

# **FIRE WHEN NOT READY**

**A report on a primary threat of reactor core meltdown – fire – and the unacceptable efforts by the Nuclear Regulatory Commission to protect Americans from this known hazard.**

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## INTRODUCTION

By law, the Nuclear Regulatory Commission (NRC) is the sole governmental agency responsible for protecting Americans from the risks posed by fire hazards at nuclear power plants. By chronic malpractice, the NRC is the sole governmental agency exposing Americans to unnecessarily high risks from fire hazards at nuclear power plants. As NRC Commissioner Gregory Jaczko stated in July 2008:

*Simple, straightforward regulations and I don't think there is one plant right now that is in compliance with those regulations.<sup>1</sup>*

The NRC knows the fire hazard is very real, estimating that the reactor meltdown risk from fire hazards is about 50%, or roughly equal to the meltdown risk from ALL other hazards, combined. And that risk assessment assumes the plants are in complete compliance with fire protection regulations.

After a 1975 fire at the Browns Ferry nuclear plant disabled all of the emergency systems provided to cool the reactor core, the NRC adopted simple, straightforward fire protection regulations in 1980 intended to prevent another disastrous fire. But as early as 1982, the NRC uncovered evidence that the regulations were not being met. The NRC did nothing other than to collect evidence of additional violations. In 1991, a whistleblower publicly disclosed information of falsified fire barrier tests. The NRC was then forced to deal with issues it had essentially ignored for over a decade.

When the NRC tested another fire barrier in 1993 to ascertain if the problems were confined to products from a single manufacturer, that fire barrier failed too. The NRC reverted to its regulatory turtle posture and essentially ignored that information for over a decade.

In the meantime, the risks Americans face from fire hazards at nuclear power plants increased dramatically on 9/11. While adequate fire protection has never been more important, the NRC allows nuclear plants like Shearon Harris to continue operating in known violation of fire protection regulations. Because the nuclear industry cannot or will not meet fire protection regulations and the NRC does nothing about it, Americans face undue risk.

The Shearon Harris nuclear plant illustrates the NRC's inept performance as guardian of public health and safety. The NRC issued an operating license for Harris in 1986. Seven years later, the NRC tested fire barriers used extensively at Harris and learned they failed dismally. The NRC did nothing, not even inform Harris' owner about the test failure. In 1999, the NRC acquired the results from fire barrier tests conducted for Harris' owners. The NRC determined those test results were unacceptable too. Still, the NRC did nothing.

In 2004, the NRC revised its regulations to establish an alternate means of achieving adequate protection against fire hazards. Harris' owner informed the NRC in 2005 that it would transition to the alternative fire protection regulations and requested discretion from sanctions for any violations identified during the transition. The NRC granted a 3-year enforcement discretion period, to 2008. When progress towards the alternative regulations lagged, the agency extended enforcement discretion for three more years. In September 2008, the NRC informed Harris' owner that its work toward the alternative regulations fell far short of the NRC's acceptance criteria, but the agency would accept it anyway. It's a recurring pattern of Harris' owner not meeting its obligations and the NRC tolerating it.

Just as "ignorance of the law" is an invalid excuse, "ignorance by the law" is also unacceptable. Americans are only protected when fire protection regulations at nuclear power plants are met. Because of NRC's negligence, for over a decade Americans have not been adequately protected. Action simply must be taken to compel the NRC to enforce rather than ignore its regulations to provide the public the protection it deserves.

The following sections of this report provide information on the Browns Ferry fire that led NRC to develop fire protection regulations; the checkered implementation of those regulations; the longstanding violations of fire protection regulations at the Shearon Harris nuclear plant in North Carolina and the NRC's deliberate lack of enforcement; the reliability and timeliness of compensatory measures applied when fire protection violations are identified; the emerging security issues that make conformance with fire protection regulations even more important; and the NRC's inexcusable ineptitude protecting Americans from fire hazards at nuclear plants.

## FIRE PROTECTION REGULATIONS

The Browns Ferry Nuclear Plant located near Athens, Alabama has three nuclear reactor units. In March 1975, Units 1 and 2 were operating while Unit 3 was nearing the completion of its construction. Units 1 and 2 shared a common control room. Directly beneath this control room was the cable spreading room. Power, control, and instrumentation cables linking the control room to equipment throughout the plant passed through the cable spreading room. <sup>ii</sup>

The plant's design called for the control room and cable spreading room to be maintained at a slightly higher pressure than surrounding areas so radioactively contaminated air would not leak into the control room if an accident occurred. On March 22, 1975, a worker used a lit candle to test whether penetrations carrying cabling through the cable spreading room's walls were properly sealed. If the candle's flame flickered when held close to a penetration, it indicated excessive leakage that might prevent adequate protection of the control room operators during an accident. The candle's flame ignited polyurethane foam being used to seal air leaks in cable penetrations through the wall between the cable spreading room and the adjacent Unit 1 reactor building. <sup>iii</sup>

The ensuing fire blazed for 7 hours and damaged about 1,600 electrical cables with a significant number of electrical circuits being destroyed in the first 15 minutes. As the cable insulation burned, exposed wires contacted each other to short out or contacted supporting trays to ground out, with the result that control power was lost for equipment such as valves, pumps, and blowers. <sup>iv</sup> The damaged cabling disabled a

substantial amount of equipment needed for reactor core cooling, including all of the emergency core cooling system pumping capability for Unit 1. <sup>v</sup>

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***During the fire, the water level dropped to within inches of the reactor core.***

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Plant workers managed to assemble a functional lineup of non-emergency components to recover water level and avert fuel damage and release of catastrophic amounts of radioactivity to the environment.

At the time, the Browns Ferry fire was the worst accident in U.S. commercial nuclear power history. The NRC formed a Special Review Group to examine the event. The special inquiry reported:

*In response to the fire, an NRC investigation revealed that the independence of redundant equipment at Browns Ferry was negated by a lack of adequate separation between cables for redundant trains of safety equipment. The investigators subsequently recommended that a suitable combination of electrical isolation, physical distance, fire barriers, and fixed automatic fire suppression systems should be used to maintain the independence of redundant safety equipment.* <sup>vi</sup>

The NRC promulgated regulations based on the Special Review Group's recommendations. These regulations went into effect in May 1980. Among other things, the regulations required that electrical cables for emergency systems be separated from electrical cables for redundant backup emergency systems so that no single fire

could simultaneously knock out both functions. The separation could either be physical (i.e., redundant electrical cables separated by a concrete wall or when the redundant circuits are located in the same room they are separated by at least 20 feet with no intervening combustibles materials) or temporal (i.e., one or both cable sets encased in fire retardant material with a rating of at least one hour). The regulations permitted manual actions to be performed by plant workers in place of electrical cable separation, but only following formal NRC review and approval of specific applications. Thus, the fire protection regulations adopted in May 1980 required either separation of electrical cables or express NRC approvals for manual actions. Collectively, the regulations sought to prevent another fire from having consequences as bad as, or worse, than the Browns Ferry fire.

Adherence to the regulations fell short of their good intentions. In the NRC's own words:

*In the early 1990s, generic problems arose with Thermo-Lag fire barriers, which many licensees were using as either a 1- or 3-hour fire barrier to comply with Paragraph III.G.2 of Appendix R. As a result, the NRC ultimately required plants to upgrade existing Thermo-Lag electrical raceway fire barrier systems or provide another means of compliance with Appendix R. Several years later, however, fire protection inspectors began identifying instances where some plants had not upgraded or replaced the Thermo-Lag fire barrier material or provided the required separation distance between redundant safety trains used to satisfy the criteria of Paragraph III.G.2. Some plants compensated for this by relying on*

*operator manual actions, which were not reviewed and approved by the NRC through the exemption process.*<sup>vii</sup>

*In 2002, the NRC informed the nuclear power industry that the use of unapproved manual actions was not in compliance with Paragraph III.G.2. During a meeting on June 20, 2002, the Nuclear Energy Institute (NEI) representative stated that there was widespread use of operator manual actions throughout the industry based on the understanding of past practice and existing NRC guidance. The industry representative also stated that the use of unapproved manual actions had become prevalent even before the concerns arose with Thermo-Lag material.*<sup>viii</sup>

Rather than protect electrical cables by physical separation to assure that control room operations could safely shut down and maintain reactor cooling following a significant fire, many reactor operators sacrificed electrical circuit integrity to a postulated fire and substituted "operator manual actions" without the NRC's review and approval.



*Power cables run through trays, conduits and tunnels, impeding the ability to inspect them, and to detect and suppress fires.*

These actions instead rely upon plant personnel leaving the control room to travel throughout the reactor building to manually open or close local circuit breakers and valves, and turn on or off switches to shut down the reactor and maintain vital reactor cooling. Depending on the number of electrical cables and their designated functions for control room operations now abandoned to destruction by a fire, the corresponding operator manual actions can involve a complex set of multiple tasks performed in sequence and under critical time constraints potentially involving entering and working in areas filled with toxic smoke, heat or flames or high radiation fields, and involve instruction manuals, tools, keys, codes, ladders and respirators. The complexity, associated risks and the question of human reliability in successfully executing these localized manual actions underscores the required preference for maintaining reliable control room operations by protecting electrical circuit integrity during and following a significant fire.

More than three decades after a worker with a candle ignited a fire that disabled all of the emergency core cooling systems on Browns Ferry Unit 1, there's no evidence that nuclear plants across the country comply with federal regulations adopted in 1980 to manage the fire hazard. And the NRC knows the fire hazard is very real:

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**“Approximately one-half of the core damage risk at operating reactors results from accident sequences that initiate with fire events.”<sup>ix</sup>**

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**In other words, the reactor meltdown risk from fire hazards is roughly equal to the**

**meltdown risk from ALL other hazards, combined.** It is important to realize that the risk assessments assume the plants are in complete compliance with fire protection regulations to minimize the chance that a fire propagates to disable redundant systems as at Browns Ferry. The known non-compliances with these regulations mean that the fire risk is likely higher than reported.

The NRC revised its fire protection regulations in 2004 to add what is termed the National Fire Protection Association (NFPA) 805 option. The fire protection regulations adopted in 1980 were prescriptive in nature. Fire zones within nuclear power plants had to be protected by fire barriers having a 1-hour rating if fire suppression systems (e.g., water sprinklers or carbon dioxide) were installed and a 3-hour rating otherwise. Under the performance-based NFPA 805 option, the total amount of combustible materials in fire zones, along with factors like fire detection and suppression systems, are analyzed to determine how likely a postulated fire is to be successfully contained and extinguished.

#### **HARRIS FIRE PROTECTION REGULATION NON-COMPLIANCES**

The Shearon Harris nuclear plant located near Apex, North Carolina began commercial operation in May 1987, more than a decade after the Browns Ferry fire and seven years after the NRC's fire protection regulations went into effect.

In 1992, the NRC declared Thermo-Lag 330-1 fire barriers “inoperable” after a series of standardized time and temperature fire tests determined that the product, required to last a minimum of one hour, generically failed in less than 30 minutes. The barrier therefore

would be unable to protect vital power, instrumentation and control cables needed by control room operators to shutdown and maintain cooling of the reactor.<sup>x</sup> Shearon Harris nuclear station heavily relied on these bogus fire barriers to protect the reactor's safe shutdown functions. After more than four years and a series of technical and safety review meetings with NRC staff, Harris operators submitted to the NRC a corrective action program to restore compliance with the federal fire protection law. Harris operators committed to replacing or upgrading Thermo-Lag fire barriers, rerouting redundant electrical cables through different and separated fire zones and re-evaluating safe shutdown equipment, all of which was to be completed by September 1, 1997.<sup>xi</sup>

Subsequent NRC inspections beginning in 1998 discovered that Harris operators did not complete the agreed upon Thermo-Lag corrective action program. As an NRC official wrote, "...the Harris Safe Shutdown Analysis (SSA) method for dealing with problem cables, that were required for control room operation of safe shutdown equipment during a fire in a certain area but were not physically protected from that fire, was to rely on operator manual actions. Only if no operator manual actions could [sic] be found would Harris physically protect the cables. Consequently, Harris has about 100 local operator manual actions that they rely on for hot shutdown. Harris did not request deviations from the NRC for any of these operator actions and probably none of them were in licensee submittals upon which our SERs (Safety Evaluation Reports) were based."<sup>xii</sup>

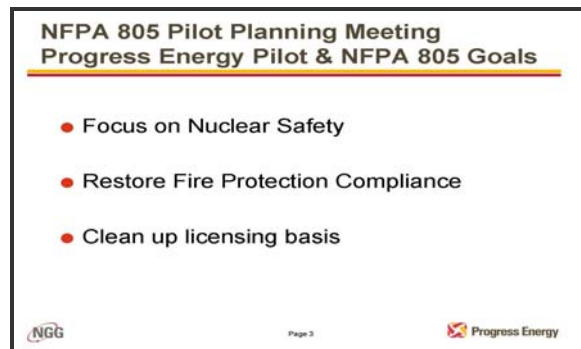
In fact, Harris was just one example of an industry-wide practice to ignore

implementation of the Thermo-Lag corrective action programs developed and consented to with NRC's fire protection branch. To make matters worse, NRC chose to ignore taking enforcement action against Harris or any other operator that balked at corrective actions to restore compliance from Thermo-Lag violations and instead, like Harris, quietly substituted unapproved operator manual actions.

According to the NRC, Harris has operated for many years in violation of the same fire protection regulations involving still more unanalyzed fire hazards and additional fire barrier products proven ineffective in protecting electrical circuits needed for safe shutdown of the reactor:

*The Licensee implemented compensatory measures upon discovery of the initial unanalyzed circuit conditions in 2002. The compensatory measures, such as a compensatory fire watch and feasible operator manual actions, were implemented in accordance with its approved fire protection program, to address the noncompliances and conditions (e.g., unanalyzed circuit condition and Hemyc and MT fire barriers).<sup>xiii</sup>*

When the NRC revised its fire protection regulations in 2004 to provide the NFPA 805 option, Harris' owner decided to attempt to comply with these alternative regulations:<sup>xiv</sup>



Harris' owner requested enforcement discretion from the NRC for additional fire protection violations identified during the transition from the old regulations to the new NFPA 805 regulations. The NRC granted a 3-year discretion period:

*On the basis of a revision to the Enforcement Policy (71 FR 19905), I am now informing you that your request for a 3-year enforcement discretion period for Shearon Harris is granted. Therefore, the discretion period for Shearon Harris, which began on June 10, 2005, will expire on June 10, 2008.<sup>xv</sup>*

*As you are aware, in order to receive enforcement discretion, you must: (a) evaluate the risk significance of all noncompliances to assure that they do not constitute "Red" (or a Severity Level I) findings under the reactor oversight program, (b) enter them into your corrective action program, and (c) implement and maintain appropriate compensatory measures until you complete your corrective actions, or until the NRC staff approves your license amendment request and issues its safety evaluation.<sup>xvi</sup>*

During a public meeting conducted on September 29, 2008, Harris' owner informed the NRC of its intention to achieve compliance with the NFPA 805 regulations prior to restarting the reactor from its refueling outage in 2010. Even if this promise is kept, Harris will have been in violation of fire protection regulations for over 16 years. The next section describes the timeliness and reliability expectations the NRC first established, and then ignored, for compensatory measures applied for fire protection regulation violations.

## **COMPENSATORY MEASURE TIMELINESS AND RELIABILITY**

For many years, the Shearon Harris nuclear plant has been in violation of NRC's fire protection regulations and has been relying instead on compensatory measures. According to the NRC, compensatory measures are commonly used to provide interim protection until safety or security problems are corrected:

*For example, the compensatory measure required by a licensee's approved FPP [fire protection program] for a degraded fire barrier is typically an hourly fire watch or, in the case of an inoperable fire suppression system, a continuous fire watch with backup fire suppression equipment.<sup>xvii</sup>*

The mini-tire provided as a spare for vehicles illustrates the concept of interim compensatory measures used in nuclear power plants. The mini-spare tire cannot work if it has a puncture or is under-inflated. Even if intact and properly inflated, the mini-spare tire is only intended to serve for a limited duration until the damaged full-size tire is patched or replaced. NRC, in theory, applies similar reliability and timeliness standards to compensatory measures used at nuclear power plants:

*The NRC staff recognizes that certain criteria must be met to ensure that adequate safety is maintained as a result of the use of operator manual actions as an alternative to separation protection. In particular, the NRC staff notes that such actions must be both feasible and reliable, especially considering that these actions are relied upon in lieu of passive fire barriers, distance, separation, and/or fire detectors and automatic fire suppression systems, each with relatively high reliability.<sup>xviii</sup>*



and

*The licensee should evaluate the technical acceptability and effectiveness of a compensatory measure with respect to the degraded or nonconforming condition and the affected SSCs [structures, systems and components].*

*The NRC expects that conditions calling for compensatory measures to restore SSC operability will be more quickly resolved than conditions that do not rely on compensatory measures to restore operability. The reason is that reliance on compensatory measures to restore SSC operability suggests a greater degree of degradation or nonconformance. Similarly, the NRC expects that conditions calling for compensatory measures to restore operability, where the compensatory measures substitute manual operator actions for automatic actions to perform a specified safety function, will be resolved expeditiously.*<sup>xix</sup>

***Nevertheless, a manual action is expected to be a temporary measure and to promptly end when the automatic action is corrected in accordance with 10 CFR Part 50, Appendix B, and the licensee's corrective action program.***<sup>xx</sup> (emphasis added)

**Typically, degraded and nonconforming conditions are resolved prior to restarting from the next forced outage or refueling outage.** The NRC's explicitly stated expectation, then, is that "conditions calling for compensatory measures" be remedied prior to the next forced outage or refueling outage because the use of compensatory measures "suggests a greater degree of degradation or nonconformance."

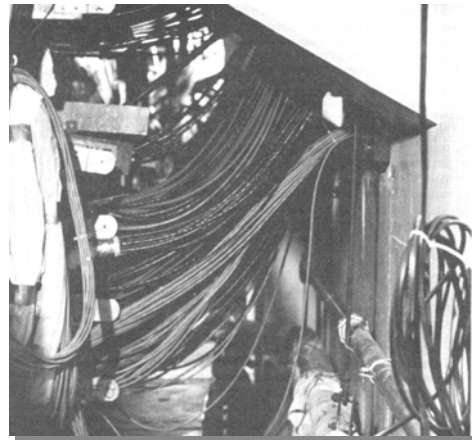
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***Like the mini-spare tire on a vehicle, compensatory measures are not intended to be ridden indefinitely at nuclear power plants.***

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**Compensatory measures cannot provide equivalent protection indefinitely primarily because they rely in large part on human actions.** The reliability of human actions depends heavily on training and qualifications. It is a simpler task to select a small number of qualified individuals and train them to implement specified steps as compensatory measures over a span of days or weeks than it is to sustain a high level of performance among many individuals across months and years. Studies consistently show that human actions can make a bad situation much worse:

*Human performance was found to be a major contributor to the risk increases in significant operating events. In the samples studied, SPAR models have shown increases ranging from 10% to 100%. **The human performance contribution to CCDP [conditional core damage probability] was positively skewed with an average of 90%.***<sup>xxi</sup>



*Hundreds of miles of electrical cables run through dozens of fire zones in a typical U.S. nuclear plant.*

To illustrate this point, consider the compensatory measures typically employed for fire protection non-compliances – fire watches deployed to identify fires when detection systems are impaired and who can initially fight fires with dry chemical extinguishers when suppression systems are disabled. Just as a mini-spare tire may be better than a flat tire but not as good as a proper full-size tire, fire watches are better than broken fire detection and suppression systems but not as reliable as conforming fire detection and suppression systems. Thus, there is a real, tangible safety reason that compensatory measures are not long-term substitutes for compliance with fire protection regulations.

The Shearon Harris matter once again illustrates the problem. Harris' owner submitted a license amendment request to the NRC in May 2008 requesting NRC's approval for the change to NFPA 805 regulations. In September 2008 the NRC formally identified significant shortcomings in the submittal:

*The submittal does not reflect the current as-built plant configuration, and it does not provide a detailed, proposed configuration at the completion of transition, including all proposed modifications (sufficient for risk analysis purposes).*

*The licensee's submittal is not clear in identifying the scope of the requested licensing action; specifically in identifying clearly the committed modifications and deviations from existing deterministic fire protection requirements.*

*The HNP NFPA 805 LAR proposes to obtain NRC staff approval to accept non-*

*conforming electrical raceway fire barrier systems (HEMYC and MT), Operator Manual Actions transitioning to Recovery Actions, and Multiple Spurious Operations. The licensee's submittal and supporting calculations do not provide a sufficient basis to conclude that the risk-informed decisions proposed are acceptable. Specifically, the submittal does not provide a justification that the Fire PRA being used, nor does it demonstrate that the manner in which it is being used is of sufficient quality for the specific changes being made.*

*The submittal does not discuss the use of fire models acceptable to the NRC.*<sup>xxii</sup>

and

*The submittal does not provide a justification that the fire probabilistic risk analysis (PRA) being used, and the manner in which it is being used, are of sufficient quality for the specific changes being made. The supporting calculations conclude that the change in risk is not acceptable.*<sup>xxiii</sup>

**Hence, the NRC cannot verify how safe Harris is today** (i.e., "...does not reflect the current as-built plant configuration..."), **cannot verify how safe Harris might be after the promised fixes** (i.e., "does not provide a detailed, proposed configuration at the completion of transition..." and "...do not provide a sufficient basis to conclude that the risk-informed decisions proposed are acceptable"), **and cannot even verify that the pathway from today's violations to tomorrow's promised conformance is sound** (i.e., "...nor does it demonstrate that the manner in which it is being used is of sufficient quality for the specific changes being made" and the "...submittal does not discuss the use of fire models acceptable to the NRC)."

And Harris is not an isolated case, as NRC Commissioner Jaczko noted during a July 2008 briefing on fire protection issues:

***But the reality is that we have licensees that are using unapproved Operator manual actions, that have been using them for a long period of time and to this day we still don't know what all of them are. That's simply unacceptable for a regulator. It is precisely our job to know and to make decisions about what we're doing and what licensees are doing.***<sup>xxiv</sup>

Clearly, the NRC lacks sufficient information upon which to honestly conclude that the compensatory measures are adequately reliable. They do not even know who is doing what where. Amid that fog, the NRC granted Harris' owner an extension of the 3-year enforcement discretion period.

***Clearly, the NRC is ignoring its own timeliness criterion governing reliance on compensatory measures.***

It is luck, rather than reliable compensatory measures of limited duration, protecting the people of North Carolina from the longstanding fire protection regulation violations at Shearon Harris.

#### **HEIGHTENED NUCLEAR PLANT FIRE HAZARD**

The NRC adopted fire protection regulations in May 1980 that were intended to manage the safety risk revealed by the Browns Ferry fire. The tragic events of 9/11 revealed a comparable security risk. The aircraft that hit the World Trade Center that day caused both towers to collapse – not due to the impact, but because of the structural damage from the ensuing fires. The NRC is fully aware of this added fire hazard:

*Nuclear power plants are inherently robust structures that our studies show provide adequate protection in a hypothetical attack by an airplane. The NRC has also taken actions that require nuclear power plant operators to be able to manage large fires or explosions - no matter what has caused them.*<sup>xxv</sup>

"The NRC has taken actions." The NRC, knowing that Shearon Harris does not meet either the initial fire protection regulations or the more recent NFPA 805 alternative, granted and then extended enforcement discretion allowing Harris to continue operating.

***With those NRC actions, Harris is therefore able to manage large fires or explosions – unless a large fire or explosion was to occur.***

A worker with a candle started a fire at Browns Ferry Unit 1 that disabled all of the emergency core cooling systems and nearly caused a reactor meltdown. Because the fire protection regulations adopted by the NRC following that near-miss are not met at Shearon Harris and other nuclear power plants, there is little basis for the NRC to claim that terrorists can cause less damage than one worker with one candle did at Browns Ferry.

#### **NRC FIRE PROTECTION REGULATORY INEPTNESS**

The mere fact that no nuclear plant in the U.S. conforms today to fire protection regulations adopted in May 1980 strongly suggests that NRC has been doing an inadequate job of guarding public health and safety. The record shows that the NRC has known since 1982 that the "new" fire

protection regulations were not being met. In March 1993, then NRC Chairman Ivan Selin testified to the U.S. Congress about an investigation by the NRC's Inspector General (IG) into the NRC's oversight of fire protection issues:

*On August 12, 1992 his report concluded that the NRC had not conducted an adequate review of fire endurance and ampacity derating information concerning the ability of the fire barrier material, Thermo-Lag 330-1; if it had, a number of problems with the test program and Thermo-Lag could have been discovered. In addition, the IG identified a number of missed opportunities between 1982 and 1991 when the staff had information that, if pursued, could have identified the generic issues earlier than 1991.*<sup>xxvi</sup>

Thermo-Lag is a fire retardant material used to wrap electrical cables of redundant emergency systems in close proximity. The Thermo-Lag fire wrap was supposed to provide, depending on the configuration, at least 1 or 3 hours of protection to the electrical cables from fire damage. In 1991, a whistleblower brought forth information showing a fire would damage cables in far less than the 1 hour or 3 hour endurance ratings. Then and only then did the NRC react. Understandably, the U.S. Congress was very concerned about the NRC's delayed, prompted reaction. Chairman Selin explicitly addressed the Congress' ire during that March 1993 hearing:

*In addition to the specific measures mentioned earlier, several general developments at the Commission in the last few years provide confidence that a recurrence of a Thermo-Lag type problem is unlikely.*<sup>xxvii</sup>

Chairman Selin was overly optimistic and the U.S. Congress, at best, grossly misled. In January 2008, the NRC's Inspector General released another report on an investigation into NRC's oversight of fire protection issues. This time, the NRC's IG examined how the NRC handled Hemyc, another fire wrap like Thermo-Lag. In September 1993, as a direct consequence of the Thermo-Lag scandal, the NRC had Hemyc tested by the National Institute of Standards and Technology (NIST). NIST tested a Hemyc fire barrier rated for 1-hour and found that it failed in less than 30 minutes. NRC did nothing about that fact for seven years. In 2000, the NRC finished its review of results it obtained in August 1999 of industry tests of Hemyc fire barriers.<sup>1</sup> The NRC concluded that the industry tests failed to satisfy NRC's requirements. The NRC did nothing about that fact for five years. In 2005, the NRC arranged for the Sandia National Laboratory to perform another test of a Hemyc fire barrier. Once again, a Hemyc fire barrier rated for 1-hour failed in less than 30 minutes. This time the NRC did nothing about that fact for only one year. In April 2006, the NRC notified plant owners about the Hemyc test failures and required them to justify Hemyc applications in their facilities by December 2007.

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***Should a fire at a nuclear plant result in damage as bad as, or worse, than that occurring at Browns Ferry, the NRC's ineptitude will be salt in the wound.***

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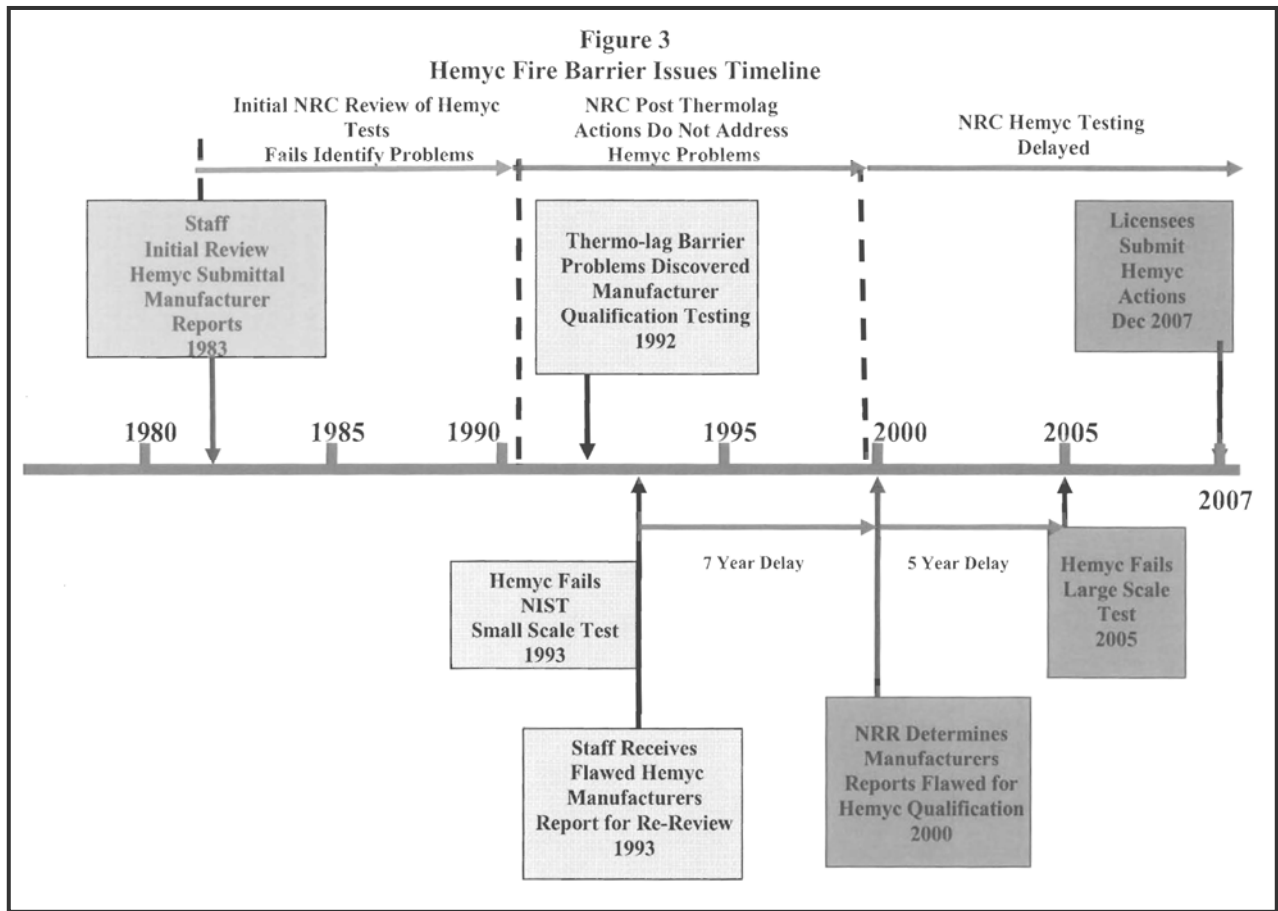
<sup>1</sup> The test results obtained by the NRC in 1999 were those conducted for the Shearon Harris nuclear plant. Thus, the NRC had determined in 2000 that its own tests demonstrated that the Hemyc fire barriers were inadequate and that industry tests failed to demonstrate otherwise.

The federal government will be unable to honestly tell the American people that every reasonable measure had been taken to protect them. After all, the Browns Ferry fire revealed deficiencies that the NRC repeatedly allowed to remain uncorrected.

The NRC is an agency within the executive branch of the federal government. Its

commissioners are appointed by the President.

The U.S. Congress has oversight responsibility for the NRC and establishes its budget. The President and the Congress must take steps to reform the NRC into the guardian of public health and safety the American people expect and deserve.



Source: xxviii

**NRC STROBE LIGHT VS SPOTLIGHT ON FIRE HAZARDS**

Q - Why has the NRC failed to resolve fire protection problems for so many years?

A – The NRC Commission has shown a strobe light rather than a spotlight on the issue.

The Commission’s meetings are listed on its website at URLs <http://www.nrc.gov/reading-rm/doc-collections/commission/tr/yyyy/> where “yyyy” is the year of interest. For example, the Commission’s meetings in 2008 are available at <http://www.nrc.gov/reading-rm/doc-collections/commission/tr/2008/>. Extracted from these records are the complete, unabridged Commission meetings on two topics:

<b>Equal Employment Opportunity</b>	<b>Fire Protection</b>
<b>05/29/2003</b>	
<b>12/09/2003</b>	
<b>06/02/2004</b>	
<b>12/07/2004</b>	
<b>06/28/2005</b>	<b>07/17/2008</b>
<b>11/30/2005</b>	
<b>07/27/2006</b>	
<b>12/13/2006</b>	
<b>11/27/2007</b>	
<b>05/28/2008</b>	

Equal employment opportunity is very important and the Commission deserves commendation for its sustained interest in this topic. But resolution of known widespread, longstanding fire protection problems seems equally important, yet it has been the subject of a grand total of one (1) Commission meeting in the past five (5) years.\* The Commission places a spotlight on equal employment opportunity and a strobe light on fire protection problems. Americans deserve better from the Commission. The Commission must put a spotlight on this clear and present danger and hold periodic briefings – every day if necessary – until all nuclear power reactors are in full compliance with fire protection regulations and the undue threat to Americans diminished.

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\* And that single Commission meeting likely would not have occurred but for the persistent efforts of Commissioner Gregory B. Jaczko.

## CITED SOURCES

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- <sup>ii</sup> Special Review Group, Nuclear Regulatory Commission, NUREG-0050, "Recommendations Related to Browns Ferry Fire," February 1976, page 1.
- <sup>iii</sup> *Ibid.*
- <sup>iv</sup> *Ibid.*
- <sup>v</sup> NC Special Review Group, page 10.
- <sup>vi</sup> Nuclear Regulatory Commission NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," October 2007, page 2-1.
- <sup>vii</sup> NUREG-1852, page 2-2.
- <sup>viii</sup> *Ibid.*
- <sup>ix</sup> Jack Grobe, Associate Director for Engineering and Safety Systems, Nuclear Regulatory Commission, Transcript of Nuclear Regulatory Commission Briefing on Fire Protection Issues, July 17, 2008, .page 58, line 1.
- <sup>x</sup> Nuclear Regulatory Commission Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers," December 17, 1992, <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/gen-letters/1992/gl92008.html>
- <sup>xi</sup> Nuclear Regulatory Commission, Completion of Licensing Action for Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers," Dated December 17, 1992 for Shearon Harris Nuclear Power Plant, Unit 1, June 3, 1997.
- <sup>xii</sup> Email, "Fire Protect Issues at Harris," Robert Schin (NRC) to Phil Qualls and Ram Subbaratnam (NRC), December 5, 2002.
- <sup>xiii</sup> James T. Wiggins, Acting Director – Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission, letter to John D. Runkle, Attorney, North Carolina Waste Awareness and Reduction Network, June 13, 2007, page 2.
- <sup>xiv</sup> Progress Energy presentation to Region II, Nuclear Regulatory Commission, "Progress Energy Input to NFPA 805 Pilot Planning Meeting, August 11, 2005, slide 3.
- <sup>xv</sup> Catherine Haney, Director – Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission, letter to C. S. Hinnant, Senior Vice President and Chief Nuclear Officer, Progress Energy, "Period of Enforcement Discretion During Implementation of National Fire Protection Association Standard 805, Shearon Harris Unit 1, H. B. Robinson Unit 2, Brunswick Units 1 and 2, and Crystal River Unit 3," April 29, 2007, pages 1 and 2.
- <sup>xvi</sup> *Ibid.*
- <sup>xvii</sup> Nuclear Regulatory Commission Regulatory Issue Summary 2005-07, "Compensatory Measures to Satisfy the Fire Protection Program Requirements," April 19, 2005, page 2.
- <sup>xviii</sup> NUREG-1852, page 1-2.
- <sup>xix</sup> Part 9900 of the Nuclear Regulatory Commission Inspection Manual, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," April 16, 2008, page 14.
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- <sup>xxi</sup> Bruce P. Hallbert, David I. Gertman, and Harold S. Blackman, Idaho National Engineering and Environmental Laboratory, and Julius J. Persensky and Eugene A. Trager, Nuclear Regulatory Commission paper "Profiles of Human Performance Contributions to Operating Events," May 7, 2001, page 9.
- <sup>xxii</sup> Thomas H. Boyce, Chief – Plant Licensing Branch II-2, Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission, letter to Chris L. Burton, Vice President, Shearon Harris Nuclear Power Plant, Carolina Power & Light Company, "Shearon Harris Nuclear Power Plant, Unit 1 - Acceptance Review Regarding The License Amendment Request To Adopt National Fire Protection Association 805 Performance-Based Standard For Fire Protection For Light Water Reactor Generating Plants (2001 Edition) (TAC No. MD8807)," September 26, 2008, page 4.
- <sup>xxiii</sup> Marlayna Vaaler, Project Manager, Nuclear Regulatory Commission, letter to Chris L. Burton, Vice President, Shearon Harris Nuclear Power Plant, Carolina Power & Light Company, September 8, 2008.
- <sup>xxiv</sup> Gregory B. Jaczko, Commissioner, Nuclear Regulatory Commission, Transcript of Nuclear Regulatory Commission Briefing on Fire Protection Issues, July 17, 2008, .page 32, lines 21 to page 33, line 4.



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<sup>xxv</sup> Dale Klein, Chairman, Nuclear Regulatory Commission, Statement on the Affirmation of the Final Design Basis Threat Rule, January 29, 2007, page 1.

<sup>xxvi</sup> Ivan Selin, Chairman, Nuclear Regulatory Commission, statement to the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, United States House of Representatives, "Fire Protection for U.S. Nuclear Power Plants," March 3, 1993, page 6.

<sup>xxvii</sup> Ivan Selin statement, page 13.

<sup>xxviii</sup> Office of the Inspector General, Nuclear Regulatory Commission, Case No. 05-46, "NRC's Oversight of Hemyc Fire Barriers," January 22, 2008, Figure 3.

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## Beyond Nuclear

Beyond Nuclear aims to educate and activate the public about the connections between nuclear power and nuclear weapons and the need to abandon both to safeguard our future. Beyond Nuclear advocates for an energy future that is sustainable, benign and democratic.

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**NC WARN: Waste Awareness & Reduction Network** is a grassroots non-profit tackling the accelerating climate crisis by working for a swift North Carolina transition to energy efficiency and clean power.

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