

# CATEGORY 10

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 FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina      05000400  
 AUTH. NAME      AUTHOR AFFILIATION  
 ELLINGTON, M.      Carolina Power & Light Co.  
 DONAHUE, J.W.      Carolina Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 97-016-00: on 970608, reactor trip occurred, due to personnel error while attempting to adjust power range nuclear instrumentation channel following performance of calorimetric. Procedures revised. W/971014 ltr.

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NOTES: Application for permit renewal filed.

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10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1  
DOCKET NO. 50-400  
LICENSE NO. NPF-63  
LICENSEE EVENT REPORT 97-016-01

Sir or Madam:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed revised Licensee Event Report is submitted. This report describes a Reactor Trip caused by personnel error in adjusting Nuclear Instrumentation and subsequent Auxiliary Feedwater automatic actuation due to a failure of a 6.9 kV breaker trip coil.

Sincerely,

J. W. Donahue  
Director of Site Operations  
Harris Plant

MSE/mse

Enclosure

c: Mr. J. B. Brady (HNP Senior NRC Resident)  
Mr. L. A. Reyes (NRC Regional Administrator, Region II)  
Mr. V. L. Rooney (NRC - NRR Project Manager)

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5413 Shearon Harris Road New Hill, NC

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## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
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INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED  
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FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND  
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.

FACILITY NAME (1)

Shearon Harris Nuclear Plant, Unit-1

DOCKET NUMBER (2)

50-400

PAGE (3)

1 OF 3

TITLE (4)

Reactor Trip and Auxiliary Feedwater actuation

| EVENT DATE (5)  |     |      | LER NUMBER (6)     |                      |                    | REPORT DATE (7)   |     |      | OTHER FACILITIES INVOLVED (8) |               |
|---|-----|------|--------------------|----------------------|--------------------|-------------------|-----|------|-------------------------------|---------------|
| MONTH   | DAY | YEAR | YEAR               | SEQUENTIAL<br>NUMBER | REVISION<br>NUMBER | MONTH             | DAY | YEAR | FACILITY NAME                 | DOCKET NUMBER |
| 06  | 08  | 97   | 97                 | -- 016               | -- 01              | 10                | 14  | 97   | FACILITY NAME                 | DOCKET NUMBER |
|   |     |      |                    |                      |                    |                   |     |      |                               | 05000         |
| OPERATING<br>MODE (9)   |     | 1    |                    |                      |                    |                   |     |      |                               |               |
| POWER<br>LEVEL (10)   |     | 028  |                    |                      |                    |                   |     |      |                               |               |
| THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) |     |      |                    |                      |                    |                   |     |      |                               |               |
|   |     |      | 20.2201(b)         |                      |                    | 20.2203(a)(2)(v)  |     |      | 50.73(a)(2)(i)                |               |
|   |     |      | 20.2203(a)(1)      |                      |                    | 20.2203(a)(3)(i)  |     |      | 50.73(a)(2)(iii)              |               |
|   |     |      | 20.2203(a)(2)(i)   |                      |                    | 20.2203(a)(3)(ii) |     |      | 50.73(a)(2)(iii)              |               |
|   |     |      | 20.2203(a)(2)(ii)  |                      |                    | 20.2203(a)(4)     |     |      | X 50.73(a)(2)(iv)             |               |
|   |     |      | 20.2203(a)(2)(iii) |                      |                    | 50.36(c)(1)       |     |      | 50.73(a)(2)(v)                |               |
|   |     |      | 20.2203(a)(2)(iv)  |                      |                    | 50.36(c)(2)       |     |      | 50.73(a)(2)(vii)              |               |
| OTHER<br>Specify in Abstract below<br>or in NRC Form 366A                                   |     |      |                    |                      |                    |                   |     |      |                               |               |

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Mark Ellington Senior Analyst- Licensing

TELEPHONE NUMBER (Include Area Code)

(919) 362-2057

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE<br>TO NPROS | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE<br>TO NPROS |
|-------|--------|-----------|--------------|------------------------|-------|--------|-----------|--------------|------------------------|
| B     | EB     | BKR       | S188         | Y                      |       |        |           |              |                        |
|       |        |           |              |                        |       |        |           |              |                        |

## 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 June 8, 1997, with the plant at approximately 28% power in Mode 1, a Reactor Trip occurred due to personnel error while attempting to adjust a Power Range (PR) Nuclear Instrumentation (NI) channel following the performance of a calorimetric. The plant was performing a startup following a refueling outage, when PR NI channel N41 was declared inoperable. The PR Neutron Flux High Setpoint, Low Setpoint, High Flux Rate, and Overtemperature differential temperature trips for N41 were placed in the tripped condition per TS 3.3.1 Table 3.3-1 Action 2 a. and 6 a. When the Plant reached approximately 28% Reactor Power the PR NI's were adjusted to match calculated power in accordance with the calorimetric procedure. PR NI channel N41 was adjusted first. PR NI channel N42, was to be adjusted next. As the operator unlocked the coarse adjustment potentiometer, N42 spiked, generating a negative rate trip signal on PR NI channel N42. This signal coupled with the rate trip signal from N41 being inoperable, met the 2/4 coincidence for the PR Flux Rate Trip and a reactor trip occurred. Following the reactor trip, a breaker failure caused a non-safety 6.9 kV bus to deenergize, resulting in the trip of the only running Main Feedwater Pump and initiated an Engineered Safety Features Actuation Signal start of both Motor - Driven Auxiliary Feedwater (MDAFW) Pumps.

Harris Nuclear Plant (HNP) has performed the following corrective actions: (1) An Operation's Night Order was issued prohibiting adjustment of a PR NI when a redundant channel is inoperable and on the use of diverse and redundant indications for instrumentation. (2) The Manager - Operations discussed this event with the operating crew. (3) The breaker for auxiliary bus 1A was replaced prior to startup. (4) Procedures were revised to provide operators an aid in identifying, at the PR channel instrument drawer, inoperable PR NI channels. (5) Procedures were revised preventing PR NI adjustment channels with a redundant PR NI channel in a tripped condition. (6) License operators reviewed LER 97-016-00 for lessons learned from the causes of this event.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

| FACILITY NAME (1)                     | DOCKET | LER NUMBER (6) |                   |                 | PAGE (3) |
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|                                       |        | YEAR           | SEQUENTIAL NUMBER | REVISION NUMBER |          |
| Shearon Harris Nuclear Plant - Unit 1 | 50-400 | 97             | -- 016            | -- 01           | 2 OF 3   |

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

**EVENT DESCRIPTION:**

On June 8, 1997 with the plant at approximately 28% power in mode 1, a Reactor Trip occurred due to attempting to adjust a Power Range (PR) Nuclear Instrumentation (NI) (EIIS code IG JI) channel with a redundant PR NI channel inoperable.

Harris Nuclear Plant (HNP) has four PR NI channels (N41, N42, N43, N44). Reactor Trips are generated by these PR channels for the following: (1) A low power trip when 2/4 PR channels reach 25% and the low power trips are not blocked. (2) A high Reactor Power trip of 109% on 2/4 PR channels. (3) A high PR rate trip when 2/4 PR channels sense an increase or decrease in Reactor Power of 5% in 2 seconds. (4) PR NI's provide input for Overtemperature differential temperature trip.

During the startup following Refueling Outage 7 (RF07), PR NI channel N41 was declared inoperable due to exceeding 5% difference between N41 indication and the indication of the other three PR channels. The N41 channel was placed in the tripped condition for the low power, high power, high rate, and Overtemperature differential temperature trips per TS 3.3.1, Table 3.3-1, Action 2 a. and 6 a. The operations staff continued the plant startup to approximately 28% power. Per plant procedure, the startup was suspended to perform a calorimetric and adjust NI channels. Following data collection and calculations for the calorimetric, Operations determined PR channels N41, N42, and N43 would require adjustment of the instrument gain due to being sufficiently out of tolerance with calculated power (PR channel N44 did not require adjusting). Following the calorimetric, the operating crew did not discuss how PR NI adjustments were going to be made with an inoperable PR NI channel. There is a provision in TS 3.3.1 Table 3.3-1 action 2 b. that allows bypassing an inoperable channel to perform surveillance testing on other PR channels, however HNP currently is not designed with a bypass switch to implement this provision. In lieu of any special precautions the operator proceeded to adjust PR NI's as usual.

After PR channel N41 was successfully adjusted, the operator unlocked the coarse gain of N42 in preparation for adjustment. The channel spiked resulting in generation of a High Flux Rate trip on channel N42. With the High Flux Rate trip already actuated for N41 due to performing TS actions for an inoperable channel, the 2/4 coincidence for Reactor Trip was achieved resulting in a Reactor Trip.

Following the Reactor Trip, non-safety 6.9 kV electrical bus 1A failed to remain energized by off-site power as designed, resulting in a trip of the only running Main Feedwater Pump (MFP) (EIIS code SJ P). With the trip of the last running MFP, an automatic Engineered Safety Features Actuation occurred which started both Motor -Driven Auxiliary Feedwater (AFW) Pumps (EIIS code BA P). The 1A bus failed to remain energized by off-site power due to a trip coil malfunction for the supply breaker to 6.9kV bus 1A from the Unit Auxiliary Transformer. When the breaker did not trip, a protective feature was initiated that isolated bus 1A from off-site power and caused all loads on bus 1A to deenergize on bus undervoltage resulting in the MFP trip. The trip coil was disassembled and subsequent evaluation could not determine the cause of the trip coil failure. Monitoring of bus 1A supply breaker performance will continue as part of the HNP Maintenance Rule program.

**CAUSE:**

This Reactor Trip was due to personnel error in not restoring PR channel N41 to operable prior to performing gain adjustments on other PR channels. Contributing factors were the inoperable PR NI drawer was not marked locally as being out of service and plant procedures did not contain effective direction prohibiting adjustment of a PR channel with a redundant channel in a tripped condition. Insufficient Control Room supervision involvement contributed to an inadequate brief and control of the NI adjustment evolution. The AFW actuation was due to a failure of a 6.9 kV non-safety bus to remain energized by off-site power following the Reactor Trip. Troubleshooting following the trip determined the bus was isolated from off-site power due to a malfunction of the trip coil for the breaker that supplies the non-safety bus from the Unit Auxiliary Transformer.

**SAFETY SIGNIFICANCE:**

There were no safety consequences associated with this event. A 6.9 kV breaker malfunctioned, resulting in an AFW actuation. Other equipment, including safety related equipment, performed as expected. Plant parameters such as primary temperature, pressure, and Steam Generator Level were normal following the trip.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

| FACILITY NAME (1)                      | DOCKET | LER NUMBER (6) |                      |                    | PAGE (3) |
|--|--------|----------------|----------------------|--------------------|----------|
|  |        | YEAR           | SEQUENTIAL<br>NUMBER | REVISION<br>NUMBER |          |
| Shearon Harris Nuclear Plant - Unit #1 | 50-400 | 97             | 016                  | 01                 | 3 OF 3   |

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

**PREVIOUS SIMILAR EVENTS:**

LER 91-013-00 describes an event where PR NI channel N43 was inoperable. The associated trips were placed in the trip condition including channel 3 Overtemperature differential temperature trip. When surveillance testing was performed on a redundant temperature channel, a reactor trip occurred.

The LER 91-013-00 event occurred during the performance of a maintenance surveillance test. The corrective actions associated with the LER 91-013-00 event focused on maintenance procedures and therefore were not effective for the trip discussed in this LER (97-016-00) since the calorimetric and the procedure used to adjust PR NI's are both operations procedures.

**CORRECTIVE ACTIONS COMPLETED:**

1. An Operations Night Order was issued prohibiting adjusting the gain of a PR NI channel when a redundant channel is inoperable.
2. The Operations personnel involved were instructed to maintain plant awareness when testing safety related components.
3. The 6.9kV bus 1A supply breaker from the "A" Unit Auxiliary Transformer was replaced with a tested spare breaker.
4. Procedures were revised to provide operators an aid in identifying, at the PR channel instrument drawer, inoperable PR NI channels.
5. Procedures were revised to prevent PR NI adjustment when a redundant PR channel is already in a tripped condition.
6. Licensed operators reviewed this LER 97-016-00 for lessons learned from the causes of this event.

