

Serial: RNP-RA/12-0028

**JUN 08 2012**

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

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

REQUEST FOR TECHNICAL SPECIFICATION (TS) CHANGES REGARDING TS 3.1.4  
ROD GROUP ALIGNMENT LIMITS AND TS 3.1.7 ROD POSITION INDICATION

Pursuant to 10 CFR 50.90, Carolina Power and Light Company, now doing business as Progress Energy Carolinas, Inc., (PEC) hereby requests an amendment to the H. B. Robinson Steam Electric Plant, Unit No. 2 renewed facility operating license DPR-23, Appendix A, Technical Specifications (TS) Sections 3.1.4, "Rod Group Alignment Limits," and TS 3.1.7, "Rod Position Indication."

When control rods have been moved substantially, Rod Position Indication (RPI) will often differ from the demand position indication by more than the TS allowed limits. The requested change would add a note that allows up to one hour soak time following substantial rod movement during which individual Rod Position Indicators may not be within their TS limits. This one-hour soak time allows sufficient time for the control rod drive mechanism to reach thermal equilibrium and the RPIs to stabilize within TS limits. The addition of a one hour soak time before entering the LCO Action Statements will not delay the plant response to an actual misaligned rod, stuck rod, or inoperable RPI. Plant procedures provide guidance on diagnosing the symptoms of an actual equipment malfunction, and will continue to remain valid after the TS change.

The enclosure provides a technical and regulatory evaluation of the proposed change. Proposed TS page markups and retyped pages are included as attachments to the enclosure. In addition, marked up pages of the bases for TS 3.1.4 and 3.1.7 are provided as an attachment for information only. Approval of the proposed license amendment is requested by April 30, 2013, with the amendment being implemented within 120 days of issuance.

Upon implementation of the proposed TS change, PEC will include the required information on when to invoke the one hour soak period in plant operating procedures.

A001  
LRR

In accordance with 10 CFR 50.91, a copy of this application is being provided to the State of South Carolina. If you should have any questions regarding this submittal, please contact Mr. R. Hightower, Supervisor – Licensing/Regulatory Programs at (843) 857-1329.

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

June 8, 2012

Sincerely,



Sharon A. Wheeler  
Manager - Support Services - Nuclear

SAW/rcw

Enclosure

cc: Ms. S. E. Jenkins, Manager, Infectious and Radioactive Waste Management Section (SC)  
Mr. V. M. McCree, NRC, Region II  
Ms. A. T. Billoch-Colon, NRC Project Manager, NRR  
NRC Resident Inspectors, HBRSEP  
Mr. A. Wilson, Attorney General (SC)

Internal References: LDCR 12-0011 and AR 00509916

## **ENCLOSURE**

### **Evaluation of the Proposed Change**

**Subject:** Request for Technical Specification (TS) Changes Regarding TS 3.1.4 Rod Group Alignment Limits and TS 3.1.7 Rod Position Indication

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1. Technical Specification Page Markups
2. Retyped Technical Specification Pages
3. Markups of TS Bases for "Information Only"
4. List of Regulatory Commitments

## 1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, Carolina Power and Light Company, now doing business as Progress Energy Carolinas, Inc., hereby requests an amendment to the H. B. Robinson Steam Electric Plant, (HBRSEP) Unit No. 2 renewed facility operating license DPR-23, Appendix A, Technical Specifications (TS) Sections 3.1.4, "Rod Group Alignment Limits," and TS 3.1.7, "Rod Position Indication."

Specifically, the proposed change would revise Technical Specifications (TS) Section 3.1.4 and 3.1.7 to add a note that allows up to one hour soak time following substantial rod movement during which individual Rod Position Indicators (RPIs) may not be within their TS limits. This one hour soak time allows sufficient time for the control rod drive mechanism to reach thermal equilibrium and the RPIs to stabilize within TS limits.

## 2.0 DETAIL DESCRIPTION

When the control rods have been moved substantially ( $\geq 10$  steps in one direction in  $\leq 1$  hour), Rod Position Indication will often differ from the demand position indication by more than the TS allowed limits. The proposed amendment would add a note which will allow a one hour soak time during which individual RPIs are not required to be within limits. This one hour time period is based on the time deemed necessary to allow the control rod drive shaft to reach thermal equilibrium and the RPIs to stabilize within TS limits.

The proposed change modifies the LCO for both TS 3.1.4 and TS 3.1.7 by including the following:

“-----Note-----

Individual Rod Position Indicators may be outside their limits for  $\leq 1$  hour following substantial rod movement.”

HBRSEP Unit No. 2, TS 3.1.4 LCO and supporting TS Bases require:

All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be as follows:

- a. For bank demand positions  $> 200$  steps, each rod shall be within 15 inches of its bank demand position, and
- b. For bank demand positions  $< 200$  steps, each rod shall be within 7.5 inches of the average of the individual rod positions in the bank.

Similarly, Surveillance Requirement (SR) 3.1.7.2 requires verification that each Analog Rod Position Indicators (ARPI) is within 7.5 inches of the average of the individual ARPIs in the associated bank after moving the associated bank  $\geq 19$  steps and returning the bank to their original positions when the bank position is  $< 200$  steps withdrawn.

In addition, TS SR 3.1.7.3 requires verification that each ARPI is within 15 inches of the associated bank demand position after moving each full length rod cluster control assembly (RCCA) bank  $\geq 19$  steps and returning the banks to their original positions when the bank

positions are  $\geq 200$  steps withdrawn. The TS 3.1.4 and TS 3.1.7 Bases will define "substantial rod movement" as "10 or more steps in one direction in less than or equal to one hour."

TS 3.1.4, "Rod Group Alignment Limits," requires the reactor control rods to be within alignment limits during MODES 1 and 2 and TS 3.1.7, "Rod Position Indication," requires the RPI System to be OPERABLE during MODES 1 and 2. As directed by the associated Bases for TS 3.1.4, the plant operators use the RPI system as the indication that the control rods are properly aligned.

When the control rods have been moved substantially, RPIs will often differ from the demand position indication by more than the TS allowed limits. With current TS, the operators recognize that LCO 3.1.4 rod alignment requirements may not be met and that LCO 3.1.7 RPI OPERABILITY requirements are not met. This requires the operators to enter LCO 3.1.7 Condition A.

This license amendment request (LAR) proposes to allow up to one hour of "soak time" following substantial rod movement during which the rod position indication may be outside its TS limits. This soak time will allow sufficient time for the control rod drive shaft to reach thermal equilibrium and RPIs to return within TS limits and thus avoid unnecessary entry into a TS Condition. The one-hour time period is consistent with NRC approved time allowances at Prairie Island Units 1 and 2 (Reference 6.1).

### **3.0 TECHNICAL EVALUATION**

As described in the Updated Final Safety Analysis Report (UFSAR) Section 7.7.1.1.5, there are two separate systems provided to sense the display control rod position. The digital and analog systems are two separate systems; each serves as backup for the other. Operating procedures require the reactor operator to compare the digital and analog readings upon recognition of any apparent malfunction. Therefore, a single failure in rod position indication does not in itself lead the operator to take erroneous action in the operation of the reactor.

In UFSAR Section 7.7.1.1.5.1, describes the ARPI system which produces an analog signal for each RCCA by a linear position transmitter. An electrical coil stack is placed above the stepping mechanisms of the control rod magnetic jacks external to the pressure housing. When the associated control rod is at the bottom of the core, the magnetic coupling between a primary and secondary is small and there is a small voltage induced in the secondary. As the control rod is raised by the magnetic jacks, the relatively high permeability of the lift rod causes an increase in magnetic coupling. Thus, an analog signal proportional to within  $\pm 3$  percent of rod position is derived.

Based on the analog signal a direct, continuous readout of every RCCA position is presented to the operator by individual meter indications, without need for operator selection or switching to determine rod position. In addition, the individual rod position signals may be fed to the plant computer for readout. A deviation monitor alarm is actuated if an individual rod deviates from its group position by a preselected distance.

USFSAR Section 7.7.1.1.5.2 describes the digital bank demand position indication system which counts pulses generated in the rod drive control system. One counter is associated with each group (or subgroups) of RCCA. Readout of the digital system is in the form of electronic add-subtract counters reading the number of steps of rod withdrawal with one display for each group or subgroup.

As discussed in the TS 3.1.4 and TS 3.1.7 Bases, the bank demand position indication system is considered highly precise (+ 1 step or + 5/8 inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod. The ARPI system provides a highly accurate indication of actual control rod position, but at a lower precision than the bank demand group step counters. The ARPI system is based on inductive analog signals from a series of coils spaced along a hollow tube with a center to center distance of 3.75 inches, which is six steps. The maximum uncertainty of the ARPI system is + 12 steps (+ 7.5 inches). With an indicated deviation of 12 steps between the bank demand group step counter and ARPI, the maximum deviation between actual rod position and the bank demand position could be 24 steps, or 15 inches.

When the RPI differs from the demand position by more than the TS allowed limits, TS LCO 3.1.7 Condition "A" requires: (1) verifying once per 8 hours, by using moveable incore detectors, the position of the control rod(s) for which the RPI differs from the demand position by more than the TS allowed limits; or (2) reducing power to  $\leq 1$  50% reactor thermal power (RTP) within 8 hours. Since both of these actions do not need to be performed for 8 hours, the operators do not take any immediate reactor operational remedial actions. The operators notify the Nuclear Engineering Group and request them to prepare to perform an incore flux map using the moveable incore detectors. They also monitor the behavior of the RPI(s) to determine if the rod position indication returns to within limits. Typically within a short time the RPI difference from the demand position returns to within limits. When the RPI returns to within limits, in accordance with LCO 3.0.2, the LCO is met prior to expiration of the completion time and completion of the Required Actions is not required for LCO 3.1.7. The operators then exit TS LCO 3.1.7 Condition "A". Since this scenario can repeat each time there is substantial control rod movement and no substantive remedial actions are required, this is considered a "nuisance" LCO Condition entry.

This unnecessary entry into LCO 3.1.7 Condition A distracts the operators from monitoring reactor operations and performing other tasks more important to plant safety. Unnecessary entry into LCO 3.1.7 Condition A also involves unnecessary testing, and preparation and operation of the moveable incore detector system which results in increased wear on the system.

This License Amendment Request (LAR) proposes to add a note to LCO 3.1.4 and LCO 3.1.7 and the associated TS Bases which will allow a one hour soak time during which individual RPIs are not required to be within limits. This one hour time period is based on the time deemed necessary to allow the control rod drive shaft to reach thermal equilibrium. With these LCO notes, unnecessary entry into a TS Condition will be avoided following substantial movement of control rods.

Operators are required to be aware of plant conditions and to meet the applicable TS. With these LCO notes, the operators will still be required to monitor the RPIs and take the appropriate actions after one hour if the RPI and demand position indication continue to differ by more than the TS allowed limits. Thus, the practical effect of the proposed LCO notes is to extend by one hour (from 8 hours to 9 hours). This is the time that individual RPI instrumentation could be inoperable or a rod could be misaligned before TS required actions would be implemented. Plant procedures including surveillance, power operation, and abnormal operating procedures will be revised to include the required information concerning the soak period.

The likelihood of having a misaligned control rod and an event sensitive to a significantly misaligned rod is small. For this reason the completion time for TS 3.1.7 Condition C is 8 hours. Since RPI instrumentation is seldom inoperable, the possibility of inoperable RPI

instrumentation coincident with a misaligned control rod and an event sensitive to a significantly misaligned rod is even more remote. Thus a one hour time extension does not introduce significant safety issues with respect to RPI operability. There may also be other instrumentation indications available to the operators that an RPI may be inoperable. For example, erratic indications, which may be more meaningful than a difference between the RPI and demand position indication. These other indications could appear independent of rod motion.

There is a small possibility that an individual RPI difference from the demand position indication is a legitimate indication of a misaligned rod. It is the expectation in the use of the HBRSEP, Unit No. 2 TS. That the differences between RPI and demand position indication will be evaluated first as RPI instrumentation inoperability in accordance with the requirements of TS 3.1.7 Condition "A". Therefore, a rod could be misaligned for up to 8 hours prior to identification as a misaligned rod. This proposed change would extend that time period by an additional hour. The likelihood of an event sensitive to a significantly misaligned rod during this one hour time period is very low.

As discussed in UFSAR Section 15.4.3, the plant is analyzed for control rod misalignment. The minimum misalignment for individual rods assumed in the safety analyses is 24 steps (15 inches). In some cases a total misalignment from fully withdrawn to fully inserted is assumed. Plant safety analyses consider two types of rod misalignment events, static misalignment and a dropped rod.

In UFSAR Section 15.4.3.2, the static misalignment of a single RCCA is defined as a malfunction of the Control Rod Drive (CRD) mechanism, or of the rod control power supply, which causes an RCCA to be out of alignment with its bank; i.e., either higher or lower than any of the other RCCAs in the same bank. For the static misalignment, two cases are analyzed to bound the misalignment conditions where the single RCCA is stuck fully out of the core or stuck fully in the core. For the condition with the single RCCA misaligned above the RCCA's in the same bank, it is conservatively assumed that Bank D is inserted to the full extent allowed by the Rod Insertion Limits (RIL) controlled by the Technical Specifications as specified on a cycle-specific basis by the Core Operating Limits Report. However, it is assumed that the most reactive "D" bank RCCA is fully withdrawn from the core. For the condition with a single RCCA misaligned below its corresponding bank, the analysis is performed with all Banks fully withdrawn and the most reactive RCCA fully inserted to the bottom of the core. The results of these analyses show that an RCCA out of position can result only from a malfunction in the mechanism or its associated power supply and, in such a case. This is clearly indicated to the operator by independent monitoring systems. For both cases discussed above, the departure from nucleate boiling (DNB) ratio remains greater than the safety limit in the event of a rod misalignment. The DNB specified acceptable fuel design limit (SAFDL) is therefore, satisfied for this event. The analyses does not credit operator intervention, therefore the static rod misalignment event is not time dependent and an additional hour with the misalignment undetected and unmitigated does not adversely impact plant safety. Multiple rod misalignment events are bounded by the single rod misalignment event analyses and therefore an additional hour would not have any impact on that event.

In UFSAR Section 15.4.3.3, a dropped rod event is defined to be initiated by a dropped RCCA. The dropped RCCA promptly inserts negative reactivity which reduces reactor power and disturbs the power distribution, resulting in increased local power peaking. The moderator temperature decreases as a result of the reduction in reactor power. Consequently, a negative

moderator temperature coefficient can return the reactor to a full power condition with an elevated radial power peaking factor corresponding to the new radial power distribution caused by the dropped RCCA. The analysis showed that for the case of a dropped full-length RCCA or RCCA bank, the minimum calculated DNB ratio is greater than the safety limit. The peak Linear Heat Generation Rate (LHGR) is less than the fuel centerline melt limit. Therefore, the event acceptance criteria on DNB ratio and fuel centerline melt are met. This event does not credit operator intervention and is not time dependent. Therefore, an additional hour with the misalignment undetected and unmitigated does not adversely impact plant safety. Multiple rod drop events cause the reactor to trip and therefore an additional hour would not have any impact on that event.

In conclusion, the proposed one hour extension does not significantly impact the safety of the plant. Allowing the operator and engineers to focus on monitoring the reactor without unnecessary entry into an LCO Condition and Required Actions may enhance plant safety and reliability of plant equipment. With these proposed changes, the HBRSEP, Unit No. 2 TS will continue to protect the health and safety of the public.

#### **4.0 REGULATORY EVALUATION**

##### **4.1 Applicable Regulatory Requirements/Criteria**

Per HBRSEP Unit No. 2 UFSAR Sections 3.1.1.1, the General Design Criteria (GDC) in existence at the time HBRSEP, Unit No. 2 was licensed (July 1970) for operation were contained in Proposed Appendix A to 10 CFR 50, General Design Criteria for Nuclear Power Plants, published in the Federal Register on July 11, 1967. (Appendix A to 10 CFR 50, effective in 1971 and subsequently amended, is somewhat different from the proposed 1967 criteria.)

HBRSEP, Unit No. 2 was evaluated with respect to the proposed 1967 GDC. The original FSAR contained a discussion of the criteria as well as a summary of the criteria by groups. UFSAR Section 3.1.2.12 identifies the following criterion for GDC-12, Instrumentation and Control Systems:

*"Instrumentation and controls shall be provided as required to monitor and maintain within prescribed operating ranges for the essential reactor facility operating variables."*

The proposed changes do not alter that capability and the RPIs along with other associated Instrumentation and Control monitoring methods, continue to provide this capability and meet this GDC.

##### **4.2 Precedent**

The NRC issued a similar amendment for the Prairie Island Nuclear Generating Plant, Units 1 and 2, in a letter dated October 1, 2003, Agencywide Documents Access and Management System (ADAMS) Accession No. ML032380178.

##### **4.3 No Significant Hazards Consideration Determination**

The proposed amendment would modify TS 3.1.4, Rod Group Alignment Limits, and TS 3.1.7, Rod Position Indication, with a note that allows up to one hour soak time following substantial rod movement. During this time individual rod position indications (RPIs) may not be within their



limits. This one hour soak time allows sufficient time for the control rod drive mechanism to reach thermal equilibrium and the RPIs to return with TS limits.

PEC has evaluated the proposed amendment against the standards in 10 CFR 50.92 and determined that operation of the HBRSEP, Unit No. 2 in accordance with the proposed amendment presents no significant hazards. Our evaluation against each of the criteria in 10 CFR 50.92 follows.

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

Response: No.

This license amendment request proposes to allow up to one hour of soak time following substantial rod movement during which time the rod position indication may be outside its limits. This would allow an additional hour for rod position indication to be inoperable or a control rod to be misaligned prior to entry into a TS LCO Condition and Required Actions.

RPI instrumentation is not an assumed accident initiator; however, the HBRSEP, Unit No. 2 safety analyses consider two types of rod misalignment events, static misalignment and a dropped rod.

The safety analyses show that for the static misalignment event, without any operator intervention, a single fully withdrawn rod event does not result in any fuel pin failure; therefore, the static rod misalignment event is not time dependent and an additional hour, with the misalignment undetected and unmitigated does not increase the consequences of the event. Multiple rod misalignment events are bounded by the single rod misalignment analyses and therefore an additional hour would not have any impact on this event.

The safety analyses also show that a single dropped rod event, without any operator intervention, does not result in any fuel pin failure; therefore, the rod drop event is not time dependent and an additional hour with the misalignment undetected and unmitigated does not increase the consequences of the event. Multiple rod drop events cause the reactor to trip and therefore an additional hour would not have any impact on that event.

Although this license amendment request may allow a misaligned rod to be undetected for an additional hour, the additional time for discovery does not change the probability of a misaligned control rod event because the one hour time extension does not affect the control rod drive system features that would result in either type of misalignment.

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.

This proposed change does not alter the design, function, or operation of any plant component and does not install any new or different equipment. No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of these changes. No new equipment performance burdens are imposed.

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 RPI system is an instrumentation system that provides indication to the operators that a control rod may be misaligned. Inoperable individual RPI instrumentation does not, by itself in any way, harm or impact reactor operation. Inoperable rod position indication may impair the ability of the operators to detect a misaligned rod. However, the impact of inoperable RPI instrumentation may be offset by availability of other indications that a rod is misaligned such as nuclear instrumentation indication that reactor power has shifted to one side of the core or thermocouple indication that the core temperatures increased in one region of the core and/or decreased in another region of the core. Based on plant experience, the likelihood of a misaligned rod at HBRSEP, Unit No. 2 is considered to be small and the likelihood of a misaligned rod coincident with inoperable rod position indication during the allowed one hour extension is even smaller. In addition, these proposed changes may enhance plant safety and reliability because the one hour soak time will allow the operators and engineers to focus on monitoring the reactor performance without unnecessary entry into TS LCO Conditions and Required Actions.

The proposed change does not involve a significant reduction in a margin of safety.

Based on the above, PEC concludes that the proposed amendment does not involve a 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.

#### 4.4 Conclusions

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.

#### 5.0 **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, or would change an inspection or surveillance requirement. The proposed amendment would modify TS 3.1.4, Rod Group Alignment Limits, and TS 3.1.7, Rod Position Indication, with a Note that allows up to one hour soak time following substantial rod movement during which individual rod position indications (RPIs) may not be within their limits.

The proposed amendment does not involve (i) a significant hazards consideration; (ii) a significant change in the types or significant increases in the amounts of any effluents that may be released offsite; or (iii) result in a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criteria 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 needs to be prepared in connection with the issuance of the amendment.

## **6.0 References**

- 6.1. NRC Letter titled: Prairie Island Nuclear Generating Plant, Units 1 and 2 - Issuance of Amendments Regarding Addition of 1-Hour Soak Time for Control Rod Drive Mechanisms (TAC NOS. MB8005 and MB8006), dated October 1, 2003, ADAMS Accession No. ML032380178.

Enclosure to Serial: RNP-RA/12-0028  
3 Pages (including cover page)

**ATTACHMENT 1**

**H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2**

**PROPOSED TECHNICAL SPECIFICATIONS CHANGES (MARK-UP)**

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be as follows:

- a. For bank demand positions  $\geq 200$  steps, each rod shall be within 15 inches of its bank demand position, and
- b. For bank demand positions  $< 200$  steps, each rod shall be within 7.5 inches of the average of the individual rod positions in the bank.

APPLICABILITY: MODES 1 and 2.

----- Note -----  
Individual Rod Position  
Indicators may be outside their  
limits for  $\leq 1$  hour following  
substantial rod movement.

#### ACTIONS

| CONDITION                         | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------------|---|-----------------|
| A. One or more rod(s) inoperable. | A.1.1 Verify SDM is within the limits provided in the COLR. | 1 hour          |
|                                   | <u>OR</u>   |                 |
|                                   | A.1.2 Initiate boration to restore SDM to within limit.     | 1 hour          |
|                                   | <u>AND</u>  |                 |
|                                   | A.2 Be in MODE 3.   | 6 hours         |

(continued)

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.7 Rod Position Indication

LCO 3.1.7 The Analog Rod Position Indication (ARPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

3.1.7

----- Note -----  
Individual Rod Position Indicators may be outside their limits for  $\leq 1$  hour following substantial rod movement.

#### NOTE

Separate Condition entry is allowed for each inoperable rod position indicator per group and each demand position indicator per bank.

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME  |
|--|--|------------------|
| A. One ARPI per group inoperable for one or more groups.   | A.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors. | Once per 8 hours |
|  | <u>OR</u><br>A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.  | 8 hours          |
| B. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position. | B.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors. | 4 hours          |
|  | <u>OR</u>  | (continued)      |

Enclosure to Serial: RNP-RA/12-0028  
3 Pages (including cover page)

**ATTACHMENT 2**

**H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2**

**REVISED AND RETYPED TECHNICAL SPECIFICATIONS PAGES**

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be as follows:

- a. For bank demand positions  $\geq 200$  steps, each rod shall be within 15 inches of its bank demand position, and
- b. For bank demand positions  $< 200$  steps, each rod shall be within 7.5 inches of the average of the individual rod positions in the bank.

-----NOTE-----

Individual RPIs may be outside their limits for  $\leq 1$  hour following substantial rod movement.

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APPLICABILITY: MODES 1 and 2.

#### ACTIONS

| CONDITION                         | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------------|---|-----------------|
| A. One or more rod(s) inoperable. | A.1.1 Verify SDM is within the limits provided in the COLR. | 1 hour          |
|                                   | <u>OR</u>   |                 |
|                                   | A.1.2 Initiate boration to restore SDM to within limit.     | 1 hour          |
|                                   | <u>AND</u>  |                 |
|                                   | A.2 Be in MODE 3.   | 6 hours         |

(continued)



### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.7 Rod Position Indication

LCO 3.1.7 The Analog Rod Position Indication (ARPI) System and the Demand Position Indication System shall be OPERABLE.

-----NOTE-----

Individual RPIs may be outside their limits for  $\leq 1$  hour following substantial rod movement.

APPLICABILITY: MODES 1 and 2

#### 3.1.7

-----NOTE-----  
Separate Condition entry is allowed for each inoperable rod position indicator per group and each demand position indicator per bank.

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME  |
|--|--|------------------|
| A. One ARPI per group inoperable for one or more groups.   | A.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors. | Once per 8 hours |
|  | <u>OR</u><br>A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.  | 8 hours          |
| B. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position. | B.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors. | 4 hours          |
|  | <u>OR</u>  | (continued)      |

Enclosure to Serial: RNP-RA/12-0028  
4 Pages (including cover page)

**ATTACHMENT 3**

**H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2**

**PROPOSED CHANGES TO TECHNICAL SPECIFICATIONS BASES PAGES**

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BASES

LCO  
(continued)      some cases a total misalignment from fully withdrawn to fully inserted is assumed.

Failure to meet the requirements of this LCO may produce unacceptable power peaking factors and LHGRs, or unacceptable SDMs, all of which may constitute initial conditions inconsistent with the safety analysis.

Insert "A"



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APPLICABILITY      The requirements on RCCA OPERABILITY and alignment are applicable in MODES 1 and 2 because these are the only MODES in which neutron (or fission) power is generated, and the OPERABILITY (i.e., trippability) and alignment of rods have the potential to affect the safety of the plant. In MODES 3, 4, 5, and 6, the alignment limits do not apply because the control rods are inserted and the reactor is shut down and not producing fission power. In the shutdown MODES, the OPERABILITY of the shutdown and control rods has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the RCS. See LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," for SDM in MODES 3, 4, and 5 and LCO 3.9.1, "Boron Concentration," for boron concentration requirements during refueling.

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ACTIONS

A.1.1 and A.1.2

When one or more rods are inoperable (e.g., untrippable), there is a possibility that the required SDM may be adversely affected. Under these conditions, it is important to determine the SDM, and if it is less than the required value, initiate boration until the required SDM is recovered. The Completion Time of 1 hour is adequate for determining SDM and, if necessary, for initiating emergency boration and restoring SDM.

In this situation, SDM verification must include the worth of the untrippable rod, as well as a rod of maximum worth.

(continued)

BASES

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LCO  
(continued)

OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned control rods can be detected. Therefore, power peaking, ejected rod worth, and SDM can be controlled within acceptable limits.

Insert "A"



APPLICABILITY

The requirements on the ARPI and step counters are only applicable in MODES 1 and 2 (consistent with LCO 3.1.4, LCO 3.1.5, and LCO 3.1.6), because these are the only MODES in which power is generated, and the OPERABILITY and alignment of rods have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and control banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

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ACTIONS

The ACTIONS table is modified by a Note indicating that a separate Condition entry is allowed for each inoperable rod position indicator per group and each demand position indicator per bank. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each inoperable position indicator.

A.1

When one ARPI channel per group fails, the position of the rod can still be determined by use of the incore movable detectors. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been significantly moved, the Required Action of B.1 or B.2 below is required. Therefore, verification of RCCA position within the Completion Time of 8 hours is adequate for allowing continued full power operation, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.

(continued)

### **Insert “A”**

This LCO is modified by a note indicating individual control rod position indications may not be within limits for up to and including one hour following substantial control rod movement. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach thermal equilibrium and thus present a consistent position indication. Substantial rod movement is considered to be 10 or more steps in one direction in less than one hour.

In accordance with this note, the comparison of the bank demand position and the RPI may take place at any time up to one hour after rod motion, at any power level. Based on this allowance, rod position may be considered within limits during the thermal soak time to allow position indication to stabilize.