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SUBJECT: LER 87-039-00: on 870619, intermediate range (IR) high neutron flux trip setpoint found out of calibr. Caused by previous adjustment to IR setpoints. New scaling currents for 25% trip incorporated into applicable procedures. W/870720 ltr.

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TITLE 50 73 Licensee Event Report (LER), Incident Rpt, etc.

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
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LICENSEE EVENT REPORT (LER)

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TITLE (4)

Intermediate Range High Neutron Flux Trip Setpoint Out of Calibration

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 NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
0 6	1 9	8 7	8 7	— 0 3 9	— 0 0	0 7	2 0	8 7		0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
M. G. Wallace/Specialist - Regulatory Compliance	9 1 9 3 6 2 - 2 3 6 0

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 fifteen single-space typewritten lines) (16)

On June 19, 1987 a problem with the scaling and setpoints for the Intermediate Range (IR) Neutron Flux monitors (N35 and N36) was identified. At the time, the plant was operating at 100 percent reactor power and Technical Specifications did not require the IR monitors to be operable.

The IR channels were reading offscale high above 70% reactor power and it was determined that a new correlation between power and IR current was necessary. Data for a new correlation was obtained during a startup on June 18, 1987, between the hours of 2200 till 2300. Upon reduction of data, on June 19, 1987, at approximately 1045 hours it was determined that the intermediate range high flux trip setpoints required at 25% reactor power for channels N35 and N36 were at actually 31% reactor power, which is in excess of the Technical Specification (Table 2.2-1) allowable of 30.9%. The Shift Foreman was notified and a priority 1 Work Request was issued to recalibrate channels N35 and N36 in accordance with the new correlation between power range and intermediate range instruments.

The cause was determined to be due to previous adjustments made on January 21, 1987.

New scaling currents were incorporated into appropriate surveillance test procedures. These tests were completed on June 19, 1987.

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

DESCRIPTION:

On June 19, 1987, a problem with the scaling and setpoints for the Intermediate Range (IR) Neutron Flux monitors (N35 and N36) was identified. At the time, the plant was operating at 100 percent reactor power and Technical Specifications did not require the IR monitors to be operable.

The IR channels were reading offscale high above 70% reactor power and it was determined that a new correlation between power and IR current was necessary. Data for a new correlation was obtained during a startup on June 18, 1987, between the hours of 2200 till 2300. The resulting data was transmitted from Reactor Engineering to the Process instrumentation Scaling Group the next day, June 19, 1987. Upon reduction of data, discussion ensued at approximately 1045 hours between Reactor Engineering, Scaling Group, and the Principle Engineer Technical Support. This discussion determined that the intermediate range high flux trip setpoints required at 25% reactor power for channels N35 and N36 were at actually 31% reactor power. The value was also in excess of the Technical Specification (Table 2.2-1) allowable of 30.9%. The Shift Foreman was notified and a priority 1 Work Request was issued to recalibrate channels N35 and N36 in accordance with the new correlation between power range and intermediate range instruments.

The new scaling currents for the 25% trip were immediately sent to Maintenance for incorporation into the appropriate surveillance test procedures (MST-I-167 and 168). These tests were completed on June 19, 1987.

CAUSE:

During the initial plant start up, the initial IR currents were adjusted as a result of an event (LER-87-004-00) in which the reactor tripped while reducing reactor power because an IR channel (N-36) remained in the tripped condition. The IR channel Trip Reset Value was found to be set too low. As a result, the IR setpoints were changed based on data obtained at approximately 20% reactor power. The data was extrapolated to define currents for the trip setpoint at 25% equivalent power level for the IR channels. Based on Westinghouse recommendations, the resulting values were reduced to 80% of the calculated value for conservatism. These steps were completed on January 21, 1987.

Reactor Engineering had in place a procedure to review 100% power IR currents however, this procedure was never implemented because at 70% power the IR indication was offscale high, which made development of an IR/PR correlation above that power level impossible. The Standard Power Ascension Test Program, along with Technical Specifications, required no recalibration of the intermediate range setpoints. It was decided to make this comparison during a power ascension and the data collected on June 18, 1987 resulted. The method used was taken from the draft revision of the plant procedure.

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CAUSE: (continued)

When the data was analyzed on June 19, 1987, the power range currents were found to be higher than the data taken on January 21, 1987, and the trip setpoints to be slightly nonconservative with respect to the Technical Specification value. It was determined that the previous adjustments to the IR setpoints caused the problem.

The following factors are major contributors to the change in IR indication over the 7 month period which ultimately caused the trip setpoint misalignment:

1. IR Compensating Voltage Adjustment/Fission Product Buildup

During the 6 month period between the initial setpoint adjustment on January 21, 1987 and the adjustment on June 19, 1987, IR Channel N35 had the compensating voltage adjusted three times while Channel N36 had the compensating voltage adjusted four times. In each case, upon plant trip, the IR indication was offscale low requiring a compensating voltage adjustment decrease (-40.00V to -15.00V). This indicated the resulting offset of initial fission product buildup in the core.

Over core lifetime, IR indication would decrease without any compensating voltage adjustment. This trend supports the lower trip setpoint correlation developed and installed on June 19, 1987. However, three or four compensating voltage adjustments were made, which has the opposite effect on IR indication, thereby increasing the indication. All of these adjustments were made with no change to IR trip setpoints. So, these two competing factors forced IR indication and the correlation to the Power Range indication to vary.

Depending on at what instant in the time period between compensating voltage adjustments one observes the IR indication, the IR trip setpoint may be above or below the new setpoint correlation developed at that specific time. That is, if a correlation is developed immediately after a compensating voltage adjustment then the new setpoint will most likely be above the installed setpoint. If the correlation is developed from a trip after a one or two month time period elapsing since the last voltage adjustment, the new setpoint will most likely be below the installed setpoint. The latter is the situation involved with this LER. The last compensating voltage adjustment was completed on January 29, 1987 for Channel N35 and March 7, 1987 for Channel N36. This problem is aggravated by the initial fresh core and the magnitude of the fission product buildup.

CAUSE: (continued)

2. IR Shielding by Control Bank D

The initial correlation was obtained with a conscience effort to move control Bank D above the core midplane thus reducing shielding to the IR detector. During the June 19 collection of data, no effort was made to compensate for Bank D position and by way of a normal increase in power, the IR detector was probably well shielded causing a slightly smaller reading.

The remaining factors are very small contributors to the IR change indication and correlation with some homogeneous to both IR and power range and either causing an increase or decrease in indication:

1. Extrapolation

The IR trip setpoints were based on a straight line extrapolation from IR currents at 20% reactor power to an estimate of the 25% power IR current. IR indication is not a linear function from 0 to 100% power. (Homogeneous to PR & IR; decrease IR indication).

2. 80% Conservatism

The trip setpoint at 25% was further reduced to 80% of the straight line value for conservatism. (IR dependent; decrease IR indication).

3. Incore/Excore

During the increase to 100% power, the initial plant incore/excore calibration was performed which adjusted indicated power range currents down approximately 2%. (PR dependent; increase IR indication).

4. Radial Changes in Power Shape

Over core lifetime the radial flux profile moves outward toward the core edges increasing core leakage. (Homogeneous to PR & IR; increase IR indication).

5. Axial Changes in Power Shape

Over core lifetime the axial flux profile shifts upwards toward the core midplane from the bottom of the core. (IR dependent; increase IR indication).

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CAUSE: (continued)

6. Calorimetric Adjustments

During Power Ascension, numerous adjustments were made after the January 21 installation of the IR trip setpoints. (PR dependent; increase/decrease IR indication).

ANALYSIS:

This event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) because the reactor was operated in a mode where the IR trip setpoints were required to be within Technical Specification limits. The IR channels are required to be operable during startup of the reactor. Reactor startups were conducted on several occasions between January 21, 1987 and June 19, 1987.

The purpose of the Intermediate Range (IR) Neutron Flux Trip is to provide core protection during reactor startup to mitigate the consequences of a uncontrolled rod cluster control assembly bank withdrawal from a subcritical condition. This trip provides redundant protection to the Low Setpoint trip on the Power Range, Neutron Flux channels. The IR channels are intended to initiate a Reactor trip at a current level equivalent to approximately 25% of Rated Thermal Power unless manually blocked when P-10 (approximately 10% power) becomes active. With the nonconservative setpoint the IR trip would have been delayed. However, the FSAR safety analysis allow credit for only the use of Power Range trips; the IR trip is assumed not to function. Throughout the interval the Power Range channels were not affected by the error found in the IR setpoints.

CORRECTIVE ACTION:

1. The new scaling currents for the 25% trip have been incorporated into applicable procedures. The new scaling currents are based on values taken during power ascension of June 18, 1987, and therefore the uncertainty which would occur because of extrapolation is negligible.

2. The Reactor Engineering procedure to monitor IR trip setpoints (EPT-008), will be revised to obtain IR/power range data from reactor start-ups in order to monitor IR trip setpoints. The implementation of this procedure will monitor changes which occur from cycle to cycle based on core loading pattern changes (low leakage, new core patterns, false rods, etc.).

3. Data obtained on July 10, 1987 indicated the new setpoints are still satisfactory for continued operation.

CP&L
Carolina Power & Light Company

HARRIS NUCLEAR PROJECT
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JUL 20 1987

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SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 87-039-00

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence and is in accordance with the format set forth in NUREG-1022, September, 1983.

Very truly yours,

for R. A. Watson
Vice President
Harris Nuclear Project

RAW:lmj

Enclosure

cc: Dr. J. Nelson Grace (NRC - RII)
Mr. B. Buckley (NRR)
Mr. G. Maxwell (NRC - SHNPP)

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