

Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

William R. Lagergren, Jr.
Site Vice President, Watts Bar Nuclear Plant

AUG 19 2004

WBN-TS-03-12

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

In the Matter of the
Tennessee Valley Authority

)
)

Docket No. 50-390

**WATTS BAR NUCLEAR PLANT (WBN) – LICENSE AMENDMENT (WBN-TS-03-12)
MONITORING OF CONTROL OR SHUTDOWN ROD POSITION BY AN ALTERNATE
MEANS - REQUEST FOR ADDITIONAL INFORMATION (RAI) (TAC MC 1419)**

Pursuant to 10 CFR 50.90, TVA submitted a request for an Operating License change (WBN-TS-03-12) to license NPF-90 for WBN Unit 1 on November 21, 2003. The proposed amendment revises Technical Specification (TS) 3.1.8, "Rod Position Indication (RPI)," to allow the position of the control and shutdown rods to be monitored by a means other than the moveable incore detectors. NRC transmitted to TVA on January 22, 2004, an RAI on the proposed amendment. TVA's responded to the January 22, 2004 RAI in a letter dated May 5, 2004. NRC's review of the RAI response resulted in additional questions which were provided to TVA on May 26, 2004. The additional questions were discussed with NRC in a teleconference that was held on June 9, 2004. From the teleconference, one additional question was raised regarding the verification of the position of the affected rod prior to escalating power above 50 percent rated thermal power following entry into Mode 3.

ADD 1

U.S. Nuclear Regulatory Commission

Page 2

AUG 19 2004

Another teleconference was held with NRC on August 6, 2004. During this discussion NRC questioned how the proposed monitoring method would provide adequate feedback to the unit operators.

Provided in Enclosure 1 is TVA's response to the May 26, 2004 RAI. Enclosure 2 addresses the question expressed in the June 9th teleconference. Enclosure 3 addresses a question expressed in the August 6th teleconference. Enclosure 4 contains updated annotated versions of TS 3.1.8 and the Bases. Listed in Enclosure 5 is the commitment made in this submittal. TVA considers that the information provided in the enclosures along with the information provided in TVA's letter dated May 5, 2004, clarified the proposed amendment and did not change the initial proposed no significant hazards consideration determination.

If there are any questions regarding this letter, please contact Paul L. Pace at (423) 365-1824.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on this 19th day of August, 2004.

Sincerely,



W. R. Lagergren

Enclosures:

1. TVA's Response to NRC's RAI Dated May 26, 2004
2. TVA's Response to the Question Expressed in the June 9, 2004, Teleconference
3. TVA's Response to the Question Expressed in the August 6, 2004, Teleconference
4. Updated Annotated Technical Specifications
5. List of Commitments

cc: See page 3

U.S. Nuclear Regulatory Commission
Page 3

AUG 19 2004

PLP:JLB

Enclosures

cc (Enclosures):

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ENCLOSURE 1

**TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1
DOCKET NUMBER 390**

**PROPOSED LICENSE AMENDMENT REQUEST WBN-TS-03-12
RESPONSE TO NRC'S REQUEST FOR ADDITIONAL INFORMATION (RAI)
RECEIVED BY TVA ON MAY 26, 2004**

General Clarification:

In TVA's previous letters regarding this amendment request, the term "gripper coil parameters" or "stationary gripper coil parameters" were used to address the alternate monitoring process. Based on NRC's Question 2 and Question 3 (addressed below), the monitoring circuit was revised to monitor the parameters of both the stationary gripper coil and the lift coil. Therefore, the terms "gripper coil parameters" and "stationary gripper coil parameters" have been replaced with the term "rod control system parameters." This wording change does not impact the public's understanding of the consequences of the proposed amendment. Therefore, TVA considers that the information provided in the enclosures of this letter along with the information provided in TVA's letter dated May 5, 2004, clarified the proposed amendment and did not change the initial proposed no significant hazards consideration determination.

NRC Question 1:

The proposed REQUIRED ACTION A.2.1 requires to verify the position of the rods with inoperable position indicators by using movable incore detectors within 8 hours and once every 31 days thereafter and 8 hours, if stationary gripper coil parameters indicate unintended movement. The NRC staff requests the licensee provide technical justification for the allowed outage times (AOTs) of proposed action A.2.1.

TVA's Response to Question 1:

Action A.2.1 consists of three distinct requirements:

1. Initial verification of the position of the affected rod using the incore detectors.
2. Reverification of the position of the affected rod every 31 days using incore detectors.
3. Verification of the position of the affected rod using incore detectors whenever the rod control system parameters indicate unintended movement.

The technical justification of completion times proposed for the three actions is defined as follows:

Requirements of Action A.2.1:		Proposed Completion Time:	Basis for Completion Time:
1.	Initial verification of the position of the affected rod the using incore detectors.	8 hours	As stated in the TS Bases for Required Action A.2.1 in the proposed amendment, Required Actions A.2.1 and A.1 are essentially the same. Required Action A.1 (an existing action) currently has a completion time of 8 hours.
2.	Reverification of the position of the affected rod every 31 days using incore detectors.	31 days	Included in TVA's amendment request dated November 21, 2003, was a section titled "Potential Impact from Repeated Use of the Moveable Incore Detector System." This section of the document clarifies TVA's concern with the repeated use of the incore detectors over a long period of time. Also included in this section, TVA documents the impact a failure of the incore detectors will have on WBN's ability to perform certain Surveillance Requirements (SRs) for core peaking factor and power distribution measurements on the required 31 day frequency [Technical Specifications (TS) 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," and TS 3.2.2, "Nuclear Enthalpy Rise Hot Channel Factor ($F_{\Delta H}^N$)"]. The proposed completion time for the re-verification action is set at 31 days to coincide with implementation of the SRs for TS 3.2.1 and TS 3.2.2.
3.	Verification of the position of the affected rod using incore detectors whenever the rod control system parameters indicate unintended movement.	8 hours	TVA's reply to Questions 2 and 3 (below) clarifies that the monitoring circuit has been modified to also monitor the parameters of the lift coil. The specific monitoring capabilities and alarm functions for unintended movement that are now provided are discussed in the response to Questions 2 and 3. However, any indication of unintended movement will be treated as if the Analog Rod Position Indicator (ARPI) had initially failed. This will result in the verification of the position of the affected rod through the use of the incore detectors within 8 hours.

TVA's Response to Question 1 (continued):

In addition to the above, TVA discussed similar amendments that had been approved for two utilities in the Background section of the amendment request dated November 21, 2003. For both of these amendments, only a review of the gripper coil parameters every 8 hours was required. The additional verification of the position of the affected rod every 31 days using the incore detectors was not specifically required by the approved amendments. In regard to this, Question 4 (below) requests that TVA address why a periodic surveillance is not required to validate that the rod control system monitoring circuit is functioning properly. TVA considers the 31 day verification of the position of the affected rod by use of the incore detectors to be an appropriate measure to confirm the rod control system monitoring circuit is operating correctly. This, along with the computer alarm (discussed under TVA's response to Questions 2 and 3 below) that will be generated if the circuit fails, provides adequate assurance that the circuit is functioning properly. In addition, SR 3.1.5.2 is performed every 92 days to verify the rods move freely. The computer algorithm used for rod control system monitoring will increment or decrement a counter representing rod position based on the signal from the rod control logic cabinet (i.e., step out or step in - refer to TVA's response to Questions 2 and 3 below for additional information). Considering this and the need to clarify in WBN's licensing basis the capabilities provided by the alternate monitoring process, TVA intends to make a regulatory commitment to revise Section 7.7.1.3.2, "Main Control Room Rod Position Indication," of the Updated Final Safety Analysis Report (UFSAR). The proposed revision will discuss the rod control system monitoring process and will clarify that while the alternate monitoring is in use, the operation of the system will be periodically verified through the implementation of SR 3.1.5.2, SR 3.2.1.1 and SR 3.2.2.1.

NRC Question 2:

The proposed REQUIRED ACTION A.2.2 requires to review the parameters of the stationary gripper coil for indications of unintended rod movement for the rods with inoperable position indicators within 16 hours and once per 12 hours thereafter. Actual Technical Specifications, REQUIRED ACTION A.1, requires the verification of the rod position with inoperable position indicators every 8 hours. That is, the intention of the actual REQUIRED ACTION A.1 is to provide the position of the affected rod every 8 hours. However, the proposed monitoring method will verify the rod position every 12 hours once the position is established with the incore detectors. The NRC staff requests the licensee provide technical justification for the 12 hours frequency of the proposed action A.2.2.

NRC Question 3:

The proposed rod position monitoring method intends to monitor the rod control system parameters for indication of "unintended" rod movement for the rods with inoperable position indicators. The NRC staff requests the licensee provide a technical justification of why the rod position will be monitored with the incore detectors only in case of unintended rod movement. Please provide the justification of why the rod position does not need to be verified using the incore detectors if the rod is intentionally moved.

TVA's Response to Question 2 and Question 3:

In order to address NRC's Question 2 and Question 3, the following factors must be established:

Rod movement - intentional and unintentional:

The control rod banks may be automatically controlled from input signals generated by the reactor control system or by manual means controlled by the unit operator. The shutdown rods are manually controlled by the unit operator. The automatic function of the control rod drive system maintains a programmed average temperature in the Reactor Coolant System (RCS) by adjusting the position of the rods which regulates core reactivity. During steady-state operation the reactor control system maintains RCS average temperature to within plus or minus 3.5 degrees Fahrenheit of the reference temperature. Consistent with this, intentional rod movement occurs when either:

1. A unit operator manually demands motion from the rod control system, or
2. A temperature or power mismatch demands motion while the rod control system is being controlled automatically.

In the previous letters submitted by TVA for the proposed amendment, TVA considered unintended movement to be the release of the stationary gripper (i.e., the loss of stationary gripper coil current) when no action was demanded either manually or automatically from the rod control system. This type of uncontrolled loss of current to the coil may result in an unintended rod step or a rod drop. However, this view of unintended movement did not include the situation where rod motion was demanded but the rod did not respond properly. Therefore, TVA has concluded that unintended movement must include rod motion in a direction other than the direction demanded by the rod control system, and/or release of the stationary gripper when none was demanded by the rod control system.

Alarm and monitoring capabilities of the proposed alternate plan:

Once implemented, the proposed alternate monitoring will provide the ability for a unit operator to continuously monitor the position of the affected rod via a recorder. The plant computer provides an output signal representative of rod position in steps to a digital recorder located on a

control board (1-M-5) in the Main Control Room (MCR). This MCR board is adjacent to the control board (1-M-4) where the displays for the ARPIS are located. Further, the implementation of the proposed monitoring method makes the deviation monitor for the affected rod continuously available. The functions of the recorder and the deviation monitor are available to indicate or alarm for intended or unintended rod movements.

Measures proposed by TVA to address Question 2 and Question 3:

As submitted in TVA's amendment request dated November 21, 2003, the completion time for Required Action A.2.2 for the review of the parameters of the gripper coil via the recorder was 12 hours. TVA addressed the basis for the completion times for Required Action A.2.2 in its RAI response dated May 5, 2004. However, based on the teleconference held with NRC on June 9, 2004, and the question expressed in Question 2 (above), TVA has revised the Completion Time of proposed Required Action A.2.2 to 8 hours. This makes the Completion Time for the review of the parameters of the alternate monitoring system to be consistent with the 8 hour Completion Time for the verification of the position of the affected rod by use of the incore detectors.

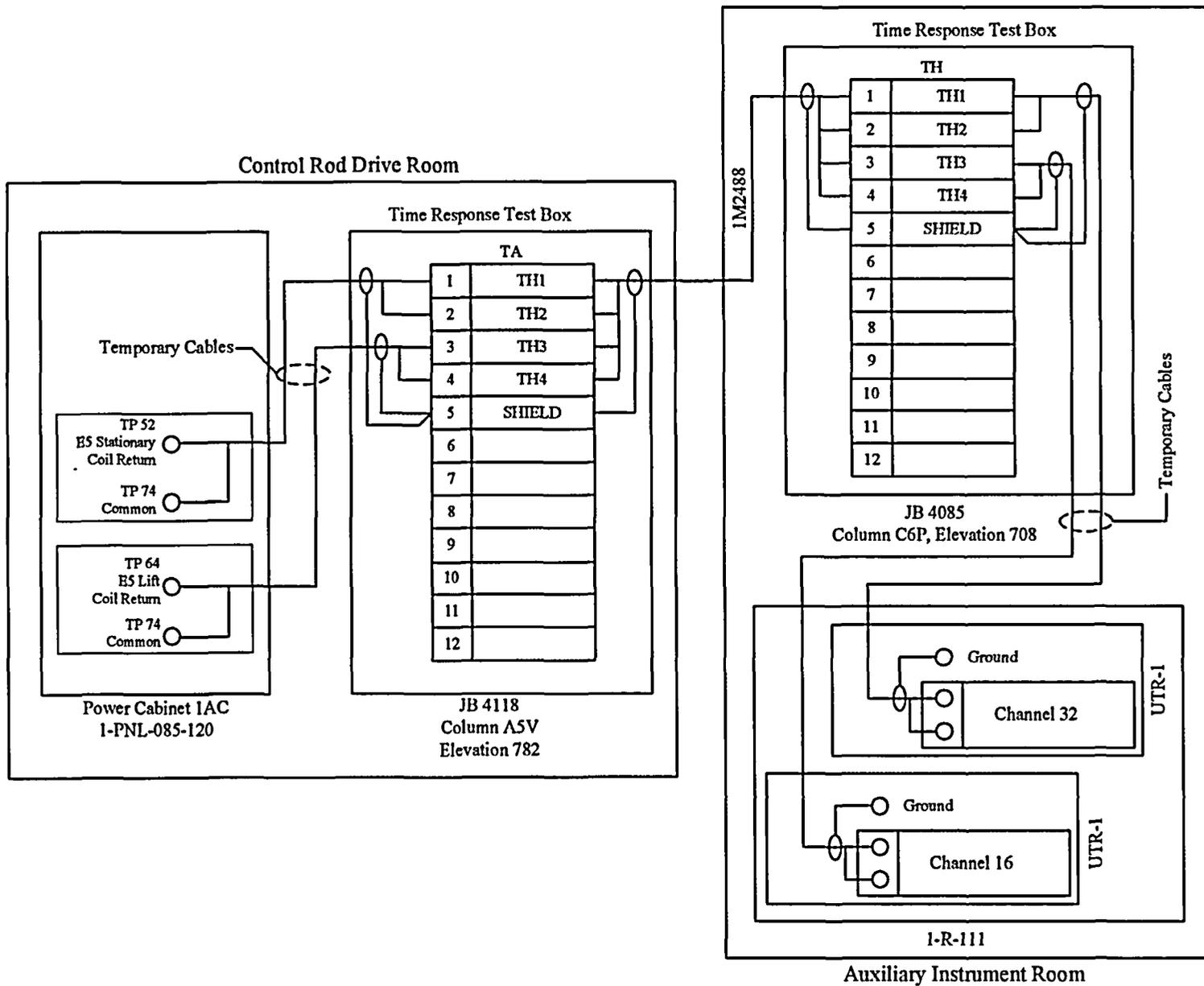
In order to monitor if the affected rod stepped in the direction that was demanded, the method of implementing the alternate means has been modified. Figure 1 (below) documents the changes that were made to the monitoring circuit which adds the capability to monitor the current of the lift coil using a circuit similar to the circuit used to monitor the stationary gripper coil. The timing of the lift coil energizing will be analyzed by a software algorithm, and compared to demand signals generated by the rod control system to determine if the rod stepped in the direction demanded.

For any of the following three situations, the software algorithm will generate a plant computer alarm:

1. The rod stepped in the wrong direction.
2. The rod stepped with no demand (whether in automatic or manual control).
3. The alternate monitoring circuit fails.

Once an alarm is received, Required Action A.2.1 is applicable and the position of the rod will have to be determined within 8 hours of the alarm by use of the incore detectors. In addition, the computer alarm generated by either of the first two conditions may be accompanied by a rod control system urgent alarm which is annunciated in the main control room.

Figure 1
Example of Wiring for the Monitoring of Rod Control System Parameters
Example Based on Control Rod E-5



NRC Question 4:

In case of rod position indicator failure and entry into LCO 3.1.8, Condition A, the licensee may use the proposed method to monitor the position of the affected rod. The proposed method will use the incore detectors to locate the rod with the inoperable ARPI. Then, the licensee will program the rod location into the plant computer to start monitoring the rod position by reviewing the stationary gripper coil parameters. The NRC staff requests the licensee explain if a test/calibration procedure will be performed in order to ensure the proper functioning of the proposed monitoring method prior to its use and if a surveillance test will be performed on a periodic basis.

TVA's Response to Question 4:

As a means to verify that the operation of the software algorithm, TVA tested the software using signal data obtained from Control Rod Drive Mechanism (CRDM) timing tests. Further, TVA considers the 31 day verification of the position of the affected rod by use of the incore detectors to be an appropriate measure to confirm the functionality of the circuit (refer to the responses to Question 1 above). This, along with the computer alarm that will be generated if the circuit fails, provides adequate assurance that the circuit is operating properly. In addition, SR 3.1.5.2 is performed every 92 days to verify the rods move freely. This test will be used to establish the monitoring circuit is operating as designed. As stated previously, TVA intends to clarify in WBN's licensing basis the capabilities provided by the alternate monitoring process. This will be accomplished through a revision to Section 7.7.1.3.2, "Main Control Room Rod Position Indication," of the Updated Final Safety Analysis Report (UFSAR). The proposed revision will discuss the rod control system monitoring process and will clarify that while the alternate monitoring is in use, the operation of the system will be periodically verified through the implementation of SR 3.1.5.2, SR 3.2.1.1 and SR 3.2.2.1.

NRC Question 5:

The licensee states the proposed monitoring method will provide a less burdensome alternative should future problems with the Analog Rod Position Indication System be experienced. In Enclosure 1 of the license amendment request, the licensee states that: "When a problem in the system requires the monitoring of a rod's position by the alternate means, TVA plans to use the alternate means until the unit enters MODE 5 and repairs to the system can be safely implemented." Based on this statement, and the licensee's plan to use the proposed method, the staff requests the licensee clarify if a NOTE condition will be implemented in the TS in order to specify the length of time the alternate monitoring method will be used until the ARPI is repaired. An example NOTE addressing the NRC staff concerns regarding the use of the proposed method could be:

NOTE: Rod position monitoring by actions A.2.1 and A.2.2 shall only be allowed: (1) until the end of the current cycle, or (2) until an entry into MODE 5 of sufficient duration, whichever occurs first, when the repair of the inoperable ARPI(s) can safely be performed. Actions A.2.1 and A.2.2 shall not be allowed after the plant has been in MODE 5 or other plant condition, for a sufficient period of time, in which the repair of the inoperable ARPI(s) could have safely been performed.

TVA's Response to Question 5:

The suggested note was added to Condition A of TS 3.1.8. An updated version of the annotated TS and Bases that incorporates the note is provided in the attachment.

ENCLOSURE 2

**TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1
DOCKET NUMBER 390**

**PROPOSED LICENSE AMENDMENT REQUEST WBN-TS-03-12
TVA'S RESPONSE TO THE QUESTION EXPRESSED IN
THE JUNE 9, 2004, TELECONFERENCE**

NRC Question:

In TVA's response dated May 5, 2004, to NRC's request for additional information (RAI), TVA listed in the response to Question 4 a series of steps for unit startup and operation following a trip or shutdown. In Step 3, TVA indicated that the position of the affected rod will be verified using the incore detectors at power levels less than 50 percent rated thermal power (RTP). TVA further indicated in the response to Question 7 in the May 5, 2004, letter that position of the affected rod will be verified at less than 50 percent power. NRC questioned that the proposed amendment contains no formal controls to ensure that the position of the rod with the inoperable Analog Rod Position Indicator (ARPI) will be verified at power levels less than 50 percent.

TVA's Response to NRC's Question:

In order to address NRC's question, TVA added Required Action A.2.3 to Technical Specification (TS) 3.1.8. Required Action A.2.3 is included in the annotated version of the TS and Bases provided in Enclosure 4. This action has the following two requirements and addresses the situation where the unit is shutdown to Mode 3 and will be returned to full power operation without repair of the ARPI:

1. Verification of the position of the rod using the incore detectors prior to escalating power above 50 percent RTP, and
2. Reverification of the position of the rod using the incore detectors within 8 hours of the unit returning to 100 percent RTP from a power level less than 50 percent RTP.

Based on the requirements of Action A.2.3, unit operation for startup following a trip or shutdown to Mode 3 will proceed in the following manner:

1. Verification that the equipment for the monitoring of the rod control system is in place and can be used to implement proposed Required Action A.2.2.

2. Entry into Mode 2 from Mode 3 and operation to less than 50 percent power in accordance proposed Required Action A.3.
3. Verification of the position of the affected rod using the incore detectors in accordance with Required Action A.2.3.
4. Programming of the rod location into the plant computer. At this point the parameters of the rod control system may be used to monitor the position of the rod.
5. Power escalation to 100 percent power and reverification of the position of the rod using the incore detectors in accordance with Required Action A.2.3.
6. Completion of Step 5 will begin the 31 day frequency for the next verification of the position of the rod using the incore detectors in accordance with Required Action A.2.1
7. Completion of Step 5 will also begin the 8 hour frequency for the review of the rod control system parameters in accordance with Required Action A.2.2.

ENCLOSURE 3

**TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1
DOCKET NUMBER 390**

**PROPOSED LICENSE AMENDMENT REQUEST WBN-TS-03-12
TVA'S RESPONSE TO THE QUESTION EXPRESSED IN
AN AUGUST 6, 2004, TELECONFERENCE**

NRC Question:

A teleconference was held with NRC on August 6, 2004, to discuss the information provided in Enclosures 1 and 2 of this letter. As a result of this discussion NRC indicated that TVA should clarify the alarm functions that will be available once an Analog Rod Position Indication (ARPI) has failed. The question was that the monitoring of the Rod Control System (RCS) parameters proposed in the amendment request may not provide adequate feedback to the unit operators. Therefore, a comparison of the alarm functions available when the position of the rod is verified using the incore detectors and the RCS monitoring should be provided.

TVA's Response to NRC's Question:

The following discussion documents the alarm functions supported by the Computer Enhanced Rod Position Indication (CERPI) system and the interface of the system with the plant computer. Also clarified are the alarm functions available during the use of the incore detectors for the monitoring of the position of a rod with a failed ARPI along with the alarms available once the RCS monitoring is implemented.

CERPI and Plant Computer Alarm Functions:

The failure of a coil stack (detector), the field cable or the cable connector will result in no signal being provided to the CERPI system. Due to this, the system will interpret the lack of a signal as zero volts ac and a rod position of zero will be displayed. With CERPI interpreting the rod position to be zero steps, a rod bottom indication for the affected rod will be displayed on the flat panels in the Main Control Room (MCR). Since any single rod being below 20 steps will initiate a "RODS AT BOTTOM" alarm, this will alarm in the MCR due to the ARPI failure. The "RODS AT BOTTOM" alarm does not have a reflash function. Therefore, any subsequent movement of a rod below 20 steps or failure of an additional ARPI will not generate an alarm. CERPI also provides indications of a Rod-to-Rod Deviation and a Rod-to-Bank Deviation for the rod with the failed ARPI on the flat panel displays. CERPI does not provide the annunciation (audible alarm) for the rod deviation condition.

Input from CERPI for all 57 ARPIs is provided to the plant computer along with the bank demands from the RCS. The plant computer runs a rod supervisory program to detect rod deviation conditions based on the inputs from CERPI and the RCS. In the case of a failed ARPI, CERPI will provide a zero position to the plant computer for the affected rod. The plant computer will annunciate a plant computer generated alarm which will be responded to by the unit operators. In conjunction with the computer generated alarm, the plant computer will display that a Rod-to-Rod deviation and Rod-to-Bank deviation has occurred.

Alarm Functions Available During use of the Incore Detectors:

Should an ARPI fail prior to approval of the amendment for the alternate monitoring process, the incore detectors will be used to determine the position of the rod every eight hours. In addition to the periodic flux map, the actions taken may include the removal of the failed ARPI field cable from the CERPI electronics, and the installation of a resistor pack. The CERPI electronics will then be scaled so that the resistor pack provides a constant rod position equal to bank demand for the affected rod at the time the resistor pack was installed. This action is necessary to clear the rod bottom indication for the affected rod on the CERPI flat panel displays in the MCR. This will also clear the "RODS AT BOTTOM" annunciation in the MCR allowing a subsequent ARPI failure or dropped rod to annunciate.

The constant rod position will also temporarily clear the Rod Deviation alarm. However, if the bank with the affected rod is moved, the ARPI for the affected rod on the flat panel will appear stuck, and Rod Deviation alarms may result. The deviation alarm may not be valid for the rod with the failed ARPI. Therefore, the input to the plant computer from the rod with the failed ARPI would no longer be used in the rod supervisory program on the plant computer. This would prevent a meaningless alarm from being generated by the affected rod since the position of the affected rod is unknown until a flux map is performed. This also disables the Rod Deviation monitor function for the one affected rod.

Alarm Functions Available During Monitoring of the RCS Parameters:

The temporary alteration that implements the monitoring of the RCS parameters specifies using the resistor pack along with the associated scaling of the CERPI electronics as discussed above. Installing the resistor pack will affect the rod bottom indication and the "RODS AT BOTTOM" alarm as previously discussed. The installation of the resistor pack will also cause the CERPI flat panels in the MCR to display a constant rod position for the affected rod even if the rod is moving with or independent of its bank.

The ARPI input from CERPI to the plant computer will no longer be used in the rod supervisory program eliminating the meaningless alarms based on deviation of the rod with the failed ARPI. The proposed RCS monitoring will provide an input to the rod supervisory program for the affected rod. This will allow the Rod Deviation monitor to continue to operate for the rod with the failed ARPI. If the proposed monitoring determines that too many or not enough steps were taken by the rod with the failed ARPI when compared to demand or other rods within the bank, the rod supervisory program on the plant computer will alert the unit operators with an audible plant computer generated alarm and the accompanying deviation message.

Summary Comparison of Alarm Functions - Incore Detectors and RCS Monitoring:

Rod Position Monitoring Method	Rod Bottom Indication	Rod Deviation Monitor
Incore Detectors	<ul style="list-style-type: none"> • Unavailable for rod with failed ARPI. • “RODS AT BOTTOM” alarm unavailable for rod with failed ARPI. Available for other 56 rods. 	<ul style="list-style-type: none"> • Both rod-to-rod and rod-to-bank deviation monitors unavailable for rod with failed ARPI. Available for other 56 rods.
RCS Parameters	<ul style="list-style-type: none"> • Unavailable for rod with failed ARPI • “RODS AT BOTTOM” alarm unavailable for rod with failed ARPI. Available for other 56 rods. 	<ul style="list-style-type: none"> • Both rod-to-rod and rod-to-bank deviation monitors are available for the rod with the failed ARPI. Also available for other 56 rods.

ENCLOSURE 4

**TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1
DOCKET NUMBER 390**

**PROPOSED LICENSE AMENDMENT REQUEST WBN-TS-03-12
ANNOTATED TECHNICAL SPECIFICATIONS (TS) AND BASES**

On November 21, 2003, TVA submitted a proposed license amendment to revise Technical Specification (TS) 3.1.8, "Rod Position Indication (RPI)." This amendment request describes a process for the monitoring of the position of a rod with a failed RPI and limiting the use of the moveable incore detectors. TVA provided in Enclosure 3 of the November 21, 2003, letter an annotated version of the TS and Bases impacted by the proposed amendment. An updated version of the annotated TS Bases was provided in a letter dated May 5, 2004. Due to the questions provided by NRC on May 26, 2004, certain changes to the TS and Bases were required. Therefore, the following version of the affected TS and Bases reflect the updates submitted in TVA's May 5, 2004 letter and the updates made in response to NRC's May 26, 2004 questions. The wording additions initially submitted in TVA's November 21, 2003, letter are shown as bold-italicized text and deletions are shown as strikethrough. The clarifications made since the November 21, 2003, letter are underlined. The pages affected by the proposed amendment include:

**TS and Bases
Affected Page List:**

3.1-17
3.1-18
3.1-19
B 3.1-51
B 3.1-52
B 3.1-52a

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Rod Position Indication

LCO 3.1.8 The Analog Rod Position Indication (ARPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----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
<p>-----NOTE----- <u>Rod position monitoring by Required Actions A.2.1 and A.2.2 shall only be allowed: (1) until the end of the current cycle, or (2) until an entry into MODE 5 of sufficient duration, whichever occurs first, when the repair of the inoperable ARPI(s) can safely be performed. Required Actions A.2.1, A.2.2 and A.2.3 shall not be allowed after the plant has been in MODE 5 or other plant condition, for a sufficient period of time, in which the repair of the inoperable ARPI(s) could have safely been performed.</u> -----</p>	<p>A.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors.</p> <p><u>OR</u></p> <p>A.2.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors.</p>	<p>Once per 8 hours</p> <p><u>AND</u></p> <p>8 hours</p> <p><u>AND</u></p> <p>Once every 31 days thereafter</p> <p><u>AND</u></p> <p>8 hours, if <u>rod control system parameters indicate unintended movement</u></p>
<p>A. One ARPI per group inoperable for one or more groups.</p>	<p><u>AND</u></p>	<p>(continued)</p>

BASES

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. (continued)</p>	<p>A.2.2 Review the parameters of the <u>rod control system for indications of unintended rod movement for the rods with inoperable position indicators.</u></p> <p><u>AND</u></p> <p>A.2.3 <u>Verify the position of the rods with inoperable position indicators by using movable incore detectors.</u></p> <p><u>OR</u></p> <p>A.32 Reduce THERMAL POWER to <u>< less than or equal to 50% RTP.</u></p>	<p>16 hours</p> <p><u>AND</u></p> <p>Once per <u>8 hours thereafter</u></p> <p><u>Prior to increasing THERMAL POWER above 50% RTP following entry into MODE 3 and within 8 hours of reaching 100% RTP.</u></p> <p>8 hours</p>
<p>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.</p>	<p>B.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors.</p> <p><u>OR</u></p> <p>B.2 Reduce THERMAL POWER to <u>< less than or equal to 50% RTP.</u></p>	<p>4 hours</p> <p>8 hours</p>

BASES

LCO
(continued) inoperable, misaligned, or mispositioned control rods can be detected. Therefore, power peaking, ejected rod worth, and SDM can be controlled within acceptable limits.

APPLICABILITY The requirements on the ARPI and step counters are only applicable in MODES 1 and 2 (consistent with LCO 3.1.5, LCO 3.1.6, and LCO 3.1.7), 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.

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.

A.2.1, A.2.2

Required Actions A.2.1 and A.1 are essentially the same. Therefore, the discussion provided above for Required Action A.1 applies to Required Action A.2.1. The options provided by Required Actions A.2.1 and A.2.2 allow for continued operation in a situation where the component causing the ARPI to be inoperable is inaccessible due to operating conditions

BASES

ACTIONS

A.2.1, A.2.2 (continued)

conditions (adverse radiological or temperature environment). In this situation, repair of the ARPI cannot occur until the unit is in an operating MODE that allows access to the failed components. The application and usage of Required Actions A.2.1 and A.1 is clarified by a Note to Condition A.

In addition to the initial 8 hour verification, Required Action A.2.1 also requires the following for the rod with the failed ARPI:

1. Verification of the position of the rod every 31 days using the incore movable detectors.
2. Verification of the position of the rod using the incore movable detectors within 8 hours of the performance of Required Action A.2.2 whenever there is an indication of unintended rod movement based on the parameters of the rod control system.

Required Action A.2.2 is in lieu of the verification of the position of the rod using the incore movable detectors every 8 hours as required by Required Action A.1. This action alleviates the potential for excessive wear on the incore system due to the repeated use of the incore detectors. Once the position of the rod with the failed ARPI is confirmed through the use of the moveable incore detectors in accordance with Required Action A.2.1, the parameters of the rod control system must be monitored until the failed ARPI is repaired. Should the review of the rod control system parameters indicate unintended movement of the rod, the position of the rod must be verified within 8 hours in accordance with Required Action A.2.1.

Required Actions A.2.1, A.2.2 and A.2.3 are modified by a note. The note clarifies that rod position monitoring by Required Actions A.2.1 and A.2.2 shall only be allowed:

1. until the end of the current cycle, or
2. until an entry into MODE 5 of sufficient duration, whichever occurs first, when the repair of the inoperable ARPI(s) can safely be performed.

Required Actions A.2.1, A.2.2 and A.2.3 shall not be allowed after the plant has been in MODE 5 or other plant condition, for a sufficient period of time, in which the repair of the inoperable ARPI(s) could have safely been performed.

BASES

ACTIONS

A.2.1, A.2.2 (continued)

The modifications required for the monitoring of the rod control system will be implemented as a temporary alteration (TA). Implementation of the TA includes a review for the impact on plant procedures and training. This ensures that changes are initiated for key issues like the monitoring requirements in the control room, and operator training on the temporary equipment.

A.2.3

The reduction of THERMAL POWER to less than or equal to 50% RTP puts the core into a condition where rod position is not significantly affecting core peaking factors (Ref. 13). However, prior to escalating THERMAL POWER above 50% RTP following entry into MODE 3, the position of the rods with an inoperable ARPI must be verified by use of the moveable incore detectors. Once 100% RTP is achieved, the position of the rod must be reverified within 8 hours by use of the moveable incore detectors. Monitoring of the rod control system parameters in accordance with Required Action A.2.2 for the rods with an inoperable ARPI may resume upon completion of the verification at 100% RTP.

A.3 2

The discussion for Required Action A.2.3 (above) clarified that a reduction of THERMAL POWER to \leq less than or equal to 50% RTP puts the core into a condition where rod position is not significantly affecting core peaking factors (Ref. 13). The allowed Completion Time of 8 hours is reasonable, based on operating experience, for reducing power to \leq less than or equal to 50% RTP from full power conditions without challenging plant systems and allowing for rod position determination by Required Action A.1 above. Consistent with LCO 3.0.4 and this action, unit startup and operation to less than or equal to 50% RTP may occur with one ARPI per group inoperable.

B.1 and B.2

These Required Actions clarify that when one or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction, since the position was last determined, the Required Actions of A.1 and A.2 are still appropriate but must be initiated promptly under Required Action B.1 to begin verifying that these rods are still properly positioned, relative to their group positions.

ENCLOSURE 5

**TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1
DOCKET NUMBER 390**

**PROPOSED LICENSE AMENDMENT REQUEST WBN-TS-03-12
LIST OF COMMITMENTS**

1. TVA intends to make a regulatory commitment to revise Section 7.7.1.3.2, "Main Control Room Rod Position Indication," of the Updated Final Safety Analysis Report (UFSAR). The proposed revision will discuss the rod control system monitoring process and will clarify that while the alternate monitoring is in use, the operation of the system will be periodically verified through the implementation of SR 3.1.5.2, SR 3.2.1.1 and SR 3.2.2.1.