

10 CFR 50.90

June 8, 2006

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

Peach Bottom Atomic Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278

Subject: License Amendment Request – Delete Reference to Banked Position
Withdrawal Sequence (BPWS)

Pursuant to 10 CFR 50.90, Exelon Generation Company, LLC (Exelon) hereby requests an amendment to Appendix A, Technical Specifications, of the Renewed Facility Operating Licenses DPR-44 and DPR-56. The proposed change modifies Technical Specifications (TS) 3.1.3, "Control Rod OPERABILITY"; TS 3.1.6, "Rod Pattern Control"; TS 3.3.2.1, "Control Rod Block Instrumentation"; TS 3.10.7, "Control Rod Testing - Operating", and; TS 3.10.8, "SHUTDOWN MARGIN (SDM) Test - Refueling". The proposed change would replace the current references to Banked Position Withdrawal Sequence (BPWS) with references to "the analyzed rod position sequence."

Exelon requests approval of the proposed changes by June 8, 2007. Once approved, the amendment shall be implemented within 60 days. The proposed changes have been reviewed by the Plant Operations Review Committee and approved by the Nuclear Safety Review Board. No new regulatory commitments are established by this submittal.

We are notifying the Commonwealth of Pennsylvania of this application for changes to the Technical Specifications by transmitting a copy of this letter and its attachments to the designated State Official.

PBAPS Unit 2 & 3 LAR
Delete Reference to Banked Position
Withdrawal Sequence (BPWS)
June 8, 2006
Page 2

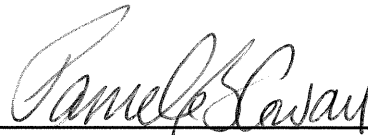
If any additional information is needed, please contact Tom Loomis at (610) 765-5510.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

JLT

June 8, 2006
Executed On



Pamela B. Cowan
Pamela B. Cowan
Director, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosures: (1) Evaluation of Proposed Change
(2) Markup of Proposed Technical Specification Page Changes
(3) Markup of Proposed Technical Specification Bases Page Changes

cc: S. J. Collins, Administrator, USNRC Region I
J. Kim, Project Manager, USNRC
F. Bowers, USNRC Senior Resident Inspector, Peach Bottom Atomic Power Station

ENCLOSURE 1

EVALUATION OF PROPOSED CHANGE

ENCLOSURE 1
EVALUATION OF PROPOSED CHANGES
CONTENTS

**SUBJECT: DELETE REFERENCE TO BANKED POSITION WITHDRAWAL SEQUENCE
(BPWS)**

1.0 DESCRIPTION

2.0 PROPOSED CHANGE

3.0 BACKGROUND

4.0 TECHNICAL ANALYSIS

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

5.2 Applicable Regulatory Requirements/Criteria

6.0 ENVIRONMENTAL CONSIDERATION

7.0 PRECEDENT

8.0 REFERENCES

PBAPS Units 2 & 3 LAR
Delete Reference to Banked Position Withdrawal Sequence (BPWS)
Evaluation of Proposed Changes
ENCLOSURE 1

1.0 DESCRIPTION

This letter is a request to amend Renewed Facility Operating Licenses Nos. DPR-44 and DPR-56. The proposed change would replace the current references to Banked Position Withdrawal Sequence (BPWS) with references to “the analyzed rod position sequence.”

Exelon Generation Company, LLC (Exelon) requests approval of the proposed changes by June 8, 2007. Once approved, the amendment shall be implemented within 60 days.

2.0 PROPOSED CHANGE

The proposed change modifies:

- 1) Technical Specifications (TS) 3.1.3, “Control Rod OPERABILITY”,
 - a) Condition D,
 - b) Required Action D.1.
- 2) TS 3.1.6, “Rod Pattern Control”,
 - a) Limiting Condition for Operation (LCO) 3.1.6,
 - b) Conditions A and B,
 - c) Surveillance Requirement 3.1.6.1.
- 3) TS 3.3.2.1; “Control Rod Block Instrumentation”
 - a) Required Action C.2.2,
 - b) Required Action D.1,
 - c) Surveillance Requirement 3.3.2.1.8.
- 4) TS 3.10.7, “Control Rod Testing - Operating”,
 - a) LCO 3.10.7.a.
- 5) TS 3.10.8, “SHUTDOWN MARGIN (SDM) Test - Refueling”,
 - a) Limiting Condition for Operation 3.10.8.b.1.

The proposed change would replace the current references to “Banked Position Withdrawal Sequence (BPWS)” with reference to “the analyzed rod position sequence”.

Enclosure 2 provides the marked up TS pages. Enclosure 3 provides the marked up Bases pages for your information only. Final typed pages will be supplied prior to approval.

3.0 BACKGROUND

The proposed change is to replace the current references to “Banked Position Withdrawal Sequence (BPWS)” with reference to “the analyzed rod position sequence”. As currently required in the identified TS sections, all control rod manipulations must comply with the requirements of the BPWS. These BPWS requirements are identified in NEDO-21231, “Banked Position Withdrawal Sequence”, dated January 1977.

Utilizing the words “the analyzed rod position sequence” in lieu of reference to only BPWS will allow greater flexibility in control rod startup and shutdown sequences that were not anticipated with the conversion to the Improved Technical Specifications, which occurred in 1995 (Reference 1) for Peach Bottom Atomic Power Station, Units 2 and 3. The conversion to the Improved Technical Specifications incorporated reference to BPWS only. Utilizing the words “the analyzed rod position sequence” will provide greater flexibility in cycle-specific control rod patterns for cases when it is desirable to maintain a control rod fully inserted. This would include situations in which failed fuel suppression rods or suspected channel bow locations requiring rod insertion do not conform to BPWS requirements. In lieu of the use of only the BPWS, other analyses will be performed to develop modified startup/shutdown sequences and control rod patterns. These sequences will be developed to minimize incremental control rod reactivity worth in accordance with the “General Electric Standard Application for Reactor Fuel,” NEDE-24011-P-A-15 (GESTAR-II), and U. S. Supplement, NEDE-24011-P-A-15-US, September, 2005, which incorporates NRC-approved methodology, and reviewed and approved in accordance with the 10 CFR 50.59 process. This change will allow startup/shutdown sequence modifications beyond those allowed by the general requirements of the BPWS and results in an overall reduction in unnecessary reactivity manipulations and associated operational challenges. This change will allow failed fuel to remain suppressed during plant startup/shutdown preventing further potential fuel damage and allows control rods to remain inserted in fuel cells with identified channel deformation. The change will also allow optimization of cycle-specific control rod startup and shutdown sequences that conform to the GESTAR-II requirements.

The revised TS wording was reviewed and approved as part of the Improved Technical Specifications (ITS) conversion for Dresden Nuclear Power Station, Units 2 and 3, LaSalle County Station, Units 1 and 2, and Quad Cities Nuclear Power Station, Units 1 and 2 (References 2, 3, and 4). Additionally, use of the words “analyzed rod position sequence” was justified in a response to a request for additional information to the U. S. NRC (Reference 5) as part of the ITS conversion for these plants.

Bases changes are provided for your information in Enclosure 3.

4.0 TECHNICAL ANALYSIS

The design basis accident that results in a positive reactivity insertion is the Control Rod Drop Accident (Updated Final Safety Analysis Report, Peach Bottom Atomic Power Station, Units 2 and 3, Section 14.6.2, “Control Rod Drop Accident”). The BPWS, as currently implemented, limits the potential reactivity increase from a postulated Control Rod Drop Accident (CRDA) during reactor startups and shutdowns below the Low Power Setpoint (LPSP) of 10% of Rated Thermal Power. CRDA analyses assume that the reactor operator follows prescribed withdrawal sequences. These sequences define the potential initial conditions for the CRDA analysis.

In order to limit the impact of a CRDA, the BPWS is applied to both reactor startup and shutdown processes. Utilizing rod pattern control systems, such as the Rod Worth Minimizer (RWM), the BPWS reduces the maximum control rod worth during the startup and shutdown process. The Rod Worth Minimizer or plant operators are functioning within the constraints of the banked position withdrawal sequences for control rod

manipulations and to limit reactivity worth. The RWM (LCO 3.3.2.1) provides backup to operator control of the withdrawal sequences to ensure that the initial conditions of the CRDA analysis are not violated.

Cycle-specific control rod patterns during startup and shut down conditions will continue to be controlled by the operator and the Rod Worth Minimizer (LCO 3.3.2.1, "Control Rod Block Instrumentation"), so that only specified control rod sequences and relative positions are allowed over the operating range of all control rods inserted to 10% of Rated Thermal Power. As a result of this proposed change, these sequences will continue to limit the potential amount of reactivity addition that could occur in the event of a Control Rod Drop Accident (CRDA).

This proposed change will allow startup/shutdown sequence modifications beyond those allowed by the general requirements of the BPWS and results in an overall reduction in unnecessary reactivity manipulations and associated operational challenges. This proposed change will allow failed fuel to remain suppressed during plant startup/shutdown preventing further potential fuel damage and allows control rods to remain inserted in fuel cells with identified channel deformation. The proposed change will also allow optimization of cycle-specific control rod startup and shutdown sequences that conform to the GESTAR-II requirements.

These sequences will be developed to minimize incremental control rod reactivity worth in accordance with the "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-15 (GESTAR-II), and U. S. Supplement, NEDE-24011-P-A-15-US, September, 2005, which incorporates NRC-approved methodology, and reviewed and approved in accordance with the 10 CFR 50.59 process.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

Exelon has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No

The proposed change modifies Technical Specifications (TS) 3.1.3, "Control Rod OPERABILITY"; TS 3.1.6, "Rod Pattern Control"; TS 3.3.2.1, "Control Rod Block Instrumentation"; TS 3.10.7, "Control Rod Testing - Operating", and; TS 3.10.8, "SHUTDOWN MARGIN (SDM) Test - Refueling". The proposed change would replace the current references to "Banked Position Withdrawal Sequence (BPWS)" with references to "the analyzed rod position sequence". The use of the "the analyzed rod position sequence" will continue to minimize the consequences of an accident previously evaluated including the Control Rod Drop Accident (CRDA). Additionally, the use of the words "the analyzed rod position sequence" will provide an equivalent level of protection during plant startups and shutdowns and therefore will not increase the consequences of an accident previously evaluated.

Control rod patterns during startup and shut down conditions will continue to be controlled by the operator and the Rod Worth Minimizer (RWM) (LCO 3.3.2.1, "Control Rod Block Instrumentation"), so that only specified control rod sequences and relative positions are allowed over the operating range of all control rods inserted to 10% of Rated Thermal Power. As a result of this change, these sequences will continue to limit the potential amount of reactivity addition that could occur in the event of a Control Rod Drop Accident (CRDA).

Accidents are initiated by the malfunction of plant equipment, or the failure of plant structures, systems, or components. The proposed change will ensure that analyzed rod position sequences are developed to minimize incremental control rod reactivity worth in accordance with the "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-15 (GESTAR-II), and U. S. Supplement, NEDE-24011-P-A-15-US, September, 2005, NRC approved methodology, and reviewed and approved in accordance with the 10 CFR 50.59 process. These analyzed rod position sequences will limit the potential reactivity increase for a postulated CRDA during reactor startups and shutdowns below the Low Power Setpoint of 10% of Rated Thermal Power.

The proposed change will continue to ensure that systems, structures and components are capable of performing their intended safety functions.

Therefore, the proposed change does 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?

Response: No

The proposed change does not affect the assumed accident performance of the control rods, nor any plant structure, system, or component previously evaluated. The proposed change does not involve the installation of new equipment, and installed equipment is not being operated in a new or different manner. The change ensures that control rods remain capable of performing their safety functions. No set points are being changed which would alter the dynamic response of plant equipment. Accordingly, no new failure modes are introduced.

Therefore, the proposed change does 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?

Response: No

The proposed change will ensure that analyzed rod position sequences are developed to minimize incremental control rod reactivity worth in accordance with the "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-15

(GESTAR-II), and U. S. Supplement, NEDE-24011-P-A-15-US, September, 2005, NRC approved methodology, and reviewed and approved in accordance with the 10 CFR 50.59 process. The proposed change will not adversely impact the plant's response to an accident or transient. All current safety margins will be maintained. There are no changes proposed which alter the set points at which protective actions are initiated, and there is no change to the operability requirements for equipment assumed to operate for accident mitigation.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based upon the above, Exelon concludes that the proposed amendment presents 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

10 CFR 50.36, "Technical specifications," provides the regulatory requirements for the content required in a licensee's TS. Criterion 3 of 10 CFR 50.36(c)(2)(ii) requires a limiting condition for operation to be established for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. 10 CFR 50.36 paragraph (c)(3) specifies that surveillance requirements should ensure that limiting conditions for operation are met.

Limiting Conditions for Operation, Conditions, Requirements, and Surveillance Requirements have been established to ensure that analyzed control rod positions are maintained and controlled to ensure the protection of systems, structures and components, and to minimize the impact of accidents and transients. The proposed change will ensure that analyzed rod position sequences are developed to minimize incremental control rod reactivity worth in accordance with the "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-15 (GESTAR-II), and U. S. Supplement, NEDE-24011-P-A-15-US, September, 2005, NRC approved methodology, and reviewed and approved in accordance with the 10 CFR 50.59 process. Criterion 3 of 10 CFR 50.36(c)(2)(ii) and paragraph (c)(3) of 10 CFR 50.36 will continue to be met since full functionality will continue to be demonstrated.

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) the 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

A review has determined that the proposed amendment would change 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 would change an inspection or surveillance requirement. However, the proposed amendment

does not involve: (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 PRECEDENT

The NRC has granted similar changes for the Dresden Nuclear Power Station, Units 2 and 3, LaSalle County Station, Units 1 and 2, and Quad Cities Nuclear Power Station, Units 1 and 2 Technical Specifications (Reference 2, 3 and 4).

8.0 REFERENCES

1. Letter from U. S. NRC to G. A. Hunger (PECO Energy Company), "Issuance of Improved Technical Specifications, Peach Bottom Atomic Power Station, Unit Nos. 2 and 3, (TAC NOS. M90746 and M90747)," dated August 30, 1995.
2. Letter from S. N. Bailey (U. S. NRC) to O. D. Kingsley (Exelon Generation Company, LLC), issuance of amendments associated with the Improved Technical Specifications for Dresden Nuclear Power Station, Units 2 and 3 (TAC. NOS. MA8382 AND MA8383), dated March 30, 2001.
3. Letter from S. N. Bailey (U. S. NRC) to O. D. Kingsley (Exelon Generation Company, LLC), issuance of amendments associated with the Improved Technical Specifications for LaSalle County Station, Units 1 and 2 (TAC NOS. MA8388 AND MA8390), dated March 30, 2001.
4. Letter from S. N. Bailey (U. S. NRC) to O. D. Kingsley (Exelon Generation Company, LLC), issuance of amendments associated with the Improved Technical Specifications for Quad Cities Nuclear Power Station, Units 1 and 2 (TAC NOS. MA8378 AND MA8379), dated March 30, 2001.
5. Letter from R. M. Krich (Commonwealth Edison Company) to U. S. Nuclear Regulatory Commission, "Response to Request for Additional Information", dated October 9, 2000.

ENCLOSURE 2
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATION PAGES
MARKUP OF PROPOSED CHANGES

Revised TS Pages

Units 2 and 3

3.1-9
3.1-18
3.1-19
3.3-17
3.3-20
3.10-18
3.10-20

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. -----NOTE----- Not applicable when THERMAL POWER > 10% RTP. -----</p> <p>Two or more inoperable control rods not in compliance with banked position withdrawal sequence (BPWS) and not separated by two or more OPERABLE control rods.</p>	<p>D.1 Restore compliance with BPWS.</p> <p><i>the analyzed rod position sequence</i></p> <p>OR</p> <p>D.2 Restore control rod to OPERABLE status.</p>	<p>4 hours</p> <p>4 hours</p>
<p>E. Required Action and associated Completion Time of Condition A, C, or D not met.</p> <p>OR</p> <p>Nine or more control rods inoperable.</p>	<p>E.1 Be in MODE 3.</p>	<p>12 hours</p>

*the
analyzed
rod position
sequence*

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Rod Pattern Control

LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the banked position withdrawal sequence (BPWS).

analyzed rod position sequence

APPLICABILITY: MODES 1 and 2 with THERMAL POWER \leq 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more OPERABLE control rods not in compliance with BPWS.</p> <p><i>the analyzed rod position sequence</i></p>	<p>A.1 -----NOTE----- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation." -----</p> <p>Move associated control rod(s) to correct position.</p>	8 hours
	<p><u>OR</u></p> <p>A.2 Declare associated control rod(s) inoperable.</p>	8 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Nine or more OPERABLE control rods not in compliance with BPWS. <i>the analyzed rod position sequence</i>	B.1 -----NOTE----- RWM may be bypassed as allowed by LCO 3.3.2.1. ----- Suspend withdrawal of control rods.	Immediately
	AND B.2 Place the reactor mode switch in the shutdown position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.6.1 Verify all OPERABLE control rods comply with BPWS.	24 hours

the analyzed rod position sequence

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. (continued)</p>	<p>C.2.1.1 Verify ≥ 12 rods withdrawn.</p> <p><u>OR</u></p> <p>C.2.1.2 Verify by administrative methods that startup with RWM inoperable has not been performed in the last calendar year.</p> <p><u>AND</u></p> <p>C.2.2 Verify movement of control rods is in compliance with banked position withdrawal sequence (BPWS) by a second licensed operator or other qualified member of the technical staff.</p>	<p>Immediately</p> <p>Immediately</p> <p>During control rod movement</p>
<p>D. RWM inoperable during reactor shutdown.</p>	<p>D.1 Verify movement of control rods is in accordance with BPWS by a second licensed operator or other qualified member of the technical staff.</p>	<p>During control rod movement</p>

the analyzed rod position Sequence

the analyzed rod position Sequence

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.2.1.5 -----NOTE----- Neutron detectors are excluded. -----</p> <p>Perform CHANNEL CALIBRATION.</p>	<p>24 months</p>
<p>SR 3.3.2.1.6 Verify the RWM is not bypassed when THERMAL POWER is \leq 10% RTP.</p>	<p>24 months</p>
<p>SR 3.3.2.1.7 -----NOTE----- Not required to be performed until 1 hour after reactor mode switch is in the shutdown position. -----</p> <p>Perform CHANNEL FUNCTIONAL TEST.</p>	<p>24 months</p>
<p>SR 3.3.2.1.8 Verify control rod sequences input to the RWM are in conformance with BPWS.</p> <p><i>the analyzed rod position sequence</i></p>	<p>Prior to declaring RWM OPERABLE following loading of sequence into RWM</p>

3.10 SPECIAL OPERATIONS

3.10.7 Control Rod Testing—Operating

LCO 3.10.7 The requirements of LCO 3.1.6, "Rod Pattern Control," may be suspended to allow performance of SDM demonstrations, control rod scram time testing, control rod friction testing, and the Startup Test Program, provided:

*analyzed
rod position
sequence*

a. The banked position withdrawal sequence requirements of SR 3.3.2.1.8 are changed to require the control rod sequence to conform to the specified test sequence.

OR

b. The RWM is bypassed; the requirements of LCO 3.3.2.1, "Control Rod Block Instrumentation," Function 2 are suspended; and conformance to the approved control rod sequence for the specified test is verified by a second licensed operator or other qualified member of the technical staff.

APPLICABILITY: MODES 1 and 2 with LCO 3.1.6 not met.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 Suspend performance of the test and exception to LCO 3.1.6.	Immediately

3.10 SPECIAL OPERATIONS

3.10.8 SHUTDOWN MARGIN (SDM) Test - Refueling

LCO 3.10.8 The reactor mode switch position specified in Table 1.1-1 for MODE 5 may be changed to include the startup/hot standby position, and operation considered not to be in MODE 2, to allow SDM testing, provided the following requirements are met:

- 1
- a. LCO 3.3.1.1, "Reactor Protection System Instrumentation," MODE 2 requirements for Functions 2.a, 2.d and 2.e of Table 3.3.1.1-1;
 - b. 1. LCO 3.3.2.1, "Control Rod Block Instrumentation," MODE 2 requirements for Function 2 of Table 3.3.2.1-1, with the banked position withdrawal sequence requirements of SR 3.3.2.1.8 changed to require the control rod sequence to conform to the SDM test sequence,

analyzed rod
position sequence

OR

2. Conformance to the approved control rod sequence for the SDM test is verified by a second licensed operator or other qualified member of the technical staff;
- c. Each withdrawn control rod shall be coupled to the associated CRD;
- d. All control rod withdrawals during out of sequence control rod moves shall be made in notch out mode;
- e. No other CORE ALTERATIONS are in progress; and
- f. CRD charging water header pressure \geq 940 psig.

APPLICABILITY: MODE 5 with the reactor mode switch in startup/hot standby position.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. -----NOTE----- Not applicable when THERMAL POWER > 10% RTP. -----</p> <p>Two or more inoperable control rods not in compliance with banked position withdrawal sequence (BPWS) and not separated by two or more OPERABLE control rods.</p>	<p>D.1 Restore compliance with BPWS.</p> <p><i>+ the analyzed rod position sequence</i></p> <p><u>OR</u></p> <p>D.2 Restore control rod to OPERABLE status.</p>	<p>4 hours</p> <p>4 hours</p>
<p>E. Required Action and associated Completion Time of Condition A, C, or D not met.</p> <p><u>OR</u></p> <p>Nine or more control rods inoperable.</p>	<p>E.1 Be in MODE 3.</p>	<p>12 hours</p>

*the
analyzed
rod position
sequence*

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Rod Pattern Control

LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the banked position withdrawal sequence (BPWS).

analyzed rod position sequence

APPLICABILITY: MODES 1 and 2 with THERMAL POWER ≤ 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more OPERABLE control rods not in compliance with BPWS.</p> <p><i>the analyzed rod position sequence</i></p>	<p>A.1 -----NOTE----- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation." -----</p> <p>Move associated control rod(s) to correct position.</p> <p><u>OR</u></p> <p>A.2 Declare associated control rod(s) inoperable.</p>	<p>8 hours</p> <p>8 hours</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Nine or more OPERABLE control rods not in compliance with BPWS. <i>the analyzed rod position sequence</i>	B.1 -----NOTE----- RWM may be bypassed as allowed by LCO 3.3.2.1. ----- Suspend withdrawal of control rods.	Immediately
	<u>AND</u> B.2 Place the reactor mode switch in the shutdown position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.6.1 Verify all OPERABLE control rods comply with BPWS.	24 hours

the analyzed rod position sequence

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. (continued)</p>	<p>C.2.1.1 Verify ≥ 12 rods withdrawn.</p> <p><u>OR</u></p> <p>C.2.1.2 Verify by administrative methods that startup with RWM inoperable has not been performed in the last calendar year.</p> <p><u>AND</u></p> <p>C.2.2 Verify movement of control rods is in compliance with banked position withdrawal sequence (BPWS) by a second licensed operator or other qualified member of the technical staff.</p>	<p>Immediately</p> <p>Immediately</p> <p>During control rod movement</p>
<p>D. RWM inoperable during reactor shutdown.</p>	<p>D.1 Verify movement of control rods is in accordance with BPWS by a second licensed operator or other qualified member of the technical staff.</p>	<p>During control rod movement</p>

the analyzed rod position sequence

the analyzed rod position sequence

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.2.1.5 -----NOTE----- Neutron detectors are excluded. -----</p> <p>Perform CHANNEL CALIBRATION.</p>	<p>24 months</p>
<p>SR 3.3.2.1.6 Verify the RWM is not bypassed when THERMAL POWER is \leq 10% RTP.</p>	<p>24 months</p>
<p>SR 3.3.2.1.7 -----NOTE----- Not required to be performed until 1 hour after reactor mode switch is in the shutdown position. -----</p> <p>Perform CHANNEL FUNCTIONAL TEST.</p>	<p>24 months</p>
<p>SR 3.3.2.1.8 Verify control rod sequences input to the RWM are in conformance with <u>BPWS</u>.</p> <p><i>the analyzed rod position Sequence</i></p>	<p>Prior to declaring RWM OPERABLE following loading of sequence into RWM</p>

3.10 SPECIAL OPERATIONS

3.10.7 Control Rod Testing—Operating

LCO 3.10.7 The requirements of LCO 3.1.6, "Rod Pattern Control," may be suspended to allow performance of SDM demonstrations, control rod scram time testing, control rod friction testing, and the Startup Test Program, provided:

Analyzed rod position sequence

a. The banked position withdrawal sequence requirements of SR 3.3.2.1.8 are changed to require the control rod sequence to conform to the specified test sequence.

OR

b. The RWM is bypassed; the requirements of LCO 3.3.2.1, "Control Rod Block Instrumentation," Function 2 are suspended; and conformance to the approved control rod sequence for the specified test is verified by a second licensed operator or other qualified member of the technical staff.

APPLICABILITY: MODES 1 and 2 with LCO 3.1.6 not met.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 Suspend performance of the test and exception to LCO 3.1.6.	Immediately

3.10 SPECIAL OPERATIONS

3.10.8 SHUTDOWN MARGIN (SDM) Test - Refueling

LCO 3.10.8

The reactor mode switch position specified in Table 1.1-1 for MODE 5 may be changed to include the startup/hot standby position, and operation considered not to be in MODE 2, to allow SDM testing, provided the following requirements are met:

a. LCO 3.3.1.1, "Reactor Protection System Instrumentation," MODE 2 requirements for Functions 2.a, 2.d and 2.e of Table 3.3.1.1-1;

b. 1. LCO 3.3.2.1, "Control Rod Block Instrumentation," MODE 2 requirements for Function 2 of Table 3.3.2.1-1, with the ~~banked position withdrawal sequence~~ requirements of SR 3.3.2.1.8 changed to require the control rod sequence to conform to the SDM test sequence,

analyzed rod
position sequence

OR

2. Conformance to the approved control rod sequence for the SDM test is verified by a second licensed operator or other qualified member of the technical staff;

c. Each withdrawn control rod shall be coupled to the associated CRD;

d. All control rod withdrawals during out of sequence control rod moves shall be made in notch out mode;

e. No other CORE ALTERATIONS are in progress; and

f. CRD charging water header pressure \geq 940 psig.

APPLICABILITY: MODE 5 with the reactor mode switch in startup/hot standby position.

ENCLOSURE 3

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

TECHNICAL SPECIFICATION BASES PAGES

MARKUP OF PROPOSED CHANGES

Revised Bases Pages

Unit 2

B 3.1-17
B 3.1-18
B 3.1-19
B 3.1-21
B 3.1-35
B 3.1-36
B 3.1-37
B 3.1-38
B 3.3-48
B 3.3-49
B 3.3-56
B 3.10-33

Unit 3

B 3.1-17
B 3.1-18
B 3.1-19
B 3.1-21
B 3.1-35
B 3.1-36
B 3.1-37
B 3.1-38
B 3.3-49
B 3.3-50
B 3.3-57
B 3.10-33

BASES

ACTIONS

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

stuck position and the highest worth OPERABLE control rod assumed to be fully withdrawn.

The allowed Completion Time of 72 hours to verify SDM is adequate, considering that with a single control rod stuck in a withdrawn position, the remaining OPERABLE control rods are capable of providing the required scram and shutdown reactivity. Failure to reach MODE 4 is only likely if an additional control rod adjacent to the stuck control rod also fails to insert during a required scram. Even with the postulated additional single failure of an adjacent control rod to insert, sufficient reactivity control remains to reach and maintain MODE 3 conditions (Ref. 5).

B.1

With two or more withdrawn control rods stuck, the plant must be brought to MODE 3 within 12 hours. The occurrence of more than one control rod stuck at a withdrawn position increases the probability that the reactor cannot be shut down if required. Insertion of all insertable control rods eliminates the possibility of an additional failure of a control rod to insert. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

With one or more control rods inoperable for reasons other than being stuck in the withdrawn position, (including a control rod which is stuck in the fully inserted position) operation may continue, provided the control rods are fully inserted within 3 hours and disarmed (electrically or hydraulically) within 4 hours. Inserting a control rod ensures the shutdown and scram capabilities are not adversely affected. The control rod is disarmed to prevent inadvertent withdrawal during subsequent operations. The control rods can be hydraulically disarmed by closing the drive water and exhaust water isolation valves. The control rods can be electrically disarmed by disconnecting power from all four directional control valve solenoids. Required Action C.1 is modified by a Note, which allows the RWM to be bypassed if required to allow insertion of the inoperable

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

control rods and continued operation. LCO 3.3.2.1 provides additional requirements when the RWM is bypassed to ensure compliance with the CRDA analysis.

The allowed Completion Times are reasonable, considering the small number of allowed inoperable control rods, and provide time to insert and disarm the control rods in an orderly manner and without challenging plant systems.

D.1 and D.2

Out of sequence control rods may increase the potential reactivity worth of a dropped control rod during a CRDA. At $\leq 10\%$ RTP, the generic banked position withdrawal sequence (BPWS) analysis (Ref. 5) requires inserted control rods not in compliance with BPWS to be separated by at least two OPERABLE control rods in all directions, including the diagonal. Therefore, if two or more inoperable control rods are not in compliance with BPWS and not separated by at least two OPERABLE control rods, action must be taken to restore compliance with BPWS or restore the control rods to OPERABLE status. Condition D is modified by a Note indicating that the Condition is not applicable when $> 10\%$ RTP, since the BPWS is not required to be followed under these conditions, as described in the Bases for LCO 3.1.6. The allowed Completion Time of 4 hours is acceptable, considering the low probability of a CRDA occurring.

the analyzed rod position sequence

(Res. 6)

E.1

If any Required Action and associated Completion Time of Condition A, C, or D are not met, or there are nine or more inoperable control rods, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours. This ensures all insertable control rods are inserted and places the reactor in a condition that does not require the active function (i.e., scram) of the control rods. The number of control rods permitted to be inoperable when operating above 10% RTP (e.g., no CRDA considerations) could be more than the value specified, but the occurrence of a large number of

(continued)

BASES

ACTIONS

E.1 (continued)

inoperable control rods could be indicative of a generic problem, and investigation and resolution of the potential problem should be undertaken. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

SURVEILLANCE
REQUIREMENTS

SR 3.1.3.1

The position of each control rod must be determined to ensure adequate information on control rod position is available to the operator for determining control rod OPERABILITY and controlling rod patterns. Control rod position may be determined by the use of OPERABLE position indicators, by moving control rods to a position with an OPERABLE indicator, or by the use of other appropriate methods. The 24 hour Frequency of this SR is based on operating experience related to expected changes in control rod position and the availability of control rod position indications in the control room.

SR 3.1.3.2 and SR 3.1.3.3

Control rod insertion capability is demonstrated by inserting each partially or fully withdrawn control rod at least one notch and observing that the control rod moves. The control rod may then be returned to its original position. This ensures the control rod is not stuck and is free to insert on a scram signal. These Surveillances are not required when THERMAL POWER is less than or equal to the actual LPSP of the RWM, since the notch insertions may not be compatible with the requirements of the Banked Position Withdrawal Sequence (BPWS) (LCO 3.1.6) and the RWM (LCO 3.3.2.1). The 7 day Frequency of SR 3.1.3.2 is based on operating experience related to the changes in CRD performance and the ease of performing notch testing for fully withdrawn control rods. Partially withdrawn control rods are tested at a 31 day Frequency, based on the potential power reduction required to allow the control rod movement and considering the large testing sample of SR 3.1.3.2. Furthermore, the 31 day Frequency takes into account operating experience related to changes in CRD performance. At any time, if a control rod is immovable, a

analyzed
rod position
sequence

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.3.5 (continued)

to the "full out" position during the performance of SR 3.1.3.2. This Frequency is acceptable, considering the low probability that a control rod will become uncoupled when it is not being moved and operating experience related to uncoupling events.

REFERENCES

1. UFSAR, Sections 1.5.1.1 and 1.5.2.2.
 2. UFSAR, Section 14.6.2.
 3. UFSAR, Appendix K, Section VI.
 4. UFSAR, Chapter 14.
 5. NEDO-21231, "Banked Position Withdrawal Sequence," Section 7.2, January 1977.
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DELETED

6. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel", latest approved revision.

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

Control rod patterns analyzed in Reference 1 follow the banked position withdrawal sequence (BPWS). The BPWS is applicable from the condition of all control rods fully inserted to 10% RTP (Ref. 2). For the BPWS, the control rods are required to be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions (e.g., between notches 08 and 12). The banked positions are established to minimize the maximum incremental control rod worth without being overly restrictive during normal plant operation. Generic analysis of the BPWS (Ref. 1) has demonstrated that the 280 cal/gm fuel damage limit will not be violated during a CRDA while following the BPWS mode of operation. The generic BPWS analysis (Ref. 8) also evaluates the effect of fully inserted, inoperable control rods not in compliance with the sequence, to allow a limited number (i.e., eight) and distribution of fully inserted, inoperable control rods.

analyzed rod position sequence

Cycle Specific

Cycle Specific

Rod pattern control satisfies Criterion 3 of the NRC Policy Statement.

LCO

Compliance with the prescribed control rod sequences minimizes the potential consequences of a CRDA by limiting the initial conditions to those consistent with the BPWS. This LCO only applies to OPERABLE control rods. For inoperable control rods required to be inserted, separate requirements are specified in LCO 3.1.3, "Control Rod OPERABILITY," consistent with the allowances for inoperable control rods in the BPWS.

original

analyzed rod position sequence

APPLICABILITY

In MODES 1 and 2, when THERMAL POWER is \leq 10% RTP, the CRDA is a Design Basis Accident and, therefore, compliance with the assumptions of the safety analysis is required. When THERMAL POWER is $>$ 10% RTP, there is no credible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel damage limit during a CRDA (Ref. 2). In MODES 3, 4, and 5, since the reactor is shut down and only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will remain subcritical with a single control rod withdrawn.

(continued)

BASES (continued)

*analyzed
rod position sequence*

ACTIONS

A.1 and A.2

With one or more OPERABLE control rods not in compliance with the prescribed control rod sequence, actions may be taken to either correct the control rod pattern or declare the associated control rods inoperable within 8 hours. Noncompliance with the prescribed sequence may be the result of "double notching," drifting from a control rod drive cooling water transient, leaking scram valves, or a power reduction to $\leq 10\%$ RTP before establishing the correct control rod pattern. The number of OPERABLE control rods not in compliance with the prescribed sequence is limited to eight, to prevent the operator from attempting to correct a control rod pattern that significantly deviates from the prescribed sequence. When the control rod pattern is not in compliance with the prescribed sequence, all control rod movement must be stopped except for moves needed to correct the rod pattern, or scram if warranted.

Required Action A.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position. LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff (i.e., personnel trained in accordance with an approved training program). This ensures that the control rods will be moved to the correct position. A control rod not in compliance with the prescribed sequence is not considered inoperable except as required by Required Action A.2. The allowed Completion Time of 8 hours is reasonable, considering the restrictions on the number of allowed out of sequence control rods and the low probability of a CRDA occurring during the time the control rods are out of sequence.

B.1 and B.2

*not in compliance with
the analyzed rod position
sequence*

If nine or more OPERABLE control rods are out of sequence, the control rod pattern significantly deviates from the prescribed sequence. Control rod withdrawal should be suspended immediately to prevent the potential for further deviation from the prescribed sequence. Control rod insertion to correct control rods withdrawn beyond their allowed position is allowed since, in general, insertion of

(continued)

BASES

ACTIONS B.1 and B.2 (continued)

control rods has less impact on control rod worth than withdrawals have. Required Action B.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position.

LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff.

the analyzed rod position sequence

When nine or more OPERABLE control rods are not in compliance with BPWS, the reactor mode switch must be placed in the shutdown position within 1 hour. With the mode switch in shutdown, the reactor is shut down, and as such, does not meet the applicability requirements of this LCO. The allowed Completion Time of 1 hour is reasonable to allow insertion of control rods to restore compliance, and is appropriate relative to the low probability of a CRDA occurring with the control rods out of sequence.

SURVEILLANCE REQUIREMENTS SR 3.1.6.1

analyzed rod position sequence

The control rod pattern is verified to be in compliance with the BPWS at a 24 hour Frequency to ensure the assumptions of the CRDA analyses are met. The 24 hour Frequency was developed considering that the primary check on compliance with the BPWS is performed by the RWM (LCO 3.3.2.1), which provides control rod blocks to enforce the required sequence and is required to be OPERABLE when operating at $\leq 10\%$ RTP.

REFERENCES

NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," latest approved revision.

1. NEDE-24011-P-A-10-US, "General Electric Standard Application for Reactor Fuel, Supplement for United States," Section 2.2.3.1, February 1991.
2. Letter (BWROG-8644) from T. Pickens (BWROG) to G. C. Lainas (NRC), "Amendment 17 to General Electric Licensing Topical Report NEDE-24011-P-A."
3. UFSAR, Section 14.6.2.3.
4. NUREG-0800, Section 15.4.9, Revision 2, July 1981.
5. 10 CFR 100.11.

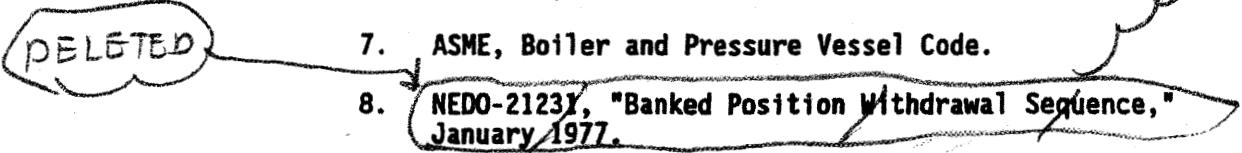
(continued)

BASES

REFERENCES
(continued)

6. NEDO-21778-A, "Transient Pressure Rises Affected Fracture Toughness Requirements for Boiling Water Reactors," December 1978.
 7. ASME, Boiler and Pressure Vessel Code.
 8. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.
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BASES

APPLICABLE
SAFETY ANALYSES,
LCO, and
APPLICABILITY

1. Rod Block Monitor (continued)

The RBM is assumed to mitigate the consequences of an RWE event when operating $\geq 30\%$ RTP. Below this power level, the consequences of an RWE event will not exceed the MCPR SL and, therefore, the RBM is not required to be OPERABLE (Ref. 1). When operating $< 90\%$ RTP, analyses (Ref. 1) have shown that with an initial MCPR ≥ 1.70 , no RWE event will result in exceeding the MCPR SL. Also, the analyses demonstrate that when operating at $\geq 90\%$ RTP with MCPR ≥ 1.40 , no RWE event will result in exceeding the MCPR SL (Ref. 1). Therefore, under these conditions, the RBM is also not required to be OPERABLE.

2. Rod Worth Minimizer

analyzed rod position sequence

and
analyzed rod position sequence
The RWM enforces the banked position withdrawal sequence (BPWS) to ensure that the initial conditions of the CRDA analysis are not violated. The analytical methods and assumptions used in evaluating the CRDA are summarized in References 3, 4, 5, and 6. The BPWS requires that control rods be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions. Requirements that the control rod sequence is in compliance with the BPWS are specified in LCO 3.1.6, "Rod Pattern Control."

The RWM Function satisfies Criterion 3 of the NRC Policy Statement.

analyzed rod position sequence
Since the RWM is a hardwired system designed to act as a backup to operator control of the rod sequences, only one channel of the RWM is available and required to be OPERABLE (Ref. 6). Special circumstances provided for in the Required Action of LCO 3.1.3, "Control Rod OPERABILITY," and LCO 3.1.6 may necessitate bypassing the RWM to allow continued operation with inoperable control rods, or to allow correction of a control rod pattern not in compliance with the BPWS. The RWM may be bypassed as required by these conditions, but then it must be considered inoperable and the Required Actions of this LCO followed.

(continued)

BASES

APPLICABLE
SAFETY ANALYSES,
LCO, and
APPLICABILITY

2. Rod Worth Minimizer (continued)

Compliance with the BPWS, and therefore OPERABILITY of the RWM, is required in MODES 1 and 2 when THERMAL POWER is < 10% RTP. When THERMAL POWER is > 10% RTP, there is no possible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel damage limit during a CRDA (Refs. 4 and 6). In MODES 3 and 4, all control rods are required to be inserted into the core; therefore, a CRDA cannot occur. In MODE 5, since only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will be subcritical.

analyzed
rod position
sequence

3. Reactor Mode Switch—Shutdown Position

During MODES 3 and 4, and during MODE 5 when the reactor mode switch is required to be in the shutdown position, the core is assumed to be subcritical; therefore, no positive reactivity insertion events are analyzed. The Reactor Mode Switch—Shutdown Position control rod withdrawal block ensures that the reactor remains subcritical by blocking control rod withdrawal, thereby preserving the assumptions of the safety analysis.

The Reactor Mode Switch—Shutdown Position Function satisfies Criterion 3 of the NRC Policy Statement.

Two channels are required to be OPERABLE to ensure that no single channel failure will preclude a rod block when required. There is no Allowable Value for this Function since the channels are mechanically actuated based solely on reactor mode switch position.

During shutdown conditions (MODE 3, 4, or 5), no positive reactivity insertion events are analyzed because assumptions are that control rod withdrawal blocks are provided to prevent criticality. Therefore, when the reactor mode switch is in the shutdown position, the control rod withdrawal block is required to be OPERABLE. During MODE 5 with the reactor mode switch in the refueling position, the refuel position one-rod-out interlock (LCO 3.9.2, "Refuel Position One-Rod-Out Interlock") provides the required control rod withdrawal blocks.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.2.1.7 (continued)

The 24 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 will pass the Surveillance when performed at the 24 month Frequency.

SR 3.3.2.1.8

The RWM will only enforce the proper control rod sequence if the rod sequence is properly input into the RWM computer. This SR ensures that the proper sequence is loaded into the RWM so that it can perform its intended function. The Surveillance is performed once prior to declaring RWM OPERABLE following loading of sequence into RWM, since this is when rod sequence input errors are possible.

REFERENCES

1. NEDC-32162-P, "Maximum Extended Load Line Limit and ARTS Improvement Program Analysis for Peach Bottom Atomic Power Station, Units 2 and 3," Revision 1, February 1993.
2. UFSAR, Sections 7.10.3.4.8 and 7.16.3.
3. NEDE-24011-P-A-10-US, "General Electric Standard Application for Reload Fuel," Supplement for United States, Section S 2.2.3.1, February 1991.
4. "Modifications to the Requirements for Control Rod Drop Accident Mitigating Systems," BWR Owners' Group, July 1986.
5. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.
6. NRC SER, "Acceptance of Referencing of Licensing Topical Report NEDE-24011-P-A," "General Electric Standard Application for Reactor Fuel, Revision 8, Amendment 17," December 27, 1987.

NEDE-24011-P-A,
"General Electric
Standard Application
for Reactor Fuel"
latest approved
revision.

(continued)

analyzed
rod position sequence

BASES

LCO
(continued)

second licensed operator or other qualified member of the technical staff. To provide additional protection against an inadvertent criticality, control rod withdrawals that do not conform to the banked position withdrawal sequence specified in LCO 3.1.6, "Rod Pattern Control," (i.e., out of sequence control rod withdrawals) must be made in the individual notched withdrawal mode to minimize the potential reactivity insertion associated with each movement. Coupling integrity of withdrawn control rods is required to minimize the probability of a CRDA and ensure proper functioning of the withdrawn control rods, if they are required to scram. Because the reactor vessel head may be removed during these tests, no other CORE ALTERATIONS may be in progress. Furthermore, since the control rod scram function with the RCS at atmospheric pressure relies solely on the CRD accumulator, it is essential that the CRD charging water header remain pressurized. This Special Operations LCO then allows changing the Table 1.1-1 reactor mode switch position requirements to include the startup/hot standby position, such that the SDM tests may be performed while in MODE 5.

APPLICABILITY

These SDM test Special Operations requirements are only applicable if the SDM tests are to be performed while in MODE 5 with the reactor vessel head removed or the head bolts not fully tensioned. Additional requirements during these tests to enforce control rod withdrawal sequences and restrict other CORE ALTERATIONS provide protection against potential reactivity excursions. Operations in all other MODES are unaffected by this LCO.

ACTIONS

A.1 and A.2

With one or more control rods discovered uncoupled during this Special Operation, a controlled insertion of each uncoupled control rod is required; either to attempt recoupling, or to preclude a control rod drop. This controlled insertion is preferred since, if the control rod fails to follow the drive as it is withdrawn (i.e., is "stuck" in an inserted position), placing the reactor mode switch in the shutdown position per Required Action B.1 could cause substantial secondary damage. If recoupling is not accomplished, operation may continue, provided the control rods are fully inserted within 3 hours and disarmed (electrically or hydraulically) within 4 hours. Inserting a

(continued)

BASES

ACTIONS

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

stuck position and the highest worth OPERABLE control rod assumed to be fully withdrawn.

The allowed Completion Time of 72 hours to verify SDM is adequate, considering that with a single control rod stuck in a withdrawn position, the remaining OPERABLE control rods are capable of providing the required scram and shutdown reactivity. Failure to reach MODE 4 is only likely if an additional control rod adjacent to the stuck control rod also fails to insert during a required scram. Even with the postulated additional single failure of an adjacent control rod to insert, sufficient reactivity control remains to reach and maintain MODE 3 conditions (Ref. 5).

B.1

With two or more withdrawn control rods stuck, the plant must be brought to MODE 3 within 12 hours. The occurrence of more than one control rod stuck at a withdrawn position increases the probability that the reactor cannot be shut down if required. Insertion of all insertable control rods eliminates the possibility of an additional failure of a control rod to insert. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

With one or more control rods inoperable for reasons other than being stuck in the withdrawn position (including a control rod which is stuck in the fully inserted position) operation may continue, provided the control rods are fully inserted within 3 hours and disarmed (electrically or hydraulically) within 4 hours. Inserting a control rod ensures the shutdown and scram capabilities are not adversely affected. The control rod is disarmed to prevent inadvertent withdrawal during subsequent operations. The control rods can be hydraulically disarmed by closing the drive water and exhaust water isolation valves. The control rods can be electrically disarmed by disconnecting power from all four directional control valve solenoids. Required Action C.1 is modified by a Note, which allows the RWM to be bypassed if required to allow insertion of the inoperable

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

control rods and continued operation. LCO 3.3.2.1 provides additional requirements when the RWM is bypassed to ensure compliance with the CRDA analysis. The allowed Completion Times are reasonable, considering the small number of allowed inoperable control rods, and provide time to insert and disarm the control rods in an orderly manner and without challenging plant systems.

D.1 and D.2

Out of sequence control rods may increase the potential reactivity worth of a dropped control rod during a CRDA. At $\leq 10\%$ RTP, the generic banked position withdrawal sequence (BPWS) analysis (Ref. 5) requires inserted control rods not in compliance with BPWS to be separated by at least two OPERABLE control rods in all directions, including the diagonal. Therefore, if two or more inoperable control rods are not in compliance with BPWS and not separated by at least two OPERABLE control rods, action must be taken to restore compliance with BPWS or restore the control rods to OPERABLE status. Condition D is modified by a Note indicating that the Condition is not applicable when $> 10\%$ RTP, since the BPWS is not required to be followed under these conditions, as described in the Bases for LCO 3.1.6. The allowed Completion Time of 4 hours is acceptable, considering the low probability of a CRDA occurring.

the analyzed rod position sequence

Ref. 6

E.1

If any Required Action and associated Completion Time of Condition A, C, or D are not met, or there are nine or more inoperable control rods, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours. This ensures all insertable control rods are inserted and places the reactor in a condition that does not require the active function (i.e., scram) of the control rods. The number of control rods permitted to be inoperable when operating above 10% RTP (e.g., no CRDA considerations) could be more than the value specified, but the occurrence of a large number of

(continued)

BASES

ACTIONS

E.1 (continued)

inoperable control rods could be indicative of a generic problem, and investigation and resolution of the potential problem should be undertaken. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

SURVEILLANCE
REQUIREMENTS

SR 3.1.3.1

The position of each control rod must be determined to ensure adequate information on control rod position is available to the operator for determining control rod OPERABILITY and controlling rod patterns. Control rod position may be determined by the use of OPERABLE position indicators, by moving control rods to a position with an OPERABLE indicator, or by the use of other appropriate methods. The 24 hour Frequency of this SR is based on operating experience related to expected changes in control rod position and the availability of control rod position indications in the control room.

SR 3.1.3.2 and SR 3.1.3.3

Control rod insertion capability is demonstrated by inserting each partially or fully withdrawn control rod at least one notch and observing that the control rod moves. The control rod may then be returned to its original position. This ensures the control rod is not stuck and is free to insert on a scram signal. These Surveillances are not required when THERMAL POWER is less than or equal to the actual LPSP of the RWM, since the notch insertions may not be compatible with the requirements of the Banked Position Withdrawal Sequence (BPWS) (LCO 3.1.6) and the RWM (LCO 3.3.2.1). The 7 day Frequency of SR 3.1.3.2 is based on operating experience related to the changes in CRD performance and the ease of performing notch testing for fully withdrawn control rods. Partially withdrawn control rods are tested at a 31 day Frequency, based on the potential power reduction required to allow the control rod movement and considering the large testing sample of SR 3.1.3.2. Furthermore, the 31 day Frequency takes into account operating experience related to changes in CRD performance. At any time, if a control rod is immovable, a

analyzed
rod position
sequence

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.3.5 (continued)

to the "full out" position during the performance of SR 3.1.3.2. This Frequency is acceptable, considering the low probability that a control rod will become uncoupled when it is not being moved and operating experience related to uncoupling events.

REFERENCES

1. UFSAR, Sections 1.5.1.1 and 1.5.2.2.

2. UFSAR, Section 14.6.2.

3. UFSAR, Appendix K, Section VI.

4. UFSAR, Chapter 14.

5. **NEDO-21231, "Banked Position Withdrawal Sequence,"**
Section 7.2, January 1977.

DELETED

6. **NEDE-24011-P-A, "General Electric Standard**
Application for Reactor Fuel", latest approved revision.

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

analyzed
rod position
sequence

Cycle
Specific

Cycle
Specific

Control rod patterns analyzed in Reference 1 follow the banked position withdrawal sequence (BPWS). The BPWS is applicable from the condition of all control rods fully inserted to 10% RTP (Ref. 2). For the BPWS, the control rods are required to be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions (e.g., between notches 08 and 12). The banked positions are established to minimize the maximum incremental control rod worth without being overly restrictive during normal plant operation. Generic analysis of the BPWS (Ref. 1) has demonstrated that the 280 cal/gm fuel damage limit will not be violated during a CRDA while following the BPWS mode of operation. The generic BPWS analysis (Ref. 8) also evaluates the effect of fully inserted, inoperable control rods not in compliance with the sequence, to allow a limited number (i.e., eight) and distribution of fully inserted, inoperable control rods.

Rod pattern control satisfies Criterion 3 of the NRC Policy Statement.

LCO

Compliance with the prescribed control rod sequences minimizes the potential consequences of a CRDA by limiting the initial conditions to those consistent with the BPWS. This LCO only applies to OPERABLE control rods. For inoperable control rods required to be inserted, separate requirements are specified in LCO 3.1.3, "Control Rod OPERABILITY," consistent with the allowances for inoperable control rods in the BPWS.

analyzed rod position sequence

APPLICABILITY

In MODES 1 and 2, when THERMAL POWER is \leq 10% RTP, the CRDA is a Design Basis Accident and, therefore, compliance with the assumptions of the safety analysis is required. When THERMAL POWER is $>$ 10% RTP, there is no credible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel damage limit during a CRDA (Ref. 2). In MODES 3, 4, and 5, since the reactor is shut down and only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will remain subcritical with a single control rod withdrawn.

(continued)

BASES (continued)

analyzed rod position sequence

ACTIONS

A.1 and A.2

With one or more OPERABLE control rods not in compliance with the prescribed control rod sequence, actions may be taken to either correct the control rod pattern or declare the associated control rods inoperable within 8 hours. Noncompliance with the prescribed sequence may be the result of "double notching," drifting from a control rod drive cooling water transient, leaking scram valves, or a power reduction to $\leq 10\%$ RTP before establishing the correct control rod pattern. The number of OPERABLE control rods not in compliance with the prescribed sequence is limited to eight, to prevent the operator from attempting to correct a control rod pattern that significantly deviates from the prescribed sequence. When the control rod pattern is not in compliance with the prescribed sequence, all control rod movement must be stopped except for moves needed to correct the rod pattern, or scram if warranted.

Required Action A.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position. LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff (i.e., personnel trained in accordance with an approved training program). This ensures that the control rods will be moved to the correct position. A control rod not in compliance with the prescribed sequence is not considered inoperable except as required by Required Action A.2. The allowed Completion Time of 8 hours is reasonable, considering the restrictions on the number of allowed out of sequence control rods and the low probability of a CRDA occurring during the time the control rods are out of sequence.

B.1 and B.2

not in compliance with the analyzed rod position sequence

If nine or more OPERABLE control rods are out of sequence, the control rod pattern significantly deviates from the prescribed sequence. Control rod withdrawal should be suspended immediately to prevent the potential for further deviation from the prescribed sequence. Control rod insertion to correct control rods withdrawn beyond their allowed position is allowed since, in general, insertion of

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

control rods has less impact on control rod worth than withdrawals have. Required Action B.1 is modified by a Note which allows the RWM to be bypassed to allow the affected control rods to be returned to their correct position.

LCO 3.3.2.1 requires verification of control rod movement by a second licensed operator or a qualified member of the technical staff.

the analyzed rod position sequence

When nine or more OPERABLE control rods are not in compliance with BPWS, the reactor mode switch must be placed in the shutdown position within 1 hour. With the mode switch in shutdown, the reactor is shut down, and as such, does not meet the applicability requirements of this LCO. The allowed Completion Time of 1 hour is reasonable to allow insertion of control rods to restore compliance, and is appropriate relative to the low probability of a CRDA occurring with the control rods out of sequence.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

The control rod pattern is verified to be in compliance with the BPWS at a 24 hour frequency to ensure the assumptions of the CRDA analyses are met. The 24 hour frequency was developed considering that the primary check on compliance with the BPWS is performed by the RWM (LCO 3.3.2.1), which provides control rod blocks to enforce the required sequence and is required to be OPERABLE when operating at $\leq 10\%$ RTP.

analyzed rod position sequence

REFERENCES

NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" latest approved revision.

1. NEDE-24011-P-A-10-US, "General Electric Standard Application for Reactor Fuel, Supplement for United States," Section 2.2.3.1, February 1991.
2. Letter (BWROG-8644) from T. Pickens (BWROG) to G. C. Lainas (NRC), "Amendment 17 to General Electric Licensing Topical Report NEDE-24011-P-A."
3. UFSAR, Section 14.6.2.3.
4. NUREG-0800, Section 15.4.9, Revision 2, July 1981.
5. 10 CFR 100.11.

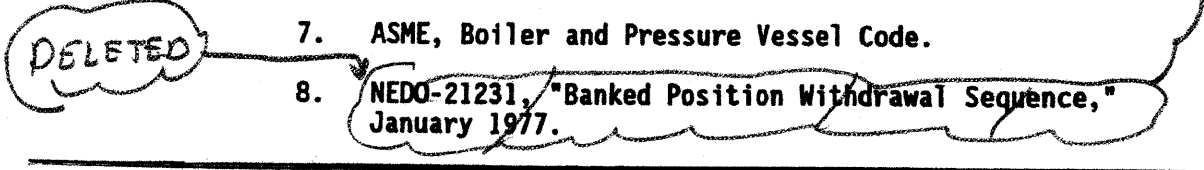
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BASES

REFERENCES
(continued)

6. NEDO-21778-A, "Transient Pressure Rises Affected Fracture Toughness Requirements for Boiling Water Reactors," December 1978.
7. ASME, Boiler and Pressure Vessel Code.
8. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.

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BASES

APPLICABLE
SAFETY ANALYSES,
LCO, and
APPLICABILITY

1. Rod Block Monitor (continued)

The RBM is assumed to mitigate the consequences of an RWE event when operating $\geq 30\%$ RTP. Below this power level, the consequences of an RWE event will not exceed the MCPR SL and, therefore, the RBM is not required to be OPERABLE (Ref. 1). When operating $< 90\%$ RTP, analyses (Ref. 1) have shown that with an initial MCPR ≥ 1.70 , no RWE event will result in exceeding the MCPR SL. Also, the analyses demonstrate that when operating at $\geq 90\%$ RTP with MCPR ≥ 1.40 , no RWE event will result in exceeding the MCPR SL (Ref. 1). Therefore, under these conditions, the RBM is also not required to be OPERABLE.

2. Rod Worth Minimizer

The RWM enforces the banked position withdrawal sequence (BPWS) to ensure that the initial conditions of the CRDA analysis are not violated. The analytical methods and assumptions used in evaluating the CRDA are summarized in References 3, 4, 5, and 6. The BPWS requires that control rods be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions. Requirements that the control rod sequence is in compliance with the BPWS are specified in LCO 3.1.6, "Rod Pattern Control."

The RWM Function satisfies Criterion 3 of the NRC Policy Statement.

Since the RWM is a hardwired system designed to act as a backup to operator control of the rod sequences, only one channel of the RWM is available and required to be OPERABLE (Ref. 6). Special circumstances provided for in the Required Action of LCO 3.1.3, "Control Rod OPERABILITY," and LCO 3.1.6 may necessitate bypassing the RWM to allow continued operation with inoperable control rods, or to allow correction of a control rod pattern not in compliance with the BPWS. The RWM may be bypassed as required by these conditions, but then it must be considered inoperable and the Required Actions of this LCO followed.

(continued)

BASES

APPLICABLE
SAFETY ANALYSES,
LCO, and
APPLICABILITY

analyzed
rod position
sequence

2. Rod Worth Minimizer (continued)

Compliance with the BPWS, and therefore OPERABILITY of the RWM, is required in MODES 1 and 2 when THERMAL POWER is < 10% RTP. When THERMAL POWER is > 10% RTP, there is no possible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel damage limit during a CRDA (Refs. 4 and 6). In MODES 3 and 4, all control rods are required to be inserted into the core; therefore, a CRDA cannot occur. In MODE 5, since only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will be subcritical.

3. Reactor Mode Switch - Shutdown Position

During MODES 3 and 4, and during MODE 5 when the reactor mode switch is required to be in the shutdown position, the core is assumed to be subcritical; therefore, no positive reactivity insertion events are analyzed. The Reactor Mode Switch - Shutdown Position control rod withdrawal block ensures that the reactor remains subcritical by blocking control rod withdrawal, thereby preserving the assumptions of the safety analysis.

The Reactor Mode Switch - Shutdown Position Function satisfies Criterion 3 of the NRC Policy Statement.

Two channels are required to be OPERABLE to ensure that no single channel failure will preclude a rod block when required. There is no Allowable Value for this Function since the channels are mechanically actuated based solely on reactor mode switch position.

During shutdown conditions (MODE 3, 4, or 5), no positive reactivity insertion events are analyzed because assumptions are that control rod withdrawal blocks are provided to prevent criticality. Therefore, when the reactor mode switch is in the shutdown position, the control rod withdrawal block is required to be OPERABLE. During MODE 5 with the reactor mode switch in the refueling position, the refuel position one-rod-out interlock (LCO 3.9.2, "Refuel Position One-Rod-Out Interlock") provides the required control rod withdrawal blocks.

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BASES

**SURVEILLANCE
REQUIREMENTS**

SR 3.3.2.1.7 (continued)

The 24 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 will pass the Surveillance when performed at the 24 month Frequency.

SR 3.3.2.1.8

The RWM will only enforce the proper control rod sequence if the rod sequence is properly input into the RWM computer. This SR ensures that the proper sequence is loaded into the RWM so that it can perform its intended function. The Surveillance is performed once prior to declaring RWM OPERABLE following loading of sequence into RWM, since this is when rod sequence input errors are possible.

REFERENCES

1. NEDC-32162-P, "Maximum Extended Load Line Limit and ARTS Improvement Program Analysis for Peach Bottom Atomic Power Station, Units 2 and 3," Revision 1, February 1993.
2. UFSAR, Sections 7.10.3.4.8 and 7.16.3.
3. NEDE-24011-P-A-10-US, "General Electric Standard Application for Reload Fuel," Supplement for United States, Section S 2.2.3.1, February 1991.
4. "Modifications to the Requirements for Control Rod Drop Accident Mitigating Systems," BWR Owners' Group, July 1986.
5. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.
6. NRC SER, "Acceptance of Referencing of Licensing Topical Report NEDE-24011-P-A," "General Electric Standard Application for Reactor Fuel, Revision 8, Amendment 17," December 27, 1987.

NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," latest approved revision.

(continued)

BASES

*analyzed rod position
sequences*

LCO
(continued)

second licensed operator or other qualified member of the technical staff. To provide additional protection against an inadvertent criticality, control rod withdrawals that do not conform to the banked position withdrawal sequence specified in LCO 3.1.6, "Rod Pattern Control," (i.e., out of sequence control rod withdrawals) must be made in the individual notched withdrawal mode to minimize the potential reactivity insertion associated with each movement. Coupling integrity of withdrawn control rods is required to minimize the probability of a CRDA and ensure proper functioning of the withdrawn control rods, if they are required to scram. Because the reactor vessel head may be removed during these tests, no other CORE ALTERATIONS may be in progress. Furthermore, since the control rod scram function with the RCS at atmospheric pressure relies solely on the CRD accumulator, it is essential that the CRD charging water header remain pressurized. This Special Operations LCO then allows changing the Table 1.1-1 reactor mode switch position requirements to include the startup/hot standby position, such that the SDM tests may be performed while in MODE 5.

APPLICABILITY

These SDM test Special Operations requirements are only applicable if the SDM tests are to be performed while in MODE 5 with the reactor vessel head removed or the head bolts not fully tensioned. Additional requirements during these tests to enforce control rod withdrawal sequences and restrict other CORE ALTERATIONS provide protection against potential reactivity excursions. Operations in all other MODES are unaffected by this LCO.

ACTIONS

A.1 and A.2

With one or more control rods discovered uncoupled during this Special Operation, a controlled insertion of each uncoupled control rod is required; either to attempt recoupling, or to preclude a control rod drop. This controlled insertion is preferred since, if the control rod fails to follow the drive as it is withdrawn (i.e., is "stuck" in an inserted position), placing the reactor mode switch in the shutdown position per Required Action B.1 could cause substantial secondary damage. If recoupling is not accomplished, operation may continue, provided the control rods are fully inserted within 3 hours and disarmed (electrically or hydraulically) within 4 hours. Inserting a

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