

POLICY ISSUE
(Notation Vote)

June 30, 2008

SECY-08-0093

FOR: The Commissioners

FROM: R. W. Borchardt
Executive Director for Operations

SUBJECT: RESOLUTION OF ISSUES RELATED TO FIRE-INDUCED CIRCUIT
FAILURES

PURPOSE:

This informs the Commission of the U.S. Nuclear Regulatory Commission (NRC) staff approach to resolving issues concerning fire-induced circuit failures and multiple spurious actuations. This paper includes a description of staff efforts to resolve the technical details for analyzing and evaluating challenges to post-fire safe-shutdown capability. This paper also requests that the Commission approve changes to the enforcement discretion guidance regarding fire-induced circuit failure violations.

BACKGROUND:

In Staff Requirements Memorandum (SRM) SECY-06-0196, "Issuance of Generic Letter 2006-XX, 'Post-Fire Safe-Shutdown Circuits Analysis Spurious Actuations,'" dated December 15, 2006, the Commission directed the staff to develop a clearly defined method of compliance to resolve fire-induced circuit failures for licensees who choose not to utilize the risk-informed approach contained in Title 10 of the *Code of Federal Regulations* Part 50, Section 48(c) (10 CFR 50.48(c)) – National Fire Protection Association Standard (NFPA) 805. The Commission also directed staff to encourage licensees to transition to 10 CFR 50.48(c) – NFPA 805.

CONTACT: Daniel Frumkin, NRR/DRA
(301) 415-2280

This paper also discusses the staff's plan to inform the Commission of other key fire protection activities.

DISCUSSION:

Staff Activities to Close Fire-Induced Circuit Failure Issues

The staff activities to provide closure to the issue of fire-induced circuit failures are described in detail in two enclosures to this paper. Enclosure 1 provides a proposed clarification of NRC requirements regarding circuit protection and analysis or methods for licensees that are not adopting the risk-informed methods of 10 CFR 50.48(c) – NFPA 805. Enclosure 2 includes the plan responding to the Commission's direction to develop guidelines that provide a clearly defined method of compliance for licensees for fire-induced circuit failures.

In order to provide clarification of NRC requirements, the staff proposes to define two classifications of equipment important to safe shutdown in the plant during a fire. The first is described in 10 CFR Part 50, Appendix R, Section III.G.1.a (Section III.G.1.a) as one train of systems necessary to achieve and maintain hot shutdown conditions (see Enclosure 1, Table 1, left column). This equipment is a subset of the second and more general set of structures, systems and components important to safe shutdown described in Section III.G.1. As described below, the level of protection for each of these classifications of equipment is different.

For one train of systems necessary to achieve and maintain hot shutdown conditions (see Enclosure 1, Table 1, left column) protection is required to meet Section III.G.2, "Fire Protection of Safe Shutdown Capability." For this equipment, there is no allowance for manual actions, or methods other than various combinations of: (1) physical separation (e.g., rated fire barriers or separation with no intervening combustibles); (2) fire detection; and/or (3) automatic fire suppression as described in Section III.G, to protect the train of systems necessary to achieve and maintain hot shutdown conditions.

Section III.G.1 also requires that fire protection features also be provided for the broader category of structures, systems and components, including circuits important to safe shutdown (right column of Enclosure 1, Table 1). However, for protection of this capability to safely shutdown, the same prescriptive requirements as listed in Section III.G.1.a and III.G.2 do not apply. Regulatory Issue Summary (RIS) 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2, Operator Manual Actions," provides a discussion protecting other safe shutdown equipment using methods such as manual actions, where one train of systems necessary to achieve and maintain hot shutdown conditions is protected in accordance with 10 CFR 50, Appendix R, III.G methods.

Since the issuance of SRM-SECY-06-0196, the staff had a number of meetings to provide industry with an opportunity for input into closure of this issue. The industry, through the Nuclear Energy Institute (NEI), developed draft NEI 00-01, Revision 2, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis," to enhance an earlier method to evaluate multiple spurious actuations due to fire. The staff sees value in certain attributes of the NEI document. However, the document does not provide for complete closure of the circuit failure issue. At a recent public meeting NEI acknowledged that further work is necessary on the draft document.

Based on discussions with industry representatives, the approach provided in Enclosure 1 clarifies circuit analysis requirements and will provide a technically sound and traceable regulatory framework that can be effectively implemented by the licensees.

Final disposition of the noncompliances will require analyses, plant changes, or submittals to the NRC for approval. Protection of the train of systems necessary to achieve and maintain hot shutdown conditions (left column in Table 1 of Enclosure 1) is required to be in accordance with the prescriptive requirements of 10 CFR Part 50, Appendix R, Section III.G. The existing guidance regarding protection (e.g. fire barriers and suppression systems) is sufficient for these purposes.

There are robust methods available for analyzing the protection of components important to safe shutdown but not required to achieve and maintain hot shutdown (the right column in Table 1 of Enclosure 1). Currently, feasible and reliable operator manual actions and modifications in accordance with Section III.G are acceptable approaches to protecting safe shutdown capability. The staff intends to work with industry, using the normal public regulatory process to enable stakeholder engagement, to develop guidelines that implement additional methods.

Circuits Enforcement Discretion

Currently, Enforcement Guidance Memorandum 98-002, Revision 2, "Disposition of Violations of Appendix R, Sections III.G and III.L Regarding Circuit Failures," provides enforcement discretion for fire-induced circuit failures where the licensee implements compensatory measures. If the Commission approves the staff's recommendation, the staff estimates that it will take approximately 3 to 6 months to issue a regulatory issue summary, or other appropriate generic communication sharing the clarification discussed in Enclosure 1 of this paper with licensees. Upon the issuance of the clarification to the licensees, the staff plans to issue a new enforcement guidance memorandum which will provide 6 months of enforcement discretion from the date of the clarification for licensees to identify, place noncompliances into their corrective action program, and institute compensatory measures. At the end of the 6 months period available for licensees to identify noncompliances, the enforcement discretion period would continue for 30 months. This period would allow time for licensees to resolve those noncompliances while maintaining compensatory measures in place. Any additional noncompliances identified during this 30 month period would not receive enforcement discretion. The overall enforcement discretion would expire approximately 3 years from the issuance of the clarification. This would align the time frame for resolution to be about the same as the time for plants who select the option of utilizing the risk-informed approach in NFPA 805 as permitted by 10 CFR 50.48(c).

New Reactors

Although this paper discusses the staff approach to resolve compliance issues concerning fire-induced circuit failures and multiple spurious actions for existing reactors, the staff is also taking a consistent approach to this issue for new reactors. However, because new reactor designs are integrating fire protection requirements, including the protection of safe-shutdown capability, into the planning and design phase for the plant, the potential for fire induced circuit failures and multiple spurious actuations to adversely affect the ability to shutdown is significantly reduced. Examples of design features that significantly reduce the adverse affects of fire induced circuit

failures include the use of fiber optic cabling and separation of redundant trains by passive barriers in all new reactor designs and the passive shutdown systems of some new reactors. Enclosure 1 also provides a discussion of the regulatory framework for new reactor designs.

Other Fire Protection Activities

The staff, under the direction of the NRC's Fire Protection Steering Committee, plans to prepare an integrated plan to address and document closure of the current key fire protection activities. The integrated plan will include a discussion of licensee transitions to NFPA 805, electrical raceway fire barriers, and post-fire operator manual actions. The staff will notify the Commission regarding the resolution of these activities.

Backfit Discussion

This position and approach for resolving fire-induced circuit failures including multiple spurious actuations is consistent with current staff positions and practice regarding the interpretation of Appendix R as it relates to fire protection for safe shutdown capability. This was most recently documented in RIS 2006-10. Specifically, paragraph III.G.2 Operator Manual Actions in Second Train of the RIS 2006-10 states:

. . . if one of the redundant trains in the same fire area is free of fire damage by one of the specified means in paragraph III.G.2 [left column of Table 1 of Enclosure 1], then the use of operator manual actions, or other means necessary, to mitigate fire-induced operation or maloperation to the second train [right column of Table 1 of Enclosure 1] may be considered in accordance with the licensee's fire protection program and license condition since paragraph III.G.2 has been satisfied.

RIS 2006-10 sets forth regulatory history documenting NRC interpretation and practice in the area of protection of safe shutdown capability. The clarification in this paper is consistent with the position in RIS 2006-10. Accordingly, the staff's positions stated in this paper do not constitute backfitting under 10 CFR 50.109 and no backfit analysis was performed.

COMMITMENT:

Upon approval of this paper the staff would issue new enforcement guidance in accordance with the discussion provided above. Also, the staff would share the information in Enclosure 1 with the industry using established regulatory communication tools. Lastly, the staff would develop or endorse guidance to include any additional methods that the staff accepts for circuit analysis.

RECOMMENDATION:

That the Commission approve issuing new enforcement discretion guidance related to fire-induced circuit failures.

RESOURCES:

To complete and implement the enforcement guidance change and to share the clarification with licensees, approximately 1 full-time equivalent position will be required. These resources are included in the current budget.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. The Office of the Chief Financial Officer has reviewed this paper and concurs.

/RA Bruce S. Mallett for/

R. W. Borchardt
Executive Director
for Operations

Enclosures:

1. Clarification of NRC Regulatory Expectations Regarding Fire-Induced Circuit Failures
2. Plan for Closing the Fire-Induced Circuit Failure Issue

Clarification of NRC Regulatory Expectations Regarding Fire-Induced Circuit Failures

PURPOSE:

The staff is clarifying regulatory expectations regarding the protection of post-fire safe shutdown capability against fire-induced circuit failures, including multiple spurious actuations. This clarification applies existing regulatory positions from Generic Letter 81-12, "Fire Protection Rule," Generic Letter 86-10, "Implementation of Fire Protection Requirements," and Regulatory Issue Summary 2006-10, "Regulatory Expectations with [10 CFR 50] Appendix R Paragraph III.G.2 Operator Manual Actions," to the resolution of the fire-induced circuit fault issue. This clarification intends to provide a technically sound and traceable regulatory framework and provide permanent closure to this issue.

BACKGROUND:

Beginning in 1997, the staff noticed that a series of licensee event reports (LERs) identified plant-specific problems related to potential fire-induced electrical circuit faults that could disrupt operation of equipment necessary to achieve and maintain safe shutdown. In 1998, the staff began interaction with stakeholders to understand the problem and develop an effective solution to the circuit analysis issue. The staff issued Information Notice (IN) 99-17, "Problems Associated with Post-Fire Safe-Shutdown Circuit Analyses," on June 3, 1999, to document additional problems.

In 2001, the Electric Power Research Institute (EPRI) and Nuclear Energy Institute (NEI) performed a series of cable functionality fire tests to further the nuclear industry's understanding of fire-induced circuit failures, particularly spurious equipment actuations initiated by circuit faults. EPRI coordinated this effort and issued the final report, EPRI Report No. 1006961, "Spurious Activation of Electrical Circuits Due To Cable Fires." Additional analysis of the EPRI/NEI test results can be found in NUREG/CR-6776, "Cable Insulation Resistance Measurements Made During Cable Fire Tests." The NRC conducted additional testing and following response to public comments on the draft test report, published Cable Response to Live Fire (CAROLFIRE) report in April 2008 to further enhance knowledge of fire-induced circuit failures. CAROLFIRE is documented in NUREG/CR-6931, "CAROLFIRE Test Report." Based on the EPRI and NRC test results, circuit failures may occur in rapid succession (without adequate time to resolve one before a second circuit failure occurs). This testing-based conclusion caused the staff to question the industry position that circuit faults may be managed in a one-at-a-time approach. Based on the test results and interactions with industry, staff concluded that clarification of regulatory expectations was needed in the area of fire-induced circuit failures. This is particularly true with respect to crediting the mitigation of such faults in the post-fire safe-shutdown circuit analysis.

DISCUSSION:

NRC Staff Clarification of Fire-Induced Circuit Fault Requirements

The fundamental requirement in 10 CFR Part 50, Appendix R, Section III.G (Section III.G), is that fire protection be provided to insure post-fire safe shutdown capability. Specifically, the rule states, "Fire protection features shall be provided for structures, systems, and components important to safe shutdown." Lack of adequate assurance of the ability to safely shutdown due to a fire would constitute a violation of regulatory requirements.

To clarify requirements, the equipment important to safe shutdown in the plant during a fire will be divided into two classifications. The first is described in Section III.G.1.a as one train of systems necessary to achieve and maintain hot shutdown conditions (see Table 1, left column). This equipment is a subset of the more general set of equipment described in Section III.G.1 as structures, systems and components important to safe shutdown (see Table 1, right column.) As described below, the level of protection for each of these classifications of equipment is different.

For one train of systems necessary to achieve and maintain hot shutdown conditions as described in Section III.G.1.a (see Table 1, left column) protection is required to meet Section III.G.2, "Fire protection of safe shutdown capability," for plants licensed to operate prior to January 1, 1979 (pre '79 plants). For this equipment (left column of Table 1), there is no allowance for manual actions, or methods other than various combinations of (1) physical separation (e.g., rated fire barriers or separation with no intervening combustibles), (2) fire detection, and/or (3) fire suppression as described in Section III.G, to protect the train of systems necessary to achieve and maintain hot shutdown conditions. The left column of Table 1 provides details regarding the requirement to protect one train of systems necessary to achieve and maintain hot shutdown conditions.

Section III.G.1 requires that fire protection features be provided for the broader category of structures, systems and components, including circuits important to safe shutdown (right column of Table 1). However, for protection of this capability to safely shutdown, the same prescriptive requirements as listed in Section III.G.1.a and III.G.2 do not apply. The right column of Table 1 provides details regarding the protection of safe shutdown capability. For example, based on previous NRC guidance, manual actions or other methods may be used to demonstrate safe shutdown capability. Regulatory Issue Summary (RIS) 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2, Operator Manual Actions," provides a discussion of protecting other safe shutdown equipment using methods such as manual actions, where one train of systems necessary to achieve and maintain hot shutdown conditions is protected in accordance with Section III.G.2 methods.

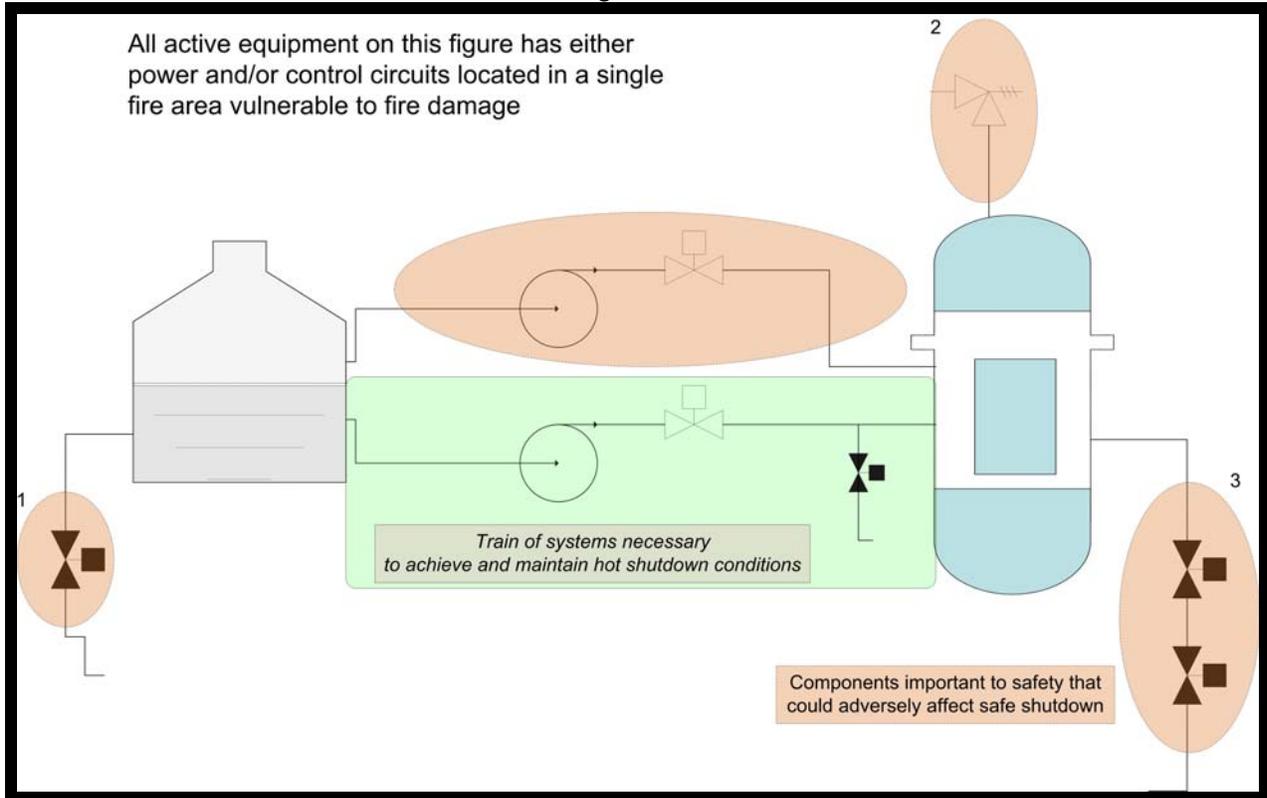
Figure 1 provides a generic graphical representation of equipment that is typically included in the train of systems necessary to achieve and maintain hot shutdown condition (in green box). The figure also shows equipment that is typically considered components important to safe shutdown that could adversely affect safe shutdown capability, that is could prevent shutdown or cause maloperation of safe shutdown systems (in orange ovals).

| Table 1 | | |
|--|--|---|
| 10 CFR 50. Appendix R, III.G. " Fire protection of safe shutdown capability. 1. Fire protection features shall be provided for structures, systems, and components important to safe shutdown." | | |
| Rule Application | Requirement to protect "one train of systems necessary to achieve and maintain hot shutdown conditions" | "Fire protection features shall be provided for structures, systems and components important to safe shutdown." |
| Compliance Options | <p>III.G.1.a "One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage"</p> <p>III.G.2 ". . . ensuring that one of the redundant trains is free of fire damage. . ." a. . . . fire barrier having a 3-hour rating. . . b. . . . 20 feet with no intervening combustible or fire hazards. . . fire detectors and an automatic fire suppression system . . . ; or c. . . . a fire barrier having a 1-hour rating, . . . fire detectors and an automatic fire suppression system. . ."</p> <p>III.G.3 "Alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, zone under consideration . . ."</p> | <p>Currently Developed Options: III.G.2 protection, and manual actions</p> <p>Options Under Development: Fire modeling, and NEI method in NEI 00-01</p> |

Table 1

| | | |
|--------------------|---|---|
| Discussion | <p>Circuits for trains of plant equipment that are required to operate for post-fire safe shutdown and equipment that assures availability of the train's required flow path must be protected so as to be free from fire damage, in accordance with III.G.1, 2 or 3.</p> <p>A train free of fire damage is demonstrated by rigorous design review and physical protection such as III.G.2. This includes consideration of single and multiple spurious actuations that could adversely affect the train of safe shutdown equipment. Manual actions, fire modeling, and risk-informed approaches such as the NEI method, cannot be used to demonstrate compliance without NRC approval.</p> | <p>Equipment that is not part of the train necessary to achieve and maintain hot shutdown conditions or is not necessary to assure availability of the hot shutdown train's flow path, but could otherwise prevent safe shutdown must be protected against fires that affect the safe shutdown systems capability. This includes multiple spurious actuation of such equipment.</p> <p>Manual actions and fire modeling are approaches that can be used to demonstrate compliance without NRC approval.</p> |
| Equipment Examples | <p>Coolant source, motive power, and flow path required to assure reactivity control, inventory control, and heat removal. Specific examples would be pumps, flow path valves, and necessary instrumentation.</p> | <p>RHR/RCS isolation valves, ADS valves, steam generator atmospheric dump vales, and steam bypass valves, when this equipment is not part of train of systems required for safe shutdown</p> |

Figure 1



Options to Protect One Train of Systems Necessary to Achieve and Maintain Hot Shutdown Conditions (Left Column of Table 1 and Green Box in Figure 1)

The train of systems necessary to achieve and maintain hot shutdown must be protected in a prescriptive manner consistent with 10 CFR Part 50, Appendix R Section III.G.2, including those areas where redundant trains are located in the same fire area. This includes source, motive power, and flow path required to assure reactivity control, make-up, cooling and necessary instrumentation, such as pumps and flow path valves indication. Required protection includes multiple spurious actuations that could adversely affect the train of systems necessary to achieve and maintain hot shutdown conditions.

Options to Protect Components Important to Safe Shutdown That Could Adversely Affect Safe Shutdown Capability (Right Column of Table 1 and Orange Ovals in Figure 1)

The protection options available as part of 10 CFR Part 50, Appendix R Section III.G.2 are also available but not required for the protection of the components important to safe shutdown. In addition, the use of operator manual actions is well established to provide for the capability to safely shutdown in the event of fire damage to circuits important to safe shutdown capability that are not part of the train required to achieve and maintain hot shutdown. In addition to the use of manual actions, the staff plans to work with the industry to provide regulatory guidance documents for additional methods for circuit analysis and protection.

Application to 10 CFR Part 50, Appendix R Section III.G.3 for Rooms Such As the Control Room and Cable Spreading Rooms

This clarification also applies to plant control rooms, cable spreading rooms and other 10 CFR Part 50, Appendix R Section III.G.3, alternate or dedicated shutdown areas. The implementation for these areas differs due to the fact that the NRC provided Safety Evaluation Reports to licensees for their alternate and dedicated shutdown strategies at the time that 10 CFR Part 50, Appendix R, Section III.G, was being implemented at each plant. These Safety Evaluation Reports are referenced in each plant's fire protection license condition.

In addition, consistent with Generic Letter 86-10, Question 5.3.10, licensees need only to consider one spurious actuation or signal until control of the plant is achieved from the alternate or dedicated shutdown system. Following control of the plant from the alternative or dedicated shutdown system, single or multiple spurious actuations that could occur in the fire affected area must be considered in accordance with the plant's approved fire protection program. The approved shutdown strategies vary from plant to plant.

Regulatory Implications for Plants Licensed After January 1, 1979

This approach also applies to plants that were licensed after January 1, 1979, that are not specifically required to meet the requirements of 10 CFR Part 50, Appendix R, Section III.G. These plants have an approved fire protection program based on a review against the guidance in NUREG-0800, "Standard Review Plan" (SRP), Section 9.5.1, "Fire Protection." The SRP, Section 9.5.1, includes similar wording as is included in 10 CFR Part 50, Appendix R, Section III.G. An NRC Safety Evaluation Report was issued documenting the NRC review of the facilities fire protection program. In addition, licensees have a license condition that says licensees may make changes to the approved fire protection program without prior approval of

the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. The staff considers changes that would permit the use of manual actions or other analysis methods in lieu of the prescriptive protection for the train of systems necessary to achieve and maintain hot shutdown conditions (left column) as an adverse affect on the ability to achieve and maintain safe shutdown capability. Such a change would therefore require prior NRC approval.

The staff is aware of two facilities licensed after 1979 for which the above information would not apply. These facilities have NRC Safety Evaluation Reports documenting approval of a fire protection program specifically protecting against only one spurious actuation. If, in the course of the NRC inspection process, risk-significant multiple spurious actuations are identified at these facilities the staff will consider the need for revision of that plant's licensing basis under the NRC's plant specific backfit provisions and 10 CFR 50.109, "Backfitting." The inspection process currently specifically looks for risk-significant multiple spurious actuations, therefore no change to the inspection process is required.

Treatment of Circuit Failures for New Reactor Plants

The fire protection programs for new reactor plants are subject to 10 CFR 50.48(a) and the Commission-approved criteria for enhanced fire protection.¹ The enhanced fire protection criteria ensures that safe shutdown can be achieved by assuming that all equipment in any one fire area will be rendered inoperable by fire for all areas of the plant.² As a result, the potential for fire induced circuit failures and multiple spurious actuations to adversely affect the ability to shutdown is greatly reduced. Consequently, licensees of new reactor plants have more flexibility than existing plants in their approach to addressing any potential multiple spurious actuations that could occur.

New reactor plants will have an approved fire protection program based on a review in accordance with NUREG-0800, "Standard Review Plan" (SRP), Section 9.5.1, "Fire Protection." License applicants must demonstrate that they have systematically identified possible multiple spurious actuation scenarios that could prevent safe shutdown and must describe their approach to addressing each scenario such that post-fire safe shutdown is ensured. The staff's approach for crediting of operator manual actions, fire modeling, etc., to ensure safe shutdown will be consistent with the guidance for these methodologies as are proposed for existing reactors.

¹ SECY-90-016, "Evolutionary Light-Water Reactor (LWR) Certification Issues and Their Relationship to Current Regulatory Requirements;" SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs " and SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs."

² The control room is excluded from this approach, provided an independent alternative shutdown capability is included in the design. For the reactor containment building fire protection for redundant shutdown systems will ensure, to the extent practicable, that one shutdown division will be free of fire damage.

Plan for Closing the Fire-Induced Circuit Failure Issue

PURPOSE:

The purpose of this enclosure is to describe the NRC staff's (staff's) efforts leading up to this paper and the staff's proposed steps for providing a method of compliance to resolve fire-induced circuit failures for licensees who choose not to utilize the risk-informed approach contained in Title 10 of the *Code of Federal Regulations* Part 50, Section 48(c) (10 CFR 50.48(c)) – National Fire Protection Association Standard (NFPA) 805. This enclosure includes a general timeline and description of the activities following Commission action on this paper.

BACKGROUND:

In Staff Requirements Memorandum (SRM) SECY-06-0196, "Issuance of Generic Letter 2006-XX, 'Post-Fire Safe-Shutdown Circuits Analysis Spurious Actuations,'" dated December 15, 2006, the Commission directed the staff to provide a clearly defined method of compliance to resolve the issue of fire-induced circuit failures including multiple spurious actuations. The staff has been working with industry stakeholders since the issuance of the SRM on the resolution of this issue. A summary of those activities is included in a December 31, 2007, memorandum to the Commission entitled, *Status of Actions to Resolve Potential Safety Concerns from Multiple Fire-Induced Spurious Equipment Operations* (Agencywide Document Management and Access System (ADAMS) Accession No. ML073470750). Since December 31, 2007, the Fire Protection Steering Committee, staff, and industry stakeholders have held three additional public meetings (ADAMS Accession No. ML081720057).

During these public meetings, the staff has shared the approach provided in this paper with industry stakeholders and has received feedback. Industry stakeholders have also provided input to this process, which the staff is considering (see May 28, 2008, letter from J. Grobe to A. Marion (ADAMS Accession No. ML080850044)).

DISCUSSION:

When the staff shares this clarification with the industry (see item C. below), following Commission action on this paper, the licensees will have adequate information to identify which structures, systems, and components (SSCs) in the plant are part of the train of systems necessary to achieve and maintain hot shutdown conditions. Licensees will then be able to bring these into compliance using the requirement in 10 CFR Part 50, Appendix R, Section III.G. For the fire protection features for SSCs important to safe shutdown, licensees have adequate information to begin dispositioning these SSCs. Item E. below discusses additional guidance that the staff plans to make available to licensees to resolve issues for SSCs important to safe shutdown.

CLOSURE PATH ACTIVITIES:

A. NRC Inspects Fire-Induced Circuit Failures

EXPECTED TIMING - Currently in place and will continue

Staff inspection of fire-induced circuit failures is ongoing and will continue through this entire process, with or without approval of this paper. Inspections will continue regardless of any changes to the enforcement discretion guidance. Inspections will not change based on this enforcement guidance changing; the enforcement guidance will only affect enforcement relating to identified violations. The enforcement discretion guidance will affect licensee-identified findings found during the period of enforcement discretion where enforcement discretion applies to newly identified noncompliances.

B. Commission Takes Action on the Commission Paper

EXPECTED TIMING - At the Commission's discretion

Action on this paper involves both the staff's approach for the compliance aspects of the fire-induced circuit failures including multiple spurious actuations and the changes to the enforcement discretion guidance. If the Commission approves this paper, the activities described below in this paper would occur. If the Commission does not approve this paper or directs other action, then staff inspection of fire-induced circuit failures will continue with enforcement discretion as described in the current Enforcement Guidance Memorandum (EGM) 98-002, Revision 2, "Disposition of Violations of [10 CFR Part 50,] Appendix R, Sections III.G and III.L Regarding Circuit Failures."

C. Staff to Share Clarification with Industry Stakeholders

EXPECTED TIMING - Will begin upon approval of this paper and should be completed approximately 3 to 6 months following Commission action on this paper

Under the direction of the NRC Fire Protection Steering Committee, the staff plans to hold public meetings with stakeholders and to issue a regulatory issue summary or similar appropriate generic communication to document the information provided in Enclosure 1 of this paper.

D. NRC Staff Revises Enforcement Discretion Guidance

EXPECTED TIMING – Timed to occur with publication of clarification (C above)

Currently EGM 98-002, Revision 2, provides enforcement discretion for violations related to fire-induced circuit failures. To receive this discretion, a licensee must implement compensatory measures for the violation. The new enforcement discretion guidance will provide six months for licensees to identify noncompliances, implement compensatory measures and place the noncompliances into the licensee's corrective action program (CAP). This would be followed by 30 months for the licensees to resolve the fire-induced circuit failure related noncompliances without being cited with a violation. For both of these time periods, compensatory measures must be in place in order to receive enforcement discretion. At the end of the 30 months, the enforcement discretion will end for all related unresolved noncompliances.

Licenseses that submit a high quality and complete exemption request or license amendment before the end of the 30 months will receive enforcement discretion until the staff dispositions the exemption request or amendment.

E. Develop Additional Evaluation Methods

EXPECTED TIMING - Will be initiated following Commission action on this paper

Currently, feasible and reliable operator manual actions and modifications in accordance with Section III.G are acceptable approaches to protecting equipment important to safe shutdown that are not part of the train required to be protected to achieve and maintain hot shutdown. The staff plans to pursue fire modeling as an additional evaluation method. Fire modeling is currently an available evaluation method under NFPA 805 to demonstrate safe shutdown capability is assured. The staff plans to pursue using the fire modeling information developed by both the staff and stakeholders as part of NFPA 805 as a model for applying fire modeling as an additional evaluation method.

The industry, through the Nuclear Energy Institute (NEI), developed draft NEI 00-01, Revision 2, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis," to enhance an earlier method to evaluate multiple spurious actuations due to fire. The staff sees value in certain attributes of the NEI approach and expects to interact further with industry stakeholders on the development of the approach discussed in draft NEI 00-01, Revision 2.

F. Licensees Find and Fix Noncompliances

EXPECTED TIMING - Licensees will likely begin to identify and fix noncompliances upon public notice of Commission action on this paper or upon issuance of staff clarification (C.) and should be completed before the end of the period of enforcement discretion

Currently, the NRC is exercising enforcement discretion pursuant to Enforcement Guidance Memorandum 98-002 for all fire-induced circuit failure related noncompliances if the licensee implemented compensatory measures. Revised enforcement guidance regarding circuit failures will be issued. For 6 months following the issuance of the clarification, licensees would receive enforcement discretion for any fire-induced circuit failure related noncompliance where compensatory measures are implemented and the noncompliance is entered into the plant's corrective action program (CAP).

Noncompliances identified following the 6 month period after the clarification would not be eligible for enforcement discretion. Finally, any noncompliance that is not resolved before the end of the 30 month period and does not have an active licensing action pending, will be subject to normal enforcement.

G. NRC Staff to Document Acceptable Methods

EXPECTED TIMING – Will begin upon completion of discussion with industry regarding methods and completed during the period of enforcement discretion.

Following the staff working with industry (Item E.) the staff intends to publish the methods in the appropriate regulatory document. The staff expects that these tools will be included, or included via reference, in Regulatory Guide, 1.189, “Fire Protection.”

H. Revise NRC Inspection Procedures

EXPECTED TIMING - Will begin upon completion of discussion with industry regarding methods and completed during period of enforcement discretion

As the methods become finalized (G.), it will be appropriate to update the NRC inspection procedures and to train the inspection staff to review licensee analyses that are performed using these methods.

I. NRC Inspects Industry Fixes

EXPECTED TIMING - Would begin at the end of enforcement discretion and would continue for 3 years during the triennial fire protection inspection cycle

As part of the reactor oversight process (ROP), the regional inspection staff will inspect fire protection programs and the application of this clarification during the triennial fire protection inspections. The reactor oversight process performs triennial fire protection inspections at each site. The inspection procedure will be revised (see H. above), to assure successful inspections.

J. Staff Consideration of Rulemaking

EXPECTED TIMING – Concurrent with the above activities if needed

The staff may explore rulemaking in the area of fire-induced circuit failure to determine if rulemaking is appropriate. At this time, there is inadequate information regarding the application of this clarification and the related methods to determine if rulemaking would be appropriate.