES

A. SUMMARY OF PROPOSED CHANGES

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," we are proposing changes to the Technical Specifications (TS) of Facility Operating License Nos. NPF-72, NPF-77, NPF-37 and NPF-66, for the Braidwood Station, Units 1 and 2, and the Byron Station, Units 1 and 2, respectively. The proposed changes extend the Surveillance Test Interval (STI) for the Solid State Protection System (SSPS) slave relays. Specifically, the proposed changes extend the STI for the Engineered Safety Features Actuation System (ESFAS) Instrumentation Surveillance Requirement (SR) 3.3.2.7, "Perform Slave Relay Test," and for the Containment Ventilation Isolation Instrumentation SR 3.3.6.5, "Perform Slave Relay Test," from a 92-day STI to an 18-month STI for the Westinghouse Type AR slave relays and for the Potter & Brumfield MDR Series slave relays, or for future replacement slave relay types that meet the acceptance criteria for the reliability assessments performed in accordance with the methodology described in the Westinghouse Electric Corporation Topical Reports, WCAP-13877, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," (Reference 1), WCAP-13878, "Reliability Assessment of Potter & Brumfield MDR Series Relays," (Reference 2), and WCAP-13900, "Extension of Slave Relay Surveillance Testing Intervals," (Reference 3).

The Westinghouse Electric Corporation Topical Reports, WCAP-13877, WCAP-13878 and WCAP-13900, analyze extending the SSPS slave relay STI for the Westinghouse Type AR slave relays and for the Potter & Brumfield MDR Series slave relays. The methodology for extending the STI for both relay types was approved by the NRC as documented in References 4, 5 and 6. The proposed changes follow the NRC approved methodology for both relay types that are currently utilized in the Braidwood Station and the Byron Station SSPS slave relay applications. The proposed changes are similar to the STI extensions previously approved by the NRC for the Watts Bar and the Diablo Canyon plants, as documented in Reference 7 and Reference 8, respectively. Future slave relay replacement types will meet the acceptance criteria for the reliability assessments performed in accordance with the NRC approved methodology described in WCAP-13877, WCAP-13878 and WCAP-13900.

The proposed changes are described in detail in Section E of this Attachment. Attachments B-1 and B-2 include the marked-up TS pages for the proposed changes for the Braidwood Station and the Byron Station, respectively. Attachments B-3 and B-4 include the associated TS pages with the proposed changes incorporated for the Braidwood Station and the Byron Station, respectively. Attachments B-5 and B-6 include the associated TS Bases pages for information only with the proposed changes incorporated for the Braidwood Station and the Byron Station, respectively. In Reference 5 and Reference 6, the NRC stated that licensees referencing WCAP-13877, WCAP-13878 and WCAP-13900 in license amendment requests for SSPS slave relay STI extensions should provide certain additional information. Attachment E provides the requested information, specifically plant-specific information that confirms the applicability and acceptability of these generic WCAPs to the Braidwood Station and the Byron Station.

We request approval of the proposed changes prior to May 1, 2001. The timely implementation of the proposed SSPS slave relay STI extension would support the NRC Task Group recommendations in Generic Letter (GL) 93-05, "Line Item Technical Specification Improvements to Reduce Surveillance Requirements for Testing During Power Operation," and the conclusions in NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," that improving safety, reducing equipment degradation, and reducing unnecessary burden on personnel can be achieved by reducing the amount of non-essential testing at power. This schedule would coincide with the first testing cycle following the Byron Station, Unit 2, spring 2001, refueling outage.

B. DESCRIPTION OF THE CURRENT REQUIREMENTS

TS 3.3.2, "Engineered Safety Features Actuation System (ESFAS) Instrumentation," requires the ESFAS instrumentation for each Function listed in Table 3.3.2-1 to be Operable. Of the eight different Functions listed in Table 3.3.2-1, seven Functions have a sub-function titled "Automatic Actuation Logic and Actuation Relays," with an associated SR 3.3.2.7, "Perform Slave Relay Test," that requires it to be performed on a frequency of 92 days.

TS 3.3.6, "Containment Ventilation Isolation Instrumentation," requires the Containment Ventilation Isolation instrumentation for each Function listed in Table 3.3.6-1 to be Operable. Of the five different Functions listed in Table 3.3.6-1, three Functions are associated with SR 3.3.2.7 above, and one Function is associated with SR 3.3.6.5, "Perform Slave Relay Test," that requires it to be performed on a frequency of 92 days.

The slave relay test that is conducted on a frequency of 92 days is performed by energizing the slave relays where relay 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 where relay contact operation is verified by a continuity check of the circuit containing the slave relay.

C. BASES FOR THE CURRENT REQUIREMENTS

The ESFAS initiates necessary safety systems, based on the values of selected unit parameters, to protect against violating reactor core design limits and the Reactor Coolant System (RCS) pressure boundary, and to mitigate accidents. The ESFAS instrumentation is segmented into three distinct but interconnected modules as follows: (1) field transmitters or process sensors and instrumentation which provide a measurable electronic signal based on the physical characteristics of the parameter being measured, (2) signal processing equipment including analog protection system, field contacts, and protection channel sets which provide signal conditioning, bistable setpoint comparison, process algorithm actuation, compatible electrical signal output to protection system devices, and control board / control room / miscellaneous indications, and (3) SSPS including input, logic, and output bays which initiates the proper unit shutdown or Engineered Safety Feature (ESF) actuation in accordance with the defined logic and based on the bistable outputs from the signal process control and protection system.

The instrumentation of concern for the proposed changes is in the SSPS. The SSPS equipment is used for the decision logic processing of outputs from the signal processing equipment bistables. To meet the redundancy requirements, two trains of SSPS, each performing the same functions, are provided. If one train is taken out-of-service for maintenance or test purposes, the second train will provide ESF actuation for the unit. If both trains are taken out-of-service or placed in test, a reactor trip will result. Each train is packaged in its own cabinet for physical and electrical separation to satisfy separation and independence requirements.

Each SSPS train has a built-in testing device that can automatically test the decision logic matrix functions and the actuation devices while the unit is at power. When any one train is placed in test, the other train is capable of providing unit monitoring and protection until the testing has been completed. The testing device is semi-automatic to minimize testing time.

The actuation of ESF components is accomplished through master and slave relays. The SSPS energizes the master relays appropriate for the condition of the unit. Each master relay then energizes one or more slave relays, which then causes actuation of the end devices. The master and slave relays are tested bi-monthly to ensure operation. The bi-monthly test of the master relays energizes the master relay, which then operates the contacts and applies a low voltage to the associated slave relays. The low voltage is not sufficient to actuate the slave relays but only demonstrates signal path continuity. The 92-day slave relay surveillance test actuates the slave relay via the test circuit and not via the master relay, and actuates the end devices if their operation will not interfere with continued unit operation. If actuation of end devices would interfere with unit operation, the slave relay test circuit prevents actual component operation, and slave relay contact operation is verified by a continuity check of the circuit containing the slave relay.

The required channels of ESFAS instrumentation provide unit protection in the event of any of the analyzed accidents. Surveillance testing provides a high level of confidence that the instrumentation will perform its required function when called upon. The conduct of SR 3.3.2.7 and SR 3.3.6.5 perform the slave relay tests described above every 92 days. The 92-day STI is based on industry operating experience that considers instrument reliability and operating history data.

D. NEED FOR REVISION OF THE REQUIREMENT

The current 92-day surveillance testing of ESFAS slave relays involves testing the slave relays at power with the attendant risk of inadvertent actuation of the ESF equipment. This on-line surveillance testing of the slave relays requires significant plant manipulation (e.g., operating switches in SSPS), abnormal configurations (e.g., abnormal system lineups), and the removal of various equipment from service, thus making it unavailable to perform its intended safety function. NUREG-1366, dated December 1992, lists four criteria, any one of which can justify changes to support line item SR revisions (e.g., changes to the SSPS slave relay STI), as follows: (1) the surveillance could lead to a plant transient, (2) the surveillance results in unnecessary wear to equipment, (3) the surveillance results in radiation exposure to plant personnel that is not justified by the safety significance of the surveillance, and (4) the surveillance places an unnecessary burden on plant personnel because the time required is not

justified by the safety significance of the surveillance. Criteria (1), (2), and (4) are applicable to the ESFAS slave relay testing conducted at the Braidwood Station and the Byron Station. The analyses documented in Reference 1 and Reference 2 demonstrate that the safety significance of the current 92-day STI does not justify the impact being imposed on the Braidwood Station and the Byron Station. The proposed changes would extend the STI to an 18-month surveillance interval for the slave relays and would significantly reduce the vulnerability of the Braidwood Station and the Byron Station to the adverse consequences listed in criteria (1), (2) and (4) above.

NRC GL 93-05, issued on September 27, 1993, was the result of the recommendations of a 1983 NRC Task Group. The Task Group was formed to investigate problems concerning TS surveillance testing requirements and to recommend improvements. The Task Group found that while some testing at power is essential to verify equipment and system operability, safety can be improved, equipment degradation reduced, and unnecessary personnel burden relaxed by reducing the amount of testing at power. The SSPS slave relays utilized in Westinghouse plants are in most cases tested at a 92-day surveillance interval and require significant plant resources as well as abnormal plant lineups and equipment out-of-services. Consequently, the SSPS slave relay surveillance requirements are a prime example of an item whose revision will improve safety, reduce equipment degradation and reduce personnel burden. In order to implement the NRC Task Group recommendations, the Westinghouse Owners Group (WOG) initiated a program to evaluate the SSPS slave relays for extension of the current STI.

Westinghouse Topical Reports WCAP-13877, WCAP-13878 and WCAP-13900, (References 1, 2, and 3, respectively), are the result of the WOG efforts. These WCAPs demonstrate that the operating history, instrument reliability, and experience with the components justify a longer STI. The proposed changes do not deviate from any of the assumptions or requirements identified in the reference WCAPs and no exceptions are being requested. Implementing the proposed changes will improve safety by ensuring that the equipment is available to perform its intended safety function, will reduce system degradation due to less component cycling and manipulation, and will reduce unnecessary burden on the plant personnel due to less frequent testing. Extending the SSPS slave relay STI is consistent with the objectives and recommendations of the 1983 NRC Task Group.

E. DESCRIPTION OF THE PROPOSED CHANGES

The proposed changes extend the STI for the ESFAS Instrumentation SR 3.3.2.7, "Perform Slave Relay Test," from a frequency of every "92 days," to a frequency of every "18 months." Additionally, an administrative change is being made to switch the numbering between SR 3.3.2.7 and SR 3.3.2.8. Specifically, "SR 3.3.2.7" is renumbered to "SR 3.3.2.8," and "SR 3.3.2.8" is renumbered to "SR 3.3.2.7," which will maintain the ascending order of the surveillance frequencies for the SRs. This renumbering is reflected in changes to Table 3.3.2-1, "ESFAS Instrumentation."

The proposed changes extend the STI for the Containment Ventilation Isolation Instrumentation SR 3.3.6.5, "Perform Slave Relay Test," from a frequency of every "92 days," to a frequency of every "18 months."

Future slave relay replacement types will meet the acceptance criteria for the reliability assessments performed in accordance with the NRC approved methodology described in WCAP-13877, WCAP-13878 and WCAP-13900.

F. SAFETY ANALYSIS OF THE PROPOSED CHANGES

The Westinghouse Electric Corporation Topical Reports, WCAP-13877, WCAP-13878 and WCAP-13900, (References 1, 2 and 3, respectively), are applicable to the Westinghouse Type AR slave relays and the Potter & Brumfield MDR Series slave relays used in the SSPS at the Braidwood Station and the Byron Station. Attachment E provides the plant-specific information, as requested by the NRC in References 5 and 6, that confirms the applicability and acceptability of these generic WCAPs to the Braidwood Station and the Byron Station. The proposed changes are consistent with the methodology and requirements approved by the NRC in References 4, 5 and 6. The proposed changes are similar to the STI extensions previously approved by the NRC for the Watts Bar and Diablo Canyon plants, as documented in Reference 7 and Reference 8, respectively, as well as the original TS approved for the Callaway, Wolf Creek, and South Texas plants.

The changes being proposed involve the extension of the SSPS slave relay STI from the current 92-day STI to an 18-month STI for the Westinghouse Type AR slave relays and for the Potter & Brumfield MDR Series slave relays, or future replacement slave relay types that meet the acceptance criteria for the reliability assessments performed in accordance with the NRC approved methodology described in the Westinghouse Electric Corporation Topical Reports, WCAP-13877, WCAP-13878 and WCAP-13900. The NRC approved WCAPs demonstrate that the reliability and operating history of the slave relays are such that the extension of the STI will not adversely affect the ability of the SSPS to perform its safety function. Plant safety will be improved by limiting the amount of on-line testing that will be performed, because on-line testing of the slave relays results in the removal of a train of equipment from service or manipulation of specific safety-related equipment which is then no longer able to perform its safety function if called upon until the surveillance test is completed. Implementing the proposed changes will also reduce system degradation due to less component cycling and manipulation, and will reduce unnecessary burden on the plant personnel due to less frequent testing.

Westinghouse performed evaluations to determine the reliability of the Westinghouse Type AR slave relays and the Potter & Brumfield MDR Series slave relays used in the SSPS to actuate ESF components. These evaluations, as documented in WCAP-13877 and WCAP-13878, respectively, include a generic review of industry information on slave relay problems, a slave relay surveillance test failure study, a failure modes and effects analysis (FMEA), and an aging assessment. Based on the results, the slave relays have a design and cycle life capability greatly in excess of that required for the SSPS slave relay application. The maximum temperature experienced by the slave relays in the SSPS cabinets is far less than each manufacturer's recommended temperature for reliable slave relay operation. The slave relay reliability studies demonstrate that the slave relays are highly reliable, principally due to the very low cycle demand and the extended periods during which no demand is expected, and is supported by the results of the aging analyses. The aging assessments concluded that the degradation of both the normally de-energized (ND) slave relays and the normally energized (NE) slave relays is sufficiently slow (i.e., the time to failure due to degradation is sufficiently

long) that an 18-month STI will adequately identify slave relay failures. A 92-day STI is no more likely to detect significant changes in the SSPS slave relays than an 18-month STI.

The aging assessments demonstrate that the ND slave relays, and the NE slave relays with a low duty cycle, will not experience temperature-induced, age-related degradation sufficient to result in failure within the 40-year plant life. The aging assessments also indicate that the NE slave relays with a significant duty cycle will experience temperature-induced, age-related degradation sufficient to result in failure within the 40-year plant life, but with replacement at a conservative interval, the NE slave relays will exhibit the same reliability as the ND slave relays. For the latter case, only two of the SSPS slave relays are NE and neither of those two relays are used in the ESFAS associated with TS 3.3.2. Therefore, the results of the aging assessment of NE slave relays are not applicable to the Braidwood Station and the Byron Station because there are no NE slave relays used in the ESFAS associated with the proposed changes.

G. IMPACT ON PREVIOUS SUBMITTALS

We have reviewed the proposed changes regarding their impact on any previous submittals and have determined that there is no impact on any previous submittals.

H. SCHEDULE REQUIREMENTS

We request approval of the proposed changes prior to May 1, 2001. The timely implementation of the proposed SSPS slave relay STI extension would support the NRC Task Group recommendations in GL 93-05 and the conclusions in NUREG-1366, that improving safety, reducing equipment degradation, and reducing unnecessary burden on personnel can be achieved by reducing the amount of non-essential testing at power. This schedule would coincide with the first testing cycle following the Byron Station, Unit 2, spring 2001, refueling outage.

I. REFERENCES

1. Westinghouse Topical Report WCAP-13877, Revision 2-P-A, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," dated October 1999.

2. Westinghouse Topical Report WCAP-13878-P-A, Revision 2, "Reliability Assessment of Potter & Brumfield MDR Series Relays," dated October 1999.

3. Westinghouse Topical Report WCAP-13900, Revision 0, "Extension of Slave Relay Surveillance Test Intervals," dated April 1994.

4. Letter from S. A. Richards (U. S. NRC) to H. A. Sepp (Westinghouse Electric Corporation), "Review of Westinghouse Topical Reports WCAP-13877, Revision 2-P and WCAP-13878-P, Revision 2 on Solid State Protection System (SSPS) Slave Relays," dated July 12, 2000.

5. Letter from T. H. Essig (U. S. NRC) to L.F. Liberatori (Westinghouse Owners Group), "Review of Westinghouse Owners Group Topical Reports WCAP-13877 Revision 1, WCAP-14129 Revision 1, and WCAP-13900 Revision 0, 'ESFAS Subgroup Relay Test Interval Extension,'" dated October 26, 1998.

6. Letter from B. A. Boger (U. S. NRC) to T. Green (Westinghouse Owners Group), "Review of Westinghouse Electric Corporation Technical Reports WCAP-13878 Revision 1, WCAP- 14117 Revision 1, and WCAP-13900 Revision 0, 'ESFAS Subgroup Test Interval Extension,'" dated May 31, 1996.

7. Letter from R. E. Martin (U. S. NRC) to J. A. Scalice (Tennessee Valley Authority), "Issuance of Watts Bar Nuclear Plant, Unit 1, Amendment Number 17 on Slave Relay Surveillance Interval," dated December 30, 1998.

8. Letter from S. D. Bloom (U. S. NRC) to G. M. Rueger (Pacific Gas and Electric), "Issuance of Amendments for Diablo Canyon Nuclear Power Plant, Unit No. 1 and Unit No. 2," dated August 19, 1996.

ATTACHMENT B-1

PROPOSED TS CHANGES FOR BRAIDWOOD STATION

MARKED-UP TS PAGES

3.3.2-7
3.3.2-9
3.3.2-10
3.3.2-11
3.3.2-12
3.3.2-13
3.3.6-3

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
[redacted]	[redacted]	[redacted]
[redacted]	----------NOTE---------- Verification of relay setpoints not required. ---------- Perform TADOT.	92 days
[redacted]	[redacted]	[redacted]
SR 3.3.2.9	----------NOTE---------- Verification of setpoint not required. ---------- Perform TADOT.	18 months

(continued)

Table 3.3.2-1 (page 1 of 6)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1.	Safety Injection					
	a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
	c. Containment Pressure – High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 4.6 psig
	d. Pressurizer Pressure – Low	1,2,3(a)	4	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 1817 psig
	e. Steam Line Pressure – Low	1,2,3(a)	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig(b)
2.	Containment Spray					
	a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
	c. Containment Pressure High – 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

Table 3.3.2-1 (page 2 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
(3) Containment Pressure High-3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

Table 3.3.2-1 (page 3 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Steam Line Isolation					
a. Manual Initiation	$_{1,2}^{(c)}{}_{,3}^{(c)}$	2	F	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	$_{1,2}^{(g)}{}_{,3}^{(g)}$	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
c. Containment Pressure – High 2	$_{1,2}^{(g)}{}_{,3}^{(g)}$	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 9.4 psig
d. Steam Line Pressure					
(1) Low	$_{1,2}^{(g)}{}_{,3}^{(a)(f)(g)}$	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig[(b)]
(2) Negative Rate – High	$_{3}^{(d)(g)}$	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 165.3 psi[(e)]

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

(c) Except when all Main Steam Isolation Valves (MSIVs) are closed.

(d) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.1 blocked.

(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(f) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.2 not enabled.

(g) Except when all Main Steam Isolation Valves (MSIVs) and MSIV bypass valves are closed.

Table 3.3.2-1 (page 4 of 6)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5.	Turbine Trip and Feedwater Isolation					
	a. Automatic Actuation Logic and Actuation Relays	$1,2^{(h)},3^{(h)}$	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
	b. Steam Generator (SG) Water Level – High High (P-14)					
	1) Unit 1	$1,2^{(h)},3^{(h)}$	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 [redacted] SR 3.3.2.10 SR 3.3.2.12	≤ 89.9% of narrow range instrument span
	2) Unit 2	$1,2^{(h)},3^{(h)}$	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 [redacted] SR 3.3.2.10 SR 3.3.2.12	≤ 81.5% of narrow range instrument span
	c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements				

(continued)

(h) Except when all Feedwater Isolation Valves are closed or isolated by a closed manual valve.

Table 3.3.2-1 (page 5 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6. Auxiliary Feedwater					
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
b. SG Water Level – Low Low					
1) Unit 1	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 16.1% of narrow range instrument span
2) Unit 2	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 34.8% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. Loss of Offsite Power (Undervoltage on Bus 141(241))	1,2,3	2	H	SR 3.3.2.3 SR 3.3.2.10 SR 3.3.2.11	≥ 2730 V
e. Undervoltage Reactor Coolant Pump (per train)	1,2	4	I	[redacted] SR 3.3.2.10 SR 3.3.2.12	≥ 4920 V
f. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure – Low	1,2,3	1 per train	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.10	≥ 17.4 psia
7. Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
b. Refueling Water Storage Tank (RWST) Level – Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 44.7% of instrument span
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(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.	[redacted]
SR 3.3.6.6	Perform CHANNEL CALIBRATION.	18 months

ATTACHMENT B-2

PROPOSED TS CHANGES FOR BYRON STATION

MARKED-UP TS PAGES

3.3.2-7
3.3.2-9
3.3.2-10
3.3.2-11
3.3.2-12
3.3.2-13
3.3.6-3

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
[redacted]	[redacted]	[redacted]
[redacted]	----------NOTE---------- Verification of relay setpoints not required. ---------- Perform TADOT.	92 days
[redacted]	[redacted]	[redacted]
SR 3.3.2.9	----------NOTE---------- Verification of setpoint not required. ---------- Perform TADOT.	18 months

(continued)

Table 3.3.2-1 (page 1 of 6)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1.	Safety Injection					
	a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
	c. Containment Pressure - High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 4.6 psig
	d. Pressurizer Pressure - Low	1,2,3(a)	4	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 1817 psig
	e. Steam Line Pressure - Low	1,2,3(a)	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig(b)
2.	Containment Spray					
	a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
	c. Containment Pressure High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

Table 3.3.2-1 (page 2 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
(3) Containment Pressure High-3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

Table 3.3.2-1 (page 3 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Steam Line Isolation					
a. Manual Initiation	$1,2^{(c)},3^{(c)}$	2	F	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	$1,2^{(g)},3^{(g)}$	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
c. Containment Pressure – High 2	$1,2^{(g)},3^{(g)}$	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 9.4 psig
d. Steam Line Pressure					
(1) Low	$1,2^{(g)},3^{(a)(f)(g)}$	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig[(b)]
(2) Negative Rate – High	$3^{(d)(g)}$	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 165.3 psi[(e)]

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

(c) Except when all Main Steam Isolation Valves (MSIVs) are closed.

(d) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.1 blocked.

(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(f) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.2 not enabled.

(g) Except when all Main Steam Isolation Valves (MSIVs) and MSIV bypass valves are closed.

Table 3.3.2-1 (page 4 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Turbine Trip and Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays	1,2(h),3(h)	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
b. Steam Generator (SG) Water Level – High High (P-14)					
1) Unit 1	1,2(h),3(h)	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 [redacted] SR 3.3.2.10 SR 3.3.2.12	≤ 89.9% of narrow range instrument span
2) Unit 2	1,2(h),3(h)	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 [redacted] SR 3.3.2.10 SR 3.3.2.12	≤ 81.5% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(continued)

(h) Except when all Feedwater Isolation Valves are closed or isolated by a closed manual valve.

Table 3.3.2-1 (page 5 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6. Auxiliary Feedwater					
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
b. SG Water Level – Low Low					
1) Unit 1	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 16.1% of narrow range instrument span
2) Unit 2	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 34.8% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. Loss of Offsite Power (Undervoltage on Bus 141(241))	1,2,3	2	H	SR 3.3.2.3 SR 3.3.2.10 SR 3.3.2.11	≥ 2730 V
e. Undervoltage Reactor Coolant Pump (per train)	1,2	4	I	[redacted] SR 3.3.2.10 SR 3.3.2.12	≥ 4920 V
f. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure – Low	1,2,3	1 per train	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.10	≥ 17.4 psia
7. Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 [redacted]	NA
b. Refueling Water Storage Tank (RWST) Level – Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 44.7% of instrument span
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(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.	[redacted]
SR 3.3.6.6	Perform CHANNEL CALIBRATION.	18 months

ATTACHMENT B-3

PROPOSED TS CHANGES INCORPORATED FOR BRAIDWOOD STATION

INCORPORATED TS PAGES

3.3.2-7
3.3.2-9
3.3.2-10
3.3.2-11
3.3.2-12
3.3.2-13
3.3.6-3

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)

Table 3.3.2-1 (page 1 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Safety Injection					
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
c. Containment Pressure – High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 4.6 psig
d. Pressurizer Pressure – Low	1,2,3[(a)]	4	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 1817 psig
e. Steam Line Pressure – Low	1,2,3[(a)]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig[(b)]
2. Containment Spray					
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
c. Containment Pressure High – 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

Table 3.3.2-1 (page 2 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
(3) Containment Pressure High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

Table 3.3.2-1 (page 3 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Steam Line Isolation					
a. Manual Initiation	1,2[c],3[c]	2	F	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	1,2[g],3[g]	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
c. Containment Pressure – High 2	1,2[g],3[g]	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 9.4 psig
d. Steam Line Pressure					
(1) Low	1,2[g],3[a][f][g]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig[b]
(2) Negative Rate – High	3[d][g]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 165.3 psi[e]

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

(c) Except when all Main Steam Isolation Valves (MSIVs) are closed.

(d) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.1 blocked.

(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(f) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.2 not enabled.

(g) Except when all Main Steam Isolation Valves (MSIVs) and MSIV bypass valves are closed.

Table 3.3.2-1 (page 4 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Turbine Trip and Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays	1,2[(h)],3[(h)]	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
b. Steam Generator (SG) Water Level – High High (P-14)					
1) Unit 1	1,2[(h)],3[(h)]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.8 SR 3.3.2.10 SR 3.3.2.12	≤ 89.9% of narrow range instrument span
2) Unit 2	1,2[(h)],3[(h)]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.8 SR 3.3.2.10 SR 3.3.2.12	≤ 81.5% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(continued)

(h) Except when all Feedwater Isolation Valves are closed or isolated by a closed manual valve.

Table 3.3.2-1 (page 5 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6. Auxiliary Feedwater					
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
b. SG Water Level – Low Low					
1) Unit 1	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 16.1% of narrow range instrument span
2) Unit 2	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 34.8% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. Loss of Offsite Power (Undervoltage on Bus 141(241))	1,2,3	2	H	SR 3.3.2.3 SR 3.3.2.10 SR 3.3.2.11	≥ 2730 V
e. Undervoltage Reactor Coolant Pump (per train)	1,2	4	I	SR 3.3.2.7 SR 3.3.2.10 SR 3.3.2.12	≥ 4920 V
f. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure – Low	1,2,3	1 per train	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.10	≥ 17.4 psia
7. Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
b. Refueling Water Storage Tank (RWST) Level – Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 44.7% of instrument span
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(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

ATTACHMENT B-4

PROPOSED TS CHANGES INCORPORATED FOR BYRON STATION

INCORPORATED TS PAGES

3.3.2-7
3.3.2-9
3.3.2-10
3.3.2-11
3.3.2-12
3.3.2-13
3.3.6-3

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)

Table 3.3.2-1 (page 1 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Safety Injection					
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
c. Containment Pressure – High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 4.6 psig
d. Pressurizer Pressure – Low	1,2,3[(a)]	4	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 1817 psig
e. Steam Line Pressure – Low	1,2,3[(a)]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig[(b)]
2. Containment Spray					
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
c. Containment Pressure High – 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

Table 3.3.2-1 (page 2 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.9	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
(3) Containment Pressure High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 21.2 psig

(continued)

Table 3.3.2-1 (page 3 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Steam Line Isolation					
a. Manual Initiation	1,2[c],3[c]	2	F	SR 3.3.2.9	NA
b. Automatic Actuation Logic and Actuation Relays	1,2[g],3[g]	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
c. Containment Pressure – High 2	1,2[g],3[g]	3	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 9.4 psig
d. Steam Line Pressure					
(1) Low	1,2[g],3[a][f][g]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 614 psig[b]
(2) Negative Rate – High	3[d][g]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≤ 165.3 psi[e]

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

(c) Except when all Main Steam Isolation Valves (MSIVs) are closed.

(d) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.1 blocked.

(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(f) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.2 not enabled.

(g) Except when all Main Steam Isolation Valves (MSIVs) and MSIV bypass valves are closed.

Table 3.3.2-1 (page 4 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Turbine Trip and Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays	1,2[(h)],3[(h)]	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
b. Steam Generator (SG) Water Level – High High (P-14)					
1) Unit 1	1,2[(h)],3[(h)]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.8 SR 3.3.2.10 SR 3.3.2.12	≤ 89.9% of narrow range instrument span
2) Unit 2	1,2[(h)],3[(h)]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.8 SR 3.3.2.10 SR 3.3.2.12	≤ 81.5% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(continued)

(h) Except when all Feedwater Isolation Valves are closed or isolated by a closed manual valve.

Table 3.3.2-1 (page 5 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6. Auxiliary Feedwater					
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
b. SG Water Level – Low Low					
1) Unit 1	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 16.1% of narrow range instrument span
2) Unit 2	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 34.8% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. Loss of Offsite Power (Undervoltage on Bus 141(241))	1,2,3	2	H	SR 3.3.2.3 SR 3.3.2.10 SR 3.3.2.11	≥ 2730 V
e. Undervoltage Reactor Coolant Pump (per train)	1,2	4	I	SR 3.3.2.7 SR 3.3.2.10 SR 3.3.2.12	≥ 4920 V
f. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure – Low	1,2,3	1 per train	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.10	≥ 17.4 psia
7. Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.8	NA
b. Refueling Water Storage Tank (RWST) Level – Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.6 SR 3.3.2.10 SR 3.3.2.12	≥ 44.7% of instrument span
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(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

ATTACHMENT B-5

PROPOSED TS BASES CHANGES FOR BRAIDWOOD STATION
FOR INFORMATION ONLY

TS BASES PAGES

B 3.3.2-53
B 3.3.2-57
B 3.3.6-8
B 3.3.6-9

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.7

SR 3.3.2.7 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 3.3.2.8

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. Future slave and auxiliary relay replacement types in the ESFAS circuit shall meet the acceptance criteria for the reliability analyses performed in accordance with the methodology described in References 12, 13, and 14.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.4

A COT is performed every 92 days on each required channel to ensure the entire channel will perform the intended Function. The Frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 2). This test verifies the capability of the instrumentation to provide the containment ventilation system isolation. The setpoint shall be left consistent with the current plant specific calibration procedure tolerance.

SR 3.3.6.5

SR 3.3.6.5 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation mode is either allowed to function or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation mode is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing the slave relay.

This test is performed every 18 months. The Frequency of 18 months is based on the reliability analyses described in References 3, 4, and 5. 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 Containment Ventilation Isolation Instrumentation circuit. Future slave and auxiliary relay replacement types in the Containment Ventilation Isolation Instrumentation circuit shall meet the acceptance criteria for the reliability analyses performed in accordance with the methodology described in References 3, 4, and 5.

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.

ATTACHMENT B-6

PROPOSED TS BASES CHANGES FOR BYRON STATION
FOR INFORMATION ONLY

TS BASES PAGES

B 3.3.2-53
B 3.3.2-57
B 3.3.6-8
B 3.3.6-9

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.7

SR 3.3.2.7 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 3.3.2.8

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. Future slave and auxiliary relay replacement types in the ESFAS circuit shall meet the acceptance criteria for the reliability analyses performed in accordance with the methodology described in References 12, 13, and 14.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.4

A COT is performed every 92 days on each required channel to ensure the entire channel will perform the intended Function. The Frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 2). This test verifies the capability of the instrumentation to provide the containment ventilation system isolation. The setpoint shall be left consistent with the current plant specific calibration procedure tolerance.

SR 3.3.6.5

SR 3.3.6.5 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation mode is either allowed to function or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation mode is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing the slave relay.

This test is performed every 18 months. The Frequency of 18 months is based on the reliability analyses described in References 3, 4, and 5. 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 Containment Ventilation Isolation Instrumentation circuit. Future slave and auxiliary relay replacement types in the Containment Ventilation Isolation Instrumentation circuit shall meet the acceptance criteria for the reliability analyses performed in accordance with the methodology described in References 3, 4, and 5.

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.

ATTACHMENT C

INFORMATION SUPPORTING A FINDING OF NO SIGNIFICANT HAZARDS CONSIDERATION

According to 10 CFR 50.92(c), "Issuance of amendment," 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.

Commonwealth Edison (ComEd) Company is proposing changes to the Technical Specifications (TS) of Facility Operating License Nos. NPF-72, NPF-77, NPF-37 and NPF-66, for the Braidwood Station, Units 1 and 2, and the Byron Station, Units 1 and 2, respectively. The proposed changes extend the Surveillance Test Interval (STI) for the Solid State Protection System (SSPS) slave relays. Specifically, the proposed changes extend the STI for the Engineered Safety Features Actuation System (ESFAS) Instrumentation Surveillance Requirement (SR) 3.3.2.7, "Perform Slave Relay Test," and for the Containment Ventilation Isolation Instrumentation SR 3.3.6.5, "Perform Slave Relay Test," from a 92-day STI to an 18-month STI for the Westinghouse Type AR slave relays and for the Potter & Brumfield MDR Series slave relays, or for future replacement slave relay types that meet the acceptance criteria for the reliability assessments performed in accordance with the methodology described in the Westinghouse Electric Corporation Topical Reports, WCAP-13877, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," WCAP-13878, "Reliability Assessment of Potter & Brumfield MDR Series Relays," and WCAP-13900, "Extension of Slave Relay Surveillance Testing Intervals."

Information supporting the determination that the criteria set forth in 10 CFR 50.92 are met for this amendment request is indicated below.

1. **Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   The proposed changes are consistent with the NRC approved Westinghouse Electric Corporation Topical Reports, WCAP-13877, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," WCAP-13878, "Reliability Assessment of Potter & Brumfield MDR Series Relays," and WCAP-13900, "Extension of Slave Relay Surveillance Testing Intervals," that analyze extending the Solid State Protection

System (SSPS) slave relay surveillance test interval (STI) for the Westinghouse Type AR slave relays and for the Potter & Brumfield MDR Series slave relays. The reliability assessment of the slave relays was comprised of a failure modes and effects analysis (FMEA) and an aging assessment of the slave relays. WCAP-13877 and WCAP-13878 verified that the Westinghouse Type AR and the Potter & Brumfield MDR Series slave relays are highly reliable and that degradation of the slave relays is sufficiently slow (i.e., the time to failure due to degradation is sufficiently long) that an 18-month STI will adequately identify slave relay failures. A 92-day STI is no more likely to detect significant changes in the SSPS slave relays than an 18-month STI. The results demonstrate that extending the SSPS slave relay STI from 92 days to 18 months does not adversely affect the reliability of the SSPS slave relays utilized in Engineered Safety Features Actuation System (ESFAS) functions. The high reliability of these slave relays precludes the need for more frequent periodic surveillance testing to verify operability.

As stated in WCAP-13877 and WCAP-13878, the overly conservative 92-day STI can be extended to an 18-month STI without impact or consequence to slave relay reliability. In addition, the proposed changes will not adversely affect the ability of the SSPS to perform its safety function. The same ESFAS instrumentation is being used and the ESFAS reliability is being maintained with the proposed changes. Because the reliability of the slave relays used in the ESFAS applications is so high, elimination of the routine surveillance testing of the slave relays when the reactor is at power will have a positive impact on ESFAS availability and plant safety. The proposed changes will not modify any system interface and will not increase the likelihood of any accident initiator because such events are independent of the proposed changes. Therefore, the probability of an accident previously evaluated is not increased.

The proposed changes will not modify, degrade, or prevent actions or alter any assumptions previously made in evaluating the radiological consequences of any accident described in the Updated Final Safety Analysis Report (UFSAR). The ESFAS instrumentation remains capable of performing its intended safety function of mitigation of consequences of accidents or transients. Therefore, the consequences of an accident previously evaluated are not increased.

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

2. **Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

The proposed changes do not alter the performance of the ESFAS. The proposed changes only extend the STI, and no changes to the testing methodology or the way in which the slave relays are tested are being proposed. No new equipment is being installed, and no installed equipment is being operated in a new or different manner with the proposed changes. Extending the STI will maintain the reliability of the slave relays as demonstrated by the NRC approved FMEA and aging assessment, and may improve the reliability of the system by reducing potential test-induced degradation. As documented in WCAP-13877 and WCAP-13878, an STI of 92 days is no more likely to

detect significant changes in the SSPS Type AR and MDR Series slave relays than a STI of 18 months.

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

3. **Does the proposed change involve a significant reduction in a margin of safety?**

The proposed changes do not affect the total ESFAS response assumed in the safety analysis. The periodic slave relay functional verification is relaxed because of the demonstrated high reliability of the slave relays and their insensitivity to any short-term wear or aging effects. The Westinghouse Owners Group (WOG) program to extend the STI for the slave relays, as documented in the NRC approved WCAP-13877 and WCAP-13878, has concluded that the slave relays used in the SSPS are highly reliable and that the surveillance testing at a frequency of 18 months, instead of the 92-day STI currently required, does not significantly decrease any margin of safety assumed in the safety analysis. Plant safety will be improved by limiting the amount of on-line testing that will be performed, because on-line testing of the slave relays results in the removal of a train of equipment from service or manipulation of specific safety-related equipment which is then no longer able to perform its safety function if called upon until the surveillance test is completed. The proposed changes also act to improve plant safety by reducing equipment degradation and reducing unnecessary burden on the operating personnel. There are no changes in testing methodology or performance criteria.

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

ATTACHMENT D

INFORMATION SUPPORTING AN ENVIRONMENTAL ASSESSMENT

Commonwealth Edison (ComEd) Company has evaluated the proposed changes against 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." ComEd has determined that the proposed changes meet the criteria for a categorical exclusion set forth in 10 CFR 51.22(c)(9), "Criteria for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," and as such, has determined that no irreversible consequences exist in accordance with 10 CFR 50.92(b), "Issuance of amendment." This determination is based on the fact that this change is being proposed as an amendment to a 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 a surveillance requirement, and the amendment meets the following specific criteria.

(i) **The amendment involves no significant hazards consideration.**

As demonstrated in Attachment C, the proposed changes do not involve any significant hazards consideration.

(ii) **There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.**

The proposed changes are limited to extending the Surveillance Test Interval for the Solid State Protection System slave relays. The proposed changes do not allow for an increase in the unit power level, do not increase the production, nor alter the flow path or method of disposal of radioactive waste or by-products. Therefore, the proposed changes do not affect actual unit effluents. There will be no change in the types or increase in the amounts of any effluents released offsite.

(iii) **There is no significant increase in individual or cumulative occupational radiation exposure.**

The proposed changes will not result in changes in the operation or configuration of the facility. There will be no change in the level of controls or methodology used for processing of radioactive effluents or handling of solid radioactive waste, nor will the proposal result in any change in the normal radiation levels within the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from the proposed changes.

ATTACHMENT E

ADDITIONAL INFORMATION

The NRC approval of Westinghouse Electric Corporation Topical Reports, WCAP-13877, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," WCAP-13878, "Reliability Assessment of Potter & Brumfield MDR Series Relays," and WCAP-13900, "Extension of Slave Relay Surveillance Testing Intervals," stated that licensees referencing these WCAPs in plant-specific license amendment requests for Solid State Protection System (SSPS) slave relay surveillance test interval (STI) extensions should provide certain additional information. The following provides the requested information, specifically plant-specific information that confirms the applicability and acceptability of these generic WCAPs to the Braidwood Station and the Byron Station.

NRC Item 1:

Confirm the applicability of the WCAP-13877 and WCAP-13878 analyses to the plant.

Response:

The Westinghouse Topical Reports, WCAP-13877, WCAP-13878 and WCAP-13900, are applicable to the Braidwood Station, Units 1 and 2, and the Byron Station, Units 1 and 2. The methodologies and assumptions utilized in these WCAP generic analyses were compared to the Braidwood Station and the Byron Station SSPS applications and were found to be directly applicable. The Braidwood Station and the Byron Station were respondents in the operating history surveys that comprised the analyses.

NRC Item 2:

Ensure that the contact loading analysis for the Westinghouse Type AR and for the Potter & Brumfield MDR Series relays have been performed to determine the acceptability of these relays.

Response:

A contact loading analysis was performed for the Braidwood Station, Units 1 and 2, and the Byron Station, Units 1 and 2, to verify that the contact loading for the Westinghouse Type AR and the Potter & Brumfield MDR Series relays used as slave relays in the SSPS does not exceed the contact ratings. The analysis evaluated every application of every contact of each of the slave relays affected by the proposed changes. The analysis used the contact rating values provided by Westinghouse and compared those values against the specified load ratings of the equipment that the contacts supply.

The analysis identified 11 sets of slave relay contacts per Engineered Safety Feature (ESF) train out of 165 possible applications that required further review. The issues

associated with the 11 sets of contacts are grouped into three broad areas and the resolutions to each are provided as follows.

1) **Contacts with connected loads which exceed the relay's interrupting rating.**

   This is applicable to a relay associated with containment isolation for the hydrogen monitoring system. These contacts open during a Safety Injection (SI) in order to de-energize/close hydrogen sampling valves. At Braidwood Station, the installation of diodes in these valve circuits as part of the resolution to an unrelated problem make the application acceptable for both Westinghouse Type AR and Potter & Brumfield MDR Series relays.

   At Byron Station, the relay associated with containment isolation for the hydrogen monitoring system will be modified by February 15, 2001, such that the relay's interrupting rating will not be exceeded. Therefore, upon installation of the modification, the application will be acceptable for both Westinghouse Type AR and Potter & Brumfield MDR Series relays at Byron Station.

2) **Contacts with momentary loads which exceed the relay's continuous rating.**

   This is applicable to a relay associated with the reset for the lockout relay for the sequencer cabinet. The relay's normally open contact closes to energize a lockout relay coil which resets the sequencer test function upon an Engineered Safety Features Actuation System (ESFAS) signal. Discussions with representatives from the lockout relay coil vendor determined that the contact load used as a design input to the contact loading analysis was in error. The actual load associated with the lockout relay coil that would be seen by the slave relay contact is well within the rating of both the Westinghouse Type AR and the Potter & Brumfield MDR Series slave relays. Therefore, the Westinghouse Type AR and Potter & Brumfield MDR Series relays are acceptable for this application.

3) **Contacts which are presently within their rating but which would exceed the replacement relay's interrupting and/or continuous rating if a Potter & Brumfield MDR Series relay were installed.**

   This is applicable to nine relays, and each of these applications at Braidwood Station and Byron Station use the Westinghouse Type AR relay, which is acceptable for this application. These applications are not acceptable for the Potter & Brumfield MDR Series relay unless a subsequent analysis determines their acceptability. Through our procurement program, we will ensure that the Potter & Brumfield MDR Series relay is not used in these applications unless subsequently verified acceptable.

Therefore, the contact loading analysis has been performed for the Westinghouse Type AR and for the Potter & Brumfield MDR Series relays to determine the acceptability of these relays.

NRC Item 3:

Determine the qualified life for the Westinghouse Type AR relays based on the plant-specific environmental conditions.

Response:

The results of the qualified life analysis determined that the Braidwood Station, Units 1 and 2, and the Byron Station, Units 1 and 2, qualified life of the Westinghouse Type AR slave relays exceeds 40 years. The qualified life of the Westinghouse Type AR relays was determined utilizing the methodology found in Section 8 of WCAP-13877. Only two of the SSPS slave relays are normally energized (NE) and neither of those two relays are used in the ESFAS associated with Technical Specification 3.3.2, "Engineered Safety Features Actuation System (ESFAS) Instrumentation." Since none of the slave relays affected by the proposed changes are normally energized, they are not subject to increased aging. Therefore, the qualified life of the slave relays in the Braidwood Station and the Byron Station SSPS exceeds 40 years.

NRC Item 4:

Ensure that the procurement program for the Potter & Brumfield MDR Series relays is adequate for detecting the types of failures that are discussed in the Office for Analysis and Evaluation of Operational Data Special Study Report (AEOD/S93-06), "Potter & Brumfield Model MDR Rotary Relay Failures," dated December 1993, Information Notice (IN) 90-57, "Substandard, Refurbished Potter & Brumfield Relays Misrepresented as New," dated September 5, 1990, and its associated Supplement 1, dated November 27, 1991, and 10 CFR Part 21, "Reporting of Defects and Noncompliance," notification dated July 21, 1995, from the San Onofre Nuclear Generating Station (SONGS).

Response:

The Braidwood Station and the Byron Station procurement programs are adequate for detecting potential failures as identified in the referenced documents. Each of the referenced documents were reviewed and compared to our procurement programs. The 10 CFR Part 21 notification from SONGS concerning relays that were returned to SONGS with bent contact arms following Potter & Brumfield rework, and IN 90-57 and its associated Supplement 1, all involve refurbished Potter & Brumfield MDR Series relays. The Braidwood Station and the Byron Station procurement programs have detailed and specific instructions attached to the ordering documentation for the Potter & Brumfield MDR Series slave relays such that any repaired or reworked slave relay requires prior approval. Additionally, there are no refurbished relays currently in use in the Braidwood Station or the Byron Station SSPS. AEOD/S93-06 covers numerous manufacturing defects that occurred prior to 1993. The most recently installed Potter & Brumfield MDR Series relay is at Byron Station and has a date code of 1998. Other failures noted in AEOD/S93-06 involve contact loading, which is addressed in our response to NRC Item 2 above.

Therefore, the procurement programs at the Braidwood Station and the Byron Station are adequate for detecting the types of failures that are discussed in AEOD/S93-06, IN 90-57, IN 90-57 Supplement 1, and the 10 CFR Part 21 notification from the SONGS.

NRC Item 5:

Ensure that all pre-1992 Potter & Brumfield MDR Series relays, which are used in either normally energized or a 20% duty cycle, have been removed from ESFAS applications.

Response:

None of the TS 3.3.2 slave relays affected by the proposed changes are NE or 20% energized (i.e., 20% duty cycle). Therefore, this item is not applicable to the Braidwood Station or the Byron Station.

NRC Item 6:

Establish a program to evaluate the adequacy of the proposed test interval if two or more slave relays fail in a 12-month period.

Response:

The Byron and Braidwood maintenance rule program implements the requirements of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and provides instructions for initiation, analysis, retrieval, trending, and periodic reporting of data relative to performance indicators of plant systems and components. The program includes guidance for trending and reporting of repetitive preventable failures of functions, which are within the scope of the maintenance rule. It also includes performance of cause determinations for failures to meet performance criteria and for repetitive failures.

Corrective actions are based on the identified causes, such as inadequate preventative maintenance or poor work-scheduling practices, and may include increased surveillance. The functions performed by the slave relays are in the scope of this program.

Additionally, the slave relay surveillance procedures will be revised upon implementation of the proposed changes to the SSPS slave relay STI. The procedure revision will include a requirement to evaluate a slave relay failure for a previous failure within the last 12 months on the same unit. If a second failure is identified within a 12-month period, the adequacy of the STI will be evaluated considering design, maintenance, and testing of all of the slave relays. The STI will be reduced if it is determined that the 18-month interval is inadequate.