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Ashok S. Bhatnagar
Vice President, Browns Ferry Nuclear Plant

August 30, 2001

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

10 CFR 50.73

Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 2 and 3 - DOCKET 50-260 AND 296 - FACILITY OPERATING LICENSE DPR - 52 AND DPR - 68 - LICENSEE EVENT REPORT (LER) 50-260/2001 002-00

The enclosed report provides details concerning a failure to meet the Technical Specifications. This report is submitted in according with 10CFR 50.73 (a)(2)(i)(B) as any operation or condition which was prohibited by the plant's Technical Specifications. In accordance with NRC RIS 2000-05, only one paper copy of this document is being sent to the NRC Document Control Desk. There are no commitments contained in this letter.

Sincerely,

Ashok S. Bhatnagar

cc: See page 2

IE28

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

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)

Non-Conservative Analysis for Oscillation Power Range Monitoring Scram Setpoint For Unit 2 and Unit 3

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
									Unit 3	05000296
07	02	2001	2001	-- 002	00	08	30	2001	NA	DOCKET NUMBER 05000

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)
Steve Austin, Licensing Engineer	(256) 729-2070

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 July 2, 2001, TVA confirmed that a potential 10 CFR Part 21 condition related to the use of non-conservative parameters associated with calculation of Oscillation Power Range Monitor (OPRM) upscale trip setpoint was applicable to BFN. At approximately 1100 hours Central Daylight Time the OPRM upscale trip function was declared inoperable. Technical Specification (TS) Actions 3.3.1.1.I.1, and 3.3.1.1.I.2 were entered on both Units 2 and 3. TS Action 3.3.1.1.I.1 requires initiation of alternate method to detect and suppress thermal-hydraulic instability oscillations within 12 hours. Action 3.3.1.1.I.2 requires that the OPRM upscale trip be returned to service in 120 days. The OPRM upscale trip function has been inoperable on Unit 2 since May of 1999, and on Unit 3 since May of 2000. Hence, TVA is reporting this event pursuant to 10 CFR 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's Technical Specifications. The root cause of this event is the original analysis performed by General Electric (GE) that defines the generic Delta Critical Power Ratio/Initial Versus Oscillation Magnitude curve was inadequate. GE identified a non-conservative deficiency for the high peak bundle power-to-flow ratios in the generic DIVOM curves. GE has proposed the development and licensing of a revised methodology for determining OPRM upscale trip setpoint. However, the revised methodology approval is not expected to meet the TS Action 120 day time limit. Subsequently, TVA proposed a TS change to delete TS Action 3.3.1.1.I.2. This change has been approved for Unit 2.

I. PLANT CONDITION(S)

At the time of discovery of this condition, Units 2 and 3 were at 100 percent power. Unit 1 was shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On June 29, 2001, General Electric (GE) notified TVA of a potential 10 CFR Part 21 condition related to the use of non-conservative parameters associated with the calculation of Oscillation Power Range Monitor (OPRM) [IG] upscale trip setpoints. On July 2, 2001, based on additional information from GE, TVA confirmed that the condition was applicable to BFN and at approximately 1100 hours Central Daylight Time (CDT), the OPRM upscale trip function was declared inoperable. Technical Specification (TS) Action 3.3.1.1.I.1, which requires, within 12 hours, initiate alternate method to detect and suppress thermal-hydraulic instability oscillations, was entered. Required Action 3.3.1.1.I.2 further stipulates the return of the OPRM upscale trip to service within 120 days. If the 120-day completion time cannot be met the unit shall be in mode 2 in 4 hours. TS Actions 3.3.1.1.I.1 and 3.3.1.1.I.2 were taken on both Units 2 and 3.

At approximately 1340 hours CDT the plant operators commenced performance of 3-SR-3.3.1.1.I, Core Thermal Stability for Unit 3 and at approximately 1400 hours CDT, plant operators commenced performance of 2-SR-3.3.1.1.I, Core Thermal Stability for Unit 2. These surveillances ensure the reactor thermal power and flow are within appropriate parameter limits to prevent uncontrolled power oscillations. The surveillances were completed satisfactorily by 1410 hours.

The OPRM module of the GE Power Range Neutron Monitoring (PRNM) [IG] was installed to satisfy TVA's long-term solution regarding reactor core stability. Browns Ferry has implemented the long-term stability solution designated as Option III in NEDO-31960, Supplement 1, "BWR Owners' Group Long-Term Stability Solution Licensing Methodology", the OPRM Upscale Trip function of the Power Range Neutron Monitoring PRNM. The trip function was enabled in May of 1999 on Unit 2 and in May of 2000 on Unit 3. The OPRM Upscale Trip function provides protection from exceeding the fuel MCPR Safety Limit in the event of thermal-hydraulic power oscillations.

Because this condition has existed on Unit 2 since May of 1999, and on Unit 3 since May of 2000, TVA is reporting this event in pursuant to 10 CFR 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's Technical Specifications.

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

None.

C. Dates and Approximate Times of Major Occurrences:

June 29, 2001	GE notified TVA of a potential 10 CFR Part 21 condition related to the use on non-conservative parameters associated with the calculation of the OPRM upscale trip points.
July 2, 2001, at 1100 hours CDT	Based on additional information from GE, TVA concluded that the 10 CFR Part 21 condition was applicable to BFN and entered the required TS Action.

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

GE notified TVA of possible issues involving the calculations used to determine the OPRM upscale trip set points.

F. Operator Actions

None.

G. Safety System Responses

None.

III. CAUSE OF THE EVENT

A. Immediate Cause

Reload safety analysis may not be adequate to protect against violation of the Safety Limit Minimum Critical Power Ratio (MCPR) for a limiting instability event.

B. Root Cause

The original analysis performed by GE that defines the generic DIVOM curve was inadequate. GE identified a non-conservative deficiency for the high peak bundle power-to-flow ratios in the generic Delta Critical Power Ratio/Initial Versus Oscillation Magnitude (DIVOM) curves specified in NEDO-32464-A, Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications, August 1996. Specifically, GE evaluations have shown that the generic DIVOM curves are not always conservative for plants which have implemented Option III stability trip system.

C. **Contributing Factors**

None.

IV. ANALYSIS OF THE EVENT

Browns Ferry has implemented the long-term stability solution designated as Option III in NEDO-31960, Supplement 1, "BWR Owners' Group Long-Term Stability Solution Licensing Methodology" the OPRM Upscale Trip function of the Power Range Neutron Monitoring PRNM. The trip function was enabled in May of 1999 on Unit 2 and May of 2000 on Unit 3. The OPRM Upscale Trip function provides protection from exceeding the fuel MCPR Safety Limit in the event of thermal-hydraulic power oscillations.

The OPRM is a subsystem of the Average Power Range Monitor system (APRM) which is designed to detect reactor core thermal hydraulic instability and provide readout, alarms, and trips associated with an instability event. The OPRM receives input signals from the Local Power Range Monitors (LPRMs) [IG] within the reactor core. An Upscale Trip is initiated if oscillatory changes in the neutron flux are detected.

The Upscale Trip function is required to be operable when the plant is in a region of power-flow operation where actual thermal-hydraulic oscillations might occur. When the reactor is operating in regions of the power/flow map, where it has been determined that unstable power oscillations cannot occur, the OPRMS trip outputs are automatically bypassed. Each OPRM channel provides an oscillation trip enable alarm that indicates when the reactor has entered the operating region where instability can occur and the trip is no longer bypassed.

A cycle specific Option III stability analysis is performed for each reload core to determine the appropriate OPRM setpoint. The analysis considers both steady state startup operation and the case of a two recirculation pump trip from rated power. The resulting stability based Operating Limit MCPRs as a function of OPRM setpoint are reported in the Supplemental Reload Licensing Report. The actual OPRM setpoint is selected such that required margin of the MCPR Safety Limit is provided without stability being a limiting event.

If the OPRM trip function should become inoperable, alternate methods to detect and suppress oscillations may be implemented for a limited period of time in accordance with the TSs. Procedures require the use of the control room instrumentation and process computer [ID] outputs to determine the operating conditions to be plotted on the power flow map. By plotting the reactor power versus core flow, the operator can demonstrate reactor power is not operating under conditions which may lead to power oscillations.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Operating procedures do not allow operation of BFN in regions of the Power Flow Map where thermal-hydraulic instability are known to occur. An abnormal operating event, such as an inadvertent dual reactor recirculation pump [AD] runback would have to occur to enter the region. If such an event were to occur, procedures dictate required actions.

Based on the above, and considering that the OPRM would have to suppress instability oscillations during a very limited set of circumstances, it is concluded that there is no adverse impact on safety as a result of this event.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

TVA declared the OPRMs for Unit 2 and Unit 3 inoperable and the TS required actions were implemented including an alternate method of detecting and surpressing thermal-hydraulic oscillations. Although inoperable, the OPRM upscale trip capacity is functional and continues to provide a measure of automatic protection even though it does not meet the licensing criteria for MCPR safety limit protection.

B. Corrective Actions to Prevent Recurrence

As a result of the issues leading to the noncompliance described in this report, GE will issue interim revised setpoint calculations for plants which have declared the OPRM inoperable. TVA will evaluate these revised setpoints for implementation at BFN[1]. GE has proposed the development and licensing of a revised methodology for determining OPRM upscale trip setpoint. However, GE's proposal is expected to exceed the 120 day time limit allocated in TS Action 3.3.1.1.I.2.

To address TS Action 3.3.1.1.I.2, return the OPRM upscale trip to service within 120 days, TVA proposed a TS change to delete this requirement. TVA has received the NRC Safety Evaluation that deletes TS Action 3.3.1.1.I.2 for Unit 2, and anticipates receiving the Unit 3 Safety Evaluation prior to expiration the TS Action 3.3.1.1.I.2 time limit.

VII. ADDITIONAL INFORMATION

A. Failed Components

None.

B. Previous LERs on Similar Events

None.

C. Additional Information

None.

1. This action is not a regulatory commitment.

D. Safety System Functional Failure:

This event did not result in a safety system functional failure in accordance with NEI 99-02.

VIII. COMMITMENTS

None.

Energy Industry Identification system (EIIS) system and component codes are identified in the TEXT with brackets (i.e., [XX]).