

June 27, 1980

DOCKET NUMBER PR-50  
PROPOSED RULE (45 FR 36082)

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DR. DONALD F. KNUTH  
President

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Comment #8 docketed  
6/30/80

Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

ATTN: Docketing and Service Branch

Dear Sir:

On May 29, 1980 the Commission published in the Federal Register (45 FR 36082) a proposed rule on fire protection. KMC, Inc., as a consultant to utilities on fire protection matters, and the thirteen utilities listed in Attachment A who own and operate and/or are constructing nuclear power plants, wish to provide comments on that proposed rule. Also, the utilities as listed in this Attachment might plan to file additional comments on the proposed rule.

The statement of consideration 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." For this reason the Commission set a rigid 30 day comment period and believed essentially full implementation could be attained by November 1, 1980. We submit that the proposed rule has never been offered for public comment. It should be noted by referring to Attachment F to SECY-80-88 that the Office of Standards Development was requested by the Office of Nuclear Reactor Regulation on October 9, 1979 to prepare a proposed rule. The proposed rule was forwarded to the Commission on February 13, 1980. It required over 120 days to prepare. The proposed rule was approved by the Commission and published on May 29, 1980. It required over 90 days for approval before it was issued for public comment. Upon learning that the proposed rule was sent forward to the Commission, KMC made two separate requests to receive copies of the proposed rule (one to NRR, the other to the Secretary). Both were denied on the stated basis that the proposed rule was predecisional material and, as such, not available until considered by the Commission. We do not believe that the comment period for a

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regulatory guide (which is a guidance document -- not a rule) offered in June, 1976 and November, 1977, is a justifiable basis for limiting utility comments to 30 days when compared with the required NRC preparation and approval times. Moreover, the statements of consideration on the proposed rule indicate that "minimum requirements contained in this rule were developed over a three year period and, in each of these instances, the staff accepted a proposed alternative before these minimum requirements were established." It does not seem appropriate that comments solicited on a regulatory guide which had requirements changed in the development of the final rule should be considered a basis to limit public comment.

We are very concerned that most utilities will be unable to meet the full implementation date being mandated by the Commission. The proposed rule sets forth new requirements not found in previous regulatory guides (for example, seismic design requirements for the reactor coolant pump lubrication oil collection system, and requirements related to associated circuits). There will not be sufficient utility manpower to complete the design and installation of such new features as proposed within the stated time frame. The utility industry is currently straining to meet other plant changes arising from the Three Mile Island lessons learned and other NRC mandated efforts, and does not believe the proposed schedule to be necessary to meet safety objectives. In addition, the proposed rule would require that "all fire protection identified by the staff as necessary ... shall be completed by November 1, 1980 ..." We doubt that the Commission's staff can possibly meet such a mandated schedule.

The proposed rule as written is overly specific. The ACRS subcommittee in its review of the proposed rule on December 5, 1979, also had problems with the overspecification of details in the proposal. The proposed rule as published in the Federal Register retained the detailed design and procedural requirements. In the Conference Report to the Energy Reorganization Act of 1974, the Congressional view, as expressed, was that the NRC should avoid generating design data of its own or from developing designs. NRC rules, in general, specify the requirements to be met. The detailed design and/or implementing procedures to meet those requirements are the responsibility of the licensee to develop. In this instance, not only are the requirements set forth but in many cases the means of meeting those requirements is also specified. The rule also now incorporates by footnote the guidance of Appendix A to Branch Technical Position 9.5-1. The Branch Technical Position did not

receive the in-depth review or comment that a regulation would receive. We believe the regulation should only define the requirements or objectives, with the licensee permitted some flexibility in developing its program to meet those requirements.

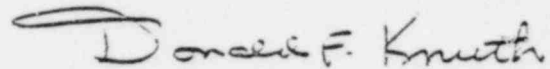
The proposed rule has requirements related to the arrangement of structures, systems, and components important to safety. A regulation of this nature may be appropriate for a plant currently being designed; however, for a plant that is operational or in the latter stages of construction there is little latitude in rearrangement of structures, systems, or components. We believe this requirement also needs the flexibility to be met by alternate methods. In this regard, licensees have already defined their specific fire protection programs and have met the intent of most, if not all, of the NRC's requirements. In some instances the method of meeting a requirement was at variance with all of the specific details proposed for the regulations; however, in its safety evaluation the staff found those instances acceptable. As a minimum, we believe that in those instances where the staff has accepted the licensee's design or method of meeting a requirement, the issue should remain closed; only where an unresolved issue was identified should the new regulations apply. Licensees have been responsive to the NRC requests to improve measures for fire protection and there is no value from a safety standpoint to abandon previously agreed upon changes and initiate re-reviews of resolved issues.

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 guidance on fire protection matters 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. We believe the wording of the regulation needs to 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.

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Our detailed review of the proposed rule is enclosed as Attachment B. This enclosure contains a proposed rewrite of the proposed rule and of Appendix R, along with our reasons for the suggested changes. In addition, we understand that some utilities are planning to provide value-impact statements which show the enormous cost to meet the detailed requirements with only marginal incremental benefits. We appreciate the opportunity to comment on this important rulemaking proceeding; however, we regret that we were only permitted 30 days to offer these comments.

Sincerely,

A handwritten signature in cursive script that reads "Donald F. Knuth". The signature is written in dark ink and is positioned above the typed name.

Donald F. Knuth

encl.

FIRE PROTECTION RULEMAKING GROUP

Arkansas Power & Light Company  
Baltimore Gas & Electric Company  
Consolidated Edison Company of New York, Inc.  
Consumers Power Company  
Detroit Edison Company  
Florida Power & Light Company  
Nebraska Public Power District  
Northeast Utilities Service Company  
Northern States Power Company  
Sacramento Municipal Utility District  
Toledo Edison Company  
Wisconsin Public Service Corporation  
Yankee Atomic Electric Company

PART 50 - DOMESTIC LICENSING OF  
PRODUCTION AND UTILIZATION FACILITIES

1. A new Section 50.48 is added to read as follows:

§50.48 Fire Protection.

(a) Each operating nuclear power facility shall have a fire protection plan which meets the requirements of Criterion 3 of Appendix A to this part. This fire protection plan ~~should consist of two sections,--The first section~~ should describe the overall fire protection program for the facility, identify the various positions within the licensee's organization that are responsible for the program, state the authorities that are delegated to each of these positions to implement those responsibilities, and outline the plans for fire protection, fire detection and suppression capability, and limitation of fire damage. ~~The second section~~ In addition it should describe specific features necessary ~~to for implementation the first section,~~ such as: administrative controls and personnel requirements for fire prevention and manual fire suppression activities; automatic and manually operated fire detection and suppression systems; and means to ensure capability to safely shutdown the plant in spite of fire damage to ~~safety related-or~~ safe shutdown structures, systems or components.

(b) For nuclear power facilities that commenced operation prior to January 1, 1979, appropriate portions of Criterion 3 of

Appendix A to this part will be satisfied by meeting the requirements contained in Appendix R to this part.<sup>3</sup>

(c) All fire protection modifications ~~identified by the staff~~ as necessary to satisfy criterion 3 of Appendix A to this part, shall be completed on a schedule to be acceptable and approved by the staff. ~~whether contained in Appendix R to this part or in other staff fire protection guidance (except for alternate or dedicated shutdown capability) shall be completed by November 17, 1980 unless for good cause shown, the Commissioner approves an extension. For alternate or dedicated shutdown capability, the following implementation schedule will apply:~~

(i) Plants not included in the Systematic Evaluation

Program (SEP),<sup>2</sup> licensees implementing alternate shutdown capability shall complete implementation by April 17, 1981. Licensees who have previously committed to earlier implementation dates will be expected to meet the earlier dates. Licensees implementing dedicated shutdown capability shall complete

<sup>3</sup>The combination of the guidance contained in Appendix A to Branch Certificate Order 9-5-77 "Guidance for Fire Protection for Nuclear Power Plants Issued Under the Act of July 17, 1976," as implemented by the staff in its plant specific fire protection program, review of operating nuclear power plants, and the requirements set forth in Appendix R to this part define the minimum necessary conditions for demonstration of compliance with General Design Criterion 3 of Appendix A to this part for nuclear power facilities that commenced operation prior to January 17, 1979.

implementation by December 17, 1981. Licensees shall submit by August 17, 1980, plans and schedules for meeting these implementation deadlines.

(ii) Plants included in the GEP. Licensees implementing alternate shutdown capability shall complete implementation by December 17, 1981. Licensees implementing dedicated shutdown shall complete implementation by October 17, 1982. Licensees shall submit by November 17, 1980, plans and schedules for meeting these implementation deadlines. The Commission may revise these implementation deadlines to earlier dates following completion by the NRC staff of its review of the status of fire protection at GEP plants. The staff review is expected to be completed in August, 1980.

The time frame for completing all fire protection requirements is contingent upon a complete understanding of the final requirements. The presently proposed schedule requirements cannot be implemented. In its previous reviews the licensees and the staff had reached agreement on what modifications would be required at specific plants and also reached agreement on the implementation schedule. In many instances the then agreed-upon schedule would be difficult to meet in consideration of design and/or construction lead times. As the proposed rule now reads "all fire protection



modifications identified by the staff as necessary to satisfy criterion 3 of Appendix A to this part, whether contained in Appendix R to this part or in other staff fire protection guidance (except for alternate or dedicated shutdown capability) shall be completed by November 1, 1980 unless ..." (emphasis added). This, in effect, is an open ended obligation to meet by November 1, 1980, whatever the staff identifies is necessary not only to meet the rule, but also that contained in undefined staff guidance. This requirement, as written, is arbitrary and capricious.

In addition to an inability to meet the arbitrary established schedule, the proposed technical requirements represent an unprecedented ratchet. The ongoing technical reviews in fire protection by the staff for each plant over the past few years have resulted in major upgrades in fire protection. Safety evaluations have documented the required changes and the utility industry has in good faith made (or committed to make) plant design or administrative changes on a mutually agreed upon schedule. We believe that the agreed upon technical reviews and decisions arising from those reviews should remain in force and not be unilaterally replaced by a single detailed staff preferred design or procedural method.

In summary, we believe the final implementation schedule should be based upon the final rule requirements which in turn should not reopen issues where the staff has reviewed and accepted alternative methods of meeting a requirement. Further, the implementation schedule should be established for each plant in recognition of the importance of the required change as well as resource availability.

2. A new Appendix R to 10 CFR Part 50 is added to read as follows:

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~~ acceptable fire protection requirements needed for nuclear power facilities to satisfy Criterion 3 of Appendix A to this part with respect to certain recurring generic issues for nuclear power plants that were operating prior to January 1, 1979.

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 include any requirements set forth in any Safety Evaluation Report for any nuclear power facility.~~

This Appendix does not apply to any issues resolved by the licensee and accepted by the staff as resolved in safety evaluations issued prior to the effective date of this rule.

*In previous reviews of fire protection issues, alternative means of meeting the objectives of currently drafted regulatory requirements were proposed by licensees and accepted by the NRC staff. These alternative means were technically justified and considered plant unique features. Many of these accepted alternate*

means have already been implemented at the plants or the schedule for implementation has been agreed upon. We believe those previously reviewed and accepted methods for meeting the current requirements should continue to be acceptable and should be excluded from review in the currently proposed regulations.

## 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 ~~important to~~ safety as required for safe shutdown at each plant and define the procedures, equipment, and personnel required to implement the program at the plant site.

The fire protection program shall be under the direction of an individual who has been delegated authority commensurate with the responsibilities of the position. The designated individual shall be knowledgeable in ~~both~~ fire protection matters. ~~and nuclear safety~~

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

1. to prevent fires from starting that would be required for safe shutdown;
2. to detect rapidly, control, and extinguish promptly those fires that do occur that would be required for safe shutdown;

3. ~~to-arrange-the-structures,-systems,-and-components~~  
~~important-to-safety-so-that~~ to assure 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.

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 ~~important-to-safety~~ required for safe shutdown. Measures for fire prevention; fire detection, suppression, and containment; and alternate shutdown capability shall be provided for each such area as follows:

1. Fire Prevention

- a. In situ fire hazards shall be minimized ~~by-design~~  
~~and-plant-arrangement~~.
- b. Transient fire hazards associated with normal operation, maintenance, repair, or modification activities shall be ~~identified-and-minimized---~~~~These-transient~~  
~~fire-hazards-that-can-not-be-eliminated-shall-be~~ controlled.

2. Fire Detection, Suppression, and Containment

- a. Fire detection ~~systems~~ capability shall be ~~installed~~ provided.
- b. Portable extinguishers and standpipe and hose stations shall be installed.
- c. ~~Manually-actuated~~ fixed suppression systems shall be installed where fire hazards of grouped electrical cables and components are large as determined by the fire hazards analysis or access for the fire brigade is restricted.
- d. A site fire brigade shall be established, trained, and equipped.
- ~~e. Automatic suppression systems shall be provided to control large fire hazards or to protect redundant systems or components important to safe shutdown.~~
- ~~f.~~ e. To ensure that fire suppression can limit the fire damage to one division of shutdown systems. Fire retardants, heat shields, or local fire barriers shall be provided as outlined in the fire hazards analysis. ~~where physical separation between such systems and fire hazards is not adequate to ensure that automatic and manual fire suppression can limit the fire damage to one division of shutdown systems.~~

- ~~g~~ f. 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.
- ~~h~~ g. Fire detection and suppression systems shall be properly designed, installed, maintained and tested. ~~by personnel properly qualified by experience and training in fire protection systems~~
- ~~i~~ h. Surveillance procedures shall be established to ensure that fire barriers and ~~automatic and manual~~ fire suppression systems and components are operable.

### 3. Alternate Shutdown Capability

Alternate shutdown capability shall be provided when safe shutdown as defined in the fire hazards analysis cannot be ensured by barriers, and detection, and or suppression systems, because of the exposure of redundant safe shutdown equipment, cabling, or components in a single fire area to an exposure fire, fire suppression activities, or rupture or inadvertant operation of fire suppression systems.

#### B. Loss of Offsite Power

Fire ~~detection and~~ 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 ~~important-to-safety~~ 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 ~~important to-safety~~ required for safe shutdown to permit effective functioning of the fire brigade.

~~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 shutdown the reactor, or the ability to minimize and control the release of radioactivity to the environment. Separation of redundant systems and components by three-hour-rated fire barriers or at least 50 feet both horizontal and vertical of clear air space shall be deemed adequate. -- Lesser ratings or distances shall be justified by analysis or test.~~

*The proposed deletions in the Section II are related to the comments provided in our letter: fire protection requirements should apply to the ability to attain and maintain safe shutdown and not consider other events simultaneous with fires, and the rule should*

recognize that the plant is already built and in operation and major rearrangements are not viable. Other changes are proposed to delete some of the language which is overly specific or not justified.

The instance of allowing only installation, maintenance, or testing by personnel qualified in fire protection is clearly inappropriate. Pumps, motors, valves, and similar equipment need proper upkeep just like similar safety related components; however, this can be accomplished by properly trained craftsmen who have not necessarily received a fire protection "stamp of approval."

Several requirements are ambiguous as to what criteria or who determines sufficiency, such as "large" group of electrical cable, "insufficient separation," or where safe shutdown cannot be "ensured." In these areas, the fire hazards analysis should be used to determine adequacy.

We agree with the requirement for the capability to operate fire suppression systems with on-site power, however, to require this capability for fire detection is not necessary. The simultaneous loss of power coincident with the initiation of a fire is of low probability and fire detection using only onsite power should not be a requirement.

Section E relating to fire hazards analysis has already been completed and submitted to the NRC by all licensees affected by this regulation and as such is not necessary in this regulation. Further, the specification for 50 feet of clear air space separation



for systems and components is unattainable and is an arbitrary and capricious requirement. There is no technical basis for this requirement of 50 feet of clear air space and it has no place in the regulation.

### III. SPECIFIC REQUIREMENTS

#### A. Fire Water Distribution System

~~An-underground-yard-fire~~ main loop shall distribute fire protection water from the fire water supplies to the ~~automatic~~ and ~~manual~~ fire suppression systems. Two ~~fresh~~ water supplies shall be provided to furnish necessary water volume and pressure to the yard fire main loop. Each supply shall ~~consist-of-a-storage tank, pump, piping, and appropriate isolation and control valves.~~ These supplies shall be separated so that a failure of one supply will not result in a failure of the other supply.

~~Two-separate-redundant-suctions-from-a-large-body-of-fresh water-will-satisfy-the-requirement-for-two-separated-water-storage tanks.~~

Each supply of the fire water distribution system shall be capable of providing for a period of two hours the maximum expected water demands as determined by the fire hazards analysis for safe shutdown areas. ~~for-safety-related-areas-or-other-areas that-present-a-fire-exposure-hazard-to-safety-related-areas.~~

~~Minimum fire water storage shall be ensured by means of dedicated tanks or by means of a vertical standpipe for other water service when storage tanks are used for combined service water/fire water uses.~~

~~Other Water systems used as a fire water supply shall be permanently connected to the fire main system and shall be capable of automatic alignment to the fire main system. Pumps, controls, and power supplies in these systems shall satisfy the requirements for the main fire pumps. The use of other water systems for fire protection shall not be incompatible with their functions required for safe plant shutdown. Failure of the other system shall not be incompatible with their functions required for safe plant shutdown. Failure of the other system shall not degrade the fire main system.~~

Requirements for the fire water distribution system should delineate minimum requirements and not specify certain designs. As proposed, the regulation would require underground fire main loops supplied by fresh water supplies and would require delineated hardware to meet the requirement. This is an over-specification of a particular design to meet requirements for fire protection. While it could be argued that reliable fire main loops are needed there is no need that this can only be met by underground loops supplied by fresh water sources. Fires can be extinguished with water which is not pedigreed by quality.

Again a general requirement for diversity of water supply may be appropriate; however, there is no contribution to safety by specifying each required component such as "each supply shall consist of a storage tank, pump, piping, etc." Further, it is our opinion that the requirement to ensure a minimum water supply should be functional in nature rather than requiring a specific design as described as "Minimum water storage shall be ensured by means of dedicated tanks or by means of vertical standpipe for other water service when storage tanks are used for combined service water/fire water uses." In other essential safety issues (including emergency core cooling) the requirements are not specified in such detail.

In summary, we are concerned that the NRC in this proposed regulation would become preoccupied with mandating design details rather than reviewing overall design objectives.

#### B. Sectional Control Valves

~~Approved-visually-indicating-sectional-control-valves-such~~  
~~as-Post-Indicator-Valves~~ Capability shall be provided to isolate portions of the fire main for maintenance or repair without shutting off the entire system.

This subsection requires compliance with a specific NRC design rather than an overall design objective. As the NRC is aware, from reviews of many subsystems, there are a number of methods to assure that safety systems (ECCS, shutdown systems, etc.) are available for operation. Any regulatory requirement

to allow only one specific measure such as "approved visually indicating sectional control valves" is unnecessary and would become an issue for litigation which in no way contributes to safety.

#### C. Hydrant Block Valves

~~Block-valves-shall-be-installed-in-hydrant-laterals-if~~  
necessary Capability shall be provided 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-safety-related-or~~ safe shutdown equipment.

The general requirement to permit hydrant isolation is not argued. As in previous sections, we believe the requirement for a specific measure is not justified. This subsection also has requirements related to "safety related equipment" which should in fact relate to safe shutdown requirements.

#### 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 for safe shutdown. ~~to-safety-related-equipment---~~ Standpipe and hose stations ~~shall-be-inside-PWR-containments-and-large-BWR-containments-that are-not-inerted---~~ 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.~~

The purpose of this requirement is to require means for effective fire fighting for fires that could affect safe shutdown. The specific need and location of standpipe and hose stations are plant specific and should be identified in the fire hazards analysis.

E. Hydrostatic Hose Tests

Fire hose shall be hydrostatically tested at a pressure 50 psi above maximum operating service pressure. ~~Hose stored in outside hose houses shall be tested annually. Interior standpipe hose shall be tested every three years.~~

Testing requirements for hoses or other operational equipment should relate to the anticipated stress that such equipment may be exposed. In our rewrite, we propose a test environment in excess of any operating demands that may occur rather than requiring tests above service pressure which may or may not relate to any expected environment. In addition, the frequency for hose testing should not be specified in the regulation; rather, it should be completed on a frequency which recognizes the plant unique design.

F. Automatic Fire Detection

Automatic fire detection ~~systems~~ capability shall be installed in all areas of the plant that contain combustibles and safe shutdown ~~or safety-related~~ systems or components.

Requirements for automatic fire detection should relate to safe shutdown needs only. Any requirement for "safety-related systems or components" should not be included in regulatory requirements as related to fire protection.

G. Protection of Safe Shutdown Capability

Protective features shall be provided for fire areas that contain cables or equipment of redundant systems ~~important~~ required to achieve ing 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 a combination of automatic and manual fire suppression capability, fire propagation retardants, physical separation, partial fire barriers, or alternate shutdown capability independent of the fire area.

~~i. The design of the protective features shall consider:~~

~~a. The zone of influence of postulated fires and the fire extinguishing system used in the fire area.~~

~~b. The access for manual fire fighting.~~

~~c. The potential disabling effects of water on shutdown capability.~~

~~d. The limitations of fixed suppression systems.~~

~~e. The separation between redundant divisions.~~

~~f. The in-situ and transient combustibles.~~

~~g. The propagation rate of fire in the configuration.~~

h. The availability of airtown capabilities independent of the fire area.

i. The air-organizational capabilities and jacket materials is comparable.

j. The heat-removal capability covered above may not be better than the available heat-removal capability but do not by themselves serve as a fire barrier to prevent the loss of function of the facility.

k. The fire-resistant coating material fire propagation but do not prevent organic matter degradation and jacket materials from burning.

l. The oxygen is available to support combustion.

m. The fire-removal system is not a suppression system.

n. The fire-removal system is not a fire barrier but may be delayed.

o. The fire-removal system does not provide adequate protection for airtown systems by removing heat generated by a fire.

p. The following minimum fire protection features shall be provided:

a. An early warning fire detection system.

b. Manual fire suppression capability.

c. Fixed fire suppression systems and alternate airtown capability as shown on Table 1.

The requirement for the protection of safe shutdown capability is unassailable. This is, indeed, the purpose of the entire section II.E. which requires the fire hazards analysis to describe the adequacy of the fire protection systems. The feature to be considered in the designed protection measures as enumerated in the fifteen enumerated statements for "consideration" have in fact already been incorporated in the fire hazards analysis reports already submitted by licensees.

We believe that regulations should contain only regulatory requirements with amplifying suggestions contained in regulatory guides, review guidelines, branch technical positions, NUREG's, or other NRC accepted publication forums. The inclusion of suggested items for consideration, in any regulation, we submit is more appropriate for a regulatory guide or NUREG document.

The inclusion of Table 1, "Fire Protection Features for Safe Shutdown Capabilities," would be appropriate for a guidance document but is totally inappropriate for a regulation. Inclusion of decision criteria as in Table 1, with subjective terms as "good" or "poor" to determine if multi-million dollar investments must be made by a utility owner for addition of fire protection hardware is capricious. This is particularly true when the regulation specifies by footnote that:



"A fire hazards analysis acceptable to the staff shall be used to determine whether the plant can be shutdown from the Control Room and whether access for manual firefighting is good."

Hence, this language gives the NRC staff unilateral authority to define "good" or "poor," which represents the decision criteria. In addition to the proposed regulation conferring unilateral freedom for the staff to determine whether the plant can be shutdown from the control room and whether access for manual fire fighting is "good," it also poses implementation schedule problems. The licensee is expected to complete all modifications on pre-determined schedules; however, there is no indication of when the staff will make its determinations.

In summary, the proposed subsection does not establish any specific fire protection requirements, rather, it offers suggestions on the contents of a fire hazards analysis (which licensees have previously submitted) and provides subjective decision criteria which will be used by the staff.

#### H. Fire Brigade

A site fire brigade trained and equipped for fire fighting shall be established. ~~to-ensure-adequate-manual-firefighting capability-for-all-areas-of-the-plant-containing-structures, systems, or-components-important-to-safety.~~ The minimum nominal size of the fire brigade shall be ~~at-least~~ five members on each shift unless a lesser number is justified. ~~The-brigade-leader~~

and at least two brigade members shall be operations personnel or have equivalent knowledge of plant safety systems. The fire brigade members qualifications shall include an annual physical examination for performing strenuous firefighting activities. The shift supervisor shall not be a member of the fire brigade. 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. Equipment provided for the brigade will consist of at least the following:

1. Personnel protective equipment such as turnout coats, boots, gloves, hard hat, and pressure demand full vision self-contained breathing apparatus with a minimum one half hour rated capacity and approved by National Institute of Occupational Safety and Health (NIOSH) for fire fighting purposes.
2. Manual suppressor equipment such as portable extinguishers and standpipe and hose with nozzle suitable for the location.
3. Other systems and equipment necessary for efficient utilization of the brigade, such as emergency lighting in access routes to areas containing safety related systems or components, and emergency communication

~~capability-throughout-the-plant-that-is-independent  
of-the-normal-communication-systems.--Emergency-com-  
munication-equipment-shall-not-interfere-with-other  
plant-equipment-or-controls.~~

The desired fire brigade attributes were established in previous regulatory guidance as requiring sufficient manpower to cope with plant fires for the initial 30 minute period. It was recognized that nominal force size requirements could be altered by plant unique features. The NRC guidance stated:

"The Staff has concluded that the minimum size of the fire brigade shift should be five persons unless a specific site evaluation has been completed and some other number justified."

The currently proposed regulation significantly departs from this guidance and sets forth specific minimum requirements. This issue was thoroughly ventilated over a year ago when the group provided its justification for a minimum size brigade of three persons. We believe our previous comments to be valid and the proposed regulation not justified.

#### 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~~ re-instruction, practice in firefighting, and fire drills. Individual records of training

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

~~These records of training shall be available for review. Retrain-  
ing or broadened training for fire fighting within buildings  
shall be scheduled for all those brigade members whose performance  
records show deficiencies.~~

Note: Our proposed revision does not include a comparative text; however, subsection 1 through 3 are deleted (the last  $\frac{1}{2}$  column of 45 FR 36087 and the first  $1\frac{1}{2}$  columns of 45 FR 36088).

The proposed requirements for fire brigade training is a classic in overspecification. Again while no one would argue that the training program needs to ensure that personnel are trained to fight fires, there is no useful purpose in overspecification which requires only one allowed training outline to meet those requirements. While there are many examples, only one will be chosen to illuminate our point. Section 3.d. states: "At three year intervals, drills shall be critiqued by qualified individuals independent of the licensee's staff. A copy of the written report from such individuals shall be submitted to NRC for evaluation."

Aside from the fact that fire protection consultants would be subsidized and NRC fire protection reviewers would have a continuing need to review paper, we know of no positive benefit from such a requirement. An audit program conducted by an independent expert within the licensee's organization (for example, by the home office) would not meet the language of regulations, yet it might result in better reviews than if conducted under contract by "individuals independent of the licensee's staff." In addition, the requirement to submit reports of such reviews to the NRC for evaluation is an exercise in paperwork. The NRC already has the authority to witness such drills, review reports or whatever suits their inspection needs. To perform this function, I&E has assembled teams of inspectors. In addition, resident inspectors are assigned to each operating plant. To reach down, through this regulation, and select this facet for submittal and continuing evaluation by the NRC is totally unjustified.

The detailed requirements in most of these subsections could also evoke similar comments; however, we believe a rereading of the details with our example in mind will lead one to conclude that the proposed language is not suitable for inclusion in a regulation. In fact, the language might be more suitable for issuance as guidance.

### J. Emergency Lighting

Emergency lighting shall be provided in all areas needed for operation of safe shutdown equipment. ~~and-in-access-routes to-all-safety-related-areas-and-ether-areas-presenting-a-fire hazard-to-safety-related-areas-~~ Such emergency lighting may be provided by the normal lighting if it is connected to an emergency bus and the fire hazard analysis shows that it will not be damaged by any fire. Otherwise permanently installed sealed beam or fluorescent units ~~with-individual-8-hour-minimum-battery-power-supply~~ shall be provided.

*Our comments relate to the requirement to have a minimum 8-hour battery rating and requirement for fixed units in "safety-related areas." There is no question that emergency lighting equipment needs to be available; however, we do not see the need for these requirements. Fire brigades, depending on the fire, could provide lighting equipment. If there is a need for additional or replacement lighting within a couple of hours, there will be ample personnel available in that time frame to provide replacement equipment.*

### K. Administrative Controls

Administrative controls shall be established to minimize fire hazards in areas containing structures, systems, and components important to safety. 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 combustible supplies in ~~safety-related~~ areas required for safe shutdown.
2. ~~Prohibit~~ Control the storage of combustibles in ~~safety-related~~ areas required for safe shutdown or establish designated storage areas and fire protection therefor.
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 ~~safety-related~~ safe shutdown systems or equipment during maintenance, modification, or refueling operations.
4. Control the use of ignition sources.
5. Define the strategies for firefighting.

Note: All items of the proposed regulation numbered 4-12 were deleted.

Our comments on this section again relate to the overspecification of administrative requirements. Definition of what is a requirement is not at issue; rather, defining the only permitted way of meeting the requirement is objectionable.

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, the design for such alternate shutdown capability shall accommodate postfire conditions where offsite power is available and where offsite power is not available ~~for~~ 72-hours.

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 conditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby<sup>5</sup> conditions for a PWR (hot shutdown<sup>5</sup> for a BWR) ~~for-at-least-72-hours~~, achieve cold shutdown conditions ~~within-72-hours~~ and maintain cold shutdown conditions thereafter. ~~The-reactor-coolant-system-process-variables-shall-be-maintained within-these-predicted-for-a-less-of-normal-ac-power.~~ The fission

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<sup>5</sup> As defined in the Standard Technical Specifications.



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.

2. The performance goals for the shutdown functions shall be:

- a. The reactivity control function shall be capable of achieving and maintaining cold shutdown reactivity conditions.
- b. The reactor coolant makeup function shall be capable of maintaining the reactor coolant level above the top of the core for BWR's and in the pressurizer for PWR's.
- c. The reactor heat removal function shall be capable of achieving and maintaining decay heat removal.
- d. The process monitoring function shall be capable of providing direct readings of the process variables necessary to perform and control the above functions.
- e. The supporting functions shall be capable of providing the process cooling, lubrication, etc., necessary to permit the operation of the equipment used for safe shutdown functions.

3. 2. Various safety-related and non-safety-related equipment and/or systems may be identified by the licensee and accepted by the staff to provide alternative means to achieve and maintain hot standby conditions (hot shut down for a BWR). The fire hazards

analysis shall show that at least one means to achieve and maintain hot standby conditions (hot shutdown for a BWR) is undamaged by any fire anywhere in the plant. In addition, the equipment and systems comprising that means of hot standby or hot shut down condition shall be capable of maintaining such conditions for at least 72 hours if the equipment required to achieve and maintain cold shutdown is not available because of fire damage. They shall also be capable of being powered by both onsite and offsite electric power systems or by onsite power systems that are independent of the onsite and offsite electric power systems. The number of operating shift personnel, exclusive of fire brigade members, required to operate the equipment and systems shall be onsite at all times.

3- 4. The fire hazards analysis shall show that either (a) any equipment and/or systems necessary to achieve and maintain cold shut down conditions will not be damaged by any fire; or (b) that any equipment and/or systems necessary to achieve and maintain cold shutdown conditions that are damaged by fire can be repaired and cold shut down achieved within 72 hours. Materials for such repairs shall be readily available onsite and procedures shall be in effect to implement such repairs. Equipment and systems used prior to 72 hours after the fire shall be capable of being powered by both onsite and offsite electric power systems or by onsite power systems that are independent of the onsite and offsite electric power systems; equipment and systems used after 72 hours may be powered by offsite power.

These shutdown systems need not be designed to meet seismic Category I criteria or single failure criteria; or to 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.

As the Commission is aware, certain of the plants affected by this proposed regulation are currently being reviewed under the Systematic Evaluation Program. One of the yet to be completed topics in that program is the definition of safe shutdown for these plants. We do not believe that a regulation on fire protection should preempt or redefine safety criteria for safe shutdown. We do agree that the regulation should require a capability to place the reactor in a safe shutdown condition and be capable of maintaining it in that mode. We are not in agreement that the regulation should specify the times for holding in each mode nor the needs to provide the shutdown system functional criteria.

#### M. Fire Barriers

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

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.~~

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 that have been tested and approved by a nationally recognized testing laboratory to have a fire resistance rating equivalent to that required of the barrier.~~

Penetrations for ventilation systems shall be protected by a standard "fire door damper" or provide equivalent protection.

*Our comments on this section pertain to the requirement for testing and approval of door openings and the requirement for standard fire door dampers on ventilation systems. The proposed wording retains the intent of the requirement, but would allow some latitude in demonstrating compliance with the requirement.*

#### N. Fire Barrier Penetration Seal Qualification

This section as written is deleted in its entirety and replaced with:

Penetration seals shall provide the equivalent protection which is required of the fire barrier. Evaluation of the penetration seals based upon a design review and relevant test data or qualification tests may be made.

The requirement to have penetration seals qualified by an independent testing laboratory is not justified. Many penetration seals could be adjudged to meet their design requirements through design reviews using relevant test data without requiring a full mockup test. We submit that the requirement for mockup testing with such detailed requirements as "is subjected to a water fog test using high-velocity fog nozzle having an included angle of spray no larger than  $30^{\circ}$  and supplied by a hose no smaller than  $1\frac{1}{2}$  inches at a pressure of at least 75 psig measured at the base of the nozzle for an application time of at least  $2\frac{1}{2}$  minutes per 100 square feet" etc. is much too detailed for a regulation. In addition, requiring tests of the fire barrier with a differential pressure is also unnecessary.

In summary, we are convinced that many penetration seal designs could be reviewed and found acceptable by knowledgeable fire protection engineers without the need for expensive qualification tests. We believe that solid engineering judgment should be permitted in addition to prescribed testing requirements.

#### O. Fire Doors

Fire doors required for safe shutdown shall be self-closing or provided with closing mechanisms and shall be inspected semi-annually to verify that automatic hold-open release, and closing mechanisms and latches are operable. Fire doors shall be kept closed unless provided with automatic hold-open, release, and closing mechanisms.

One of the following measures shall also be provided for each door:

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 commander shall have ready access to keys for any locked fire doors.

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 an automatic 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 vented closed container. A flame arrestor is

required in the vent if the flash point characteristics of the oil present the hazard of fire flash back. Leakage points to be protected shall include lift pump and piping, overflow lines, tube oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines and tube oil reservoirs where such features exist on the reactor coolant pumps. -- Leakage shall be collected and drained to a closed container that can hold the entire tube oil system inventory. -- The drain line shall be large enough to accommodate the largest potential oil leak.

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

1. -- The tube 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 safety-related 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 an external tube oil piping not designed to withstand an SSE in addition to leakage from points identified above.

~~If an automatic 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.~~

The main objective of this subsection should be to provide either a reactor coolant pump lubrication collection system or a fire suppression system to extinguish an oil fire if the containment is not inerted. We believe each licensee should be permitted to design the system suited to its facility. We have retained functional requirements in our proposed rewrite and have deleted the detailed design requirements which specified each collection point and the seismic design requirements. With regard to seismic considerations, many of the operating plants were designed and built prior to the seismic definitions as now used, and are currently undergoing a seismic re-review as part of the Systematic Evaluation Program. In many of these instances the precise analytical parameters for a seismic SSE event have not been defined yet engineering judgments of adequacy can be made on proposed designs.

#### Q. Associated Circuits

~~Associated circuits shall be electrically isolated from safety equipment so that hot shorts, open circuits, or shorts to ground in the associated circuit will not prevent operation of the safety equipment.~~



~~If associated circuits are not known to be so electrically isolated, they shall be considered safe shutdown circuits. The separation and barriers between trays and conduits containing associated circuits or safe shutdown cables from the redundant division shall be such that a postulated fire involving associated circuits or safe shutdown cables from the redundant division shall be such that a postulated fire involving associated circuits will not prevent safe shutdown.~~

Associated circuits were not a consideration in the design of many of the older plants for which this fire protection regulation applies and is a new design requirement. In the time frame for implementation of this regulation, there is not available manpower (in consideration of all the continuing and new generic issues raised by the NRC staff) to define and evaluate all associated circuits as described.