

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
THE HARTFORD ELECTRIC LIGHT COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
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PROPOSED RULE

PR-50⁽²⁾
(45 FR 36082)

Secretary of the Commission
Attn: Docketing and Service Branch
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Haddam Neck Plant
Millstone Nuclear Power Station, Unit Nos. 1 and 2
Proposed Rule Regarding Fire Protection



On May 29, 1980, the Commission published in the Federal Register (45FR36083) a proposed amendment to its regulations requiring specified provisions for fire protection in operating nuclear power plants. On behalf of Connecticut Yankee Atomic Power Company (CYAPCO) and Northeast Nuclear Energy Company (NNECO), Northeast Utilities Service Company (NUSCO) is hereby providing comments on this proposed rule. To facilitate future Commission action on this issue, NUSCO's suggested revision to Appendix R, with the accompanying justification for the changes, is attached. This information is being provided in addition to the general comments which follow.

The proposed Appendix R to 10CFR Part 50 represents an extension of the Commission's authority to establish new regulations to ensure the continued protection of the public health and safety, because it proposes to establish requirements which exceed those necessary to fulfill that objective. The most fundamental objection to the proposed regulation relates to its scope, in that it is stated that Appendix R was developed to resolve 17 generic issues in the fire protection safety evaluation reports for 32 plants where agreement had not been reached between the Staff and the licensees. The requirements which would be mandated by this regulation far surpass that purpose by imposing requirements far in excess of those necessary to resolve issues contested by various licensees.

In addition, the proposed regulation is excessively specific, unjustifiably restrictive, and does not allow the latitude necessary to accommodate the differences which exist between currently operating plants. Historically, NRC rules have stated specific objectives to be met and the detailed design and/or implementing procedures to meet those objectives have been the responsibility of the licensees. Proposed Appendix R does not conform to this practice and, therefore, greatly increases the difficulty and cost associated with meeting those requirements.

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We believe that the significant costs associated with Appendix R cannot be justified by a realistic cost/benefit appraisal. For the three operating nuclear units we represent, the cost to implement Appendix R in its current form is estimated to be approximately \$150 million. This cost estimate does not include the staggering costs of replacement power which will be suffered to implement the proposed modifications as well as those incurred by not being able to comply with the unreasonable and unattainable implementation dates mandated by the proposed regulation. Supporting details to the three major areas of disagreement are contained in the following paragraphs.

As previously stated, the Commission has acknowledged that safety evaluation reports for fire protection contained open issues for 32 plants. Implicit in that statement is the admission that for some 38 plants there were no areas of disagreement. For the three operating units we represent, the unresolved areas involved fire brigade size, training, and drilling. In light of previous discussions between CYAPCO, NNECO, and the Staff, it might logically be deduced that the proposed regulation, which was developed to address those open items, would apply only to the unresolved issues. In that case, the impact of the regulation would be reasonable and the implementation schedule attainable. However, the proposed rule addresses many issues and establishes new requirements which were previously documented as having been resolved by the Staff. It is difficult to justify from a safety standpoint the abandonment of previously agreed upon modifications based upon plant unique evaluations and thus requiring re-review of issues once resolved.

In recognition of the fact that the Commission intends to adopt a rule on fire protection, we have developed an alternative approach which can be taken to satisfy those concerns in a much more reasonable manner. NUSCO emphasizes that the proposed regulation is judged to be unduly proscriptive and excessively conservative. The attached material provides revised language and explains the basis for the suggested changes. The format is arranged to facilitate synergistic evaluation of the published version, the revised version, and the basis for the revision. Specific examples are noted as follows:

(1) Section II.G - Protection of Safe Shutdown Capability

This section is excessively detailed in prescribing protective features. For maximum effectiveness, rules should specify objectives to be met and the detailed design and/or implementing procedures to meet those requirements should remain the responsibility of the licensees. This comment is especially relevant in that for the majority of cases, the proposed regulation addresses issues previously classified as resolved by the NRC Staff.

(2) Section II.H - Fire Brigade

Approximately seven pages of the proposed regulation are devoted to detailed requirements concerning fire brigades. Among the requirements are provisions tantamount to a "lesson plan" for initial classroom instruction. This level of detail is inappropriate for an NRC regulation and implies a relative importance of this item which is unjustifiable.

(3) Section II.K - Administrative Controls

Again, some five pages are devoted to the establishment of appropriate administrative controls to minimize fire hazards. This section is excessively specific and is nearly as detailed as the implementing procedures themselves.

(4) Section II.A - Fire Protection Program

The proposed regulation is applicable to nuclear power plants operating prior to January 1, 1979, yet this section directs licensees to "arrange the structures, systems, and components important to safety so that a fire that starts in spite of the fire prevention activities and that is not promptly extinguished by the fixed automatic or manual fire suppression activities will not prevent the safe shutdown of the plant". This requirement is unrealistic as there is little latitude in rearrangement of structures, systems, or components in operating plants.

In the statement of consideration, the Commission states that "the public has been afforded several opportunities to comment on the provisions of the rule during two extensive comment periods and in open meetings with the ACRS in which a Regulatory Guide on fire protection was considered". Apparently, the above statement was instrumental in the Commission's decision to specify a rigid 30-day comment period, as well as an implementation schedule of November 1, 1980. NUSCO submits that this proposed rule has never been offered for public comment; the previous instances where the subject of fire protection was a matter of public deliberation involved matters substantively different from proposed Appendix R. The impact on CYAPCO and NNECO would be escalated considerably by this proposed rule from those discussed in prior fire protection documents. It is not appropriate that comments solicited on a Regulatory Guide, which had requirements changed during its evolution to a final rule, be considered as a basis for limiting the public scrutiny of this proposed rule. The key issues, including requirements for alternate/dedicated shutdown systems and requirements regarding associated circuits, have not "been under discussion for several years" as stated by the Commission.

For consideration during its final deliberation, the Commission should be aware that it is highly likely that CYAPCO and NNECO will be unable to comply with all the provisions mandated by the dates indicated. Significant new requirements are proposed which were not contained in previous regulatory guidance, including the requirement for the reactor coolant pump lubrication oil collection system to be seismically designed. The requirements related to associated circuits have a significant impact and were not identified prior to the issuance of proposed Appendix R.

Most importantly, it will be physically impossible to engineer and install an alternate or dedicated shutdown system by the dates specified. The existence of this proposed requirement represents a complete rejection of previously accepted methods of assuring safe shutdown capability. A relevant excerpt from the Millstone Unit No. 2 SER is as follows: "The licensee will conduct an evaluation to determine a suitable method to provide isolation, separation, or protection of redundant safety-related cables in the cable spreading area". NNECO has previously docketed its comprehensive method of fulfilling the intent of the above statement by providing isolation, separation, protection, and fire detection systems for safety-related cables in the cable spreading area. NUSCO is forced to conclude that the Commission has completely reversed the Staff position stated in the Millstone Unit No. 2 SER, even though Appendix R states that its provisions do not rescind any SER requirements.

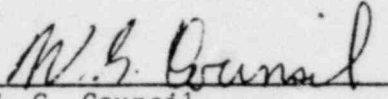
Another major issue raised in the proposed rule is the apparent requirement to consider fires simultaneously with other accidents. This interpretation arises from the wording of some requirements which apply to structures, systems, and components "important to safety". Although all previously issued regulatory guidance states that fires need not be postulated to be concurrent with non-fire-related failures in other systems, other plant accidents, or the most severe natural phenomena, this regulation does not contain that definition and needs to be clarified to be consistent. The wording of the regulation should indicate that the probability of the simultaneous fire with these events is sufficiently low that the NRC requirements for fire protection are to ensure that the plant can be brought to and maintained in a safe shutdown condition. Many structures, systems, and components which are important to safety in the event of an accident are not required for safety in the event of a fire alone.

The separate comments of Commissioners Hendrie and Kennedy suggest an awareness by some members of the Commission that the implementation schedules proposed are totally unreasonable. The cumulative economic impact on all affected licensees, considering the direct costs of hardware/procedural implementation as well as replacement power costs, will likely reach billions of dollars with as yet unjustified incremental benefits. Further, the proposed rule will result in loss of nuclear generation capacity for lengthy intervals, an action in direct conflict with the Administration's policy on reducing the consumption of imported oil because of economic and national security considerations. It is NUSCO's judgment that the attached revision of Appendix R which we have prepared will ensure continued protection of the public health and safety in a manner which recognizes realistic resources limitations and plausible fire protection scenarios.

CYAPCO, NNECO, and NUSCO would welcome the opportunity to participate in any future Commission deliberations on this subject.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY


W. G. Council
Senior Vice President

Attachment

cc: Commissioner Ahearne
Commissioner Bradford
Commissioner Gilinsky
Commissioner Hendrie
Commissioner Kennedy
Dr. Milton Plesset, ACRS

APPENDIX R

FIRE PROTECTION PROGRAM

FOR

NUCLEAR POWER FACILITIES OPERATING PRIOR TO JANUARY 1, 1979

APPENDIX R - FIRE PROTECTION PROGRAM FOR NUCLEAR POWER FACILITIES
OPERATING PRIOR TO JANUARY 1, 1979

I. INTRODUCTION AND SCOPE

This Appendix sets forth the minimum fire protection requirements needed to resolve outstanding issues in respective nuclear power facilities Safety Evaluation Reports in order to satisfy General Design Criterion 3 of Appendix A to this part. *1

This Appendix applies only to licensed commercial nuclear power electric generating stations operating prior to January 1, 1979; it does not apply to production reactors, test reactors, research reactors, or other licensed or unlicensed reactors used for other than electric power production.

This Appendix does not rescind any requirements set forth in any Safety Evaluation Report for any nuclear power facility.

II. GENERAL REQUIREMENTS

A. Fire Protection Program

A fire protection program shall be established at each plant. The program shall establish the fire protection policy for the protection of structures, systems, and components required for safe shutdown at each plant and procedures, equipment, and personnel required to implement the program at the plant site. 2

The fire protection program shall be under the direction of an individual who has been delegated authority commensurate with

*The numbers in right-hand margin denote a rewrite which is supported in an attachment entitled "Explanation Notes".

the responsibilities of the position. The individual shall be knowledgeable in both fire protection and nuclear safety.

The fire protection program shall extend the concept of defense in depth to fire protection with the following objectives.

- o to prevent fires from starting
- o to detect rapidly, control and extinguish promptly those fires that do occur
- o to provide active and passive fire protection features for safe shutdown systems or components so that a fire that starts in spite of the fire prevention activities will be promptly extinguished and will not prevent the safe shutdown of the plant.

The fire protection program shall consist of an integrated effort of procedures, equipment and personnel necessary to carry out the three-part defense-in-depth concept for each fire area containing combustibles and containing or presenting a fire hazard to structures, systems and components required for safe shutdown. Measures for fire prevention; fire detection, suppression and containment; or provisions to assure alternate shutdown capability shall be provided for each fire area as follows.

1. Fire Prevention

- (a) In-situ fire hazards shall be minimized.
- (b) Transient fire hazards associated with normal operation, maintenance, repair or modification activities shall be controlled, minimized, and eliminated where possible.

2. Fire Detection, Suppression, and Containment

(a) Fire detection capability shall be provided.

(b) Portable extinguishers and standpipe and hose stations shall be installed.

(c) Suppression systems and preventative systems (automatic, fixed, manually operated, hose stations, fire barriers and fire coating) shall be provided where fire hazards of grouped electrical cables are large or access for the fire brigade is restricted.

(d) A site fire brigade shall be established, properly equipped and trained.

(e) Fire protection features shall be provided to control large fire hazards. These features may consist of any one or combination of: sprinkler systems, detection, hose stations, fire retardants, heat shields, local fire barriers, or curbing.

(f) Fire protection features shall be provided to protect redundant systems or components. Such features shall also be provided where physical separation between redundant safe shutdown systems and components or between such systems and fire hazards is not adequate to ensure that fire damage is limited to only one division of shutdown systems. Fire protection features may consist of any one or combination of: sprinkler systems, detection, hose stations, fire retardants, heat shields, local fire barriers and curbing.

(g) Fire barriers surrounding each fire area shall have a 3-hour fire rating unless the fire hazards analysis demonstrates

that a lesser rating exceeds the duration of the in-situ fire load by at least one-half hour, or justify that the in-situ fire could be controlled by other fire protection features such as sprinkler systems.

(h) Fire detection and suppression systems shall be designed, installed, maintained and tested by personnel properly qualified in fire protection systems.

(i) Surveillance procedures, for safe shutdown areas, shall be established to ensure that fire barriers and fire suppression systems and components are operable.

3. Alternate Shutdown Capability

Alternate shutdown capability shall be provided when safe shutdown, as defined in respective current licenses, cannot be ensured by active and passive fire protection features. Such features include sprinkler systems, detection, hose stations, fire retardants, heat shields, local fire barriers, and fire brigade response.

B. Loss of Offsite Power

Fire suppression systems protecting systems necessary to achieve and maintain safe plant shutdown shall be capable of functioning with or without offsite power.

C. Manual Fire Fighting

Manual fire fighting capability shall be provided in all areas containing or presenting a fire hazard to structures, systems, or components required for safe shutdown.

D. Access for Manual Fire Fighting

Access shall be provided to all areas containing or presenting a fire hazard to structures, systems or components *required for safe shutdown*, such that the fire brigade can function effectively.

E. Fire Hazard Analysis

The adequacy of fire protection for any particular plant area shall be determined by analysis of the effects of postulated exposure fires involving both in-situ and transient combustibles on the ability to safely shut down the reactor, or the ability to minimize and control the release of radioactivity to the environment. The Fire Hazards Analysis Report shall provide the information required by the guidelines entitled "Supplemental Guidance on Information Needed for Fire Protection Program Evaluation" issued by the Staff in September, 1976.

III. SPECIFIC REQUIREMENTS

A. Fire Water Distribution System

A fire main loop shall distribute fire protection water from the fire water supplies to the *fire water* suppression systems. Two water supplies shall be provided to furnish necessary water volume and pressure to the fire main loop. Each supply shall be *separated or have the ability to be separated by isolation or control valves so that a failure of one supply will not result in a failure of the other supply.*

Each supply of the water distribution system shall be capable of providing for a period of 2 hours the maximum expected water demands as determined by the fire hazards analysis for *safe shutdown* areas or other areas that present a fire exposure hazards to *safe shutdown* areas. Automatic fire water makeup can be credited into this water demand. 20

Other water systems used as a primary fire water supply shall be permanently connected to the fire main system and shall be capable of automatic alignment to the fire main system.

B. Sectional Control Valves

Sectional control valves shall be provided to isolate portions of the fire main for maintenance or repair without isolating the entire system. Fire service approved visual indicating valves, such as Post Indicator Valves, shall be used where possible. 21

C. Hydrant Block Valves

Block valves shall be installed in hydrant laterals if necessary to permit isolation of outside hydrants from the yard fire main without interrupting the fire water supply to any area containing or presenting a fire hazard to *safe shutdown* equipment. 22

D. Manual Fire Suppression

Standpipe and hose systems shall be installed so that at least one effective hose stream will be able to reach any location that contains or could present an exposure fire hazard to *safe shutdown* equipment. Standpipe and hose stations shall be inside PWR containments and large BWR containments that are not inerted.

Standpipe and hose stations are not required if sufficient justification can be provided that adequate fire protection features have been provided to account for a given fire area. For BWR drywells, standpipe and hose stations shall be placed outside the drywell with adequate lengths of hose to reach any location inside the drywell with an effective hose stream.

E. Hydrostatic Hose Tests

Fire hose shall be hydrostatically tested at a pressure of 50 psi above maximum operating pressure.

F. Automatic Fire Detection

Automatic fire detection capability shall be provided in all areas of the plant that contain combustibles and safe shutdown systems or components.

G. Protection of Safe Shutdown Capability

Protective features shall be provided for fire areas that contain cables or equipment of redundant systems required to achieving and maintaining safe shutdown conditions to ensure that at least one means of achieving said conditions survives postulated fires. The protective features may consist of any one or combination of the following: automatic fire suppression capability, fire detection and manual fire suppression capability, fire propagation retardants, physical separation, partial fire barriers, or alternate shutdown capability independent of the fire area.

H. Fire Brigade

A site fire brigade equipped and trained for firefighting shall be established to ensure adequate manual firefighting capability for all areas of the plant containing structures, systems or components required for safe shutdown.

The nominal size of the fire brigade shall be five members on each shift unless a smaller number is justified in light of plant specific considerations.

Regardless of the size of the fire brigade, at least three (3) members must be plant personnel who are knowledgeable of plant safety systems.

The brigade leader shall be competent to assess the potential safety consequences of a fire and advise control room personnel. Such competence by the brigade leader may be evidenced by possession of an operator's license or equivalent knowledge of plant safety systems.

The fire brigade members' qualifications shall include an annual physical examination.

Fire brigade members shall be provided with personal protective equipment and whatever equipment is required to allow them to safely and efficiently extinguish fires.

I. Fire Brigade Training

The fire brigade training program shall ensure that the capability to fight potential fires is established and maintained. The program shall consist of an initial classroom instruction program followed by periodic classroom instruction, practice in fire-fighting, and fire drills.

1. Classroom Program

The classroom training program shall be conducted annually to review fire protection in general (basics) and to review the specifics of plant fire protection. The intent of the annual classroom sessions shall be to present a thorough review of fire protection and to introduce changes or revisions in plant specifics.

Instructions shall be provided to all fire brigade members and fire brigade leaders.

2. Practice Sessions

Practice sessions shall be held for each fire brigade member on the proper method of fighting the various types of fires that could occur in a nuclear power plant. These sessions shall provide brigade members with experience in actual fire extinguishment and the use of emergency breathing apparatus under strenuous conditions encountered in firefighting. These practice sessions shall be provided at least once per year for each fire brigade member.

3. Drills

(a) Fire brigade drills shall be performed in the plant so that the fire brigade can practice as a team.

(b) Drills shall be performed at regular intervals and fire brigade members must participate in at least two drills per year.

(c) Drills will include the simulated use of equipment and will be preplanned and post-critiques to establish the training objectives of the drills and determine how well these objectives have been met.

(d) At least one drill per year shall be performed on a "back shift" for each shift fire brigade.

(e) At 3 year intervals, drills shall be critiqued by qualified individuals independent of the *plant* staff. A copy of the written report from such individuals shall be *available* to NRC for evaluation.

4. Records

Individual records of training provided to each fire brigade member, including drill critiques, shall be maintained for at least 4 years to ensure that each member receives training in all parts of the training program.

J. Emergency Lighting

Emergency lighting shall be provided in all areas needed for operation of safe shut down equipment and in access routes to all safe shutdown areas and other areas presenting a fire hazard to safe shutdown areas. Such emergency lighting may be provided by the normal lighting or by permanently installed sealed beam or fluorescent units with individual 2-hour minimum battery power supply. A *sufficient number of portable sealed-beam battery-powered hand lights shall be provided to support fire fighting and repair activities.*

K. Administrative Controls

Administrative controls shall be established to minimize fire hazards in areas containing structures, systems, and components required for safe shutdown. These controls shall establish procedures to:

1. Govern the handling and limitation of the use of ordinary combustible materials, combustible and flammable gases and liquids, high efficiency particulate air and charcoal filters, dry ion exchange resins, or other combustibles, in safe *shutdown* areas.

2. *Minimize and control* the storage of combustibles in safe *shutdown* areas or establish designated storage areas

3. Govern the handling of and limit transient fire loads such as combustible and flammable liquids, wood and plastic products, or other combustible materials in buildings containing *safe shutdown* systems or equipment during maintenance, modification, or refueling operations.

4. Govern the use of ignition sources by means of a flame permit system that controls welding, flame cutting, brazing, or soldering operations.

L. Alternate Shutdown Capability

1. If the combination of fire protection features required for safe shutdown includes alternate shutdown capability independent of a specific fire area, *then the design for such a system shall assure that a fire in the specific area for which alternate shutdown was provided will not affect the power supply of the alternate shutdown system.*

If there are several such areas, the combinations of systems that provide the shutdown capability may be unique for each critical area. However, the shutdown capability provided for each such area shall be able to achieve and maintain subcritical reactivity con-

ditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby conditions for a PWR (hot shutdown for a BWR).

The fission product boundary integrity shall not be affected; i.e., there shall be no fuel clad damage, rupture of any primary coolant boundary, or rupture of the containment boundary.

These shutdown systems need not be designed to: (1) seismic Category I criteria; (2) single failure criteria; or (3) cope with other plant accidents such as pipe breaks or stuck valves except where required for other reasons, e.g., because of interface with or impact on existing safety systems.

M. Fire Barriers

Fire barriers (floors, walls, ceilings, or other enclosures) separating fire areas, or equipment or components of redundant systems *required for safe shutdown* within an area, shall have a fire rating of 3 hours unless a lower rating is justified by the fire hazard analysis, *or unless other fire protection features have been provided to ensure equivalent protection.*

Structural steel forming a part of or supporting such fire barriers shall have fire resistance equivalent to that required of the barrier. Such fire resistance shall be provided by protection equivalent to metal lath and plaster covering *or other acceptable equivalents.*

Penetrations in these fire barriers, including conduits, cable trays, and piping, shall be sealed or closed to provide fire resistance rating equivalent to that required of the barrier. Door openings shall be protected with doors, frames, and hardware with a resistance rating equivalent to that required of the barrier.

Penetrations for ventilation systems shall be protected by a standard "fire damper", or equivalent protection provided to assure that a fire will not violate the barrier penetrated.

N. Fire Barrier Penetration Seal Qualification

Penetration seals shall provide the equivalent protection which is required of the fire barrier. The seals shall be installed, tested and qualified using current industry standards.

O. Fire Doors

Fire doors shall be self-closing or provided with closing mechanisms unless provided with automatic hold-open, release, and closing mechanisms.

One of the following measures shall also be provided:

1. Fire doors shall be electrically supervised at a continuously manned location; or,
2. Fire doors shall be locked closed and inspected weekly to verify that the doors are in the closed position; or,
3. Fire doors shall be provided with automatic hold-open and release mechanisms and inspected daily to verify that doorways are free of obstructions; or,

4. Fire doors shall be kept closed and inspected daily to verify that they are in the closed position.

The fire brigade leader shall have ready access to keys for any locked fire doors.

Safe shutdown areas protected by automatic total flooding gas suppression systems shall have electrically supervised self-closing fire doors.

P. Reactor Coolant Pump Lubrication System

The reactor coolant pump lubrication system shall be protected by either an oil collection system or a fire suppression system *if the containment is not inerted during normal operation.*

Oil collection systems shall be capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pumps' lube oil systems, and draining the oil to a closed container that can hold the entire lube oil system inventory.

To provide adequate protection for a design basis Safe Shutdown Earthquake (SSE), one of the following should be provided:

1. The lube oil system components whose failure could result in leakage should be designed to withstand an SSE without leakage, and the dropping of oil collection system components during an SSE should not cause loss of operability of safe shutdown equipment; or,
2. The oil collection system should be designed to withstand an SSE and continue to be able to collect and drain leakage that may occur during an SSE. In this case the oil collection system

should be adequate to collect oil from any external lube oil piping not designed to withstand an SSE in addition to leakage from points identified above.

If a fire suppression system is selected, either the automatic and manual fire suppression system or the lube oil system components whose failure could result in leakage should be designed to withstand the SSE.

Q. Associated Circuits

Deleted.

EXPLANATION NOTES

1. This revision allows Appendix R to set forth the minimum fire protection requirements for those items in respective SER's in which the staff has documented as unresolved.
2. The words "important to safety" were deleted because they were too encompassing and subject to misinterpretation. Appendix R must be consistent with BTP 9.5-1 Appendix A and apply to only safe shutdown systems or components.
3. Reference to arranging structures, systems, and components important to safety, was deleted. This requirement would be acceptable for power plants in the engineering and design phase. The rewrite for this section will satisfy the concern by providing active and/or passive fire protection features for the structures, systems and components required for safe shutdown.
4. The words "the fixed automatic or manual" were deleted - superfluous.
5. The words "important to safety" were deleted because they were too encompassing and subject to misinterpretation. Appendix R must be consistent with BTP 9.5-1 Appendix A and apply to only safe shutdown systems or components.
6. Clarification was added to allow for fire protection provisions to assure alternate shutdown capability.

7. The words "by design and plant arrangement" were deleted for the reasons given in explanation note #3. Also, there are many ways for minimizing, controlling, or accounting for in situ fire hazards. Appendix R should not restrict the methods to only design and arrangement.
8. The requirements for fire detection systems were too limiting. An automatic sprinkler system with appropriate alarm check valves and central alarm features provide acceptable detection/alarming capability. The change provides flexibility by referring to fire detection capability rather than fire detection systems.
9. The words "manually actuated fixed suppression systems" were too restrictive, more flexibility was incorporated to account for grouped electrical cable fire hazards.
10. This was modified for clarity. The requirement for the protection of redundant systems or components for safe shutdown systems was incorporated into item (f). The requirement to control larger fires remained as item (e). Also, more flexibility was provided, for the large fires, by allowing more fire protection options rather than being restricted to only automatic suppression systems.
11. This change was initiated to consolidate the requirements of (e) and (f) with respect to the protection of redundant systems or components and to provide additional fire protection options for such areas. This change is consistent with NRC's intent to allow

the use of combinations of fire protection features to ensure fire damage is restricted to only one redundant division.

12. This requirement was expanded to allow credit for other acceptable features which can restrict and control a fire thus justifying a lesser rating. Sprinkler system water curtains have been acceptable in lieu of rated barriers. Credit should be given when used as a supplement to fire rated barriers.
13. The words "by experience and training" were deleted - superfluous.
14. The words "automatic and manual" were deleted because they were restrictive. Surveillance procedures should apply to all fire protection systems serving safe shutdown areas and not to only automatic and manual as suggested.
15. Change was incorporated to clarify exact definition of safe shutdown. Also, reference to fire protection features was incorporated in lieu of barriers, detection, and suppression systems. The intent was that all fire protection features must be considered when determining if alternate shutdown capability is necessary.
16. Reference to detection systems was deleted because loss of detection for safe shutdown areas automatically requires a fire watch patrol in accordance with technical specification requirements.

17. The words "important to safety" were deleted because they were too encompassing and subject to misinterpretation. Appendix R must be consistent with BTP 9.5-1 Appendix A and apply to only safe shutdown systems or components.
18. The words "important to safety" were deleted because they were too encompassing and subject to misinterpretation. Appendix R must be consistent with BTP 9.5-1 Appendix A and apply to only safe shutdown systems or components.
19. Reference to separation of redundant systems and components by fire barriers by at least 50 feet of clear air space are considered design parameters and were deleted from this section. To satisfy a requirement of 50 feet of clear air space for an operating power plant is not practical. Fire protection features have been provided in lieu of clear air space. The fire hazard analysis should define the safety systems/components and what fire protection features have been provided.
20. Requirement as written restricted to specific design concepts. The requirement should delineate minimum acceptable requirements and not specify specific designs or features.
21. This was revised to qualify the word approved (approved by whom?). Also, a change was made to allow the use of curbox or key valves to isolate the underground main when the visual indicating (Post Indicator) valves become impractical because of roadways and vehicle traffic.

22. The reference to safety-related equipment was deleted. It is sufficient to refer to all areas presenting a fire hazard to safe shutdown equipment.
23. A statement was added to allow deletion of standpipe and hose systems if sufficient justification can be presented that a hazard does not exist or other acceptable fire protection features have been provided to account for the potential hazard. This does not change the intent of the requirement, which is to assure that an appropriate fire fighting system is readily available where any hazard exists.
24. The reference to service pressure is subject to misinterpretation. Fire hose should be tested as stated by using the maximum operating pressure. Reference to test frequencies was deleted because such a requirement is part of technical specification requirements.
25. Reference to detection systems was deleted to be consistent with explanation note #8 and safety related systems was deleted in accordance with explanation note #22.
26. Reference to the design of the protective features to consider, item (1a) through (1n), was deleted. Items (1a) through (1n) are guidelines to consider in the course of performing a Fire Hazard Analysis and should not be regulatory requirements in Appendix R. The considerations should be listed in supporting documents such as a regulatory guide, review guide, or branch technical position.

Reference to minimum fire protective features to be provided, item (2a) through (2c), was deleted. The minimum requirements as listed are too specific to allow flexibility for the purpose of providing the optimum combination of active and passive fire protection features to assure safe shutdown capability. Table 1 was also deleted. Type of fire protection systems or combination of fire protection features to assure safe shutdown capability cannot be categorized or standardized in tabular form. Physical parameters, such as room geometry, construction, and equipment arrangement are all considerations in determining the best possible protection afforded to assure safe shutdown. Table 1 is too restrictive to allow for this required flexibility.

27. The words "important to safety" were deleted because they were too encompassing and subject to misinterpretation. Appendix R must be consistent with BTP 9.5-1 Appendix A and apply to only safe shutdown systems or components.
28. This revision allows a smaller brigade size if it can be justified that a smaller number based on plant specifics is adequate.
29. This revision deletes reference to using operations personnel but satisfies the requirement by assuring that at least (3) members of the fire brigade are knowledgeable individuals with respect to plant safety systems.

30. The requirements that the shift supervisor shall not be a member of the fire brigade was deleted. Appendix R requirements should only state qualification of the brigade leaders and brigade members. The individual licencees should determine who would best fit those qualifications.
31. The words "performing strenuous firefighting activities" was deleted. Some fire training programs involve strenuous firefighting activities on an annual basis. Monitoring strenuous firefighting activities and undergoing an annual physical will provide adequate assurance of physical capability.
32. The section regarding specific equipment for brigade members items (1), (2) and (3), was deleted. This section was revised to satisfy the requirement of the need for personal protective equipment without referring to an itemized listing.
33. This revision sets a requirement for an annual classroom training program to review the basics of fire protection and update brigade members as to new fire protection strategies or changes/revisions to plant specifics which can affect firefighting activities or strategies. Also, the detail with respect to what teaching material should be presented in classroom training sessions was deleted. This type of detail should be presented in a guideline form or supporting document such as a regulatory guide, review guide, or branch technical position. A requirement should not endorse/support a concept or particular program by providing an itemized listing of

subrequirements. Some fire training programs far exceed the intent of this requirement.

34. Word change to clarify that practice sessions are for brigade members and not for shift brigades.
35. This section was revised to establish the minimum requirements and frequencies for conducting drills. All the detail listed as item (a) through (e) was deleted for the same reasons as explanation note #33.
36. This was added for clarity.
37. Licencee should be allowed to use a qualified person that is not associated with critiquing regular drills. Also critiqued reports should be available for NRC evaluation.
38. This section was modified to reduce the 8-hour requirement to 2-hours and to add a requirement for portable battery powered hand-lights. The combination of emergency lighting and portable hand lights provide flexibility in fire fighting and supporting repair activities.
39. This section was revised to eliminate items (1) thru (12). These items represent too much detail and should be presented as documented in explanation note #33. The requirements retained represent the minimum requirements needed to satisfy this section.

40. Clarification was provided to minimize and control the storage of combustibles.
41. This section was modified to maintain the intent of the requirement, that is, to assure that a power supply is maintained for any or all areas in which alternate shutdown capability has been provided for specific areas. Also, detailed information in the form of achieving shutdown should not be part of the regulation.
42. Provisions have been added to allow for other acceptable means for providing equivalent protection to fire barriers, structural steel and ventilation system. Sprinkler water-curtains have been used as an acceptable method of providing equivalent protection (see explanation note #12).
43. Reference to acceptability by an approved national recognized testing laboratory was deleted. In some cases, doors constructed of heavy gage steel, for security reasons, far exceeded the requirements of fire rated doors which are laboratory "listed".
44. Penetration qualification details listed as item (1) through item (8) were deleted per explanation note #33. Penetration seals should be qualified to the latest state-of-the-art testing methods and in accordance with current industry standards.
45. This section was modified for clarity. The only requirement changed was the deletion of the semiannual inspection to verify door hardware

is functional. This semiannual inspection should be a part of plant technical specifications.

46. This revision was made to specify exact areas where self-closing doors must be electrically supervised.
47. This change was made to delete the requirement for power plants in which no hazards exist because of inerted conditions.
48. The requirement on associated circuits was deleted in its entirety. This requirement is not appropriate for operating plants (explanation note #3).