Progress Energy

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

Serial: HNP-04-146
10 CFR 50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2002-004-06

Ladies and Gentlemen:

The enclosed Licensee Event Report (LER) 2002-004-06 is submitted in accordance with 10 CFR 50.73. This report is a revision to a previously submitted LER that describes an unanalyzed condition due to inadequate separation of associated circuits. Previous revisions to this report, LER 2002-004-00, submitted on February 18, 2003; LER 2002-004-01, submitted on March 26, 2003; LER 2002-004-02, submitted on September 19, 2003; LER 2002-004-03, submitted on April 12, 2004; LER 2002-004-04, submitted on October 12, 2004; and LER 2002-004-05, submitted on November 15, 2004; described similar unanalyzed conditions. The revised information includes additional fire areas and additional conditions in previously identified fire areas.

Corrective actions underway in response to the previously identified conditions include a validation of the safe shutdown analysis. This validation is a detailed analysis of the routing of cables affecting equipment credited in response to a fire. The commitments and associated due dates identified in Section VI remain the same. Compensatory actions, including fire watches and walkdowns, ensure safety pending permanent resolution of the identified conditions.

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

Sincerely,

B. C. Waldrep
Plant General Manager
Harris Nuclear Plant

BCW/jpy

Enclosure

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IE22

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

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

LICENSEE EVENT REPORT (LER)

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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	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	05000
10	20	2004	2002	- 004 -	06	12	20	2004	N/A	05000

9. OPERATING MODE: 6

10. POWER LEVEL: 0

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

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☒ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Robert Hill – Lead Licensing Engineer	(919) 362-2033

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

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

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

On December 20, 2002, inspection of the Harris Nuclear Plant (HNP) Safe Shutdown Analysis (SSA) identified that postulated fires could cause spurious actuation of certain valves. Valve actuation in the flowpath for the protected Charging/Safety Injection Pump (CSIP) could result in loss of the pump. Similarly, simultaneous spurious closure of multiple valves in the flowpaths to the Reactor Coolant Pump (RCP) seals could result in the loss of RCP seal cooling. HNP implemented interim compensatory actions upon discovery.

During review and validation, HNP identified other postulated fires could cause spurious actuation of certain valves or components that could also result in the conditions described above, transfer of Refueling Water Storage Tank (RWST) inventory to the containment recirculation sump, transfer of some Reactor Coolant System (RCS) inventory to containment, inadvertent pressurizer spray, or could potentially impact indication used to monitor Reactor Coolant System pressure and level. These additional postulated fires were discovered on January 29 and July 23, 2003; February 13, August 13, September 14 & 15, October 4, 20, 26 & 29, 2004.

The cause of these conditions is inadequate original Safe Shutdown Analysis of certain conductor-to-conductor interactions. Design changes or other methods approved by the NRC will be used to restore compliance.

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

I. DESCRIPTION OF EVENT

The Harris Nuclear Plant (HNP) discovered that a condition exists with the lack of separation of cables for redundant components credited by the Safe Shutdown Analysis (SSA). This condition was discovered on December 20, 2002 and reported in LER 2002-004-00, dated February 18, 2003. Revision 1 to this LER describes another condition, which was discovered on January 29, 2003. Revision 2 to this LER describes another condition, which was discovered on July 23, 2003. Revision 3 to this LER describes another condition, which was discovered on February 13, 2004. Revision 4 to this LER describes additional conditions, which were discovered on August 13, September 14, and September 15, 2004. Revision 5 to this LER describes additional conditions, which were discovered on September 15 and October 4, 2004. Revision 6 to this LER describes additional conditions, which were discovered on October 20, October 26, and October 29, 2004.

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 cooling.

On January 29, 2003, with the Unit in Mode 1 at 100% power, HNP identified that simultaneous spurious opening of multiple valves could result in transferring of Refueling Water Storage Tank (RWST) [BE-, BP-, & BQ-TK] inventory to the containment recirculation sump. A roving fire watch has been posted in fire areas of concern.

On July 23, 2003, with the Unit in Mode 1 at 100% power, HNP identified that spurious opening of certain valves could result in transferring of RWST inventory to the containment recirculation sump. A roving fire watch was already posted in fire areas of concern as interim compensatory actions for other safe shutdown related issues, and the fire watch remains posted. This discovery of an old design issue was made during validation of the HNP safe shutdown analysis. This validation was being performed as a corrective action to the previously reported conditions.

On February 13, 2004, with the Unit in Mode 1 at 100% power, HNP identified four additional fire areas where spurious actuation of multiple valves could result in loss of the CSIP in service at the time of the postulated fire and in transferring of RWST inventory to the containment recirculation sump. The fire areas of concern are protected by detection and suppression systems, and they are on the path of a roving fire watch already posted as interim compensatory actions for other safe shutdown related issues. The fire watch remains posted. These additional fire areas were inadvertently missed during the investigation for the previously reported conditions (reference December 20, 2002 and July 23, 2003 discoveries). Similar to the previous discoveries, the discovery on February 13, 2004, is an old design issue that was identified during a review of the HNP safe shutdown program. This review and other validations are being performed as corrective actions to the previously reported conditions.

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

I. DESCRIPTION OF EVENT (Continued)

On August 13, September 14, and September 15, 2004, with the Unit in Mode 1 at 100% power, HNP identified that spurious opening of multiple valves could potentially result in the loss of the CSIP in service at the time of the postulated fire. A roving fire watch was already posted in fire areas of concern as interim compensatory actions for other safe shutdown related issues, and the fire watch remains posted. These discoveries are old design issues that were identified during a review of the HNP safe shutdown program. This review and other validations are being performed as corrective actions to the previously reported conditions.

On September 15, with the Unit in Mode 1 at 100% power, HNP identified that spurious actuation of multiple valves could potentially result in the loss of the CSIP in service at the time of the postulated fire. Additionally, HNP identified that spurious valve opening concurrent with spurious start of a Containment Spray (CT) pump [BE-P] could potentially result in the transfer of the RWST inventory to containment. On October 4, 2004, with the Unit in Mode 1 at 100% power, HNP identified that spurious closure of a certain valve could potentially result in the loss of RCP seal cooling credited by the SSA. Additionally, HNP identified that a postulated fire could result in a loss of indication of both Reactor Coolant System (RCS) wide range pressure transmitters [AB-PT] credited to monitor RCS pressure and level. A roving fire watch was already posted in these fire areas of concern as interim compensatory actions for other safe shutdown related issues, and the fire watch remains posted. These discoveries are old design issues that were identified during a review of the HNP safe shutdown program. This detailed review and other validations are being performed as corrective actions to the previously reported conditions.

On October 20, 26, and 29, with the Unit in Mode 6 at 0% power, HNP identified discoveries in four additional SSA fire areas and discoveries of components or combinations of components not previously reported in five previously identified SSA fire areas. These discoveries included spurious actuation of multiple components that could potentially result in mal-operation of components similar to previously reported conditions. A roving fire watch was already posted in these fire areas of concern as interim compensatory actions for other safe shutdown related issues, except for fire area 1-C since the containment is closed during normal operations. Additional walkdowns of fire area 1-C in the area of interest were performed to ensure that no in situ ignition sources and no intervening or transient combustibles were in the area. For the other areas, the fire watch remains posted. These discoveries are old design issues that were identified during a review of the HNP safe shutdown program. This detailed review and other validations are being performed as corrective actions to the previously reported conditions.

These findings of unanalyzed conditions are being reported pursuant to 10 CFR 50.73(a)(2)(ii)(B). No systems, structures, or components were inoperable at the time of discovery that significantly contributed to the event.

The previous four SSA fire areas identified included:

1. 1-A-BAL-B, located in the Reactor Auxiliary Building (RAB) Elevations 261' and 286'
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'
4. 1-A-EPB, located in the RAB Electrical Penetration Room "B" Elevation 261'

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

I. DESCRIPTION OF EVENT (Continued)

The discovery on February 13, 2004 identified the following four additional SSA fire areas:
1. 1-A-CSRA, located in the RAB Elevation 286'
2. 1-A-CSRB, located in the RAB Elevation 286'
3. 12-A-CR, located in the RAB Elevation 305'
4. 12-A-CRC1, located in the RAB Elevation 305'

The discoveries on August 13, September 14, and September 15, 2004 included new valves in the following five previously identified SSA fire areas:
1. 1-A-BAL-B, located in the RAB Elevations 261' and 286'
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'
4. 1-A-CSRA, located in the RAB Elevation 286'
5. 1-A-CSRB, located in the RAB Elevation 286'

The discoveries on September 15 and October 4, 2004 included new components in the following two previously identified SSA fire areas:
1. 1-A-BAL-B, located in the RAB Elevations 261' and 286'.
2. 1-A-CSRB, located in the RAB Elevation 286'

The discoveries on October 20 and October 29, 2004 identified the following four additional SSA fire areas:
1. 1-A-BAL-A, located in the RAB Elevations 190', 216', 236', and 261'
2. 1-A-SWGRA, located in the RAB Elevation 286'
3. 1-A-SWGRB, located in the RAB Elevation 286'
4. 1-C, located in the Containment Elevation 261'

The discoveries on October 26 and October 29, 2004 included new components or combinations of components in the following five previously identified SSA fire areas:
1. 1-A-BAL-B, located in the RAB Elevations 261' and 286'
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'
4. 1-A-CSRA, located in the RAB Elevation 286'
5. 1-A-CSRB, located in the RAB Elevation 286'

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I. DESCRIPTION OF EVENT (Continued)

The specific conditions for each of the fire areas identified above or for a combination of the fire areas identified above, as applicable based on the routing of cables for the various components are detailed below.

For a postulated fire in SSA fire areas 1-A-BAL-B or 1-A-EPA (261' elevation), certain cabling [CBL3] for the two outlet valves (1CS-165 or 1CS-166) of the Volume Control Tank (VCT), the CCW supply valve to RCP thermal barriers (1CC-207), the outlet isolation valve (1SI-4) of the Boron Injection Tank (BIT), and the safety injection to the Reactor Coolant System (RCS) isolation valves (1SI-52 and 1SI-107) 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 power cables for safety injection system MOVs 1SI-4, 1SI-52, and 1SI-107 are routed through SSA fire areas 1-A-BAL-B and 1-A-EPA with no fire barrier. In addition, the control power 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 cooling. The safety injection system valves are normally closed, so a postulated fire in this area resulting in spurious opening of multiple valves could result in damage to the running CSIP due to run out conditions. Simultaneous spurious actuation of multiple 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 (286' elevation), 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. The CCW system 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 cooling. However, RCP seals would still be protected by the normal seal injection function of the redundant charging/safety injection trains.

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I. DESCRIPTION OF EVENT (Continued)

For a postulated fire in SSA fire area 1-A-BAL-B (261' elevation), 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 (1-A-BAL-B, 261' elevation) 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.

Simultaneous spurious actuation of multiple 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.

For a postulated fire in SSA fire areas 1-A-BAL-B or 1-A-BAL-C (286' elevation), certain cabling for eight safety injection MOVs, three MOVs in each area, (1SI-300, 1SI-310, and 1SI-322; or 1SI-301, 1SI-311, and 1SI-323, respectively); and two MOV's in both areas, the outlet isolation valve (1SI-3) of the Boron Injection Tank (BIT) and the safety injection to the RCS isolation valve (1SI-86), 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 MOVs 1SI-300, 1SI-310, and 1SI-322 are unprotected inside their MCCs in SSA fire area 1-A-BAL-B. Similarly, the control power cables for MOVs 1SI-301, 1SI-311, and 1SI-323 are routed through SSA fire area 1-A-BAL-C and into their MCCs in this area with no fire barrier. In addition, the control power cables for safety injection system MOVs 1SI-3 and 1SI-86 are routed through SSA fire areas 1-A-BAL-B and 1-A-BAL-C with no fire barrier. Therefore, the unprotected cables for these MOVs are vulnerable to fire-induced hot shorts. These valves are required to shut to prevent transfer of inventory from the RWST to the containment recirculation sump. Simultaneous spurious opening of these multiple valves from a fire in either of these areas could result in inadvertently transferring inventory from the RWST to the containment recirculation sump. If this transfer of inventory were to occur, the water normally used for inventory makeup to the Reactor Coolant System (RCS) would not be available from a suction source (i.e., the RWST) credited by the SSA. The safety injection system MOVs 1SI-3 and 1SI-86 are normally closed, so a postulated fire in these areas resulting in spurious opening of these multiple valves could result in damage to the running CSIP due to run out conditions.

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 areas 1-A-EPA, 1A-EPB, or 1-A-BAL-B (261' elevation), certain cabling for two containment spray MOVs (1CT-102 and 1CT-105) 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 MOV 1CT-102 are routed in SSA fire area 1-A-EPB with no fire barrier. Similarly, the control power cables for MOVs 1CT-105 are routed through SSA fire areas 1-A-EPA and 1-A-BAL-B with no fire barrier. Therefore, the unprotected cables for these MOVs are vulnerable to fire-induced hot shorts. These valves are required to remain shut to prevent transfer of inventory from the RWST to the containment recirculation sump. Spurious opening of either of these valves from a fire in any of these fire areas could result in inadvertently transferring inventory from the RWST to the containment recirculation sump. If this transfer of inventory were to occur, the water normally used for inventory makeup to the Reactor Coolant System (RCS) would not be available from a suction source (i.e., the RWST) credited by the SSA. However, back-up sources would be available, and the ability to achieve and maintain cold shutdown would not be affected.

For a postulated fire in SSA fire areas 1-A-CSRA (286' elevation), 1-A-CSRB (286' elevation), 12-A-CR (305' elevation) or 12-A-CRC1 (305' elevation), certain cabling for the two outlet MOVs (1CS-165 or 1CS-166) of the Volume Control Tank (VCT) and for two containment spray MOVs (1CT-102 and 1CT-105) 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 MOVs 1CS-165 and 1CS-166 are routed through SSA fire areas 1-A-CSRA, 1-A-CSRB, 12-A-CR, and 12-A-CRC1 with no fire barrier. 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.

In addition, the control power cables for MOVs 1CT-102 and 1CT-105 are routed through SSA fire areas 1-A-CSRA, 1-A-CSRB, 12-A-CR, and 12-A-CRC1 with no fire barrier. Therefore, the unprotected cables for these MOVs are vulnerable to fire-induced hot shorts. These valves are required to remain shut to prevent transfer of inventory from the RWST to the containment recirculation sump. Spurious opening of either of these valves from a fire in any of these fire areas could result in inadvertently transferring inventory from the RWST to the containment recirculation sump. If this transfer of inventory were to occur, the water normally used for inventory makeup to the Reactor Coolant System (RCS) would not be available from a suction source (i.e., the RWST) credited by the SSA. However, back-up sources would be available, and the ability to achieve and maintain cold shutdown would not be affected.

For a postulated fire in SSA fire areas 1-A-CSRA (286' elevation) or 1-A-CSRB (286' elevation), certain cabling for the four safety injection MOVs (1SI-3, 1SI-4, 1SI-86, and 1SI-107) 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 safety injection MOVs 1SI-4, 1SI-86, and 1SI-107 are routed through SSA fire area 1-A-CSRA with no fire barrier, and the control power cables for safety injection MOVs 1SI-3 and 1SI-86 are routed through SSA fire area 1-A-CSRB with no fire barrier and therefore, are vulnerable to fire-induced hot shorts. These safety injection system valves are normally closed, so a postulated fire in either of these areas resulting in spurious opening of these multiple valves could result in damage to the running CSIP due to run out conditions.

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I. DESCRIPTION OF EVENT (Continued)

For a postulated fire in SSA fire area 1-A-CSRB (286' elevation), certain cabling is not protected in accordance with the requirements of NUREG 0800, Attachment 1 (Branch Technical Position CMEB 9.5-1) Section C.5.b and therefore is vulnerable to fire-induced hot shorts.

The C CSIP suction cross-connect valve with the A CSIP (1CS-168) is required to remain open to ensure the credited A CSIP is aligned to its suction source. Therefore, a postulated fire resulting in a spurious closure of this valve could result in damage to the running CSIP.

The B CT pump and its associated discharge valve (1CT-88) are required to remain off and shut, respectively, to ensure that the RWST inventory is not discharged to the containment via the containment spray ring header. Therefore, a postulated fire in this area resulting in spurious actuation of these multiple components could result in the water normally used for inventory makeup to the RCS not being available from a suction source (i.e., the RWST) credited by the SSA.

The RCP Thermal Barrier Flow Control Valve (1CC-252) is required to remain open to provide CCW flow to the RCP seals. As a result, a postulated fire in this area could result in spurious closure of this valve and loss of RCP seal cooling credited by the SSA.

The RCS wide range pressure transmitters (PT-402 and PT-403) provide the Operator with an indication of RCS pressure and level. Therefore, a postulated fire in this area could result in the loss of RCS pressure and level indication credited by the SSA.

For a postulated fire in SSA fire area 1-A-BAL-B (261' and 286' elevations), certain cabling is not protected in accordance with the requirements of NUREG 0800, Attachment 1 (Branch Technical Position CMEB 9.5-1) Section C.5.b and therefore is vulnerable to fire-induced hot shorts. The "A" CT pump is required to remain off and its associated discharge valve (1CT-50) is required to remain shut to ensure that the RWST inventory is not discharged to the containment via the containment spray ring header. Therefore, a postulated fire in this area resulting in spurious actuation of these multiple components could result in the water normally used for inventory makeup to the RCS not being available from a suction source (i.e., the RWST) credited by the SSA.

- For a postulated fire in SSA fire area 1-A-SWGRB (286' elevation), certain cabling for the RCP thermal barriers flow control valve (1CC-252) and the CCW supply valve to RCP seals and motor coolers (1CC-208), certain cabling for the Boron Injection Tank outlet isolation valve (1SI-3) and the safety injection to the RCS isolation valve (1SI-86), and certain cabling for the "B" reactor coolant pump (1RC-RCPB) and the pressurizer spray valve loop "B" (1RC-103) is 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. Therefore this cabling is vulnerable to fire-induced hot shorts. The CCW system MOVs 1CC-208 and 1CC-252 are required to remain open to provide CCW flow to the RCP thermal barrier heat exchangers. As a result, a postulated fire in this area could result in spurious closure of either of these valves and loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal cooling. The safety injection system MOVs 1SI-3 and 1SI-86 are normally closed, so a postulated fire in these areas resulting in spurious opening of these multiple valves could result in damage to the running CSIP due to run out conditions. A postulated fire in this areas resulting in the simultaneous spurious start of the "B" reactor coolant pump (after it had been secured) and the spurious opening of pressurizer spray valve loop "B" valve 1RC-103 could result in an inadvertent pressurizer spray and subsequent depressurization.

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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-A (190', 216', 236', and 286' elevations), certain cabling for the Auxiliary Feedwater (AFW) motor pump "A" discharge valve (1AF-19) and the VCT outlet isolation valve (1CS-166) is 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. Therefore this cabling is vulnerable to fire-induced hot shorts. The AFW valve 1AF-19 is required to remain open while its associated pump is in service. As a result, a fire in this area could result in spurious closure of this valve and therefore the loss of AFW flow to the "A" and "C" steam generators credited by the SSA. The charging system valve is 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 this area could result in spurious closure of the VCT outlet valve, 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.

For a postulated fire in SSA fire area 1-A-CSRA (286' elevation), certain cabling for the charging system flow control valve (1CS-231), for the pressurizer power-operated relief valve (PORV) (1RC-114) and its associated isolation (block) valve (1RC-113), for the and for the "A" containment spray pump (1CT-E004) and its associated discharge valve (1CT-50) is 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. Therefore this cabling is vulnerable to fire-induced hot shorts. The charging system valve 1CS-231 is required to remain open for RCP seal cooling and as a boration flowpath. As a result, a fire in this area could result in spurious closure of this valve and therefore the loss of RCP seal cooling and a boration flowpath credited by the SSA. The pressurizer PORV 1RC-114 is closed and its associated isolation valve 1RC-113 is open during normal plant operation. As a result, a fire in this area could result in spurious opening of the pressurizer PORV and its associated isolation valve could not be closed resulting in the transfer of some RCS inventory to the Pressurizer Relief Tank (PRT). The "A" CT pump 1CT-E004 is required to remain off and its associated discharge valve (1CT-50) is required to remain shut to ensure that the RWST inventory is not discharged to the containment via the containment spray ring header. Therefore, a postulated fire in this area resulting in spurious actuation of these multiple components could result in the water normally used for inventory makeup to the RCS not being available from a suction source (i.e., the RWST) credited by the SSA.

A comprehensive matrix of components by fire area is presented in the table below. This matrix lists the components that have been previously reported as well as the most recent components identified by this LER.

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

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I. DESCRIPTION OF EVENT (Continued)

Matrix of Components by Fire Area

1-A-BAL-B (261')	1-A-BAL-B (286')	1-A-CSRA (286')
1CC-207	1CC-207	1CC-207
1CC-249	1CC-249	1CC-249
1CC-252	1CS-165	1CC-252
1CS-165	1CS-243	1CS-165
1CS-166	1CT-50	1CS-166
1CS-168	1CT-E004	1CS-169
1CS-169	1RC-103	1CS-170
1CS-170	1RC-107	1CS-231
1CS-214	1RC-RCPA	1CS-243
1CS-217	1RC-RCPB	1CT-102
1CS-218	1SI-3	1CT-105
1CS-219	1SI-300	1CT-50
1CS-243	1SI-301	1CT-E004
1CS-250	1SI-310	1RC-103
1CS-254	1SI-311	1RC-107
1CS-257	1SI-322	1RC-113
1CS-261	1SI-323	1RC-114
1CT-102	1SI-86	1RC-900
1CT-105	1-A-BAL-C (286')	1RC-901
1CT-50	1CC-208*	1RC-902
1CT-E004	1CC-251*	1RC-903
1RC-103	1CS-166	1RC-904
1RC-107	1CS-243	1RC-RCPA
1RC-RCPA	1CS-341	1RC-RCPB
1RC-RCPB	1CS-382	1SI-107
1SI-107	1CS-423	1SI-3
1SI-4		1SI-4
1SI-52		1SI-86

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I. DESCRIPTION OF EVENT (Continued)

Matrix of Components by Fire Area (Continued)

1-A-CSRB (286')	1-A-EPA (261')	1-A-SWGRB (286')
1CC-208	1CC-207	1CC-208
1CC-251	1CS-165	1CC-251
1CC-252	1CS-166	1CS-166
1CS-165	1CT-102	1CS-168
1CS-166	1CT-105	1CS-171
1CS-168	1SI-107	1CS-217
1CS-217	1SI-4	1CS-220
1CS-220	1SI-52	1CS-240
1CS-240	1-A-EPB (261')	1CS-243
1CS-243	1CT-102	1CS-341
1CS-341	1CT-105	1CS-382
1CS-382	12-A-CR (305')	1CS-423
1CS-423	1CS-165	1RC-103
1CT-102	1CS-166	1RC-RCPB
1CT-105	1CT-102	1SI-3
1CT-88	1CT-105	1SI-86
1SI-107	12-A-CRC1 (305')	1-A-BAL-A (190', 216', 236', & 261')
1SI-3	1CS-165	
1SI-4	1CS-166	1AF-19
1SI-86	1CT-102	1CS-166
PT-402	1CT-105	1-C (261')
PT-403	1-A-SWGRA (286')	1RC-900
	1CC-249	1RC-901
	1CS-243	1RC-902
	1RC-107	1RC-903
	1RC-RCPA	1RC-904
		1RC-905

* Condition of 1CC-208 and 1CC-251 has been corrected in fire area 1-A-BAL-C (Modification #56427).

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II. CAUSE OF EVENT

The cause of these conditions 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.

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 (261' elevation) 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 cooling,
- Loss of charging or high head safety injection flow credited by the SSA,
- Simultaneous spurious actuation of multiple 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,
- Simultaneous spurious actuation of multiple 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 LOCA without credited CSIPs.

Potential safety consequences for postulated fires in fire areas 1-A-BAL-B and 1-A-EPA (261' elevation) that also result in spurious opening of certain SSA MOVs may include:

- Spurious opening of valves in the containment spray system could result in transfer of RWST inventory to the containment recirculation sump. However, this water inventory would still be available for use, if needed, from the containment recirculation sump.
- Simultaneous spurious opening of multiple valves in the safety injection system could result in damage to the CSIP in service due to run out conditions.

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III. SAFETY SIGNIFICANCE (Continued)

Potential safety consequence for a postulated fire in fire area 1-A-BAL-B (286' elevation) that also results in spurious opening of certain SSA MOVs may include:

- Simultaneous spurious opening of multiple valves in the safety injection system could result in transfer of RWST inventory to the containment recirculation sump. However, this water inventory would still be available for use, if needed, from the containment recirculation sump.
- Simultaneous spurious opening of multiple valves in the safety injection system could result in damage to the CSIP in service due to run out conditions.

Potential safety consequence for a postulated fire in fire area 1-A-EPB (261' elevation) that also results in spurious opening of certain SSA MOVs may include:

- Spurious opening of valves in the containment spray system could result in transfer of RWST inventory to the containment recirculation sump. However, this water inventory would still be available for use, if needed, from the containment recirculation sump.

Potential safety consequences for a postulated fire in fire area 1-A-BAL-C (286' elevation) that also results in spurious actuation of certain SSA MOVs may include:

- Loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal cooling. However, RCP seals would still be protected by the normal seal injection function of the redundant charging/safety injection trains.
- Simultaneous spurious opening of multiple valves in the safety injection system could result in transfer of RWST inventory to the containment recirculation sump. However, this water inventory would still be available for use, if needed, from the containment recirculation sump.
- Simultaneous spurious opening of multiple valves in the safety injection system could result in damage to the CSIP in service due to run out conditions.

Potential safety consequences for a postulated fire in fire areas 1-A-CSRA (286' elevation), 1-A-CSRB (286' elevation), 12-A-CR (305' elevation) and 12-A-CRC1 (305' elevation) that also results in spurious actuation 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.
- Spurious opening of valves in the containment spray system could result in transfer of RWST inventory to the containment recirculation sump. However, this water inventory would still be available for use, if needed, from the containment recirculation sump.

Potential safety consequences for a postulated fire in fire areas 1-A-CSRA (286' elevation) and 1-A-CSRB (286' elevation) that also results in spurious opening of certain SSA MOVs may include:

- Simultaneous spurious opening of multiple valves in the safety injection system could result in damage to the CSIP in service due to run out conditions.

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III. SAFETY SIGNIFICANCE (Continued)

Potential safety consequence for a postulated fire in fire area 1-A-CSRB (286' elevation) that also results in spurious actuation of certain components include:

- Subsequent damage to the running CSIP credited by the SSA for charging flow and RCP seal cooling.
- Discharge of RWST inventory to the containment via the containment spray ring header, resulting in the water normally used for inventory makeup to the RCS not available from a suction source (i.e., the RWST) credited by the SSA.
- Loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal cooling.
- Loss of RCS pressure and level indication credited by the SSA which could potentially impact pressure and level monitoring.

Potential safety consequence for a postulated fire in fire area 1-A-BAL-B (261' and 286' elevations) that also results in spurious actuation of certain components include:

- Discharge of RWST inventory to the containment via the containment spray ring header, resulting in the water normally used for inventory makeup to the RCS not being available from a suction source (i.e., the RWST) credited by the SSA.

Potential safety consequence for a postulated fire in fire area 1-A-SWGRB (286' elevation) that also results in spurious actuation of certain components include:

- Loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal cooling.
- Simultaneous spurious opening of multiple valves in the safety injection system could result in damage to the CSIP in service due to run out conditions.
- Simultaneous spurious start of the "B" reactor coolant pump (after it had been secured) and the spurious opening of a pressurizer spray valve could result in an inadvertent pressurizer spray and subsequent depressurization.

Potential safety consequence for a postulated fire in fire area 1-A-BAL-A (190', 216', 236', and 286' elevations) that also results in spurious actuation of certain components include:

- Loss of AFW flow to the "A" and "C" steam generators credited by the SSA.
- Loss of suction flow and subsequent damage to the running CSIP credited by the SSA for charging flow and RCP seal cooling.

Potential safety consequence for a postulated fire in fire area 1-A-CSRA (286' elevation) that also results in spurious actuation of certain components include:

- Loss of flow to RCP thermal barrier heat exchangers for RCP seal cooling and loss of a boration flowpath credited by the SSA.
- Spurious actuation of multiple valves could result in transfer of some RCS inventory to the Pressurizer Relief Tank (PRT).
- Spurious actuation of multiple components could result in discharge of RWST inventory to the containment via the containment spray ring header, resulting in the water normally used for inventory makeup to the RCS not being available from a suction source (i.e., the RWST) credited by the SSA.

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III. SAFETY SIGNIFICANCE (Continued)

Potential safety consequence for a postulated fire in the other two additional SSA fire areas 1-A-SWGRA (286' elevation) and 1-C (261'elevation in containment) and the discoveries of components or combinations of components in the previously identified SSA fire areas that also results in spurious actuation of certain components identified by Revision 6 of this LER include:

- Simultaneous spurious start of the "A" reactor coolant pump (after it had been secured) and the spurious opening of a pressurizer spray valve could result in an inadvertent pressurizer spray and subsequent depressurization.
- Loss of flow to RCP thermal barrier heat exchangers credited by the SSA for RCP seal cooling.
- Transfer of some RCS inventory to containment atmosphere. However, the RCS high point vent system is designed to ensure that any transfer of coolant inventory is less than the make-up capacity of one charging pump in the event of a Safety Class 2 pipe break or inadvertent valve actuations. In addition, the path from the reactor vessel head utilizes a 3/8-inch diameter orifice, which also limits flow to less than the make-up capacity of one charging pump in the event of a Safety Class 2 pipe break or inadvertent valve actuations.

The defense-in-depth provided by the 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.

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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.

The additional fire areas have been added to the roving fire watch as interim compensatory action for the condition identified on February 13, 2004. For the conditions identified by Revision 6 of this LER, a roving fire watch was already posted in the fire areas of concern as interim compensatory actions for other safe shutdown related issues, except for fire area 1-C since the containment is closed during normal operations. Additional walkdowns of fire area 1-C in the area of interest were performed to ensure that no in situ ignition sources and no intervening or transient combustibles were in the area. For the other areas, the fire watch remains posted.

Complete a validation 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. The previously reported condition of 1CC-208 and 1CC-251 has been corrected in fire area 1-A-BAL-C (HNP Modification #56427).

These actions are scheduled to be completed by refueling outage (RFO) 13 (Currently scheduled for May 13, 2006).

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V. PREVIOUS SIMILAR EVENTS

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. The root cause for this previous event is not significant in relation to the subject event, therefore, the previous corrective actions would not be expected to identify or prevent the deficiencies identified by this LER.

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." The root cause for this previous event is not significant in relation to the subject event, therefore, the previous corrective actions would not be expected to identify or prevent the deficiencies identified by this LER.

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." The root cause for this previous event is significant in relation to the subject event. The previous corrective action did not identify or prevent the deficiencies identified by this LER because the valve identified in this fire area (1CT-102) was not included in the SSA. The root cause for the previous event performed a review in the additional fire area only of associated cables credited in the SSA.

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VI. COMMITMENTS

The actions committed to by Carolina Power & Light Company doing business as Progress Energy Carolinas, Inc. (PEC) in this document are identified below. Any other actions discussed in this submittal represent intended or planned actions by PEC. 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.	June 20, 2005
2. Restore the identified conditions of this LER to compliance by design changes or other methods approved by the NRC.	Refueling Outage 13 (Current schedule May 13, 2006)