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Docket No. 50-321

HL-6119

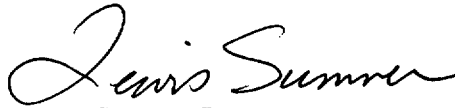
U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Edwin I. Hatch Nuclear Plant - Unit 1  
Licensee Event Report  
Error in Generic Analysis Results in Potentially Nonconservative  
Oscillating Power Range Monitor Setpoint

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(i)(B), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report (LER) concerning an error in a generic analysis which resulted in a potentially nonconservative oscillating power range monitor setpoint.

Respectfully submitted,

  
H. L. Sumner, Jr.

OCV/eb

Enclosure: LER 50-321/2001-003

cc: Southern Nuclear Operating Company  
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SNC Document Management (R-Type A02.001)

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**FACILITY NAME (1)**  
Edwin I. Hatch Nuclear Plant - Unit 1

**DOCKET NUMBER (2)**  
05000-321

**PAGE (3)**  
1 OF 4

**TITLE (4)**  
Error in Generic Analysis Results in Potentially Nonconservative Oscillating Power Range Monitor Setpoint

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(S)
06	25	2001	2001	003	00	08	23	2001	Plant Hatch Unit 2	05000-366
										DOCKET NUMBER(S) 05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § : (Check one or more) (11)			
1	100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
		<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)
		<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)
		<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)
		<input type="checkbox"/> 20-2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> OTHER
		<input type="checkbox"/> 20-2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	
		<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	
		<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
		<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	

**LICENSEE CONTACT FOR THIS LER (12)**

**NAME**  
Steven B. Tipps, Nuclear Safety and Compliance Manager, Hatch

**TELEPHONE NUMBER (Include Area Code)**  
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**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)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	NO				
	<input checked="" type="checkbox"/>				

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

On 6/25/01 at 1935 EDT, Unit 1 and Unit 2 were operating in the Run Mode at 100% of rated thermal power (2763 CMWt). At that time, the Oscillating Power Range Monitors (OPRMs) for both units were declared inoperable when it was determined that the Hatch reload licensing analysis provided by General Electric (GE) potentially failed to protect against violation of the Safety Limit Minimum Critical Power Ratio during thermal-hydraulic instabilities. An alternate method of detecting and suppressing thermal-hydraulic instabilities was then initiated, as required by the Technical Specifications.

The cause of the event was the failure of the generic industry analysis to account for certain operating conditions.

Among the corrective actions are the following: 1) The alternate method of manually detecting and suppressing core oscillations was implemented upon declaring the OPRMs inoperable. 2) On 7/12/01, new OPRM setpoints were provided by GE and input into the hardware. As a result, the OPRMs were declared operable. 3) GE is working with the Boiling Water Reactor Owners' Group to determine new data that will be bounding for all future operating conditions.

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

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor  
Energy Industry Identification System codes appear in the text as (EIIS Code XX).

DESCRIPTION OF EVENT

On 6/25/2001 at 1935 EDT, Unit 1 and Unit 2 were in the Run Mode, operating at 100% of rated thermal power (RTP) (2763 CMWt). At that time, the Oscillating Power Range Monitors (OPRMs, EIIS Code IG) for both units were declared inoperable when it was determined that the Hatch reload licensing analysis provided by General Electric (GE) potentially was not adequate to prevent violation of the Safety Limit Minimum Critical Power Ratio (SLMCPR). Specifically, generic information used to determine the OPRM setpoints did not adequately account for certain operating conditions. As a result, the Hatch-specific OPRM setpoints were nonconservative. The OPRMs, which are required by Technical Specification 3.3.1.1, serve to prevent violation of the SLMCPR during anticipated thermal-hydraulic oscillations by initiating a reactor scram when those oscillations exceed the OPRM setpoint.

Upon declaring the OPRMs inoperable, Hatch Technical Specifications Required Action Statement (RAS) 3.3.1.1.I was entered. This requires initiating an alternate method of detecting and suppressing oscillations when the OPRM system is out of service. At Hatch, this alternate method is described in plant procedures and essentially consists of monitoring the Local Power Range Monitors (LPRM, EIIS Code IG) and the Average Power Range Monitors (APRM, EIIS Code IG) for abnormal oscillations and taking appropriate action if they indicate the presence of a thermal-hydraulic instability. Additionally, the alternate method restricts entry into a region of the power/flow map where instabilities are most likely to occur. The RAS allows operation in this mode for 120 days; if the OPRM system remains inoperable at the end of the 120 days, reactor shutdown is required. Accordingly, the alternate method of detecting and suppressing instabilities was initiated, with the trip function of the OPRM conservatively left functional.

Subsequently, GE provided SNC with an OPRM setpoint value that could be used until a more realistic value could be obtained. Plant Hatch personnel input the new value into the OPRM hardware and declared them operable on 7/12/2001.

CAUSE OF EVENT

This event occurred because information necessary to determine OPRM setpoints was provided to Plant Hatch, by GE, which was non-conservative with respect to certain operating conditions that could have actually been achieved during the current Hatch Unit 1 and Unit 2 cycles. Specifically, determination of OPRM setpoints relies, in part, on industry generic data, which was expected to be bounding for all operating conditions for BWRs which installed the OPRM system. However, it was discovered that this information was not bounding under conditions where one or more fuel assemblies is operated at a higher power than originally analyzed. This increase in bundle power may occur as a result of a change in rated thermal power, but may also be caused by changes in operation not associated with rated core thermal power, such as higher radial peaking. The industry data, which is non-conservative, is the relationship between the magnitude of an oscillation and the change in CPR of the fuel. This data is known as the delta CPR/initial CPR versus oscillation magnitude (DIVOM) curve.

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

The generic data was not verified, either by SNC or GE personnel, to be applicable to each Hatch-specific operating cycle; however, for the Hatch extended power uprate submittal GE concluded that the methodology for calculating this generic data, which is normalized to the initial CPR, is independent of reactor power level. This conclusion did not adequately consider the effect of absolute bundle power on CPR during an instability. GE included this conclusion in their generic topical report on extended power uprate for all BWRs.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This report is required by 10 CFR 50.73(a)(2)(i)(B), because the OPRM setpoint was nonconservative and, thus, potentially incapable of providing protection against violating the SLMCPR during a design-basis thermal-hydraulic instability event, a condition prohibited by Technical Specification 3.3.1.1.

The SLMCPR is intended to protect the fuel rods from experiencing transition boiling, a condition characterized by steam film blanketing the fuel cladding, thus severely restricting the heat transfer from cladding to coolant. This weakens the cladding, which could lead to structural damage and an eventual release of radioactive material to the primary system. The SLMCPR is calculated each operating cycle such that 99.9% of fuel rods in the core are expected to avoid boiling transition during normal operation and during a design-basis anticipated operational occurrence (AOO). This is a conservative limit because no fuel failures are expected to occur even if fuel rods do experience transition boiling, for a short period of time.

To prevent violation of the SLMCPR, each cycle the most limiting AOOs are re-analyzed to determine the largest reduction in the critical power ratio (CPR). The operating limit (OL) MCPR is then calculated such that the CPR does not decrease below the SLMCPR at any time during this worst case transient. An instability event is one of the potentially limiting transients analyzed each cycle. This event is characterized by the following sequence of events: 1) The plant is operating at or near rated power, at or near the lowest flow licensed for that power condition. 2) Both recirculation pumps trip resulting in a core flow reduction down to natural circulation. 3) The reactor begins to experience a thermal-hydraulic instability event. If the magnitude of the oscillations become large enough, the OPRM system is designed to detect the corresponding local power oscillations and initiate a reactor protection system (RPS) scram when the OPRM setpoint is exceeded. This action is sufficient to prevent a violation of the SLMCPR during the instability. However, if the OPRM setpoint is too high for the actual operating MCPR value prior to the event (i.e., MCPR is too low), the scram may occur too late to protect the SLMCPR.

In this event, the Hatch Unit 1 and Unit 2 OPRM setpoints of 1.14 and 1.11 were potentially non-conservative (too high).

In order to return the Hatch Units 1 and 2 OPRM systems to operability, GE provided SNC with new, lower OPRM setpoint values (1.09 for both units) based on more conservative data than the generic data used to calculate the original setpoint values. This new data, like the generic data, is intended to apply to the entire range of BWRs; therefore, it uses very conservative assumptions relative to the current Hatch operating cycles. In order to quantify the amount of this conservatism, SNC is working with GE to determine a more realistic set of data that can be used to establish OPRM setpoints more appropriate for Plant Hatch. Until that analysis has been completed, it is not possible to conclude whether or not the original setpoints would have prevented a violation of the SLMCPR had a design-basis instability event occurred during the current operating cycles. Until that information is available, SNC will continue to base its choice of OPRM setpoints on the more conservative data applicable to all BWRs.

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CORRECTIVE ACTIONS

The Unit 1 and Unit 2 OPRMs were declared inoperable, and the alternate method of detecting and suppressing oscillations was initiated.

A new setpoint (1.09) was later input into the OPRM hardware, returning the OPRM system to operable status.

GE is working with the BWR Owners' Group (BWROG) to determine new generic data that will be bounding for all plants and all operating conditions.

GE is revising the affected stability reload licensing design procedures to include a step to confirm the applicability of the generic DIVOM curve applied in each plant's reload application.

SNC's Nuclear Fuel Department personnel are working with GE personnel to determine if there could have been a violation of the SLMCPR during a thermal-hydraulic instability event during the current operating cycles.

ADDITIONAL INFORMATION

This is an issue that affects other domestic boiling water reactors. GE has issued a 10 CFR Part 21 notification detailing the causes of the non-conservative data as well as some corrective actions being taken in conjunction with the BWR Owners Group. The notification was issued on June 29, 2001.

No systems other than those mentioned in this report were involved in this event.

No failed components caused or resulted in this event.

There have been no previous similar events in the last 2 years in which a mistake in a generic analysis resulted in a condition prohibited by the Technical Specifications.