

Delaying With Fire: Attachment 1

Union of Concerned Scientists

July 2006

Shearon Harris Fire Protection Abridged Chronology	
Date	Event
11/19/1980	The NRC published in the Federal Register a revised 10 CFR 50.48 and a new Appendix R to 10 CFR 50 regarding fire protection requirements for new and existing nuclear power plants, respectively. ¹
02/17/1981	The revised 10 CFR 50.48 and new Appendix R to 10 CFR 50 became effective. ²
02/20/1981	The NRC notified all power reactor licensees that the fire protection regulations in the revised 10 CFR 50.48 and new Appendix R to 10 CFR 50 are in force. ³
07/1981	The NRC issued Revision 3 to Section 9.5.1, "Fire Protection Program," to NUREG-0800, the Standard Review Plan for nuclear power reactors. ⁴
04/24/1986	The NRC issued Generic Letter 86-10 to power reactor licensees to clarify the agency's expectations regarding fire protection requirements. ⁵
02/04/1988	CP&L declared an emergency (Unusual Event) when the reactor auxiliary building supply fan motor S-3B was reported to be smoking. The electrical breaker for the fan was opened to de-energize the motor. ⁶
10/10/1989	CP&L declared an emergency (Alert level) at Harris due to a fire in the main generator and "B" main transformer. ⁷
04/28/1997	Workers called the Holly Springs fire department for assistance due to a fire in the A-SA battery room. The plant was in a refueling outage at the time. ⁸
08/18/1997	According to the NRC: <i>...the licensee [Carolina Power & Light Company] made changes to the approved fire protection program without prior Commission approval, that adversely affected the ability to achieve and maintain safe shutdown in event of a fire. In Safety Evaluation 97-255 the licensee accepted the condition of a degraded Thermo-Lag fire barrier assembly between the B Train Switchgear Room/ACP Room and the A Train CSR [Cable Spreading Room] in lieu of the intended 3-hour fire rating. ... The licensee went from full compliance with the fire protection safe shutdown system separation criteria to less than full compliance which increased the likelihood that both redundant divisions or trains of safety-related systems could be damaged by a single fire.⁹</i>
11/05/1999	The NRC performed a pilot fire protection inspection using a procedure revised for the new Reactor Oversight Process (ROP) and identified two violations: (1) fire resistance ratings and qualification testing of Thermo-Lag, and (2) Heymc [sic] one-hour and Promatec "MT" three-hour fire barrier systems not being qualified to meet safe shutdown separation requirements. Thermo-Lag was installed as a three-hour fire barrier between Switchgear Room B, Cable Spreading Room A, and Cable Spreading Room B. CP&L performed Thermo-Lag

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	<p>testing in 1994 and 1995 that demonstrated the Thermo-Lag fire barrier would function for only one hour and 48 minutes instead of three hours. CP&L performed an evaluation that accepted the reduced performance capability of the Thermo-Lag fire barrier. The NRC inspection revealed the Harris Final Safety Analysis Report (FSAR) indicated a three hour fire severity loading existed in the area adjacent to the Thermo-Lag fire barriers and that no backup means of fire protection (e.g., automatic fire sprinklers) existed for the areas.</p> <p>Heymc [sic] and Promatec fire barrier wraps were applied for cables on redundant trains of safe shutdown related functions throughout the plant and both trains of the emergency diesel generators power cables routed through fire zone 4-A-CHLR. CP&L's fire barrier tests CTP-1026 for Heymc [sic] and CTP-1071 for Promatec "MT" indicated that the tests used the acceptance criteria of American Nuclear Insurers Bulletin No. 5 (1979) for fire barrier systems. The NRC inspection team discovered that the cover letters for each test report specifically stated the methodology was not considered an equivalent endurance qualification method for rating fire barriers.</p> <p>NRC Region II asked the NRC's Office of Nuclear Reactor Regulation to review these fire protection findings and determine if they constituted violations.¹⁰</p>
12/17/1999	The NRC notified CP&L of the two fire protection issues identified during the pilot fire protection inspection conducted at Harris. ¹¹
04/25/2000	The NRC issued a GREEN finding for a violation, with six examples, of fire protection program requirements for fire barrier wraps. ¹²
08/01/2000	<p>The NRC's Office of Nuclear Reactor Regulation (NRR) responded to the NRC Region II request to evaluate issues identified during the November 1999 pilot fire protection inspection at Harris. NRR concluded:</p> <p style="padding-left: 40px;"><i>The licensee has not clearly demonstrated that the as-installed Thermo-Lag fire barriers and associated penetration seals are adequate to withstand the hazards associated with the area(s) to protect important equipment from damage. The use of Thermo-Lag in this application appears to conflict with the NRC's fire protection requirements as specified in GDC [general design criterion] 3.</i></p> <p style="padding-left: 40px;"><i>The information documented in Final Report CTP 1026 is insufficient to qualify the Hemyc fire barrier system as a 1-hour-rated electrical raceway fire barrier system.</i></p> <p style="padding-left: 40px;"><i>The information documented in Final Report CTP 1071 is insufficient to qualify "MT" fire barrier systems as 3-hour-rated conduit fire barrier systems.¹³</i></p>
08/08/2000	CP&L identified "Oversight of the Transient Combustible Program" as an improvement initiative at Harris. ¹⁴
09/15/2000	CP&L challenged the NRC NRR position about Thermo-Lag at Harris. CP&L informed the NRC about evaluations it performed of the fire hazards in the areas where Thermo-

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	<p>Lag was installed. CP&L stated:</p> <p style="text-align: center;"><i>These evaluations, in conjunction with the upgrades performed, demonstrate that although the Thermo-Lag fire barriers do not fully meet the originally intended fire endurance capability, they are adequate to ensure a postulated fire on one side of the fire barrier would not induce damage to redundant safe shutdown circuits located on the other side of the barrier. This conclusion is based on the credible fire hazards and scenarios that are in accordance with the guidance provided in Generic Letter 86-10.¹⁵</i></p>
09/25/2000	NRC Region II forwarded CP&L's letter of September 15, 2000, to the NRC Office of Nuclear Reactor Regulation and asked if the letter presented any information that would alter NRR's position documented in its August 1, 2000, letter. ¹⁶
10/24/2000	<p>The NRC's Office of Nuclear Reactor Regulation (NRR) responded to the NRC Region II request to re-evaluate issues identified during the November 1999 pilot fire protection inspection at Harris based on "new" information provided by CP&L. NRR reported:</p> <p style="text-align: center;"><i>Based on its review, the staff concluded that the licensee's September 15, 2000, letter did not provide any additional technical information to change the conclusions NRR made in its August 1, 2000, response to TIA 99-028.¹⁷</i></p>
11/06/2000	NRC informed CP&L that its position on fire barriers at Harris was not altered by the information provided by the company in its September 15, 2000, letter. ¹⁸
02/26/2001	<p>The NRC Office of Nuclear Reactor Regulation informed NRC Region II about conclusions from its review of test reports for Thermo-Lag fire barriers separating Switchgear Room A, Cable Spreading Room A, and Cable Spreading Room B at Harris. NRR reported:</p> <p style="text-align: center;"><i>The 1-hour wall assembly satisfied the acceptance criteria specified in Supplement 1 to Generic Letter (GL) 86-10 for a wall assembly to achieve a 1-hour fire resistive rating to meet NRC fire protection requirements.</i></p> <p style="text-align: center;"><i>The 3-hour wall and ceiling assemblies fire tests did not satisfy the acceptance criteria in Supplement 1 to GL 86-10 to achieve a 3-hour fire resistive rating, and therefore should not be used as the basis for determining the adequacy of the fire barriers for satisfying NRC fire protection requirements.¹⁹</i></p>
03/19/2001	The NRC informed CP&L that the Nuclear Energy Institute (NEI) had informed the agency that Harris, Arkansas Nuclear One Units 1 and 2, Catawba Units 1 and 2, Ginna, Indian Point Units 2 and 3, Robinson 2, Waterford, FitzPatrick, McGuire Units 1 and 2, and Vermont Yankee relied on Hemyc and/or MT fire wrap to comply with 10 CFR 50, Appendix R safe shutdown separation requirements. The NRC informed CP&L that it had asked NEI to coordinate a generic industry initiative to address the non-conforming fire barrier issues, but NEI refused to do so. Consequently, the NRC informed CP&L it would be working directly with the company and the owners of the other non-conforming plants to resolve the issues. ²⁰

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03/21/2001	During a public meeting on fire protection issues, CP&L restated its position that the as-installed fire protection configuration at Harris was technically and legally adequate. ²¹
04/17/2001	<p>ShawPittman, CP&L’s outside legal counsel, informed the NRC that the agency’s conclusions regarding fire barriers at Harris was wrong for three reasons:</p> <p style="padding-left: 40px;"><i>First, Harris is not licensed to Appendix R.</i></p> <p style="padding-left: 40px;"><i>Second, the Hemyc fire barrier systems were qualified to testing requirements specifically endorsed by the NRC Atomic Safety and Licensing Board and explicitly made part of the licensing basis of Harris. The fire rating of the installed fire wrap at Harris is demonstrated by the qualifications testing, as approved by the NRC at the time for a number of nuclear plants, and is not indeterminate simply because it does not meet the testing requirements favored by NRC today.</i></p> <p style="padding-left: 40px;"><i>Third, before attempting to require the “affected licensees” to discuss an approach for resolving the issue, NRR must complete the analysis and justification as set forth in 10 C.F.R. § 50.109.²²</i></p>
05/10/2001	CP&L and the NRC have a conference call to discuss the Thermo-Lag fire barriers used in the Cable Spreading Rooms at Harris. During the call, CP&L provided additional information to support its position that the configuration “ <i>meets the original intent of the three hour fire barrier design requirements based on withstanding 1.8 hours of ASTM E119 fire exposure, and through additional engineering analysis of the as-installed configurations (fire barrier plus a 1” air gap between the fire barrier surface and cable tray).</i> ” ²³
06/15/2001	CP&L submitted a licensee event report to the NRC about a design deficiency involving inadequate fuse coordination affecting safe shutdown train separation. ²⁴
07/27/2001	<p>The NRC informed CP&L about its inspection of the fuse coordination issue. The NRC reported:</p> <p style="padding-left: 40px;"><i>If certain fires occurred in the “A” switchgear room, the potential existed for a PORV [power operated relief valve] and its associated block valve, in the opposite safe shutdown division, to be open at the same time without the ability to shut either valve. With the existence of the identified deficiency, the occurrence of any of several fires could have resulted in an unisolable stuck-open PORV (small-break loss-of-coolant accident).²⁵</i></p>
08/14/2001	CP&L provided the NRC with the company’s position that the fire brigade at Harris fully complies with existing regulations and guidance and requested additional information from the NRC for the agency’s determination that the Harris fire bridge is “moderately degraded.” ²⁶
08/21/2001	CP&L submitted its calculation titled “Assessment of Tested and As-Built Thermo-Lag Fire Barrier Configurations,” and dated August 17, 2001, to the NRC as a follow-up to the May 10 th conference call. ²⁷

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09/26/2001	<p>The NRC responded to CP&L's letter about fire brigade performance. The NRC reported:</p> <p style="text-align: center;"><i>We do not interpret this characterization [fire brigade effectiveness in conjunction with a fire protection inspection finding] as a finding in its own right based on a determination of compliance or non-compliance of the fire brigade with regulations.²⁸</i></p>
10/25/2001	<p>The NRC issued a GREEN finding to CP&L for the design deficiency involving inadequate fuse coordination resulting in the potential for the pressurizer power operated relief valves (PORVs) and associated block valves failing open in event of a fire in Switchgear Room A.</p>
12/03/2001	<p>In response to the company's request, the NRC conducted a public meeting with CP&L in the NRC's Region II offices to discuss Thermo-Lag fire barrier adequacy.²⁹</p>
12/18/2001	<p>The NRC identified two apparent violations involving fire protection regulations. The NRC issued a Preliminary WHITE finding for an apparent violation involving the Thermo-Lag fire barrier between Switchgear Room B and Cable Spreading Room A not meeting its three-hour requirement. The NRC stated this violation was significant because:</p> <p style="text-align: center;"><i>This degraded condition increased plant risk because, if a severe fire occurred in Fire Area 1-A-SWGR-B and breached the Thermo-Lag fire barrier, both trains of post-fire safe shutdown capability could be damaged or lost due to the same fire.</i></p> <p>The second apparent violation involved CP&L using an analysis for the degraded Thermo-Lag fire barrier that had not been reviewed and approved by the NRC.³⁰</p>
01/28/2002	<p>The NRC issued a GREEN finding for an apparent violation involving two examples of failing to properly implement the fire protection program in Cable Spreading Room B. The first example involved the failure to have automatic sprinklers in the cable spreading room tunnel area where multiple safety-related cable trays contain safe shutdown cables. NRC inspectors pointed out that Section 9.5.1 of the Harris Final Safety Analysis Report indicated that all of the cable spreading rooms had automatic fire suppression and that CP&L's Engineering Service Request 95-00620 acknowledged that Cable Spreading Room B lacked automatic fire sprinklers.</p> <p>The second example was the use of Thermo-Lag as a three-hour fire barrier on the ends of the Cable Spreading Room B tunnel. The Thermo-Lag barrier itself had a rating of only 1.8 hours, and it along with an assumed 1-inch gap on one side of the barrier were credited with meeting the three-hour requirement. The NRC inspectors looked for either physical or administrative protection of the 1-inch air gap but found none. The NRC inspectors did not find the 1-inch air gap mentioned in any FSAR descriptions of the barrier for the cable spreading room fire areas and did not see the 1-inch air gap included on any design drawings. The NRC inspectors concluded that the unverified assumption had not been properly validated as required by plant procedures.³¹</p>

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01/31/2002	<p>During the pre-enforcement conference for NRC's apparent violations involving Thermo-Lag fire barriers at Harris, CP&L stated that the core damage frequency (CDF) related to fire events could be expressed as:</p> <p style="padding-left: 40px;"> $CDR = IF \times PP \times MS \times BD \times SSD$, where IF = ignition frequency (i.e., chance of a fire starting) PP = propagation probability (i.e., chance that fire damage propagates to impair both safe shutdown trains) MS = manual suppression (i.e., chance that workers successfully mitigate the fire consequences) BD = barrier degradation (i.e., chance that fire barriers fail to confine fire) SSD = safe shutdown equipment (i.e., chance that safe shutdown equipment fails to safely shutdown the reactor)³² </p>
01/31/2002	<p>CP&L promised the NRC:</p> <p style="text-align: center;"><i>Harris is committed to restoring compliance in a timely manner.</i>³³</p>
03/18/2002	<p>The NRC revised its risk assessment for the Thermo-Lag apparent violation based on information provided by CP&L during the January 31st pre-decisional enforcement conference. The preliminary WHITE finding remained a WHITE finding after the mathematical revision.³⁴</p>
04/16/2002	<p>The NRC issued a Final WHITE finding for an apparent violation involving the Thermo-Lag fire barrier between Switchgear Room B and Cable Spreading Room A not meeting its three-hour requirement.³⁵</p>
05/16/2002	<p>NRC informed the Nuclear Energy Institute (NEI) in writing of its position that operator manual actions could be credited for fires involving 10 CFR 50, Appendix R III.G.2 fire areas ONLY when pre-approved by the NRC via exemptions or deviations.³⁶</p>
08/12/2002	<p>The NRC reported results from its follow-up inspection into the WHITE finding for fire protection and a subsequent WHITE finding for debris impairing the post-accident performance of the emergency core cooling systems. With regard to the fire protection issue, the NRC identified:</p> <p style="padding-left: 40px;"><i>The potential problem with the Thermo-Lag fire barrier material was identified to industry by the NRC in 1992. Licensee [CP&L] actions to address Generic Letter (GL) 92-08 resulted in the acceptance of an inadequate Thermo-Lag fire barrier in 1997 (ESR 95-00620, Thermo-lag Fire Protection Issues Resolution, Revision 1). There were several opportunities to find this problem. The final response to the GL provided the Harris final plan and included the safety evaluation for the modification. The GL response was routed through licensee management and was signed out by the site vice president. The 1998 triennial fire protection Nuclear Assessment Section (NAS) audit inspected a sample of Thermo-lag and included the required independent evaluation performed by a contractor. Self-assessments of the fire protection program after 1997 also had the opportunity to find the problem. However, they were dominated by the individuals responsible for the</i></p>

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	<i>Thermo-lag evaluation.</i> ³⁷
09/09/2002	<p>The NRC issued its report for the supplemental inspection performed at Harris to assess CP&L's corrective actions for the violation involving Thermo-Lag fire barrier in the Cable Spreading Rooms which had resulted in a WHITE finding. The NRC reported:</p> <p style="text-align: center;"><i>...the inspector identified that the licensee intended to use local manual operator actions in lieu of one of the methods identified in NRC Position C.5.b.(2) of Branch Technical Position (BTP) CMEB 9.5-1.</i>³⁸</p>
10/04/2002	<p>The NRC informed CP&L that actions taken at Harris to physically separate the auxiliary control panel room from the B Train switchgear room had lowered the risk of a fire challenging the Thermo-Lag barrier by a factor of 10, which lowered the overall significance of the condition from its original WHITE finding level to the GREEN finding level. Consequently, the NRC was considering the WHITE finding closed.³⁹</p>
01/23/2003	<p>Workers at Harris, responding to findings during last month's triennial fire protection baseline inspection determined that simultaneous multiple spurious opening of certain valves caused by hot shorts during a fire could result in transferring the Refueling Water Storage Tank (RWST) inventory to the containment recirculation sump. If that transfer occurred, the water needed to inventory makeup to the reactor coolant system would not be available from a source credited in the safe shutdown analysis.⁴⁰</p>
01/31/2003	<p>The NRC reported that the triennial fire protection baseline inspection at Harris identified nine (9) violations:</p> <ol style="list-style-type: none"> 1. <i>Physical and procedural protection for equipment that was relied on for safe shutdown (SSD) during a fire in safe shutdown analysis (SSA) areas 1-A-BAL-B1, 1-A-BAL-B2, and 1-A-EPA of the reactor auxiliary building were inadequate. Motor-operated valve 1CS-165, volume control tank outlet to charging/safety injection pumps was not protected physically or procedurally from maloperation due to a fire. Consequently, a fire in one of the three SSA areas could result in a reactor coolant pump seal loss of coolant accident (LOCA) with no high pressure safety injection available.</i> 2. <i>Physical and procedural protection for equipment that was relied on for SSD during a fire in SSA area 1-A-BAL-B-B5 of the reactor auxiliary building were inadequate. Motor-operated valves 1CS-169, charging/safety injection pump (CSIP) suction cross-connect; 1CS-214, CSIP mini-flow isolation; 1CS-218, CSIP discharge cross-connect; and 1CS-219, CSIP discharge cross-connect; were not protected physically or procedurally from maloperation due to a fire. Consequently, a fire in SSA area 1-A-BAL-B-B5 could result in a loss of all charging and high pressure safety injection.</i> 3. <i>Physical and procedural protection for equipment that was relied on for SSD during a fire in SSA area 1-A-BAL-B-B4 of the reactor auxiliary building were inadequate. Motor operated valves 1CS-166, volume control tank outlet to CSIPs; and 1CS-168, CSIP suction cross-connect; were not protected physically</i>

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	<p><i>or procedurally from maloperation due to a fire. Consequently, a fire in SSA area 1-A-BAL-B-B4 could result in a loss of all charging and high pressure safety injection.</i></p> <p>4. <i>Physical and procedural protection for equipment that was relied on for SSD during a fire in SSA area 1-A-BAL-C of the reactor auxiliary building were inadequate. Motor operated valves ICC-208, component cooling water (CC) supply to reactor coolant pump (RCP) seals; and ICC-251, CC return from RCP seals; were not protected physically or procedurally from maloperation due to a fire. Consequently, a fire in SSA area 1-A-BAL-C could potentially result in an RCP seal LOCA.</i></p> <p>5. <i>Many local manual operator actions were used in place of the required physical protection of cables for equipment relied on for SSD during a fire, without obtaining NRC approval for these deviations from the approved fire protection program. This condition applied to all areas that were inspected, including the new auxiliary control panel fire area that had been recently created as corrective action for previous Violation 50-400/02-08-01. This reliance on large numbers of local manual actions, in place of the required physical protection of cables, could potentially result in an increased risk of loss of equipment that was relied upon for SSD from a fire.</i></p> <p>6. <i>Procedure steps for safe shutdown (SSD) from a fire and related corrective action for previous Violation 50-400/02-08-01 were inadequate. For a fire in the new auxiliary control panel fire area, certain cables were not physically protected from the fire and certain SSD procedure steps, that were used in place of physical protection of cables, involved excessive challenges to operators. Consequently, a fire in the ACP fire area could result in a loss of all auxiliary feedwater.</i></p> <p>7. <i>A procedure for SSD from a fire and related corrective action for previous Violation 50-400/02-08-01 were inadequate. For a fire in certain safe shutdown analysis areas of the reactor auxiliary building, including the new auxiliary control pane fire area, there were too many SSD procedure contingency actions to respond to potential spurious actuations for the one designated SSD non-licensed operator to perform. Consequently, equipment that was relied on for SSD may not be available.</i></p> <p>8. <i>A procedure for SSD from a fire was inadequate. For a fire in safe shutdown analysis areas near the boric acid tank (BAT) in the reactor auxiliary building, the SSD procedure directed operators to take CSIP suction from the BAT even if BAT level indication were lost. However, the charging volume needed for reactor coolant system cooldown would have emptied the BAT and damaged the CSIP.</i></p> <p>9. <i>Required battery-backed emergency lights were not provided in locations where operators were required to perform actions for SSD from a fire. This condition</i></p>

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	<p><i>affected SSD during fires in all of the areas inspected in the reactor auxiliary building, including the new auxiliary control panel fire area that was created as corrective action for previous Violation 50-400/02-08-01. The lack of required lighting could result in an increased risk of operators failing to perform the SSD actions in a timely and accurate manner.</i>⁴¹</p>
02/13/2003	<p>CP&L called NRC disputing the findings from the January 31st inspection report. Among other objections, CP&L told NRC that “<i>They don’t think a loop [loss of offsite power] would occur for a fire in the room.</i>”</p>
02/18/2003	<p>CP&L submitted a licensee event report to the NRC for violations involving unprotected spurious action of equipment relied upon for safe shutdown as identified by the NRC during its triennial fire protection inspection in December 2002. CP&L reported:</p> <p style="text-align: center;"><i>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.</i>⁴²</p>
03/10/2003	<p>The NRC conducted a public meeting with Progress Energy on fire protection issues at Harris. Progress Energy informed the NRC:</p> <ul style="list-style-type: none"> • Cable separation issues had been resolved using manual actions as the primary choice. • Failure to properly distinguish between acceptance criteria for manual actions used for remote shutdown function and for Appendix R III.G.2 areas. • Failure to validate manual actions used for Appendix R III.G.2 areas. • Corrective actions include assigning one additional auxiliary operator to each operating shift. • Corrective actions include de-energizing, where possible, motor-operated valves to eliminate hot short potential. • Safe Shutdown Analysis validation effort expected to be completed in mid 2004. • Commitment to “<i>Reduce operator manual actions to the greatest extent possible.</i>”⁴³
05/05/2003	<p>After the NRC identified non-conforming conditions involving fire protection requirements for the cable spreading rooms and other plant areas, Progress Energy implemented continuous fire watches as a compensatory measure pending resolution of the non-conforming conditions. NRC inspectors subsequently inspected efforts taken and underway to resolve the fire protection problems, including the use of fire watches as compensatory measures.</p> <p>The NRC inspectors identified a non-conformance with the process used by Progress Energy to administer compensatory measures while the other NRC-identified non-conformances were resolved. Specifically, Progress Energy (then operating under the name Carolina Power & Light) revised two procedures controlling fire watch activities. The procedure changes allowed the fire protection program manager to approve the use of a single fire watch to survey multiple fire areas. Contrary to the requirements of 10</p>

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	<p>CFR 50.59, CP&L had not performed an evaluation of these procedure changes to determine if prior NRC approval was required.</p> <p>After the NRC identified this non-conformance, Progress Energy reverted to the practice of using a fire watch to monitor a single fire area.⁴⁴</p>
07/23/2003	<p>During the validation of the Harris Safe Shutdown Analysis by an external party, it was determined that simultaneous multiple spurious opening of certain valves caused by hot shorts during a fire could result in transferring the Refueling Water Storage Tank (RWST) inventory to the containment recirculation sump. If that transfer occurred, the water needed to inventory makeup to the reactor coolant system would not be available from a source credited in the safe shutdown analysis.⁴⁵</p>
07/28/2003	<p>The NRC documented its review of Progress Energy corrective actions in an inspection report. The NRC's inspection report stated:</p> <p style="text-align: center;"><i>AR 85136, During the last completion of the fire door surveillance procedure, relatively many fire doors were identified with deficiencies.</i>⁴⁶</p>
07/31/2003	<p>The NRC conducted a public meeting with Progress Energy on fire protection issues at Harris. Progress Energy informed the NRC of its plans to complete modifications of cable protection for the auxiliary control panel room by December 15, 2003, and of cable protection for the charging system (RWST transfer problem) by December 31, 2003.⁴⁷</p>
08/01/2003	<p>The NRC staff reported the final risk value for the accident sequence precursor program for the Thermo-Lag fire barrier problems at Harris was a ΔCDF [delta core damage frequency] of 5.6×10^{-6}.⁴⁸</p>
11/18/2003	<p>The NRC issued two GREEN findings for apparent violations of fire protection requirements identified during the triennial fire protection baseline inspection and documented in the January 31st inspection report.⁴⁹</p>
01/07/2004	<p>The NRC conducted a public meeting with Progress Energy on fire protection at Harris, HB Robinson, and Crystal River Unit 3. Progress Energy informed the NRC that it "Initiated Safe Shutdown Analysis" for Harris in June 2003.</p> <p>With regard to operator manual actions, Progress Energy informed the NRC:</p> <p style="text-align: center;"><i>Progress Energy will use NRC interim feasibility criteria as provided in recent Federal Register Notice to assess manual actions.</i></p> <p style="text-align: center;"><i>Remaining manual operator actions for III.G.2 not specifically approved by the staff will be submitted for approval per latest regulation.</i>⁵⁰</p>
02/13/2004	<p>Workers determined that a fire in any one of four additional fire areas could result in spurious operation of certain valves that would result in loss of the charging/safety injection pump and transfer of water from the Refueling Water Storage Tank to the containment recirculation sump. If that transfer occurred, the water needed to inventory makeup to the reactor coolant system would not be available from a source credited in</p>

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	the safe shutdown analysis. ⁵¹
04/20/2004	The NRC conducted a public meeting with Progress Energy on fire protection issues at Harris. Progress Energy informed the NRC of its plans to complete modifications of cable protection for the auxiliary control panel room by May 31, 2004, and of cable protection for the charging system (RWST transfer problem) by the end of refueling outage 12. Progress Energy informed the NRC about its plans to complete the Harris Safe Shutdown Analysis by June 2005. ⁵²
08/13/2004 09/14/2004 09/15/2004	Workers determined that multiple spurious opening of certain valves could result in loss of the charging/safety injection pump. This scenario could result in a reactor coolant pump seal loss of coolant accident (RCP seal LOCA) without the credited charging/safety injection pumps providing credited makeup water flow. ⁵³
09/27/2004	It was identified that cables for redundant components credited in the Safe Shutdown Analysis lacked the required degree of separation in one fire area, creating the potential for spurious opening of multiple valves in the reactor coolant system that could transfer some coolant inventory to the containment. Progress Energy reported the <i>“most probable cause of this historical condition is that the drawing change requiring these cables to be protected by fire barrier material was apparently never issued during plant construction.”</i> ⁵⁴
10/04/2004 10/20/2004 10/26/2004 10/29/2004	During the Safe Shutdown Analysis validation effort, it was determined that a fire could cause spurious action of certain valves or components that could result in inadvertent pressurizer spray or could impact indication used to monitor Reactor Coolant System pressure and level. ⁵⁵
11/05/2004	Progress Energy implemented Engineering Change 51444 that replaced active solenoid valves in the Essential Services Chilled Water (ESCW) System with passive check valves. As long as the Service Air System was in operation, the ESCW expansion tank would be pressurized, ensuring the check valves would close to prevent water inventory loss. If the Service Air System failed, EC 51444 added actions to plant procedures for the operators to monitor the pressure in the ESCW expansion tank and take certain steps if the Service Air System was not immediately restored. But the manual actions added under EC 51444 did not conform to the guidance provided by the NRC in Information Notice 97-78, “Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times.” This non-conformance was remedied on March 5, 2005, by temporary modification EC 60425. ⁵⁶
01/18/2005	During the Safe Shutdown Analysis validation effort, it was determined that a fire in any one of eight fire areas could cause spurious action of valves or other components with adverse implications. For example, a fire in fire area 1-A-ACP (286’ elevation) could prevent valve 1SW-39 from closing, or could cause it to open if already closed, leading to failure to isolate the nuclear service water system from the emergency service water system. ⁵⁷
05/12/2005	NIRS, NC WARN, and others petitioned the NRC pursuant to 10 CFR 2.206 for emergency enforcement action at Harris and 13 other nuclear power reactors. The petition involved test results showing that Hemyc/MT fire barrier materials did not

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	support 1-hour and 3-hour fire resistant ratings. ⁵⁸
06/10/2005	<p>Progress Energy informed the NRC of its intention to adopt National Fire Protection Association (NFPA) Standard 805 in accordance with 10 CFR 50.48(c) at Harris. Progress Energy stated:</p> <p style="text-align: center;"><i>During the review of the Safe Shutdown Analysis (SSA) for the PEC and PEF plants, issues have been identified that clearly have alternative means to ensure safety, but no clear path exists to approve deviations. NFPA 805 provides an alternative method to comply with NRC Fire Protection requirements.</i></p> <p>Progress Energy informed the NRC that it planned to submit the license amendment request for transition to NFPA 805 in May 2008.⁵⁹</p>
08/11/2005	The NRC conducted a public meeting with Progress Energy on fire protection issues. Progress Energy outlined its plans for transitioning to NFPA 805 at Harris. Progress Energy's schedule had the transition completed in mid-2009. ⁶⁰
08/30/2005	During the Safe Shutdown Analysis validation effort, it was determined that a fire in a fire area in the reactor auxiliary building could result in loss of cooling water flow to the air handler (AH-13-1B) for switchgear room "B". In that event, the loss of cooling to the switchgear room could affect the performance of equipment credited in the Safe Shutdown Analysis. ⁶¹
10/14/2005	The NRC issued its report on the triennial fire protection baseline inspection conducted at Harris in August 2005. This inspection produced no findings. ⁶²
12/2005	The NRC reported observations from visits to the two pilot plants in the NFPA 805 transition process. The NRC reported that <i>"The industry representatives indicated that any requirement for a shutdown modes PRA would be a "show stopper." There is no current or planned guidance/methods for performing a shutdown PRA. Resources are not likely to be committed by utility management, and the development of methods and performance of the PRA would not support the transition schedules. Implementing guidance for meeting 10 CFR 50.48(cc) should be clarified to explicitly indicate the expectations for assessing fire risk in shutdown modes."</i> ⁶³
01/09/2006	The NRC denied the petition by NIRS, NC WARN, and others for emergency enforcement action related to the Hemyc/MT fire barrier test results. ⁶⁴
03/27/2006	<p>The NRC visited Harris to observe activities related to the transition to NFPA 805. Progress Energy provided the NRC with updated status on scheduled items:</p> <ul style="list-style-type: none"> • The license amendment request for NFPA 805 at Harris is scheduled to be submitted to NRC in June 2008. • The validation of the Safe Shutdown Analysis at Harris is scheduled to be completed by May 31, 2006. • 5 modifications necessary for NFPA 805 are scheduled for implementation during cycle 12. • 7 modifications necessary for NFPA 805 are scheduled for implementation during

Shearon Harris Fire Protection Abridged Chronology	
Date	Event
	<p>cycle 13.</p> <ul style="list-style-type: none"> • 17 modifications necessary for NFPA 805 are scheduled for implementation during cycle 14. • Approximately 15 modifications necessary for NFPA 805 are scheduled for implementation during cycles 15 and 16. • Harris has about 6,500 feet of Hemyc fire barrier and about 1,250 feet of MT fire barrier. Hemyc is considered inoperable with hourly fire watches in places as compensatory measures. MT is not considered inoperable, but fire watches are applied as conservative measure.⁶⁵
04/10/2006	NRC issued Generic Letter 2006-03, “Potentially Nonconforming Hemyc and MT Fire Barrier Configurations,” to Progress Energy and other plant owners requiring responses within 60 days. ⁶⁶
06/09/2006	<p>Progress Energy responded to the NRC’s Generic Letter 2006-03, “Potentially Nonconforming Hemyc and MT Fire Barrier Configurations.” Progress Energy informed the NRC:</p> <p style="padding-left: 40px;"><i>HNP [Harris Nuclear Plant] has determined that the Hemyc ERFBS [electrical raceway fire barrier systems] installed at HNP is not fully capable of keeping the protected electrical circuits free of fire damage for one (1) hour when subjected to an ASTM E-119 fire in accordance with GL 86-10, Supplement 1 guidance.</i></p> <p style="padding-left: 40px;"><i>HNP’s position on the MT ERFBS installations is that the previous NRC fire testing is not directly applicable due to variations in the material tested from the material used at HNP. HNP is planning to perform proprietary fire testing in accordance with GL 86-10, Supplement 1 guidance to determine the fire ratings for the installed MT ERFBS.</i></p> <p>Attachment 2, page A2-1 of 23, to the Progress Energy response listed 23 plant systems having a role to play in the Safe Shutdown Analysis. For two systems (RHR pump area HVAC and Residual Heat Removal), the role is defined as exclusively cold shutdown related.⁶⁷</p>

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⁶ Nuclear Regulatory Commission, Daily Event Report No. 11414, February 4, 1988.
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⁸ Nuclear Regulatory Commission, Daily Event Report No. 32233, April 28, 1997.
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- ¹⁶ Letter dated September 25, 2000, from Loren R. Plisco, Director – Division of Reactor Projects, Nuclear Regulatory Commission, to John A. Zwolinski, Director – Division of Licensing Project Management, Nuclear Regulatory Commission, “Task Interface Agreement (TIA 2000-16) Shearon Harris Nuclear Power Plant, Unit 1 – Review of Additional Information Provided by Licensee for Resolution of Fire Protection Inspection Fire Barrier Qualification Issues.”
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- ¹⁸ Letter dated November 6, 2000, from Kerry Landis, Chief – Engineering Branch, Nuclear Regulatory Commission, to James Scarola, Vice President – Harris Plant, Carolina Power & Light Company, “Task Interface Agreement 2000-16, Shearon Harris Nuclear Power Plant, Unit 1 – Review of Additional Information Provided by Licensee for Resolution of Fire Protection Inspection Fire Barrier Qualification Issues.”
- ¹⁹ Memo dated February 26, 2001, from Suzanne C. Black, Deputy Director – Division of Licensing Project Management, Nuclear Regulatory Commission, to Loren R. Plisco, Director – Division of Reactor Projects, Nuclear Regulatory Commission, “Supplemental NRR Response to Task Interface Agreement (TIA) 2000-16, Shearon Harris Nuclear Power Plant, Unit 1 – Review of Fire Test Reports Provided by Licensee for Resolution of Fire Protection Inspection Fire Barrier Qualification Issues.”
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