Progress Energy

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

Serial: HNP-03-105
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2003-005-00

Ladies and Gentlemen:

The enclosed Licensee Event Report 2003-005-00 is submitted in accordance with 10 CFR 50.73. This report describes a manual reactor trip and an auxiliary feedwater actuation following a trip of the "A" condensate pump motor. Event notification EN# 40084 previously reported this event in accordance with 10 CFR 50.72.

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

Sincerely,

T. Walt for B. Waldrep

B. C. Waldrep
Plant General Manager
Harris Nuclear Plant

BCW/jpy

Enclosure

c: Mr. R. A. Musser (HNP Senior NRC Resident)
Mr. C. P. Patel (NRC-NRR Project Manager)
Mr. L. A. Reyes (NRC Regional Administrator, Region II)

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NRC FORM 366 (7-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004
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.

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4. TITLE
Manual Reactor Trip Following a Trip of the "A" Condensate Pump Motor

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	17	2003	2003	- 005 -	00	10	09	2003	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
10. POWER LEVEL	100		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)	X	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)		OTHER Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
			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)		

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
John Yadusky – Lead Licensing Engineer	(919) 362-2020

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
X	SD	P	Siemens-Allis	Y					

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

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

On August 17, 2003 at 1551 with the reactor at approximately 100% power, the Harris Nuclear Plant (HNP) manually tripped the reactor in response to an automatic trip of one of two operating condensate pumps (CPs). The "A" CP tripped following an electrical short in its motor due to a severe lightning storm. The trip of the "A" CP resulted in subsequent trips of the "A" condensate booster pump and the "A" main feedwater pump (MFP) as designed. As directed by plant procedures, the operations crew manually tripped the reactor upon the trip of a MFP with initial reactor power greater than 90%. The manual reactor trip coupled with the trip of the "A" condensate and feedwater train resulted in a reduction of steam generator (SG) water levels. The subsequent low-low SG levels resulted in an auto-start of the auxiliary feedwater pumps as designed. Safety systems functioned as required.

The cause of the unplanned trip of the "A" CP motor was a lightning voltage surge that overcame the dielectric strength of the motor winding insulation (i.e., an electrical short). In addition, the grounding system was not effective at protecting the "A" CP motor from a lightning strike.

Corrective actions included replacing the "A" CP motor and installing surge protection. In addition, HNP will enhance the "A" CP grounding system and install surge protection on the "B" CP motor.

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

I. DESCRIPTION OF EVENT

On August 17, 2003 at 1551 hours with the reactor at approximately 100% power, the Harris Nuclear Plant (HNP) manually tripped the reactor as directed by plant procedures in response to an automatic trip of one of two operating condensate pumps (CPs) [SD-P]. The "A" CP tripped following an electrical short in its motor. At the time of this event, a severe lightning storm was passing through the area. The "A" CP motor is a 6.9 KV motor manufactured by Siemens-Allis, serial number 1-5017-10368-1-1.

As designed, the trip of the "A" CP resulted in subsequent trips of the "A" condensate booster pump (CBP) and the "A" main feedwater pump (MFP) [SJ-P]. The main turbine control circuitry sensed the trip of the "A" MFP and automatically reduced turbine power (i.e., a turbine runback) to approximately 94% until the turbine runback was terminated by the manual reactor trip, as directed by plant procedures. Plant procedures require immediate action to manually trip the reactor upon the trip of any MFP with initial reactor power greater than 90%. The manual reactor trip coupled with the trip of the "A" condensate and feedwater train resulted in a reduction of steam generator water levels. During a rapid load reduction, such as a turbine runback or a reactor trip, steam generator levels lower (shrink). The lowest steam generator levels were observed within about one minute of the reactor trip with levels reaching approximately 17%, 23%, and 19% for the "A," "B," and "C" steam generators, respectively. Due to the low-low steam generator levels (i.e., less than 25%), both motor-driven auxiliary feedwater (AFW) pumps [BA-P] and the turbine-driven AFW pump auto-started as designed.

The operations crew responded to the event in accordance with applicable plant procedures and promptly stabilized plant conditions. Safety systems functioned as required during this event.

The HNP condensate and feedwater design includes two redundant trains each with a condensate pump, a condensate booster pump, and a main feedwater pump. The condensate pumps take suction from the main condenser hotwell. The discharge from both condensate pumps combine and flow through the condensate polishers to the suction of both condensate booster pumps. The discharge of the condensate booster pumps flow through a series of feedwater heaters and combine with the discharge of the heater drain pumps to provide suction to the two main feedwater pumps. The main feedwater pumps discharge flow through two additional feedwater heaters, and then the flow is separated into three lines to provide inventory to the three steam generators. The HNP condensate and feedwater design results in a trip of the associated condensate booster pump and main feedwater pump when a condensate pump trips.

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

II. CAUSE OF EVENT

The cause of the unplanned trip of the "A" CP motor was a lightning voltage surge that overcame the dielectric strength of the motor winding insulation (i.e., an electrical short). This electrical short led to a trip of the CP breaker on instantaneous overcurrent and subsequent trips of the "A" CBP and the "A" MFP. Plant procedures require immediate action to manually trip the reactor upon the trip of any MFP with initial reactor power greater than 90%, so the reactor was manually tripped. In addition, the grounding system was not effective (i.e., a high impedance path) at protecting the "A" CP motor from a lightning strike.

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

III. SAFETY SIGNIFICANCE

Other than the transient induced by the manual reactor trip, there were no safety significant consequences as a result of this event. The plant was manually tripped by control room operators as directed by plant procedures. The plant is designed for a loss of main feedwater, and it responded as expected for this condition. The loss of normal feedwater event is classified as an ANS Condition II event, a fault of moderate frequency (i.e., expected to occur, in general, no more than once per year). The initial plant conditions were well within the bounding conditions for the plant design. The event did not involve any release of radioactive material. No design safety limits were exceeded, and no fission product barriers or components were damaged as a result. The plant was promptly stabilized at normal operating no-load RCS temperature and pressure, and no unusual conditions were observed for plant equipment following the manual reactor trip. All safety equipment functioned as required. The operating staff performed the required actions for the trip.

The potential safety consequences under other alternate conditions, such as a loss of both MFPs, may have increased the severity of the transient and may have resulted in an automatic rather than manual reactor trip, but these alternate conditions would not have significantly increased the potential safety consequences of this event. In general, the severity of the plant transient is reduced at lower power levels, so the same event initiated at a lower power (i.e., less than 100% power) would be expected to result in a smaller transient. This report is submitted pursuant to 10CFR50.73(a)(2)(iv)(A) for the manual reactor trip and automatic actuation of the AFW system.

IV. CORRECTIVE ACTIONS

Corrective actions included replacing the "A" CP motor and installing surge protection. In addition, HNP will enhance the "A" CP grounding system and install surge protection on the "B" CP motor.

V. PREVIOUS SIMILAR EVENTS

HNP LER 1999-009-00 (reported 1/13/00)

The 'A' CP motor failed on 12/14/99 and was investigated in AR 10088 (LER 1999-009-00). This previous event was evaluated in the failure analysis for this event to assess the potential of a repeat failure or common cause. The investigation in 1999 concluded that the motor failure was caused by a voltage surge based on the post-event inspection. The stator failed from a phase-to-phase short at the 1st and 3rd coil of the parallel wye winding. However, the investigation could not determine conclusively the root cause of the voltage surge since the failure site in the motor was destroyed by the arc from the motor internal fault. Lightning was suspected since there was severe weather at the time of failure, but there was no direct evidence to support that conclusion. Therefore, the most likely root cause of the voltage surge that resulted in the phase-to-phase short was determined to be an internal fault. The corrective action to prevent recurrence was to replace the motor. Based on the historical performance of the Siemens-Allis pumps and current performance data for other pumps in service, the extent of condition was limited to the motor that failed. Therefore, the planned actions did not include any additional corrective actions to prevent recurrence. So, although the root cause for this previous event is significant in relation to the subject event, the previous corrective actions would not have prevented the event identified by this LER.