Progress Energy

NOV 17 2006

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

Serial: HNP-06-125
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2006-003-00

Ladies and Gentlemen:

The enclosed Licensee Event Report 2006-003-00 is submitted in accordance with 10 CFR 50.73. This report describes an automatic turbine/reactor trip due to a generator lockout signal. Event notification EN# 42848 previously reported this event on September 19, 2006 in accordance with 10 CFR 50.72.

Please refer any questions regarding this submittal to Mr. Dave Corlett, Supervisor - Licensing/Regulatory Programs, at (919) 362-3137.

Sincerely,

Eric A. McCartney
Plant General Manager
Harris Nuclear Plant

EAM/sfm

Enclosure

c: HNP Senior NRC Resident
NRC-NRR Project Manager
NRC Regional Administrator, Region II

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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory 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 and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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 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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE
Automatic Reactor Trip Due to Generator Lockout Signal

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	05000
09	19	2006	2006	- 003 -	00	11	17	2006	FACILITY NAME: N/A	DOCKET NUMBER: 05000

9. OPERATING MODE
1

10. POWER LEVEL
100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Dave Corlett – Licensing Supervisor	919-362-3137

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
D	EL	64	ASEA	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

At 09:59 EDT on September 19, 2006, with the reactor at 100 percent power, the reactor automatically tripped from a turbine trip due to a generator lockout signal. There was no inoperable equipment at the start of this event that contributed to this event. Safety systems functioned as required and operators responded in accordance with approved procedures.

Post trip discovery found that a ground fault protective relay module failure caused by self heating actuated the 86/G1A Main Generator Lockout Relay which initiated a turbine and reactor trip. Further investigation revealed that no module specific inspection requirements exist for the generator, main transformer and auxiliary transformer protective relay modules to detect self heating concerns.

Completed corrective actions include replacing the failed relay module for the main generator stator ground detection circuit. Additional corrective actions are to establish specific inspection requirements for the generator, main transformer and auxiliary transformer protective relays and to brief appropriate maintenance personnel.

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

I. DESCRIPTION OF EVENT

At 09:59 EDT on September 19, 2006, with the reactor at 100 percent power, the reactor automatically tripped from a turbine trip due to a generator lockout signal [EL-86]. There was no inoperable equipment at the start of this event that contributed to this event.

The auxiliary feedwater [BA] system actuated approximately 18 seconds after the reactor trip as expected to stabilize steam generator levels. All systems functioned as required and no other safety systems were actuated. All control rods fully inserted on the reactor trip. The operations staff responded to the event in accordance with applicable plant procedures. The plant stabilized at normal operating no-load reactor coolant system temperature and pressure following the reactor trip.

Post trip, the main generator and the 22kv system were investigated for a possible ground with no grounds found. Post trip investigation revealed that the turbine and reactor trip were caused by a failure of a specific module within the main generator neutral ground fault protective relay [EL-64].

The main generator neutral ground transformer Ground Fault Protection Relay is a non-safety component manufactured by ASEA and is a type RAGEA 64/37 G ground fault protection relay. This relay is used to detect a main generator stator ground at the fundamental frequency (module 107). Post trip discovery revealed that the ground fault protection relay module 107 had degraded and failed due to self heating in a manner that actuated the Main Generator Lockout Relay (86/G1A) which caused the turbine and reactor trip.

This condition is being reported as an unplanned reactor protection system actuation and specified system actuation in accordance with 10 CFR 50.73(a)(2)(iv)(A).

Energy Industry Identification System (EIIS) codes are identified in the text within brackets [ ].

II. CAUSE OF EVENT

An investigation found no evidence of an actual ground. Post trip discovery revealed that the ground fault protection relay had degraded and failed in a manner that actuated the Main Generator Lockout Relay (86/G1A). Specifically, the 107 module of the ground fault relay was found damaged due to self heating. This module is from the original installation. The module's internal components and wiring showed signs of overheating and conductor insulation melting. Output contacts that are designed to close to initiate a generator lockout were also found failed in the made up position due to contact mechanism part failure (the contact actuation mechanism was out of position and holding the contacts closed).

The module's contact mechanism spacers are made from an acetyl polymer (e.g., DuPont Delrin or polyoxymethylene). Although this polymer has very good mechanical properties, it is very susceptible to degradation by acids or bases, and will degrade when exposed to elevated temperatures. The relay is designed with ventilation holes to account for internal heating and has been in service since original installation. The replacement relays obtained from another plant were newer vintage modules with cases that did not possess vent holes and showed no sign of heat stress. The manufacturer's new design incorporated in the replacement relay has eliminated much of the heat production that can shorten relay life.

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(1-2001)

LICENSEE EVENT REPORT (LER)

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

The relays were operated in accordance to their design specifications. The visual and mechanical inspections are governed by procedure MNT-TRMX-00068 which is performed by maintenance technicians. The visual and mechanical inspections required by MNT-TRMX-00068 did not detect the degraded condition. The determination that this activity was not performed adequately is based on the appearance of the 107 module that failed. Had individual relay modules been removed and inspected, it is reasonable to expect that corrective maintenance was warranted. The ASEA Type RAGEA is a solid-state relay panel with enclosed modules. As such, maintenance personnel did not consider the module a serviceable subcomponent requiring post maintenance inspection. Maintenance personnel were not aware of the heat stress that module 107 was operating under and the design deficiency that made failure possible. As a result, the required visual post maintenance inspection was not taken to the module level.

At Harris, this type of module is only used for the generator stator ground fault protection and detection. Further investigation revealed that no specific inspection requirements exist for the generator, main transformer, and auxiliary transformer protective relay modules to detect self heating concerns. The backup generator ground fault relay (64/B) is a GE Type 121AV51D which does not use the ASEA modules.

III. SAFETY SIGNIFICANCE

This event is not safety significant.

Actual Safety Consequences:
The transient was an automatic reactor trip from 100% power generated by turbine trip due to a generator lockout. A turbine trip is analyzed for the Harris Plant and is described in the HNP FSAR Section 5.2, "Decrease in Heat Removal by the secondary system." A turbine and reactor trip is classified as an American Nuclear Society (ANS) Condition II event – a fault of moderate frequency. The plant is designed for these types of events and responded as expected for these conditions. The initial plant conditions prior to the trips were well within the bounding conditions for the plant design. The plant promptly attained normal operating no-load temperature and pressure, and no unusual conditions were observed for plant equipment following the reactor trips. All safety equipment functioned as required including AFW in response to low steam generator water levels in "A" and "C" steam generators. No additional or compensatory measures were required for this event.

The operating staff performed the required actions for the trip. Other than the transient induced by the trip, there are no adverse safety consequences.

Potential Safety Consequences:
The potential safety consequences under alternate conditions would have been bounded by the FSAR Chapter 15 events.

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

IV. PREVIOUS SIMILAR EVENTS

There are no previous HNP trips related to a failure the main generator neutral ground protection relay.

V. CORRECTIVE ACTIONS

Completed corrective actions include replacing the failed relay module in the main generator stator ground detection circuit. Additional corrective actions are to establish specific inspection requirements for the generator, main transformer and auxiliary transformer protective relays and to brief appropriate maintenance personnel.

VI. COMMITMENTS

This document contains no new regulatory commitments.