



Progress Energy

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

Serial: HNP-03-008
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2002-004-00

Ladies and Gentlemen:

The enclosed Licensee Event Report 2002-004-00 is submitted in accordance with 10CFR50.73. This report describes an unanalyzed condition due to a postulated fire that could result in the loss of safe shutdown functions credited in the Safe Shutdown Analysis. This condition was previously reported to the NRC by Event Notification 39465 dated December 20, 2002. Commitments are identified in Section VI of this submittal.

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

Sincerely,

B. C. Waldrep
Plant General Manager
Harris Nuclear Plant

BCW/jpy

Enclosure

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

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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME Harris Nuclear Plant – Unit 1	2. DOCKET NUMBER 05000400	3. PAGE 1 OF 7
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4. TITLE
Unanalyzed Condition Due to Inadequate Separation of Associated Circuits

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
12	20	2002	2002	004	00	02	18	2003		

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check all that apply)				
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
10. POWER LEVEL 100	<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)	OTHER Specify in Abstract below or in NRC Form 366A	
	<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"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)		
	<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 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)		

12. LICENSEE CONTACT FOR THIS LER

NAME John Yadusky – Lead Licensing Engineer	TELEPHONE NUMBER (Include Area Code) (919) 362-2020
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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

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

On December 20, 2002, with the reactor at 100% power, inspection of the Harris Nuclear Plant Safe Shutdown Analysis (SSA) identified that postulated fires in three fire areas could cause spurious closure of certain valves. Spurious closure of valves in the flowpath for the protected Charging/Safety Injection Pump (CSIP) could result in loss of the protected CSIP if it was in service at the time of the postulated fire. Similarly, simultaneous multiple spurious closures of valves in the flowpaths of water to the Reactor Coolant Pump (RCP) seals could result in loss of RCP seal cooling credited in the SSA and subsequent RCP seal degradation. These inspection findings represent an unanalyzed condition.

Upon discovery, interim compensatory actions were implemented to minimize the impact of the postulated fires. These measures included de-energizing the CSIP suction cross-connect valves to minimize susceptibility to mal-operation of components, and posting a roving fire watch in fire areas of concern.

The cause of this condition is inadequate original Safe Shutdown Analysis. Specifically, certain conductor-to-conductor interactions (i.e., hot shorts) were not adequately evaluated in the initial Safe Shutdown Analysis. Design changes or other methods approved by the NRC will be used to restore compliance.

LICENSEE EVENT REPORT (LER)

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

I. DESCRIPTION OF EVENT

On December 20, 2002, with the Unit in Mode 1 at 100% power, inspection of the Harris Nuclear Plant (HNP) Safe Shutdown Analysis (SSA) in Case of Fire identified that for postulated fires in three SSA fire areas, the design and compensatory actions credited by the SSA would not ensure a protected train of equipment would remain available. Specifically, the inspection identified that postulated fires could cause spurious actuation of components potentially resulting in loss of the Charging/Safety Injection Pump (CSIP) [CB-P] or loss of Reactor Coolant Pump (RCP) [AB-P] seal cooling credited by the SSA. The fires were postulated to cause spurious closure of valves in the flowpaths for the protected CSIP, prior to implementation of the preplanned actions designed to preserve these flowpaths, resulting in loss of the protected CSIP if it was in service at the time of the postulated fire. Similarly, the fires were postulated to cause spurious closure of valves in the flowpath of Component Cooling Water (CCW) [CC] to the RCP thermal barrier heat exchangers, resulting in loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP protection. These inspection findings led to discovery at approximately 19:15 Eastern Standard Time of an unanalyzed condition that are being reported pursuant to 10 CFR 50.73(a)(2)(ii)(B). There were no systems, structures, or components that were inoperable at the time of discovery that contributed to that conclusion.

The three SSA fire areas identified included:

1. 1-A-BAL-B, located in the Reactor Auxiliary Building (RAB) Elevation 261'
2. 1-A-BAL-C, located in the RAB Elevation 286'
3. 1-A-EPA, located in the RAB Electrical Penetration Room "A" Elevation 261'

For a postulated fire in SSA fire areas 1-A-BAL-B or 1-A-EPA, certain cabling [CBL3] for the two outlet valves (1CS-165 or 1CS-166) of the Volume Control Tank (VCT) and the CCW supply valve to RCP thermal barriers (1CC-207) are not protected from spurious actuation in accordance with the requirements of NUREG 0800, Attachment 1 (Branch Technical Position CMEB 9.5-1) Section C.5.b. Specifically, the control power cables for charging system Motor Operated Valve (MOV) [20] 1CS-165 and CCW system MOV 1CC-207 are routed through SSA fire areas 1-A-BAL-B and 1-A-EPA with no fire barrier. Similarly, the control cable for charging system MOV 1CS-166 is unprotected for about one foot above its Motor Control Center (MCC) [MCC] and inside its MCC in SSA fire area 1-A-BAL-B. Therefore, the unprotected cables for these MOVs are vulnerable to fire-induced hot shorts. The charging system valves are required to remain open to provide CSIP suction from the VCT during a postulated fire in these fire areas. As a result, a fire in any of these areas could result in spurious closure of one of the VCT outlet valves, loss of suction flow to the running CSIP, and subsequent damage to the running CSIP credited by the SSA for charging flow and RCP seal cooling. The CCW system valve is required to remain open to provide CCW flow to RCP thermal barrier heat exchangers. As a result, a postulated fire in this area could result in spurious closure of this valve and loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal protection. Multiple simultaneous spurious actuations of valves in the charging system and the component cooling water system could result in degradation of the RCP seals, possibly leading to an RCP seal loss of coolant accident (LOCA) without credited CSIPs.

For a postulated fire in SSA fire area 1-A-BAL-C, the control power cables for the CCW return valve from RCP thermal barriers (1CC-251) and the CCW supply valve to RCP seals and motor coolers (1CC-208) are not protected from spurious actuation in accordance with the requirements of NUREG 0800, Attachment 1 (Branch Technical Position CMEB 9.5-1) Section C.5.b. Specifically, the control power cables for the CCW system MOVs 1CC-251 and 1CC-208 are routed through SSA fire area 1-A-BAL-C and into their MCC in this area with no fire barrier. Therefore, the unprotected cables for these MOVs are vulnerable to fire-induced hot shorts. These valves are required to remain open to provide CCW flow to RCP thermal barrier heat exchangers. As a result, a postulated fire in this area could result in spurious closure of these valves and loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal protection. However, RCP seals would still be protected by the normal seal injection function of the redundant charging/safety injection trains.

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

I. DESCRIPTION OF EVENT (Continued)

For a postulated fire in SSA fire area 1-A-BAL-B, the control power cables for the CSIP suction cross-connect valves (1CS-168 and 1CS-169), the CSIP mini-flow isolation valve (1CS-214), and the CSIP discharge cross-connect valves (1CS-217, 1CS-218, and 1CS-219) are not protected from spurious actuation in accordance with the requirements of NUREG 0800, Attachment 1 (Branch Technical Position CMEB 9.5-1) Section C.5.b. Specifically, the control power cable for charging system MOVs 1CS-168 and 1CS-217 are unprotected inside their MCC in SSA fire area 1-A-BAL-B. The control power cables for charging system MOVs 1CS-169, 1CS-214, 1CS-218, and 1CS-219 are unprotected for about one foot above their MCC and inside their MCC in the same fire area. Therefore, the unprotected cables for these MOVs are vulnerable to fire-induced hot shorts.

MOVS 1CS-168 and 1CS-169 valves are required to remain open to provide CSIP suction during a postulated fire in these fire areas. As a result, a fire in this area could result in spurious closure of one of the CSIP suction valves, loss of suction flow to the running CSIP, and subsequent damage to the running CSIP credited by the SSA for charging flow and RCP seal cooling.

MOV 1CS-214 provides mini-flow for the CSIPs. As a result, a fire in this area could result in spurious closure of the mini-flow isolation valve, and subsequent loss of mini-flow to the CSIPs. However, this loss of function would be recoverable since the CSIPs would not be damaged.

MOVs 1CS-217, 1CS-218, and 1CS-219 are required to remain open to provide charging flow from the running CSIP. As a result, a postulated fire in this area could result in spurious closure of one of the CSIP discharge valves, and subsequent loss of flow to charging or high head safety injection credited by the SSA. However, this loss of function would be recoverable since the CSIPs would not be damaged.

Multiple simultaneous spurious actuations of valves in the charging system (i.e., MOVs 1CS-214, 1CS-217, 1CS-218, and 1CS-219) could result in loss of mini-flow to the CSIPs and loss of flow to charging or high head safety injection, and subsequent damage to the running CSIP.

Upon discovery, interim compensatory actions were implemented to minimize the impact of the postulated fires. These measures included de-energizing the CSIP suction cross-connect valves to minimize susceptibility to mal-operation of components, and posting a roving fire watch in fire areas of concern.

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

II. CAUSE OF EVENT

The cause of this condition is inadequate original Safe Shutdown Analysis. Specifically, certain conductor-to-conductor interactions (i.e., hot shorts) were not adequately evaluated in the initial Safe Shutdown Analysis.

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III. SAFETY SIGNIFICANCE

All of the findings are based on scenarios that have not actually occurred. Therefore, there are no actual adverse safety consequences.

Potential safety consequences for postulated fires in fire areas 1-A-BAL-B and 1-A-EPA that also result in spurious closure of certain SSA MOVs may include:

- Loss of suction flow and subsequent damage to the running CSIP credited by the SSA for charging flow and RCP seal cooling,
- Loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal protection,
- Loss of charging or high head safety injection flow credited by the SSA,
- Multiple simultaneous spurious actuations of valves in the charging system could result in loss of mini-flow to the CSIPs and loss of flow to charging or high head safety injection, and subsequent damage to the running CSIP,
- Multiple simultaneous spurious actuations of valves in the charging system and the component cooling water system could result in degradation of the RCP seals, possibly leading to a RCP seal LOCA without credited CSIPs.

Potential safety consequences for a postulated fire in fire area 1-A-BAL-C that also results in spurious closure of certain SSA MOVs may include:

- Loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal protection. However, RCP seals would still be protected by the normal seal injection function of the redundant charging/safety injection trains.

The defense-in-depth fire protection program mitigates some of these potential safety consequences by:

- Prevention of fire initiation,
- Prompt detection of fires or incipient fire conditions by installed automatic detection systems,
- Effective suppression of fires by installed automatic fire suppression systems with fire brigade backup.

Opening and de-energizing the CSIP suction cross-connect valves (1CS-168 and 1CS-169) also mitigates the potential safety consequences of a postulated fire in fire area 1-A-BAL-B.

IV. CORRECTIVE ACTIONS

Upon discovery, interim compensatory actions were implemented to minimize the impact of the postulated fires. These measures included de-energizing the CSIP suction cross-connect valves (1CS-168 and 1CS-169) to minimize susceptibility to mal-operation of components, and posting a roving fire watch in fire areas of concern.

Complete a revalidation of the HNP safe shutdown analysis.

Restore the identified conditions of this LER to compliance by design changes or other methods approved by the NRC.

These actions are scheduled to be completed by the next available refueling outage (RFO12).

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V. PREVIOUS SIMILAR EVENTS

HNP LER 2001-002-00 (reported 6/15/01)

This LER reported a determination by HNP engineering personnel that fuses intended to maintain safe shutdown train separation, in the event of a fire in the "A" Switchgear Room, are not capable of performing their intended function due to a design error. A fire in one fire area could result in the inability to isolate a Pressurizer Power Operated Relief Valve (PORV) and associated block valve. These fuses were intended to protect against this condition by isolating the PORV Block Valve control circuit on an electrical short due to a fire. The fuses provide power to the plant computer for PORV Block Valve position indication. The power to reposition the PORV Block Valves and the position indication on the PORV Block Valve control switch is not powered by these fuses. The cause of this event was inadequate analysis during design of the applicable circuit. The corrective actions included: 1) The applicable fuses were pulled as a temporary compensatory measure to provide safe shutdown train separation, 2) The design analysis was corrected, and 3) HNP implemented a design change to install the correct fuses.

NRC Inspection Report 50-400/00-09 (dated February 3, 2000)

This inspection identified two unresolved items (URIs) concerning adequacy of a Thermo-Lag fire barrier to meet plant licensing basis requirements and the adequacy of the 10 CFR 50.59 for changes made to the FSAR to revise the fire rating of selected Thermo-Lag fire barriers. The identified fire barrier serves as the fire area separation barrier between the "B" Train Switchgear Room/Auxiliary Control Panel (ACP) Room and the "A" Train Cable Spreading Room. Based on Thermo-Lag barrier fire resistance tests conducted in 1994 and 1995, this fire barrier did not have the required three-hour fire resistance rating. Therefore, a single fire in the "B" Train Switchgear Room, of significant intensity and duration, could breach the Thermo-Lag fire barrier assembly and damage certain redundant "A" train cables and their associated functions of safe shutdown systems. The final significance determination for these two items was one notice of violation (White finding).. The root cause was inadequate fire testing of the installed fire barrier. The corrective actions included modifications to the affected rooms and establishing review criteria to ensure that future fire barrier modifications do not invalidate test results.

HNP LER 97-020-00 (reported 9/12/97)

This LER reported that design discrepancies were identified during an Engineering review of the Safe Shutdown Analysis in Case of Fire. These discrepancies pertain to safety-related electrical cables in 261' elevation of the RAB for the EDG Fuel Oil Transfer Pumps "A" and "B". These cables did not comply with separation requirements to maintain safe shutdown capability. These deficiencies were caused by engineering oversight and inadequate design verification during initial plant construction. A plant modification was installed to provide the required protection for the cited cables. The root cause investigation (CR 97-03861) stated, "A review of the safe shutdown cables in the unit 2 areas north of column line 43 was performed and no additional cable protection discrepancies were found. Also, an in-depth review of an additional fire area (1-A-EPB) was performed . . . and no similar deficiencies were identified."

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V. PREVIOUS SIMILAR EVENTS (Continued)

HNP LER 97-006-00 (reported 4/17/97)

This LER reported that an undocumented breach was identified in the thermo-lag wall while sealing penetrations through the Thermo-Lag Wall in the 286' Cable Spreading Room "A." Follow-up investigation revealed an additional thermo-lag fire barrier deficiency in a floor drain assembly in the cable spread room. These conditions do not comply with the 3-hour fire-rated barrier requirements specified in the HNP FSAR. The root cause was identified to be incomplete design, incomplete construction, and incomplete final construction walkdown. The penetration was modified per ESR 95-00715. The root cause investigation (CR 97-01123) stated, "Nothing indicates a common trend to the fact of an area of a Thermo-lag panel being missed both in design and in the final construction walkdown."

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

VI. COMMITMENTS

The actions committed to by Progress Energy Carolinas, Inc. in this document are identified below. Any other actions discussed in this submittal represent intended or planned actions by Progress Energy Carolinas, Inc. They are described for the NRC's information and are not regulatory commitments.

Commitment(s)	Scheduled Completion Date
1. Complete a validation of the HNP safe shutdown analysis.	August 5, 2004
2. Restore the identified conditions of this LER to compliance by design changes or other methods approved by the NRC.	Refueling Outage 12 (Current schedule November 11, 2004)