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**Rick J. King**  
Director  
Nuclear Safety Assurance

November 5, 2001

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

Subject: River Bend Station  
Docket No. 50-458  
License No. NPF-47  
Licensee Event Report 50-458 / 01-002-00

File Nos. G9.5, G9.25.1.3

RBG-45864  
RBF1-01-0238

Ladies and Gentlemen:

In accordance with 10CFR50.73, enclosed is the subject Licensee Event Report.  
There are no commitments in this document.

Sincerely,

A handwritten signature in black ink, appearing to read "Rick J. King".

RJK/dhw  
enclosure

IE22

November 5, 2001

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cc: U. S. Nuclear Regulatory Commission  
Region IV  
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Arlington, TX 76011

NRC Sr. Resident Inspector  
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## LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to: bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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)

River Bend Station

DOCKET NUMBER (2)

05000 458

PAGE (3)

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## TITLE (4) Potential Violation of Maximum Reactor Power Limit Due to Nonconservative Error in Core Thermal Power Calculation Software

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	04	2001	2001	- 002 -	00	11	05	2001	FACILITY NAME	DOCKET NUMBER
									05000	05000
OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)							
POWER LEVEL (10)		0	20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)	50.73(a)(2)(x)
			20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)	73.71(a)(4)
			20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)	X OTHER
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)			50.73(a)(2)(i)(B)			50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME

J.W. Leavines, Manager - Licensing

TELEPHONE NUMBER (Include Area Code)

225-381-4642

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

## SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On October 4, 2001, a review by River Bend engineering of a General Electric (GE) report determined that the station has in the past potentially operated slightly above the maximum core thermal power as authorized in the facility operating license. This event is being reported as required by River Bend's license condition 2.E under the 10CFR50.73 reporting format.

In September 2001, GE issued a report titled "Impact of Steam Carryover Fraction on Process Computer Heat Balance Calculations." The GE report details the condition in which a nonconservative error in the process computer software causes the calculation of core thermal power to be slightly low. It is estimated that the station has operated, at times, approximately three megawatts thermal over its licensed maximum limit.

The moisture carryover constant in River Bend's process computer was previously defined to be 0.1 percent. As a conservative measure to assure compliance with the operating license, that value has been changed to 0.0. Any process computer heat balance subroutines will now utilize the new constant value of 0.0, pending the disposition of the forthcoming GE Service Information Letter on this subject.

As stated in the General Electric report, use of the carryover fraction of 0.1 percent in thermal power calculations, while nonconservative, does not represent a safety issue. Therefore, this condition was of minimal consequence with respect to the health and safety of the public.

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**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)

**REPORTED CONDITION**

On October 4, 2001, a review by River Bend engineering of a GE report determined that the station has in the past potentially operated slightly above the maximum core thermal power as authorized in the facility operating license. This event is being reported as required by River Bend's license condition 2.E under the 10CFR50.73 reporting format.

In September 2001, GE issued a report titled "Impact of Steam Carryover Fraction on Process Computer Heat Balance Calculations." The GE report details the condition in which a nonconservative error in the process computer software causes the calculation of core thermal power to be slightly low. This error leads to a scenario in which actual core thermal power can, unknown to the operator, be slightly above the maximum value allowed by the operating license. It is estimated that the station has operated, at times, approximately three megawatts thermal over its licensed maximum limit.

**INVESTIGATION**

The performance specifications on most boiling water reactor (BWR) steam dryers require less than 0.1 percent steam carryover fraction (moisture content in the steam) leaving the reactor vessel. This specification value is commonly used in the process computer for core thermal power calculations. Measurements of the carryover fraction produced by later generations of BWR's has shown that steam dryer performance has improved significantly as dryer designs have evolved.

At the time of this investigation, River Bend used a design value of 0.1 percent for the moisture carryover fraction in the core thermal power calculation performed by the plant process computer.

**CORRECTIVE ACTIONS**

General Electric has not provided a determination of whether the 0.1 percent value is a part of the licensed core monitoring methodology, and is currently working on a Service Information Letter to address this condition.

The moisture carryover constant in River Bend's process computer was previously defined to be 0.1 percent. As a conservative measure to assure compliance with the operating license, that value has been changed to 0.0. Any process computer heat balance subroutines will now utilize the new constant value of 0.0, pending the disposition of the forthcoming GE Service Information Letter.

**SAFETY SIGNIFICANCE**

As stated in the General Electric report, use of the carryover fraction of 0.1 percent in thermal power calculations, while nonconservative, does not represent a safety issue. This error in calculated core thermal power is an order of magnitude less than the precision in the minimum critical power ratio evaluation process. The 0.1 percent error in core thermal power is significantly less than the precision

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**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)

of the process computer core thermal power estimate. Additionally, River Bend's accident analysis assumes through various methodologies that core thermal power is 2 percent greater than maximum rated at the initiation of an event, in accordance with Regulatory Guide 1.49. The error induced by the nonconservative carryover fraction caused reactor power to be, at maximum, approximately 100.1 percent of rated. Therefore, this condition did not have the potential to cause fuel thermal limits to be exceeded. This condition was of minimal consequence with respect to the health and safety of the public.