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Ashok S. Bhatnagar
Vice President, Browns Ferry Nuclear Plant

July 25, 2002

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop OWFN, P1-35
Washington, D. C. 20555-0001

10 CFR 50.73

Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 2 - DOCKET 50-260 - FACILITY OPERATING LICENSE DPR-52 - LICENSEE EVENT REPORT (LER) 50-260/2002-001-00

The enclosed report provides details of a failure to meet the requirements of a Technical Specifications (TS) Limiting Condition for Operation due to inoperability of both channels of the Rod Block Monitoring instrumentation.

In accordance with 10 CFR 50.73(a)(2)(i)(B), TVA is reporting this event as any operation or condition prohibited by the plant's Technical Specifications. There are no commitments contained in this letter.

Sincerely,

Ashok S. Bhatnagar

cc: See page 2

IE22

Enclosure
cc (Enclosure):
(Via NRC Electronic Distribution)
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NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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TITLE (4)

Rod Block Monitoring Calibration Error Results in Operation Prohibited by Technical Specifications

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	28	2002	2002	01	00	07	25	2002	NA	NA
				--	--				NA	NA

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	100		20.2201(b)		20.2203(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Paul S. Heck, Nuclear Engineer, Industry Affairs	256-729-3624

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 22, 2002, Instrument Maintenance was scheduled to perform a surveillance requirement (SR) to calibrate the Unit 2 Rod Block Monitor (RBM) channel B. A prerequisite step in the procedure required the "applicable Operating Limit Minimum Critical Power Ratio (OLMCPR)" be provided by Reactor Engineering. Test personnel contacted the on-call reactor engineer, stated the RBM calibration procedure was being performed, and the OLMCPR value was needed. The on-call reactor engineer provided the OLMCPR value for the current plant operating conditions rather than the RBM setpoint basis OLMCPR value specified in the Core Operating Limits Report. This value was provided to the test performers and was used to calibrate the RBM Channel B. Two days later a similar error was made while calibrating RBM Channel A. On May 28 Maintenance and Reactor Engineering personnel recognized the errors during post-work in-shop reviews. The RBM channels were declared inoperable and required TS actions taken. The RBM channels were then correctly calibrated.

The root cause of this event was procedural inadequacy. Corrective actions included correctly calibrating the RBM channels, revising surveillance procedures, and briefing Instrument Maintenance, Reactor Engineering, and Operations personnel.

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I. PLANT CONDITION(S)

During this event, Unit 2 was in Mode 1 at 100 percent reactor power, approximately 3458 megawatts thermal. Unit 3 was in Mode 1 at 100 percent reactor power, approximately 3458 megawatts thermal. Unit 1 was shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On May 22, 2002, Instrument Maintenance was scheduled to perform a surveillance requirement (SR) to calibrate the Unit 2 Rod Block Monitor (RBM) channel B. A pre-job briefing was held between the Operations crew [utility - licensed] and the Instrument Maintenance personnel [utility - non-licensed] at 08:22 AM. In the pre-job briefing, the attending personnel discussed the scope, objectives, and expected results of the test.

A prerequisite step in the SR procedure required the "applicable Operating Limit Minimum Critical Power Ratio (OLMCPR)" be provided by Reactor Engineering. The instrument mechanic contacted the on-call reactor engineer and stated that he was performing the RBM calibration procedure and needed the OLMCPR value. The on-call reactor engineer [utility - non-licensed] provided the OLMCPR value for the current plant operating conditions rather than the OLMCPR value specified in the Core Operating Limits Report (COLR) as the RBM setpoint basis. In the COLR the RBM OLMCPR setpoint basis is specified so as to be lower than any OLMCPR that will be encountered during the operating cycle. The RBM setpoint as specified in the COLR is therefore a conservative value for any operating condition. For the plant conditions at the time of this procedure performance, the actual OLMCPR value was 1.30. The value specified in the COLR for the RBM setpoint basis was 1.25.

Instrument Maintenance was provided the OLMCPR value of 1.30 associated with the actual, current plant conditions by the on call reactor engineer rather than the OLMCPR value of 1.25 which was the RBM setpoint basis. Instrument Maintenance then performed the SR using the incorrect OLMCPR value.

On May 24, 2002, the Unit 2 RBM Channel A was calibrated in similar fashion. The on-call reactor engineer (the same individual who had been on duty on May 22nd) provided the same OLMCPR value of 1.30 to the performers. In neither case were time or situational pressures involved.

During a final in-shop review following completion of the field work, Instrument Maintenance reviewers raised a question to Reactor Engineering regarding the OLMCPR value used in the calibration. At this time it was realized by Reactor Engineering personnel that the current OLMCPR value had been provided rather than the RBM setpoint basis OLMCPR, and this incorrect value had been used in calibrating both RBM channels. Reactor Engineering notified Operations of the error, and Operations declared both RBM channels inoperable in accordance with the Technical Specifications. The LCO time for completion for the actions associated with inoperable RBM channels had already been exceeded, therefore this event is being reported under 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's Technical Specifications.

As discussed below in Section IV., while the initial calibration error was made on May 22nd, 2002, the RBM channels did not fail to meet TS requirements until May 24th, 2002, when the core MCPR decreased to below 1.40. The calibration error was discovered and corrected on May 28th, 2002. Therefore this report is being submitted prior to July 27th, 2002, which is within 60 days of the discovery date.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None

C. Dates and Approximate Times of Major Occurrences:

May 22, 2002, 0822 CDT	Instrument Mechanics and Operations commenced a pre-job briefing before beginning calibration work on RBM channel B. An incorrect OLMCPR value of 1.30 had been supplied by Reactor Engineering to the performers for use as the RBM setpoint basis during this work.
1253 CDT	Test completed with RBM Channel B calibrated using an RBM setpoint basis OLMCPR of 1.30.
May 24, 2002, 0759 CDT	Instrument Mechanics began calibration work on RBM channel A. The same incorrect RBM setpoint basis OLMCPR value of 1.30 was provided to the performers by Reactor Engineering.
1028 CDT	Test completed with RBM Channel A calibrated using RBM setpoint basis OLMCPR of 1.30.
May 28, 2002, 1014 CDT	After being questioned by Instrument Maintenance personnel about the results of the calibration performances, Reactor Engineering personnel recognized that the OLMCPR value which had been supplied to the test performers had been in error. Reactor Engineering notified Operations that the RBM channels had been incorrectly calibrated during the May 22nd and May 24th surveillance performances. Operations immediately declared both RBM channels inoperable and entered TS LCO 3.3.2.1 Actions A.1 and B.1.
May 28, 2002, 1051 CST	RBM channel A was placed in the TRIP condition to meet Action B.1 of TS LCO 3.3.2.1.
May 28, 2002, 1506 CST	Instrument Maintenance personnel commenced recalibration of the RBM channels using the correct OLMCPR basis value of 1.25. RBM channel B was recalibrated satisfactorily at 1553 hours. Operations declared RBM channel B operable at this time and exited TS LCO action B.1.
May 28, 2002, 1620 hours	Instrument Maintenance personnel completed the recalibration of RBM channel A. Operations declared RBM channel A operable at this time and exited TS LCO action A.1.

D. Other Systems or Secondary Functions Affected

None

E. Method of Discovery

During post-performance review of the surveillance procedure data packages, Instrument Maintenance personnel questioned Reactor Engineering personnel regarding the OLMCPR values which had been used. Reactor Engineering personnel recognized that an incorrect RBM setpoint basis OLMCPR value had been inadvertently provided to Instrument Maintenance.

F. Operator Actions

Upon being informed by Reactor Engineering personnel that an error had been made in the calibration of the RBM channels, Operations declared both RBM channels inoperable. One RBM channel was then placed in the TRIP condition as directed by TS LCO 3.3.2.1 Action B.1. All operator actions taken in response to this event were appropriate.

G. Safety System Responses

None required

III. CAUSE OF THE EVENT

A. Immediate Cause

A misunderstanding existed between the Instrument Maintenance personnel and the on-call reactor engineer as to which OLMCPR value was being sought. As a result the COLR value for current OLMCPR value was provided to the test performers rather than the COLR value for the RBM OLMCPR setpoint basis.

B. Root Cause

The root cause of this event was procedural inadequacy. The Instrument Maintenance surveillance requirement procedure did not clearly specify which COLR OLMCPR value was to be provided by Reactor Engineering.

C. Contributing Factors

None

IV. ANALYSIS OF THE EVENT

Critical Power Ratio is a reactor fuel thermal limit used in BWR's. Onset of transition boiling is a term describing a condition within a fuel bundle where the heat removal capacity of the coolant within the bundle has begun to rapidly deteriorate. The Critical Power Ratio compares the calculated heat production necessary to produce an onset of transition boiling within a given fuel bundle to the actual heat production in that bundle. A lowering critical power ratio indicates that the actual heat generation in a fuel bundle is approaching the heat generation at which the onset of transition boiling is calculated to occur within that bundle. The Technical Specifications contain safety limits which specify the Minimum Critical Power Ratio (MCPR) allowable within the core during both steady-state reactor operations and during transient conditions. In order to ensure compliance with this TS safety limit for design basis transient conditions, the Core Operating Limits Report (COLR) specifies Operating Limit MCPR (OLMCPR) values which must be maintained during steady-state power operations and normal power maneuvering. By operating with the most limiting fuel bundle critical power ratio (the core MCPR) within the COLR OLMCPR values, adequate margin is maintained such that the occurrence of design basis transients will not result in exceeding the TS safety limits on MCPR.

The RBM functions to monitor the local power levels in the fuel bundles surrounding a control rod selected for movement. If withdrawal of the control rod would result in critical power ratio values in these surrounding fuel bundles lower than the RBM setpoint, then withdrawal of the control rod is blocked.

The BFN Technical Specifications detail the reactor operating conditions under which operable RBM channels are required. With the reactor power greater than or equal to 90% rated, which was the case during the entire time interval associated with this event, the TS require the RBM to be operable when the core MCPR is less than 1.40. With an MCPR of 1.40 or above, there is no need for the RBM function because the core conditions are such that no single postulated control rod withdrawal error would result in the violation of the TS safety limit for MCPR should a transient then occur. A review of the core thermal limits for the relevant time interval determined that the MCPR was equal to 1.40 at 0800 hours on May 22nd (prior to the initial miscalibration of RBM Channel B) and remained at 1.40 until approximately 1600 hours on May 24th. During this time interval, there was no actual TS requirement for either RBM channel to be operable.

At approximately 1600 hours on May 24th, the MCPR value lowered to 1.38. At this point in time neither RBM channel was correctly calibrated, and with the reactor thermal power greater than 90% and the MCPR less than 1.40, the TS requirements were no longer being met. As discussed in Section II.A above, this condition was recognized on the morning of May 28th and the RBM channels declared inoperable. The time interval during which reactor operation continued without the required RBM function or TS compensatory action was therefore approximately four days.

During the period that the RBM function was required, but was inoperable from a TS perspective, the RBM was available. The RBM channels would have functioned to inhibit rod withdrawal if an MCPR value of less than 1.30 would have resulted from the rod movement. Since during this period the actual OLMCPR was 1.30, as specified by the COLR for the plant conditions existing at the time, the core remained adequately protected from the consequences of postulated control rod withdrawal errors.

The root cause of this event was the lack of clarity in the SR procedure in its use of the term "OLMCPR." Given that the term "OLMCPR" can have different meanings according to the context in which it is used, the procedure was not sufficiently specific regarding the information sought from the reactor engineers.

V. ASSESSMENT OF SAFETY CONSEQUENCES

There was no impact to the health and safety of the public from this event. Unit 2 remained in steady state operation in the interval between the erroneous miscalibration of the RBM channels and the correction of this condition approximately six days later. As noted in Section IV above, the TS actually required an operable RBM function for approximately four days of this six day interval. The purpose of this function is to block control rod withdrawal when the core power conditions in the vicinity of the specific control rod are such that additional rod withdrawal would decrease the desired margin to the TS MCPR safety limit.

Additionally, the OLMCPR value used in error to calibrate the RBM channels was the value assumed in the Unit 2 Core Operating Limits Report for operation under the plant conditions existing during this event. During the interval when the RBM channels were miscalibrated, the RBM would still have functioned to block inappropriate control rod withdrawal. The OLMCPR value used in the RBM calibration was adequate to ensure sufficient margin to the TS MCPR safety limits was maintained. With this margin available, a high confidence exists that the occurrence of any design basis transient would not have resulted in exceeding the TS MCPR safety limits.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Operations declared RBM channels A and B inoperable and placed RBM channel A into the TRIP condition.

Both RBM channels were then recalibrated using the correct RBM setpoint basis OLMCPR value of 1.25. Following successful completion of the calibration work, the RBM channels were declared operable and the TS LCO actions exited.

B. Corrective Actions to Prevent Recurrence[1]

A training package for will be prepared for presentation to the Reactor Engineering section. This package will include refresher training on the Average Power Range Monitoring/Oscillation Power Range Monitoring calibration procedures, RBM calibration procedures, the COLR, and various instances where the OLMCPR is used as a basis for different setpoints. The Stop-Think-Ask-Act-Review (STAAR) concept, as well as management expectations for work performance, will be reaffirmed also.

Surveillance requirement procedures will be revised as necessary to add second party verifications.

A briefing package will be prepared by Reactor Engineering for presentation to the Instrument Maintenance shop and Operations SRO's regarding this incident.

[1] TVA does not consider these corrective actions as regulatory commitments. The completion of these actions will be tracked in TVA's Corrective Action Program.

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VII. ADDITIONAL INFORMATION

A. Failed Components

None

B. Previous LERs on Similar Events

None

C. Additional Information

None

D. Safety System Functional Failure Consideration:

This event is not considered a safety system functional failure in accordance with NEI 99-02 in that the RBM would have adequately performed its safety function during this event. While the OLMCPR basis used to calibrate the RBM channels during this event was not bounding for all possible plant operating configurations, it was bounding for the plant operating configuration in existence at the time of this event. Therefore, the functional capability of the overall system was not jeopardized.

E. Loss of Normal Heat Removal Consideration:

N/A. No scram occurred in association with this event.

VIII. COMMITMENTS

None