3.0 GUIDELINES OF BTP CMEB 9.5-1

3.1 FIRE PROTECTION PROGRAM REQUIREMENTS

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a.	Fire Protection Program	
	A fire protection program should be established at each nuclear power plant. The program should establish the fire protection policy for the protection of structures, systems, and components important to safety at each plant and the procedures, equipment, and personnel required to implement the program at the plant site.	Comply. Refer to Section II.A of Appendix A5.7.
(1)	The fire protection program should be under the direction of an individual who has been delegated authority commensurate with the responsibilities of the position and who has available staff personnel knowledgeable in both fire protection and nuclear safety.	Comply. Refer to Section II.A of Appendix A5.7.
(2)	The fire protection program should extend the concept of defense-in-depth to fire protection in fire areas important to safety, with the following objectives:	Comply. Refer to Section II.A of Appendix A5.7.
	to prevent fires from starting; to detect rapidly, control, and extinguish promptly those fires that do occur;	

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to provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant.	
(3) Responsibility for the overall fire protection program should be assigned to a person who has management control over all organizations involved in fire protection activities. Formulation and assurance of program implementation may be delegated to a staff composed of personnel prepared by training and experience in fire protection and personnel prepared by training and experience in nuclear plant safety to provide a balanced approach in directing the fire protection program for the nuclear power plant.	Administrative procedures identify the individual delegated the authority for establishing the Fire Protection program. He has nuclear plant safety expertise available as part of the operating department.
The staff should be responsible for:	
(a) Fire protection program requirements, including consideration of potential hazards associated with postulated fires, with knowledge of building layout and systems design.	Using the prefire plans for safety-related areas, hazards are defined, structures and system identified. The Fire Marshall (as administrator) maintains the plans.
(b) Post-fire shutdown capability.	The Shift Manager is responsible for operating safely and can order shutdown if he deems it necessary for safety.

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(c) Design, maintenance, surveillance, and quality assurance of all fire protection features (e.g., detection systems, suppression systems, barriers, dampers, doors, penetration seals, and fire brigade equipment).	Maintenance and surveillance are handled by the station Operating, Maintenance and Engineering programs and procedures. Offsite QA is a separate organization. Onsite QA organization provides review of maintenance, and purchase activities in accordance with the corporate QA Manual.
(d) Fire prevention activities (administrative controls and training).	The Fire Marshall and Training Department direct training.
(e) Fire brigade organization and training.	The Fire Marshall administers the station fire protection program (see 3.1. a(2))
(f) Prefire planning.	Prefire plans are written for safety-related areas and are controlled by the Fire Marshall. Preplans were reviewed by a Fire Protection Engineer.

Comply.

1. Responsibility for the Fire Protection Program

a. Initial Design and Construction Phase

The fire protection system design for the EGC plants was developed by the project consulting engineer using members of his staff who were experienced in nuclear plant design.

Exelon Generation Company is a member of Nuclear Electric Insurance Limited (NEIL) and therefore guidelines for fire protection design were provided in the NEIL Property Loss Prevention Standards for Nuclear Generating Stations.

The building design was done by the consulting engineer. All design

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	drawings which were pertinent to fire protection were submitted to a fire protection consultant as required by NEIL for their review and comment. The fire protection consultant was employed by NEIL and was therefore independent of EGC. The comments on design information made by the fire protection consultant were submitted to EGC for their action. Exelon Generation Company reviewed the project consultants' design drawings and the fire protection consultants' comments. Judgments were made on a cost-benefit basis as to whether or not the fire protection features were to be incorporated into the plant. Consideration was given to the following plant features when evaluation of fire protection was made: a. plant and personnel safety, b. credibility of a fire or fire hazard, c. loss of generation because of fire loss, and d. protection of surrounding or adjacent equipment resulting from a fire.

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	A Project Engineer who reported to the Project Engineering Manager coordinated fire protection design features at B/B. Likewise, a review of design and design changes was performed by a Fire Protection Engineer in the Nuclear Services Department and by Independent Fire Protection Engineers working under contract to EGC. Resumes for the reviewers are in Appendix A5.1. Surveillance tests were performed by the Project Construction Department and by the Station. The Fire Protection Engineers were involved in pre-operational and surveillance acceptance tests.

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	b. Operating Phase Exelon Generation Company has a Fire Marshall and Fire Protection System Engineer at each nuclear plant. In addition, there are Fire Protection Engineers in the Corporate and/or site design engineering departments. 1. Properties and Equipment - The Fire Protection Engineers furnish information on underwriting standards, fire insurance rating standards and other information. When necessary, they arrange for procuring advice from outside fire prevention agencies or other outside sources. When necessary, they arrange and set up meetings to discuss and resolve any questions on current standards or fire protection equipment. 2. Fire Inspections - Site personnel, QA (Nuclear Oversight), and NEIL performs fire protection inspections of plant facilities. 3. Fire Fighting Equipment - The Station Fire Marshall sees that adequate fire fighting equipment is provided and that such equipment is maintained in good operating condition. 4. Tests - The station conducts tests of fire fighting equipment and automatic fire protection

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systems to ensure that each is in good condition and operating satisfactorily. During normal or routine inspections, one or more of the following tests may be made:

a. alarm tests,

b. drain tests,

c. churning of fire pumps,

d. inspecting of control valves,

e. physical testing of fire pumps and yard hydrants,

f. checking or testing water deluge systems,

g. checking of automatic sprinkler systems, and

h. testing of standpipes and hoses.

5. Contacts - The Station Fire Marshall maintains company contacts with local fire departments. The Station Fire Marshall and the Fire Protection Engineers maintain contact with fire prevention organizations, insurance companies, and others on matters relating to fire fighting.

6. Reporting Fires - Fire reports are issued by the station. The Fire Marshall reports fires as necessary to the insurance company.

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	7. Training of Personnel - The Station Training Department, Corporate Training Department, and Fire Marshall are responsible for personnel training. This is done to ensure that individuals trained become familiar with the operation and use of fire fighting equipment. 8. Rules and Standards - The Fire Protection Engineers assist and advise departments concerned with established rules and standards relative to fire prevention and protection as may be necessary. 9. Recommendations - On all recommendations initiated by insurance agencies, fire prevention organizations, and other outside activities or company departments, the Fire Protection Engineers investigate, evaluate, discuss, and review such recommendations, where necessary, before making final recommendations as to specific action to be taken. 10. Design Change - All design changes are reviewed for impact upon the Fire Protection Program per administrative procedures. It is our opinion that the intent of the Branch Technical Position is met by the above outlined organizational structure in design, construction and operation of the EGC nuclear plants.
(4) The organizational responsibilities and lines of communication pertaining to fire protection should be defined between the various positions through the use of organizational charts and functional descriptions of each position's responsibilities. The following positions/organizations should be designated:	Administrative procedures define the organizational responsibilities and lines of communication for the Fire Protection Program.

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(a)	The upper level offsite management position which has management responsibility for the formulation, implementation, and assessment of the effectiveness of the nuclear plant fire protection program.	Administrative procedures identify the offsite-delegated individual responsible for the nuclear plant fire protection program. Assessment of the program is made by EGC Fire Protection Engineers.
(b)	The offsite management position(s) directly responsible for formulating, implementing, and periodically assessing the effectiveness of the fire protection program for the licensee's nuclear power plant including fire drills and training conducted by the fire brigade and plant personnel. The results of these assessments should be reported to the upper level management position responsible for fire protection with recommendations for improvements or corrective actions as deemed necessary.	Nuclear Oversight and EGC Fire Protection Engineers have these responsibilities.
(c)	The onsite management position responsible for the overall administration of the plant operations and emergency plans which include the fire protection and prevention program and which provide a single point of control and contact for all contingencies.	Administrative procedures identify the onsite-delegated individual responsible for the overall administration of the plant operations and emergency plans.

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(d) The onsite position(s) which:	
i. Implements periodic inspections to: minimize the amount of combustibles in safety-related areas; determine the effectiveness of housekeeping practices; assure the availability and acceptable condition of all fire protection systems/equipment, emergency breathing apparatus, emergency lighting, communication equipment, fire stops, penetration seals, and fire retardant coatings; and assures the prompt and effective corrective actions are taken to correct conditions adverse to fire protection and preclude their recurrence.	Administrative Procedures require the Fire Marshall to conduct periodic plant tours, identify unacceptable conditions, and initiate corrective actions. The Fire Marshall is responsible for implementation and administration of the fire protection program. Administrative Procedures state that Radiation Protection department will control and maintain emergency breathing apparatus. Administrative Procedures state that Electrical Maintenance will maintain emergency lighting and communications. Fire barriers, seals, doors, and dampers will be inspected per Station procedures and surveillance. Administrative Procedures state that the Fire Marshall will investigate fires, evaluate prevention recommendations and make recommendation when needed.
ii. Is responsible for the fire fighting training for operating plant personnel and the plant's fire brigade; design and selection of equipment; periodic inspection and testing of fire protection systems and equipment in accordance with established procedures, and evaluate test results and determine the acceptability of the systems under test.	Fire brigade training is a responsibility of both the Fire Marshall and the training department. Operating personnel are trained periodically through the Training Department on fire fighting. The Operating Manager ensures all operating surveillance are done in accordance to required guides. The Maintenance, Engineering and Operating Managers are responsible for station procedures performed by their department.

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	Fire Marshall will review the surveillances he deems necessary. Evaluation of tests and surveillances is specified in test, surveillance and administrative procedures. Fire Marshall is responsible for the purchase of fire brigade equipment.
iii. Assists in the critique of all fire drills to determine how well the training objectives have been met.	Critique of all fire drills is a responsibility of the Fire Marshall.
iv. Reviews and evaluates proposed work activities to identify potential transient fire loads.	The Fire Marshall will have these responsibilities.
v. Implements a program for indoctrination of all plant contractor personnel in appropriate administrative procedures which implement the fire protection program, and the emergency procedures relative to fire protection.	Contractor's training through NGET fulfills this requirement. They are informed of emergency procedures relative to fire protection.
vi. Implements a program for instruction of personnel on the proper handling of accidental events such as leaks or spills of flammable materials that are related to fire protection.	The Administrative procedures provide instructions for personnel on the proper handling of oil spills. These procedures reference corporate general instruction on spill prevention and counter measures.

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(e) The onsite position responsible for fire protection quality assurance. This position should be responsible for assuring the effective implementation of the fire protection program by planned inspections, scheduled audits, and verification that the results of these inspections of audits are promptly reported to cognizant management personnel.	The Fire Protection Program identifies that Fire Protection Activities are treated as augmented quality per the QA program. Site/Off-Site QA (Nuclear Oversight) Department personnel conduct audits and surveillances to ensure proper implementation and administration of the Fire Protection Program.
(f) The positions which are part of the plant fire brigade:	
i. The plant fire brigade positions should be responsible for fighting fires. The authority and responsibility of each fire brigade position relative to fire protection should be clearly defined.	Administrative procedures define the Fire Chief and Brigade responsibilities and the requirements for authority and duties.
ii. The responsibilities of each fire brigade position should correspond with the actions required by the fire fighting procedures.	
iii. The responsibilities of the fire brigade members under normal plant conditions should not conflict with their responsibilities during a fire emergency.	Training will be scheduled through the Fire Marshall and Operating Department. Administrative Procedures specify personnel (non-brigade) required for operation.

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iv. The minimum number of trained fire brigade members available onsite for each operating shift should be consistent with the activities required to combat the most significant fire. The size of the fire brigade should be based upon the functions required to fight fires with adequate allowance for injuries.	Byron complies with BTP CMEB 9.5-1 paragraph 3.3.b and Appendix R III.H. which requires a 5 member brigade.
v. The recommendations for organization, training, and equipment of "Private Fire Brigades" as specified in NFPA No. 27-1975, including the applicable NFPA publications listed in the appendix to NFPA No. 27, are considered appropriate criteria for organizing, training, and operating a plant fire brigade.	See Table 3-1 for discussion of conformance with NFPA 27.
(5) Personnel Qualifications.	Comply.
(a) The position responsible for formulation and implementation of the fire protection program should have within his organization or as a consultant a fire protection engineer who is a graduate of an engineering curriculum of accepted standing and shall have completed not less than 6 years of engineering attainment indicative of growth in engineering competency and achievement, 3 years of which shall have been in responsible charge of fire protection engineering work. These requirements are the eligibility	The position responsible for the fire protection program has the use of a Fire Protection Consultant. These Consultants meet SFPE member grade requirements. Exelon Generation Company also employs Fire Protection Engineers who meet the qualifications for member grade in SFPE. (The Fire Protection Engineer's duties are identified in the Fire Protection Program administrative procedures.)

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	requirements as a Member in the Society of Fire Protection Engineers.	
(b)	The fire brigade members' qualifications should include satisfactory completion of a physical examination for performing strenuous activity, and of the fire brigade training described in Position C.3.d.	The fire brigade members have an annual physical which shows them capable of unrestricted activity.
(c)	The personnel responsible for the maintenance and testing of the fire protection systems should be qualified by training and experience for such work.	The personnel responsible for maintenance and testing of the fire protection systems receive training scheduled by the training department.
(d)	The personnel responsible for the training of the fire brigade should be qualified by training and experience for such work.	The initial training of the fire brigade was administered by State of Illinois licensed instructors.
(6)	The following NFPA publications should be used for guidance to develop the fire protection program:	The administrative procedures needed for maintaining the performance of the fire protection system and personnel were established with the guidance of the NFPA standard available at the time. The organization of fire protection services and the review of their performance is one of the functions of the station administration.
	No. 4 - "Organization for Fire Services"	
	No. 4A - "Organization of a Fire Department"	
	No. 6 - "Industrial Fire Loss Prevention"	See Table 3-1 for discussion of conformance with the listed NFPA publications.
	No. 7 - "Management Control of Fire Emergencies"	
	No. 8 - "Management Responsibilities for Effects of Fire on Operations"	

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No. 27 - "Private Fire Brigades"	
(7) On sites where there is an operating reactor and construction or modification of other units is underway, the superintendent of the operating plant should have the lead responsibility for site fire protection.	Comply. Position Description procedures define this as a duty of the station manager.
b. Fire Hazards Analysis	
The fire hazards analysis should demonstrate that the plant will maintain the ability to perform safe shutdown functions and minimize radioactive releases to the environment in the event of a fire. The fire hazards analysis should be performed by qualified fire protection and reactor systems engineers to (1) consider potential in situ and transient fire hazards; (2) determine the consequences of fire in any location in the plant on the ability to safely shut down the reactor or on the ability to minimize and control the release of radioactivity to the environment; and (3) specify measures for fire prevention, fire detection, fire suppression, and fire containment and alternative shutdown capability as required for each fire area containing structures, systems, and components important to safety that are in conformance with NRC guidelines and regulations. "Worst case" fires need not be postulated to be simultaneous with nonfire-related failures in safety systems, plant	Comply. The overall fire protection program is based on evaluation of fire hazards so a safe shutdown can be accomplished. The fire protection program began with the protection of specific hazards in mind, to minimize, or prevent the loss of property. The main emphasis is now placed on safe plant shutdown, but the protection of ALL hazards will satisfy both reasons. Not ALL hazards are protected or separated as indicated in other sections of the report, but the basis for the fire protection program basically complies. Fire hazards were considered in plant design for Byron/Braidwood Units 1 and 2. The cable separation criteria for the plant is described in Appendix 5.2 of this report. The fire protection system is discussed in Appendix 5.4. Deviations from the compliance criteria of 10 CFR 50 Appendix R are listed and justified in Appendix A5.7..

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accidents, or the most severe natural phenomena.	
On multiple-reactor sites, unrelated fires in two or more units need not be postulated to occur simultaneously. Fires involving facilities shared between units and fires due to man-made site-related events that have a reasonable probability of occurring and affecting more than one reactor unit (such as an aircraft crash) should be considered.	Comply. A fire involving more than one reactor unit was not postulated except for facilities shared between units.
Because fire may affect safe shutdown systems and because the loss of function of systems used to mitigate the consequences of design basis accidents under postfire conditions does not per se impact public safety, the need to limit fire damage to systems required to achieve and maintain safe shutdown conditions is greater than the need to limit fire damage to those systems required to mitigate the consequences of design basis accidents. Three levels of fire damage limits are established according to the safety function of the structure, system, or component:	The criteria used to demonstrate safe shutdown capability are consistent with these requirements.

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Safety Function	Fire Damage Limits	
Hot Shutdown	One train of equipment necessary to achieve hot shutdown from either the control room or emergency control station(s) must be maintained free of fire damage by a single fire, including an exposure fire.	
Cold Shutdown	Both trains of equipment necessary to achieve cold shutdown may be damaged by a single fire, including an exposure fire, but damage must be limited so that at least one train can be repaired or made operable within 72 hours using onsite capability.	
Design basis accidents	Both trains of equipment necessary for mitigation of consequences following design basis accidents may be damaged by a single exposure fire.	

The most stringent fire damage limit should apply for those systems that fall into more than one category. Redundant systems used to mitigate the consequences of other design basis accidents but not necessary for safe shutdown may be lost to a single exposure fire. However, protection shall be provided so that

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a fire within only one such system will not damage the redundant system.	
The fire hazards analysis should separately identify hazards and provide appropriate protection in locations where safety-related losses can occur as a result of:	Sections 2.3 and 2.4 basically provide for each fire zone in the plant the relevant information from this list applicable to each zone.
(1) Concentrations of combustible contents, including transient fire loads due to combustibles expected to be used in normal operations such as refueling, maintenance, and modifications;	
(2) Continuity of combustible contents, furnishings, building materials or combinations thereof in configurations conducive to fire spread;	
(3) Exposure fire, heat, smoke, or water exposure, including those that may necessitate evacuation from areas that are required to be attended for safe shutdown;	
(4) Fire in control rooms or other locations having critical safety-related functions;	
(5) Lack of adequate access or smoke removal facilities that impede fire extinguishment in safety-related areas;	
(6) Lack of explosion-prevention measures;	
(7) Loss of electric power or control circuits;	
(8) Inadvertent operation of fire suppression systems.	Inadvertent operation of fire suppression systems has no adverse impact on safe shutdown capability as described in EC 341981.

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The fire hazards analysis should verify that the NRC fire protection program guidelines have been met. The analysis should list applicable elements of the program, with explanatory statements as needed to identify location, type of system, and design criteria. The analysis should identify and justify any deviations from the regulatory guidelines. Justification for deviations from the regulatory guidelines should show that an equivalent level of protection will be achieved. Deletion of a protective feature without compensating alternative protection measures will not be acceptable, unless it is clearly demonstrated that the protective measure is not needed because of the design and arrangement of the particular plant.	
c. Fire Suppression System Design Basis	Comply.
(1) Total reliance should not be placed on a single fire suppression system. Appropriate backup fire suppression capability should be provided.	Backup fire suppression equipment is provided in the form of manual hose stations and portable fire extinguishers at or near where automatic fire suppression systems are installed as well as at other locations throughout the plant. At the River Screen House, backup portable fire extinguishers are provided.
(2) A single active failure or a crack in a moderate-energy line (pipe) in the fire suppression system should not impair both the primary and backup fire suppression capability. For example, neither the failure of a fire pump, its power supply or controls, nor a crack in a moderate-energy line in the fire suppression system, should result in loss of function of both sprinkler and hose standpipe systems in an area protected by such primary and backup systems.	The primary supply of fire protection water at each station is described in Appendix 5.4. Cracks in the fire protection piping will not impair primary suppression system performance or availability of the backup hose stations. Non-safety-related portions of the fire protection system can be isolated from the safety-related portions by manual isolation valves. Loss of a main fire pump is considered in the design of the system. The SX system is also available as a backup for the hose stations.

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(3)	As a minimum, the fire suppression system should be capable of delivering water to manual hose stations located within hose reach of areas containing equipment required for safe plant shutdown following the safe shutdown earthquake (SSE). In areas of high seismic activity, the staff will consider on a case-by-case basis the need to design the fire detection and suppression systems to be functional following the SSE.	Comply. See Section A5.4.1. Cross-ties to the essential service water system are provided to ensure seismically qualified water supply to the Seismic Category I portions of the fire suppression (standpipe systems) located in safety-related areas.
(4)	The fire protection systems should retain their original design capability for (a) natural phenomena of less severity and greater frequency than the most severe natural phenomena (approximately once in 10 years) such as tornadoes, hurricanes, floods, ice storms, or small-intensity earthquakes that are characteristic of the geographic region, and (b) potential man-made site-related events such as oil barge collisions or aircraft crashes that have a reasonable probability of occurring at a specific plant site. The effects of lightning strikes should be included in the overall plant fire protection program.	Comply. Seismic design is considered in the whole FP system; however, only the Category I portions are designated seismic. The majority of the Fire Protection system previously classified as Safety Category I, Quality Group C has been reclassified as Safety Category II, Quality Group D (Ref. EC 626662); and remains classified as Seismic Category I. Floods have no effect. A single tornado missile can do no more damage than as described in 3.1c2.
(5)	The consequences of inadvertent operation of or a crack in a moderate energy line in the fire suppression system should meet the guidelines specified for moderate-energy systems outside containment in SRP Section 3.6.1.	Comply.

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d. Alternate or Dedicated Shutdown	
Alternative or dedicated shutdown capability should be provided where the protection of systems whose functions are required for safe shutdown is not provided by established fire suppression methods or by Position C.5.6.	Comply (Refer to Section 2.4 "Safe Shutdown Analysis") Exemptions from 10 CFR 50 Appendix R Sections III.G and III.L are listed in Appendix A5.7.
e. Implementation of Fire Protection Programs	
(1) The fire protection program (plans, personnel, and equipment) for buildings storing new reactor fuel and for adjacent fire areas that could affect the fuel storage area should be fully operational before fuel is received at the site. Such adjacent areas include those whose flames, hot gases, and fire-generated toxic and corrosive products may jeopardize safety and surveillance of the stored fuel.	Comply. Fire Brigade, hose reels and fire extinguishers were functional prior to receiving fuel. Training records and surveillance were being conducted for receipt of fuel. Pre-fire plans were in place for the fuel handling building and the adjacent fire areas. The fire brigade members were trained prior to receiving fuel on site.
(2) The fire protection program for an entire reactor unit should be fully operational prior to initial fuel loading in that reactor unit.	Comply.
(3) On reactor sites where there is an operating reactor and construction or modification of other units is under way, the fire protection program should provide for continuing evaluation of fire hazards. Additional fire barriers, fire protection capability, and administrative controls should be provided as necessary to protect the operating unit from construction fire hazards.	Comply. The continuing evaluation of fire hazards is accomplished by periodic inspections as specified in administrative procedures. Administrative control to protect the operating unit from construction fire hazards is accomplished by adhering to administrative procedures.

3.2 ADMINISTRATIVE CONTROLS

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	Administrative controls should be used to maintain the performance of the fire protection system and personnel. These controls should establish procedures to:	Administrative controls which will be in effect will comply with the requirements of this section.
a.	Prohibit bulk storage of combustible materials inside or adjacent to safety-related buildings or systems during operation or maintenance periods. Regulatory Guide 1.39 provides guidance on housekeeping, including the disposal of combustible materials.	Comply. Refer to Section III.K.2 of Appendix A5.7.
b.	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.	Comply. Refer to Section III.K.1 of Appendix A5.7.
c.	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 systems or equipment during all phases of operating, and especially during maintenance, modification, or refueling operations.	Comply. Refer Section III.K.3 of Appendix A5.7.

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d.	Designate the onsite staff member responsible for the inplant fire protection review of proposed work activities to identify potential transient fire hazards and specify required additional fire protection in the work activity procedure.	Comply. Refer to Section III.K.4 of Appendix A5.7.
e.	Govern the use of ignition sources by use of a flame permit system to control welding, flame cutting, brazing, or soldering operations. A separate permit should be issued for each area where work is to be done. If work continues over more than one shift, the permit should be valid for not more than 24 hours when the plant is operating or for the duration of a particular job during plant shutdown.	Comply. Refer to Section III.K.5 of Appendix A5.7.
f.	Control the removal from the area of all waste, debris, scrap, oil spills, or other combustibles resulting from the work activity immediately following completion of the activity, or at the end of each work shift, whichever comes first.	Comply. Refer to Section III.K.6 of Appendix A5.7.
g.	Govern leak testing; similar procedures such as airflow determination should use one of the commercially available techniques. Open flames or combustion-generated smoke should not be permitted.	Comply. Leak testing is done with noncombustible materials.
h.	Maintain the periodic housekeeping inspections to ensure continued compliance with these administrative controls.	Comply. Refer to Section III.K.7 of Appendix A5.7.

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i.	Control the use of specific combustibles in safety-related areas. All wood used in safety-related areas during maintenance, modification, or refueling operation (such as lay-down blocks or scaffolding) should be treated with a flame retardant. Equipment or supplies (such as new fuel) shipped in untreated combustible packing containers may be unpacked in safety-related areas if required for valid operating reasons. However, all combustible materials should be removed from the area immediately following unpacking. Such transient combustible material, unless stored in approved containers, should not be left unattended during lunch breaks, shift changes, or other similar periods. Loose combustible packing materials such as wood or paper excelsior, or polyethylene sheeting should be placed in metal containers with tight-fitting self-closing metal covers.	Comply with exceptions. Refer to Section III.K.8 of Appendix A5.7 for details.
j.	Disarming of fire detection or fire suppression systems should be controlled by a permit system. Fire watches should be established in areas where systems are so disarmed.	Comply. Disarming of fire detection or fire suppression systems is controlled by administrative procedure. A fire watch or other compensatory measures are established as required by the governing administrative procedure.

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k. Successful fire protection requires testing and maintenance of the fire protection equipment and the emergency lighting and communication. A test plan that lists the individuals and their responsibilities in connection with routine tests and inspections of the fire detection and protection systems should be developed. The test plan should contain the types, frequency, and detailed procedures for testing. Procedures should also contain instructions on maintaining fire protection during those periods when the fire protection system is impaired or during periods of plant maintenance, e.g., fire watches or temporary hose connections to water systems.	Comply. The scope of the job classification for maintenance personnel identifies job responsibilities in the area of fire protection. Disarming of fire detection or fire suppression systems for maintenance is controlled by administrative procedure. A fire watch or other compensatory measures are established as required by the governing administrative procedure. The surveillance program (Test Plan) contains the types, frequency, and detailed procedures for testing.
l. Control actions to be taken by an individual discovering a fire, for example, notification of control room, attempt to extinguish fire, and actuation of local fire suppression systems.	Comply. Refer to Section III.K.9 of Appendix A5.7.
m. Control actions to be taken by the control room operator to determine the need for brigade assistance upon report of a fire or receipt of alarm on control room annunciator panel, for example, announcing location of fire over PA system, sounding fire alarms, and notifying the shift supervisor and the fire brigade leader of the type, size, and location of the fire.	Comply. Refer to Section III.K.10 of Appendix A5.7.

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n. Control actions to be taken by the fire brigade after notification by the control room operator of a fire, for example, assembling in a designated location, receiving directions from the fire brigade leader, and discharging specific fire fighting responsibilities, including selection and transportation of fire fighting equipment to fire location, selection of protective equipment, operating instructions for use of fire suppression systems, and use of preplanned strategies for fighting fires in specific areas.	Comply. Refer to Section III.K.11 of Appendix A5.7.
o. Define the strategies for fighting fires in all safety-related areas and areas presenting a hazard to safety-related equipment. These strategies should designate:	Pre-fire plans have been developed for Byron which generally meet these guidelines. Refer to Appendix A5.7, Section K.12 for a detailed discussion of these plans and their conformance to these requirements.
(1) Fire hazards in each area covered by the specific prefire plans.	
(2) Fire extinguishants best suited for controlling the fires associated with the fire hazards in that area and the nearest location of these extinguishants.	
(3) Most favorable direction from which to attack a fire in each area in view of the ventilation direction, access hallways, stairs, and doors that are most likely to be free of fire, and the best station or elevation for fighting the fire. All access and egress routes that involve	

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locked doors should be specifically identified in the procedure with the appropriate precautions and methods for access specified.	
(4) Plant systems that should be managed to reduce the damage potential during a local fire and the location of local and remote controls for such management (e.g., any hydraulic or electrical systems in the zone covered by the specific fire fighting procedure that could increase the hazards in the area because of overpres-surization or electrical hazards).	
(5) Vital heat-sensitive system components that need to be kept cool while fighting a local fire. Particularly hazardous combustibles that need cooling should be designated.	
(6) Organization of fire fighting brigades and the assignment of special duties according to job title so that all fire fighting functions are covered by any complete shift personnel complement. These duties include command control of the brigade, transporting fire suppression and support equipment to the fire scenes, applying the extinguishant to the fire, communication with the	

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
control room, and co-ordination with outside fire departments.	
(7) Potential radiological and toxic hazards in fire zones.	
(8) Ventilation system operation that ensures desired plant air distribution when the ventilation flow is modified for fire containment or smoke clearing operation.	
(9) Operations requiring control room and shift engineer coordination or authorization.	
(10) Instructions for plant operators and general plant personnel during fire.	

3.3 FIRE BRIGADE

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
a. The need for good organization, training, and equipping of fire brigades at nuclear power plant sites requires that effective measures be implemented to ensure proper discharge of these functions. The guidance in Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants," should be followed as applicable.	The guidelines of Regulatory Guide 1.101 are followed where applicable. Insurance industry standards in existence at that time and NFPA 27-"Private Fire Brigades" - were consulted in writing the procedures. Station administrative procedures governing the fire protection program outlines the organization, training and the equipping of the fire brigades.

SECTION	NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
b.	A site fire brigade trained and equipped for fire fighting should be established to ensure adequate manual fire fighting capability for all areas of the plant containing structures, systems, or components important to safety. The fire brigade should be at least five members on each shift. The brigade leader and at least two brigade members should have sufficient training in or knowledge of plant safety-related systems to understand the effects of fire and fire suppressants on safe shutdown capability. The qualification of fire brigade members should include an annual physical examination to determine their ability to perform strenuous fire fighting activities. The shift supervisor should 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-related systems.	Comply, except as noted. Refer to Section III.H of Appendix A5.7 for details.

SECTION	NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
c.	The minimum equipment provided for the brigade should consist of personal protective equipment, such as turnout coats, boots, gloves, hard hats, emergency communications equipment, portable lights, portable ventilation equipment, and portable extinguishers. Self-contained breathing apparatus using full-face positive-pressure masks approved by NIOSH (National Institute for Occupational Safety and Health-approval formerly given by the U.S. Bureau of Mines) should be provided for fire brigade, damage control, and control room personnel. At least 10 masks shall be available for fire brigade personnel. Control room personnel may be furnished breathing air by a manifold system piped from a storage reservoir if practical. Service or rated operating life shall be a minimum of one-half hour for the self-contained units. At least two extra air bottles should be located onsite for each self-contained breathing unit. In addition, an onsite 6-hour supply of reserve air should be provided and arranged to permit quick and complete replenishment of exhausted supply air bottles as they are returned. If compressors are used as a source of breathing air, only units approved for breathing air shall be used; compressors shall be operable assuming a loss of offsite power. Special care must be taken to locate the compressor in areas free of dust and contaminants.	Comply. Refer to Section III.H of Appendix A5.7 for details.

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
d. 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, fire fighting practice, and fire drills. (1) The initial classroom instruction should include: (a) Indoctrination of the plant fire fighting plan with specific identification of each individual's responsibilities. (b) Identification of the type and location of fire hazards and associated types of fires that could occur in plant. (c) The toxic and corrosive characteristics of expected products of combustion. (d) Identification of the location of fire fighting equipment for each fire area and familiarization with the layout of the plant, including access and egress routes to each area.	The fire brigade training program meets the requirements presented in Items 1 through 9 herein. Refer to Section III.I of Appendix A5.7 for a discussion of conformance with the requirements of Items 1 through 8 below.

SECTION	NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
	(e) The proper use of available fire fighting equipment and the corrective method of fighting each type of fire. The types of fires covered should include fires in energized electrical equipment, fires in cables and cable trays, hydrogen fires, fires involving flammable and combustible liquids of hazardous process chemicals, fires resulting from construction or modification (welding), and record file fires.	
	(f) The proper use of communication, lighting, ventilation, and emergency breathing equipment.	
	(g) The proper method for fighting fires inside buildings and confined spaces.	
	(h) The direction and coordination of the fire fighting activities (fire brigade leaders only).	
	(i) Detailed review of fire fighting strategies and procedures.	
	(j) Review of the latest plant modifications and corresponding	

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
changes in fire fighting plans.	
(k) Training of the plant fire brigade should be coordinated with the local fire department so that responsibilities and duties are delineated in advance. This coordination should be part of the training course and should be included in the training of the local fire department staff.	Comply with Items k and l. The local fire department is included periodically in the station fire drills, which require them coming into the plant boundary. The local fire department has been trained in operational precaution and the need for radioactive protection of personnel in fighting fires in a nuclear power plant. It is clearly understood by the local fire department that they are a reserve force only and that they will be under the direction of the station Fire Marshall or Chief at the station.
(l) Local fire departments should be provided training in operational precautions when fighting fires on nuclear power plant sites and should be made aware of the need for radiological protection of personnel and the special hazards associated with a nuclear power plant site. Note: Items (i) and (j) may be deleted from the training of no more than two of the nonoperations personnel who may be assigned to the fire brigade.	
(2) The instruction should be provided by qualified individuals who are knowledgeable, experienced, and	Comply. Refer to Section III.I.1.b of Appendix A5.7.

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
suitably trained in fighting the types of fires that could occur in the plant and in using the types of equipment available in the nuclear power plant.	
(3) Instruction should be provided to all fire brigade members and fire brigade leaders.	
(4) Regular planned meetings should be held at least every 3 months for all brigade members to review changes in the fire protection program and other subjects as necessary.	Comply. Refer to Section III.I.1.d of Appendix A5.7.
(5) Periodic refresher training sessions shall be held to repeat the classroom instruction program for all brigade members over a 2-year period. These sessions may be concurrent with the regular planned meetings.	Comply. Refer to Section III.I.1.e of Appendix A5.7.
(6) Practice	
(a) Practice sessions should be held for each shift fire brigade 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 fire fighting.	Comply. Refer to Section III.I.2 of Appendix A5.7.
(b) These practice sessions should be provided at least once per year for each fire brigade member.	

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(7) Drills	
(a) Fire brigade drills should be performed in the plant so that the fire brigade can practice as a team.	Items 7a through 7f under (7) drills are accomplished by administrative procedure that includes drill and drill assessments. Refer to Section III.I.3 of Appendix A5.7 for details.
(b) Drills should be performed at regular intervals not to exceed 3 months for each shift fire brigade. Each fire brigade member should participate in each drill, but must participate in at least two drills per year. A sufficient number of these drills, but not less than one for each shift fire brigade per year, should be unannounced to determine the fire fighting readiness of the plant fire brigade, brigade leader, and fire protection systems and equipment. Persons planning and authorizing an unannounced drill should ensure that the responding shift fire brigade members are not aware that a drill is being planned until it is begun. Unannounced drills should not be scheduled closer than 4 weeks. At least one drill per year should be performed on a "back shift" for each shift fire brigade.	

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
(c) The drills should be pre-planned to establish the training objectives of the drill and should be critiqued to determine how well the training objectives have been met. Unannounced drills should be planned and critiqued by members of the management staff responsible for plant safety and fire protection. Performance deficiencies of a fire brigade or of individual fire brigade members should be remedied by scheduling additional training for the brigade or members. Unsatisfactory drill performance should be followed by a repeat drill within 30 days.	
(d) These drills should provide for local fire department participation periodically (at least annually).	
(e) At 3-year intervals, a randomly selected unannounced drill should be critiqued by qualified individuals independent of the licensee's staff. A copy of the written report from such individuals should be available for NRC review.	
(f) Drills should as a minimum include the following: i. Assessment of fire alarm effectiveness, time required to notify and assemble	

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
fire brigade, and selection, placement, and use of equipment and fire fighting strategies.	
ii. Assessment of each brigade member's knowledge of his or her role in the fire fighting strategy for the area assumed to contain the fire. Assessment of the brigade members' conformance with established plant fire fighting procedures and use of fire fighting equipment, including self-contained emergency breathing apparatus, communication equipment, and ventilation equipment, to the extent practicable.	
iii. The simulated use of fire fighting equipment required to cope with the situation and type of fire selected for the drill. The area and type of fire chosen for the drill should differ from those used in the previous drills so that brigade members are trained in fighting fires in various plant areas. The situation selected should simulate the size	

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
And arrangement of a fire that could reasonably occur in the area selected, allowing for fire development due to the time required to respond, to obtain equipment, and organize for the fire, assuming loss of automatic suppression capability.	
iv. Assessment of brigade leader's direction of the fire fighting effort as to thoroughness, accuracy, and effectiveness.	
(8) Records	
Individual records of training provided to each fire brigade member, including drill critiques, should be maintained for at least 3 years to ensure that each member receives training in all parts of the training program. These records of training should be available for NRC review. Retraining or broadened training for fire fighting within buildings should be scheduled for all those brigade members whose performance records show deficiencies.	Comply. Refer to Section III.I.4 of Appendix A5.7.
(9) Guidance Documents	
NFPA 27, "Private Fire Brigade," should be followed in organization, training, and fire drills. This standard also is applicable for the inspection and maintenance of	Comply. Fire training by responsible instructors is done periodically. See Table 3-1 for delineation of conformance with NFPA 27. NFPA 197 has been renumbered NFPA 1410, deals with public fire departments, and is not applicable at the station level.

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fire fighting equipment. Among the standards referenced in this document, NFPA 197, "Training Standard on Initial Fire Attacks," should be utilized as applicable. NFPA booklets and pamphlets listed in NFPA 27 may be used as applicable for training references. In addition, courses in fire prevention and fire suppression that are recognized or sponsored by the fire protection industry should be utilized.	The local fire department has been checked for fire hose thread compatibility and a letter is on file to document compatibility. The letter is on file in central files at Byron Station.

3.4 QUALITY ASSURANCE PROGRAM

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
The quality assurance (QA) programs of applicants and contractors should ensure that the guidelines for design, procurement, installation, and testing and the administrative controls for the fire protection systems for safety-related areas are satisfied. The QA program should be under the management control of the QA organization. This control consists of (1) formulating a fire protection QA program that incorporates suitable requirements and is acceptable to the management responsible for fire protection or verifying that the program incorporates suitable requirements and is acceptable to the management responsible for fire protection, and (2) verifying the effectiveness of the QA program for fire protection through review, surveillance, and audits. Performance of other QA program functions for meeting the fire protection program requirements may be performed by personnel outside of the QA organization. The QA program for fire protection should be part of the overall plant QA program. It should satisfy the specific criteria listed below.	The fire protection systems at Byron Station Units 1 and 2 are addressed in two different manners under the Quality Assurance Program. 1. Fire protection systems classed as safety-related are covered by the entire Quality Assurance Program which includes the criteria set forth in Appendix B of 10 CFR 50. 2. Fire protection systems that are classed as non-safety-related and that are awarded after September 1, 1978 are procured and installed in accordance with the Branch Technical Position 9.5-1. Vendors awarded with supplying or installing a fire protection system after September 1, 1978 must have an approved QA Program as required by the Quality Assurance Program and be on the Approved Bidder's List. However, exceptions may be made for selected non-safety-related systems to allow installation without an approved QA program. Each installation of this type requires a separate analysis that

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	includes, as a minimum, a regulatory change evaluation; a definable augmented quality class break point, such as an isolation valve; and a hydraulic evaluation for added sprinklers or fire hose stations, as applicable. The applicable fire and building codes (such as NFPA codes) will be followed and a fire protection engineer will review the change.
	Scheduled fire protection inspections are conducted under the direction of QA (Nuclear Oversight) and with direct participation by a qualified fire protection engineer consultant. New designs or revisions to plant fire protection systems are reviewed as outlined in the response to Section 3.1.
	The Quality Assurance Program applies to procurement, design, installation, modifications and maintenance activities involving fire protection systems. As such, each specific criteria listed as "a" through "j" of Section NRC Position are covered by the Quality Assurance

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	Program and by Department and Station Procedures. Further implementation relating to specific criteria, where deemed appropriate follow:
a. Design and Procurement Document Control Measures should be established to ensure that the guidelines of the regulatory position of this guide are included in design and procurement documents and that deviations therefrom are controlled.	
b. Instructions, Procedures, and Drawings Inspections, test, administrative controls, fire drills, and training that govern the fire protection program should be prescribed by documented instructions, procedures, or drawings and should be accomplished in accordance with these documents.	b. Department and station procedures are established to cover specific instructions such as for inspections, test, administrative controls, fire drills and training that govern the fire protection program.
c. Control of Purchased Material, Equipment, and Services Measures should be established to ensure that purchased material, equipment, and services conform to the procure-ment documents.	c. Carbon dioxide (CO_2) is controlled as a non-safety-related item per Material Engineering Group Evaluation M-94-0585-00.

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d. Inspection A program for independent inspection of activities affecting fire protection should be established and executed by or for the organization performing the activity to verify conformance with documented installation drawings and test procedures for accomplishing the activities.	d. Independent inspections are performed by Quality Assurance (Nuclear Oversight), utilizing fire protection consultants, as required. At Byron, periodic inspections are performed on fire-rated penetration seals. Inspection of the interface between exterior electrical conduit surfaces and the fire barrier are performed as part of the periodic fire barrier inspection. This conduit/barrier interface consists of an approved material specified by typical details on design drawings, which restores the barrier after the conduit has been installed in accordance with the QA Program. At the request of the Byron NRC Resident Inspector in May 2000, one sample conduit penetration in a masonry block wall in the Unit 2 4KV Switchgear Room was examined to verify its installation conforms to the design detail. It was confirmed that the conduit/barrier interface was installed during initial installation as specified in the design drawing. See also Section C.4.i for a discussion of Records associated with the installation of conduit/barrier interfaces.

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
e. Test and Test Control A test program should be established and implemented to ensure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. The tests should be performed in accordance with written test procedures; test results should be properly evaluated and acted on.	e. Tests of fire protection equipment and systems are included in regularly scheduled station operating surveillance procedures. These procedures and test results are reviewed and evaluated by appropriate station personnel. QA (Nuclear Oversight) also audits this area.
f. Inspection, Test, and Operating Status Measures should be established to provide for the identification of items that have satisfactorily passed required tests and inspections.	
g. Nonconforming Items Measures should be established to control items that do not conform to specified requirements to prevent inadvertent use or installation.	

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h. Corrective Action Measures should be established to ensure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and nonconformances, are promptly identified, reported, and corrected.	h. Tests of fire protection equipment and systems are included in regularly scheduled operating surveillance procedures. Nonconforming equipment is identified as a result of their test and corrective action taken to rectify any deficiencies as provided by the QA Program.
i. Records Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program.	i. Documentation involving the fire protection program is retained in a central file or QA vault as provided by the QA Program. Records of fire-rated barriers and fire-rated penetration seals are maintained in accordance with the QA Program. Individual installation records for each internal conduit non-combustible seal, cable tray fire stop, mechanical penetration seal, and other fire-rated seals are maintained in accordance with the QA Program. The sealing interface between exterior electrical conduit surfaces and a fire barrier is not considered an individual fire seal. Installation records of this interface are a part of the fire barrier QA records.

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j. Audits Audits should be conducted and documented to verify compliance with the fire protection program, including design and procurement documents, instructions, procedures and drawings, and inspection and test activities.	j. Scheduled audits and surveillances of the fire protection activities in our plants are performed in accordance with the QA Program by the Nuclear Oversight Department.

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	SITE QUALITY ASSURANCE The fire protection program is covered by the Quality Assurance Program. Fire Protection activities are subject to audit under the applicable portions of the approved QA program to ensure proper implementation and compliance with commitments, which is described in the QA topical report (QATR) CE-1-A. FIRE PROTECTION AUDIT CRITERIA Quality Assurance can use, but is not limited to, the following documents as audit reference material. 1. Station Fire Protection Report 2. Station responses to the Branch Technical Position 9.5-1. 3. Station SER and Supplements 4. Technical Specifications 5. Station Fire Protection Procedures 6. QATR 7. NFPA Codes 8. Applicable sections of 10 CFR 50 App. R 9. 29 CFR 1910.155 to 165

3.5 GENERAL PLANT GUIDELINES

SECTION	NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
a.	Building Design	
(1)	Fire barriers with a minimum fire resistance rating of 3 hours should be provided to: (a) Separate safety-related systems from any potential fires in non-safety-related areas that could affect their ability to perform their safety function; (b) Separate redundant divisions or trains of safety-related systems from each other so that both are not subject to damage from a single fire; (c) Separate individual units on a multiple-unit site unless the requirements of General Design Criterion 5 are met with respect to fires.	The fire area concept, as it relates to reactor safety, was not a requirement in the initial design of Byron Station Units 1 and 2. As implied in the Branch Technical Position and as stated in Section 4.3.4.4 of NUREG-0050, "Recommendation Related to Browns Ferry Fire," the fire area concept is impractical to implement to any great extent to plants already under construction. The original plant design did incorporate a fire hazard separation in accordance with insurance industry standards for nuclear power plants. In areas where redundant safety-related systems could not be separated from each other by a barrier, an analysis was conducted to determine if both ESF divisions could be adversely affected by a single postulated credible fire. These areas are identified in Section 2.3. Deviations from the Appendix R separation criteria are identified and justified in Appendix A5.7.
(2)	Appropriate fire barriers should be provided within a single safety division to separate components that present a fire hazard to other safety-related components or high concentrations of safety-related cables within that division.	The general separation criteria used for Byron Units 1 and 2 is described in Appendix 5.2 of this report. In general, safety-related systems are isolated from unacceptable fire hazards as discussed in Section 2.3.

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(3) Openings through fire barriers for pipe, conduit, and cable trays which separate fire areas should be sealed or closed to provide a fire resistance rating at least equal to that required of the barrier itself. Openings inside conduit larger than 4 inches in diameter should be sealed at the fire barrier penetration. Openings inside conduit 4 inches or less in diameter should be sealed at the fire barrier unless the conduit extends at least 5 feet on each side of the fire barrier and is sealed either at both ends or at the fire barrier with noncombustible material to prevent the passage of smoke and hot gases. Fire barrier penetrations that must maintain environmental isolation or pressure differentials should be qualified by test to maintain the barrier integrity under such conditions.	Electrical penetration seals have been installed at all barrier penetrations; their construction characteristics are described in Appendix 5.2. Mechanical penetration seals have been installed in all penetrations of rated fire barriers. All openings inside conduits that penetrate fire barriers that separate fire areas are sealed in accordance with Appendix A5.2.2 of this report.
Penetration designs should utilize only noncombustible materials and should be qualified by tests. The penetration qualification tests should use the time-temperature exposure curve specified by ASTM E-119, "Fire Test of Building Construction and Materials." The acceptance criteria for the test should require that:	For both the electrical and mechanical penetrations, all materials used in the construction of the fire stops have a flame spread of 25 or less. Penetration tests were conducted in accordance with IEEE 634-78 using the time temperature curve of ASTM E-119.

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(a)	The fire barrier penetration has withstood the fire endurance test without passage of flame or ignition of cables on the unexposed side for a period of time equivalent to the fire resistance rating required of the barrier.	All rated fire barrier penetration seals have 3-hour ratings.
(b)	The temperature levels recorded for the unexposed side are analyzed and demonstrate that the maximum temperature does not exceed 325°F.	The acceptance criteria is an average of 250°F above ambient. This is considered to be equivalent to the stated requirement.
(c)	The fire barrier penetration remains intact and does not allow projection of water beyond the unexposed surface during the hose stream test. The stream shall be delivered through a 1-1/2-inch nozzle set at a discharge angle of 30% with a nozzle pressure of 75 psi and a minimum discharge of 75 gpm with the tip of the nozzle a maximum of 5 ft from the exposed face; or the stream shall be delivered through a 1-1/2-inch nozzle set at a discharge angle of 15% with a nozzle pressure of 75 psi and a minimum discharge of 75 gpm with the tip of the nozzle a maximum of 10 ft from the exposed face; or the stream shall be delivered through a 2-1/2-inch national standard playpipe equipped with 1-1/8-inch tip, nozzle pressure of 30 psi,	Fire testing is normally done per IEEE-634.

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located 20 feet from the exposed face.	
(4) Penetration openings for ventilation systems should be protected by fire dampers having a rating equivalent to that required of the barrier (see NFPA-90A, "Air Conditioning and Ventilating Systems"). Flexible air duct coupling in ventilation and filter systems should be noncombustible.	Ventilation system penetrations in rated barriers are protected by fire dampers having a rating equivalent to that of the barrier. For details, see the Fire Protection Report Subsection 2.1.4.1b and c. See Table 3-1 for delineation of conformance with NFPA-90A.
(5) Door openings in fire barriers should be protected with equivalently rated doors, frames, and hardware that have been tested and approved by a nationally recognized laboratory. Such doors should be self-closing or provided with closing mechanisms and should be inspected semiannually to verify that automatic hold-open, release, and closing mechanisms and latches are operable. (See NFPA 80, "Fire Doors and Windows.")	Access doors in fire barriers are Label A or B fire doors or are of Label A or B construction (see Section 2.1, page 2.1-8 for a detailed discussion of doors provided for rated fire barriers). See Table 3-1 for delineation of conformance with NFPA 80:
One of the following measures should be provided to ensure they will protect the opening as required in case of fire:	All fire doors have automatic closers. Options a, b, and d are used on various doors in the plant. Cable spreading room interior doors alarm in the control room. The other supervised doors are monitored by security.

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(a) Fire doors should be kept closed and electrically supervised at a continuously manned location;	
(b) Fire doors should be locked closed and inspected weekly to verify that the doors are in the closed position;	Locked fire doors are inspected every 31 days, based upon historical analysis of plant specific records (document identification number DG99-000873).
(c) Fire doors should be provided with automatic hold-open and release mechanisms and inspected daily to verify that doorways are free of obstructions; or	
(d) Fire doors should be kept closed and inspected daily to verify that they are in the closed position.	Unlocked fire doors are inspected every 7 days, based upon historical analysis of plant specific records (document identification number DG99-000873).
The fire brigade leader should have ready access to keys for any locked fire doors.	The brigade chief can obtain a key to access all areas.
Access protected by automatic total flooding gas suppression systems should have electrically supervised self-closing fire doors or should satisfy option (a) above.	The diesel generator day tank rooms, the auxiliary feedwater diesel driven pump and day tank rooms, and the essential service water makeup pump diesel oil storage tank rooms are not electrically supervised, although they are protected by automatic total flooding gas suppression systems. The diesel generator rooms are also protected by automatic total flooding gas suppression systems; however, the doors from the diesel generator rooms to their respective ventilation shaft areas are not electrically supervised.The fire doors to these rooms are surveilled to ensure they are in their proper positions.

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(6) Personnel access routes and escape routes should be provided for each fire area. Stairwells outside primary containment serving as escape routes, access routes for firefighting, or access routes to areas containing equipment necessary for safe shutdown should be enclosed in masonry or concrete towers with a minimum fire rating of 2 hours and self-closing Class B fire doors.	The stairwells at Byron which serve as escape routes for station personnel and access routes for fire-fighting personnel, as per the requirements of building codes, are enclosed by 2-hour fire rated masonry walls with self-closing fire doors, and are clearly marked.

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(7) Fire exit routes should be clearly marked.	Comply, see item 6 above.
(8) Each cable spreading room should contain only one redundant safety division. Cable spreading rooms should not be shared between reactors. Cable spreading rooms should be separated from each other and from other areas of the plant by barriers having a minimum fire resistance of 3 hours.	The Byron design complies, except for instances where cables from both safety divisions are routed in the same cable spreading room. Fire Protection Report Section 2.4.2 describes the measures taken in these areas to assure safe shutdown.
(9) Interior wall and structural components, thermal insulation materials, radiation shielding materials, and soundproofing should be noncombustible.	Minor amounts of combustibles are used as architectural finish materials. These existing materials do not significantly contribute to the fire loading in the plant, and do not expose safety-related systems to undue risks.
Materials that are acceptable for use as interior finish without evidence of test and listing by a nationally recognized laboratory are the following:	
Plaster, acoustic plaster, gypsum plasterboard (gypsum wallboard), either plain, wallpapered, or painted with oil- or water-base paint;	
Ceramic tile, ceramic panels;	
Glass, glass blocks;	
Brick, stone, concrete blocks, plain or painted;	
Steel and aluminum panels, plain, painted, or enameled;	
Vinyl tile, vinyl-asbestos tile, linoleum, or asphalt tile on concrete floors.	

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(10) Metal deck roof construction should be noncombustible and listed as "acceptable for fire" in the UL Building Materials Directory, or listed as Class I in the Factory Mutual System Approval Guide.	Not applicable. Metal deck roof construction is not used at Byron Station.
(11) Suspended ceiling and their supports should be of non-combustible construction. Concealed spaces should be devoid of combustibles except as noted in Position C.6.b.	Comply.
(12) Transformers installed inside fire areas containing safety-related systems should be of the dry type or insulated and cooled with noncombustible liquid. Transformers filled with combustible fluid that are located indoors should be enclosed in a transformer vault (see Section 450 (c) of NFPA 70, "National Electrical Code").	Comply. See Table 3-1 for discussion of compliance with NFPA 70.
(13) Outdoor oil-filled transformer should have oil spill confinement features or drainage away from the buildings. Such transformers should be located at least 50 feet distant from the building, or by ensuring that such building walls within 50 feet of oil-filled transformers are without openings and have a fire resistance rating of at least 3 hours.	Does not fully comply. The Unit 1 (2) Unit Auxiliary Transformer 141 (241) is within approximately 30 feet of the turbine building. The turbine building wall has a 2-hour fire rating in this area. It also has a door with a 1-1/2-hour or Class B fire rating. The turbine building and equipment located inside it are non-safety-related. All outdoor transformers are separated from the safety-related auxiliary building by approximately 48 feet. The auxiliary building wall in this area has a 3-hour fire rating.

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(14) Floor drains sized to remove expected firefighting waterflow without flooding safety-related equipment should be provided in those areas where fixed water fire suppression systems are installed. Floor drains should also be provided in other areas where hand hose lines may be used if such firefighting water could cause unacceptable damage to safety-related equipment in the area (see NFPA-92, "Water-proofing and Draining of Floors"). Where gas sup-pression systems are installed, the drains should be provided with adequate seals or the gas suppression system should be sized to compensate for the loss of the suppression agent through the drains. Drains in areas containing combustible liquids should have provisions for preventing the backflow of combustible liquids to safety-related areas through the interconnected drain systems. Water drainage from areas that may contain radioactivity should be collected, sampled, and analyzed before discharge to the environment.	Comply. See Table 3-1 for discussion of compliance with NFPA Codes such as NFPA 13, 15. 16, etc., which takes the place of the previous guidance in NFPA 92M. NFPA 92M-1972 is no longer an NFPA Code.
b. Safe Shutdown Capability	
(1) Fire protection features should be provided for structures, systems, and components important to safe shutdown. These features should be capable of limiting fire damage so that:	Refer to Appendix A5.7, Section III.G for a discussion of fire protection provided for safe shutdown capability and detailed discussion of conformance to the criteria listed in paragraphs b(1), b(2), and b(3).
(a) One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency	

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control station(s) is free of fire damage; and (b) Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours. 2. To meet the guidelines of Position C5.b.1, one of the following means of ensuring that one of the redundant trains is free of fire damage should be provided: (a) Separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers should be protected to provide fire resistance equivalent to that required of the barrier; (b) Separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area; or (c) Enclosure of cable and equipment and associated circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire de-tectors and an automatic	

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fire suppression system should be installed in the fire area.

(3) If the guidelines of Positions C5.b.1 and C5-b.2 cannot be met, then alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided.

c. Alternative or Dedicated Shutdown Capability

(1) Alternative or dedicated shutdown capability provided for a specific fire area should be able to achieve and maintain subcritical reactivity conditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby* conditions for a PWR (hot shutdown* for a BWR) and achieve cold shutdown* conditions within 72 hours and maintain cold shutdown conditions thereafter. During the postfire shutdown, the reactor coolant system process variables shall be maintained within those predicted for a loss of normal ac power, and the fission product boundary integrity shall not be affected; i.e., there shall be no fuel clad damage, rupture, or any primary coolant boundary, or rupture of the containment boundary.

*As defined in the Technical Requirements Manual

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(2) The performance goals for the shutdown functions should be: (a) The reactivity control function should be capable of achieving and maintaining cold shutdown reactivity conditions. (b) The reactor coolant makeup function should be capable of maintaining the reactor coolant level above the top of the core for BWRs and be within the level indication in the pressurizer for PWRs. (c) The reactor heat removal function should be capable of achieving and maintaining decay heat removal. (d) The process monitoring function should be capable of providing direct readings of the process variables necessary to perform and control the above functions. (e) The supporting functions should be capable of providing the process cooling, lubrication, etc., necessary to permit the operation of the equipment used for safe shutdown functions.	Comply, with following clarification. For some fire zones, it is necessary to take credit for Making certain repairs in order to achieve cold shutdown within 72 hours. Refer to Section 2.4 for details for individual fire zones.
(3) The shutdown capability for specific fire areas may be unique for each such area, or it may be one unique combination of systems for all such areas. In either case, the alternative shutdown capability shall be independent of the specific fire area(s)	Comply.

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	and shall accommodate postfire conditions where offsite power is available and where offsite power is not available for 72 hours. Procedures shall be in effect to implement this capability.Comply.	
(4)	If the capability to achieve and maintain cold shutdown will not be available because of fire damage, the equipment and systems comprising the means to achieve and maintain the hot standby or hot shutdown condition shall be capable of maintaining such conditions until cold shutdown can be achieved. If such equipment and systems will not be capable of being powered by both onsite and offsite electric power systems because of fire damage, an independent onsite power system shall be provided. The number of operating shift personnel, exclusive of fire brigade members, required to operate such equipment and systems shall be onsite at all times.	Comply.
(5)	Equipment and systems comprising the means to achieve and maintain cold shutdown conditions should not be damaged by fire; or the fire damage to such equipment and systems should be limited so that the systems can be made operable and cold shutdown achieved within 72 hours. Materials for such repairs shall be readily available onsite and procedures shall be in effect to implement such repairs. If such equipment and systems used prior to 72 hours after the fire will not be capable of being powered by	Comply. Repair procedures have been prepared to cover any repairs required. All materials and equipment needed to make these repairs will be maintained onsite.

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both onsite and offsite electric power systems because of fire damage, an independent onsite power system should be provided. Equipment and systems used after 72 hours may be powered by offsite power only.	
(6) Shutdown systems installed to ensure postfire shutdown capability need not be designed to meet seismic Category I criteria, single failure criteria, or other design basis accident criteria, except where required for other reasons, e.g., because of interface with or impact on existing safety systems, or because of adverse valve actions due to fire damage.	Comply.
(7) The safe shutdown equipment and systems for each fire area should be known to be isolated from associated circuits in the fire area so that hot shorts, open circuits, or shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment. The separation and barriers between trays and conduits containing associated circuits of one safe shutdown division and trays and conduits containing associated circuits or safe shutdown cables from the redundant division, or the isolation of these associated circuits from the safe shutdown equipment, should be such that a postulated fire involving associated circuits will not prevent safe shutdown.	Comply. There are no associated circuits as defined in IEEE 384-1974 at B/B. Associated circuits as defined in the NRC's April 6, 1982 clarification letter to Generic Letter 81-12 are addressed in Subsection 2.4.1.6.

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d. Control of Combustibles	
(1) Safety-related systems should be isolated or separated from combustible materials. When this is not possible because of the nature of the safety system or the combustible material, special protection should be provided to prevent a fire from defeating the safety system function. Such protection may involve a combination of automatic fire suppression, and construction capable of withstanding and containing a fire that consumes all combustibles present. Examples of such combustible materials that may not be separable from the remainder of its system are:	Comply.
(a) Emergency diesel generator fuel oil day tanks.	The emergency diesel generator fuel oil day tanks are provided with automatic fire suppression.
(b) Turbine-generator oil and hydraulic control fluid systems.	The turbine generator oil and hydraulic control fluid system are contained in the Turbine Building and thus separated from all safety-related areas.
(c) Reactor coolant pump lube oil system.	Fire Protection of the reactor coolant pump lube oil system is described in A5.7 Section III O and 3.7.a(1) (e).
(2) Bulk gas storage (either compressed or cryogenic), should not be permitted inside structures housing safety-related equipment. Storage of flammable gas such as hydrogen should be located outdoors or in separate detached buildings so that a fire or explosion will not adversely affect any safety-related systems or	See Table 3-1 for delineation of conformance with NFPA 50A.

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	equipment. Refer to NFPA 50A, “Gaseous Hydrogen Systems.") Care should be taken to locate high pressure gas storage containers with the long axis parallel to building walls. This will minimize the possibility of wall penetration in the event of a container failure. Use of compressed gases (especially flammable and fuel gases) inside buildings should be controlled. (Refer to NFPA 6, "Industrial Fire Loss Prevention.")	
(3)	The use of plastic materials should be minimized. In particular, halogenated plastics such as polyvinyl chloride (PVC) and neoprene should be used only when substitute noncombustible materials are not available. All plastic materials, including flame and fire retardant materials, will burn with an intensity and BTU production in a range similar to that of ordinary hydrocarbons. When burning, they produce heavy smoke that obscures visibility and can plug air filters, especially charcoal and HEPA. The halogenated plastics also release free chlorine and hydrogen chloride when burning which are toxic to humans and corrosive to equipment.	Comply.
(4)	Storage of flammable liquids should, as a minimum, comply with the requirements of NFPA 30, "Flammable and Combustible Liquids Code."	See Table 3-1 for delineation of conformance with NFPA 30.

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(5) Hydrogen lines in safety-related areas should be either designed to seismic Class I requirements, or sleeved such that the water pipe is directly vented to the outside, or should be equipped with excess flow valves so that in case of a line break, the hydrogen concentration in the affected areas will not exceed 2%.	Comply. A 1-inch diameter hydrogen pipe is routed from the station hydrogen system through the Auxiliary Building to the Volume Control Tank. This line provides a blanket of hydrogen above the reactor coolant in the Volume Control Tank to aid in oxygen control. Within the auxiliary building, the hydrogen piping is Category II, except for the sections of pipe between the Volume Control Tank and the control valve which are Category I. However, the Category II portions are seismically supported throughout this building. An excess flow check valve is also provided at the bulk storage facility. The pipe routing takes this pipe through the general areas on elevation 364'-0", 383'-0", and 401'-0", and through the Unit 1 piping penetration area on elevation 364'-0". These areas are all large open areas. Because of the large size of these areas, any hydrogen flow from a line break would be stopped by the excess flow check valve well before the concentration would reach 2%. Although these areas contain safe shutdown equipment, the hydrogen piping is separated from exposed safe shutdown equipment within these areas by the maximum distance practicable. Because of this separation and the seismic support of the piping, the hydrogen piping does not present a significant fire hazard to the safe shutdown equipment. The Volume Control Tank Room is enclosed by shield walls. The valves used for operation of the Volume Control System are located in an adjacent valve aisle. Therefore, a fire in the Volume Control Tank

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	Room would not disable system operation. A short loop of the hydrogen piping containing the hydrogen control valves also extends into this valve aisle. The hydrogen pipe between the control valve and the Volume Control Tank is Category I piping. The remainder of the hydrogen pipe is Category II, but additional margin is incorporated into the design of the pipe and supports to protect against failure under seismic loads. The Unit 2 piping is a continuation of the Unit 1 system.
e. Electrical Cable Construction, Cable Trays, and Cable Penetrations	
(1) Only metal should be used for cable trays. Only metallic tubing should be used for conduit. Thin-wall metallic tubing should not be used. Flexible metallic tubing should only be used in short lengths to connect components to equipment. Other raceways should be made of noncombustible material.	Comply.
(2) Redundant safety-related cable systems outside the cable spreading room should be separated from each other and from potential fire exposure hazards in nonsafety-related areas by fire barriers with a minimum fire rating of 3 hours. These cable trays should be provided with continuous line-type heat detectors and should be accessible for manual firefighting. Cables should be designed to allow wetting down with fire suppression water without electrical faulting. Manual hose stations and	Separation of redundant safety-related cable systems by 3-hour rated barriers is not employed outside of the cable spreading rooms. The cable separation criteria used at Byron are described in Appendix 5.2. Continuous line-type heat detectors are not used, as they are unnecessary. The general areas containing safety-related cable trays have ionization (or photoelectric) and thermal type fire detectors, which are effective in detecting fires involving cable materials. Automatic water-type area suppression is not employed on the

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	portable hand extinguishers should be provided. Safety-related cable trays of a single division that are separated from redundant divisions by a fire barrier with a minimum rating of 3 hours and are normally accessible for manual firefighting should be protected from the effects of a potential exposure fire by providing automatic water suppression in the area where such a fire could occur. Automatic area protection, where provided, should consider cable tray arrangements and possible transient combustibles to ensure adequate water coverage for areas that could present an exposure hazard to the cable system. Manual hose standpipe systems may be relied upon to provide the primary fire suppression (in lieu of automatic water suppression systems) for safety-related cable trays of a single division that are separated from redundant safety divisions by a fire barrier with a minimum rating of 3 hours and are normally accessible for manual firefighting if all of the following conditions are met: (a) The number of equivalent* standard 24-inch-wide cable trays (both safety-related and nonsafety-related) in a given fire area is six or less;	cable tray system at Byron. Cables are not considered to be the primary fire hazard in any areas of the plant except the cable spreading rooms, and therefore they do not have specific fire suppression systems provided, except for the cable spreading rooms. However, cable trays are protected by the detection and/or manual suppression equipment provided for areas where they are located. Refer to Section 2.3 for detailed discussion of each fire zone.

*Trays exceeding 24 inches should be counted as two trays; trays exceeding 48 inches should be counted as three trays, regardless of tray fill.

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(b) The cabling does not provide instrumentation, control or power to systems required to achieve and maintain hot shutdown; and	
(c) Smoke detectors are provided in the area of these cable routings, and continuous line-type heat detectors are provided in the cable trays.	
Safety-related cable trays that are not accessible for manual firefighting should be protected by a zoned automatic water system with open-head deluge or open directional spray nozzles arranged so that adequate water coverage is provided for each cable tray. Such cable trays should also be protected from the effects of a potential exposure fire by providing automatic water suppression in the area where such a fire could occur.	
In other areas where it may not be possible because of other overriding design features necessary for reasons of nuclear safety to separate redundant safety-related cable systems by 3-hour-rated fire barriers, cable trays should be protected by an automatic water system with open-head deluge or open directional spray nozzles arranged so that adequate water coverage is provided for each cable tray. Such cable trays should also be protected from the effects of a potential exposure fire by providing automatic water suppression in the area where such a fire could occur. The capability to	

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achieve and maintain safe shutdown considering the effects of a fire involving fixed and potential transient combustibles should be evaluated with and without actuation of the automatic suppression system and should be justified on a suitably defined basis.	
(3) Electric cable construction should, as a minimum, pass the flame test in the current IEEE Std. 383. (This does not imply that cables passing this test will not require fire protection.)	Cables installed in cable trays, with the exception of certain specialty instrumentation cables, pass the IEEE 383-1974 flame test. Cables that do not pass the flame test will be identified and any corrective action which is deemed necessary will be implemented.
(4) Cable raceways should be used only for cables.	Comply.
(5) Miscellaneous storage and piping for flammable or combustible liquids or gases should not create a potential exposure hazard to safety-related systems.	Comply. Propane storage is in a separate building. Welding gases and oxygen are stored outdoors. Individual bottles of flammable gasses used for calibration are located in the auxiliary building.
f. Ventilation	
(1) The products of combustion and the means by which they will be removed from each fire area should be established during the initial stages of plant design. Consideration should be given to the installation of automatic suppression systems as a means of limiting smoke and end heat generation. Smoke and corrosive gases should generally be discharged directly outside to an area that will not affect safety-related plant areas. The normal plant ventilation system	Since all fire barrier ventilation openings have fire dampers which close if a fire causes room temperature to exceed a setpoint, automatic exhaust of combustion products is not possible. However, the means and methods to remove smoke from all safety-related plant areas have been established and are set forth in Station procedures.

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	may be used for this purpose if capable and available. To facilitate manual firefighting, separate smoke and heat vents should be provided in specific areas such as cable spreading rooms, diesel fuel oil storage areas, switchgear rooms, and other areas where the potential exists for heavy smoke conditions (see NFPA 204 for additional guidance on smoke control).	
(2)	Release of smoke and gases containing radioactive materials to the environment should be monitored in accordance with emergency plans as described in the guidelines of Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants." Any ventilation system designed to exhaust potentially radioactive smoke or gases should be evaluated to ensure that inadvertent operation or single failures will not violate the radiologically controlled areas of the plant design. This requirement includes containment functions for protecting the public and maintaining habitability for operations personnel.	All smoke and gases which contain possible radioactive material is monitored prior to release to the environment. For details, see FSAR Subsections 3.1.2.6.1, 3.1.2.6.2, 6.4.1, 6.4.4.1, 6.5.1, 6.5.1.1, 9.4.1.2.b, 9.4.1.3e, 9.4.1.3h, 9.4.9.1.1.6-2, 9.4.9.1.2.c, and 9.4.9.1.2e
(3)	Special protection for ventilation power and control cables may be required. The power supply and controls for mechanical ventilation systems should be run outside the fire area served by the system where practical.	Power supply and controls for mechanical ventilation equipment are not necessarily routed outside of fire zones served by the system. Most ventilation equipment is located within the fire hazard area, thereby requiring electrical cable to be routed accordingly. However, such cabling is in conduit. To relocate the vent equipment outside the fire hazard area would be impractical. For details, see FSAR

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	Subsections 4.4.4, 9.4.1.1.g, and 9.4.1.3a.
(4) Engineered safety feature filters should be protected in accordance with the guidelines of Regulatory Guide 1.52. Any filter that includes combustible materials and is a potential exposure fire hazard that may affect safety-related components should be protected as determined by the fire hazards analysis.	Comply. For details, see FSAR Subsection 6.5.1.2.1.d-5 and Fire Protection Report Subsection 2.3.3.14.
(5) The fresh air supply intakes to areas containing safety-related equipment or systems should be located remote from the exhaust air outlets and smoke vents of other fire areas to minimize the possibility of contaminating the intake air with the products of combustion.	Comply. For details, see FSAR Subsection 9.4.1.1.1e and Figure 6.4-1.
(6) Stairwells should be designed to minimize smoke infiltration during a fire.	Comply, see part 6 of Subsection 3.5a.
(7) Where total flooding gas extinguishing systems are used, area intake and exhaust ventilation dampers should be controlled in accordance with NFPA 12, "Carbon Dioxide Systems," and NFPA 12A, "Halon 1301 Systems, to maintain the necessary gas concentration.	See Table 3-1 for delineation of conformance to NFPA 12 and NFPA 12A. For details, see Fire Protection Report Subsections 2.3.3.6, 2.3.3.7, 2.3.3.8, 2.3.3.9, 2.3.3.10 and 11, 2.3.3.14, 2.3.3.16, 2.3.3.18, and 2.3.3.20.
g. Lighting and Communication Lighting and two-way voice communication are vital to safe shutdown and emergency response in the event of fire. Suitable fixed and portable emergency lighting and communication devices should be provided as follows:	

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(1)	Fixed self-contained lighting consisting of fluorescent or sealed-beam units with individual 8-hour minimum battery power supplies should be provided in areas that must be manned for safe shutdown and for access and egress routes to and from all fire areas. Safe shutdown areas include those required to be manned if the control room must be evacuated.	Comply. Fixed self-contained lighting will be provided in all areas where manual operation is assumed in the safe shutdown analysis in Section 2.4. See FPR Section A.5.7.III.5.
(2)	Suitable sealed-beam battery-powered portable hand lights should be provided for emergency use by the fire brigade and other operations personnel required to achieve safe plant shutdown.	Comply. Portable lights are provided for emergency use by the fire brigade and other operations personnel.
(3)	Fixed emergency communications independent of the normal plant communication system should be installed at preselected stations.	Comply. A plant pager system is installed at locations shown on prints 6/20E-0-3789 and 3789A. Power is supplied from MCC 131X2 (1AP25E) and 231X2 (2AP25E).
(4)	A portable radio communications system should be provided for use by the fire brigade and other operations personnel required to achieve safe plant shutdown. This system should not interfere with the communications capabilities of the plant security force. Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage. Preoperational and periodic testing should demonstrate that the frequencies used for portable radio communication will not affect the actuation of protective relays.	Comply. Four repeaters are provided at the Byron station. The repeaters are located in the Operations Task Read Room (OTRR) on elevation 451' in the Turbine Building along with column row L. The repeaters connect with the station Distributed Antenna System (DAS) above the OTRR on Elevation 468' in the Turbine Building along column row L. A single credible fire at either location could disable all repeaters. However, the remaining base stations and hand-held radios would remain operable for the fire brigade, other operations personnel, and security to mitigate the consequences of such a fire and to achieve safe plant shutdown. Testing has demonstrated that coverage of the plant by the

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	remaining radio system components in the event of such a fire is adequate. Separate radio talk groups for normal radio system operation and and independent frequency for abnormal operations are available for use by the fire brigade and other operations personnel required to achieve safe plant shutdown. Security has its own talk group for normal operation and its own frequency for abnormal operations. Preoperational testing has demonstrated that the frequencies used for portable radio communications do not affect the actuation of protective relays nor the transmitters that input to a relay that actuate a reactor trip for an engineered safety feature. In the latter case, the areas surrounding the transmitters have been labeled with appropriate warning messages. Further, portable radio transmissions are not allowed in the auxiliary electric equipment room and other designated areas. These actions have been taken in lieu of periodic testing.

3.6 FIRE DETECTION AND SUPPRESSION

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a.	Fire Detection Protection	
(1)	Detection systems should be provided for all areas that contain or present a fire exposure to safety-related equipment.	Comply with exceptions. See Table 2.2-3.
(2)	Fire detection systems should comply with the requirements of Class A systems as defined in NFPA 72D, "Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems," and Class 1 circuits as defined in NFPA 70, "National Electrical Code."	Comply, see Appendix 5.4. See Table 3-1 for delineation of conformance to NFPA 72D.
(3)	Fire detectors should be selected and installed in accordance with NFPA 72E, "Automatic Fire Detectors." Preoperational and periodic testing of pulsed line-type heat detectors should demonstrate that the frequencies used will not affect the actuation of protective relays in other plant systems.	Comply. Line type heat detectors are not used, in general, at B/B except in most charcoal filters and all outdoor transformers. See Table 3-1 for delineation of conformance to NFPA 72E.
(4)	Fire detection systems should give audible and visual alarm and annunciation in the control room. Where zoned detection systems are used in a given fire area, local means should be provided to identify which detector zone has actuated. Local audible alarms should sound in the fire area.	The fire detection system will give audible and visual alarm and annunciation in the control room. Local alarms are provided for areas with fixed suppression systems.
(5)	Fire alarms should be distinctive and unique so they will not be confused with any other plant system alarms.	Comply.

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(6) Primary and secondary power supplies should be provided for the fire detection system and for electrically operated control valves for automatic suppression systems. Such primary and secondary power supplies should satisfy provisions of Section 2220 of NFPA 72D. This can be accomplished by using normal offsite power as the primary supply with a 4-hour battery supply as secondary supply; and by providing capability for manual connection to the Class 1E emergency power bus within 4 hours of loss of offsite power. Such connection should follow the applicable guidelines in Regulatory Guides 1.6, 1.32, and 1.75.	The fire detection system is powered from an ESF bus. See Table 3-1 for delineation of conformance to NFPA 72D.
b. Fire Protection Water Supply Systems	
(1) An underground yard fire main loop should be installed to furnish anticipated water requirements. NFPA 24, "Standard for Outside Protection" gives necessary guidance for such installation. It references other design codes and standards developed by such organizations as the American National Standards Institute (ANSI) and the American Water Works Association (AWWA). Type of pipe and water treatment should be design considerations with tuberculation as one of the parameters. Means for inspecting and flushing the systems should be provided.	See Table 3-1 for delineation of conformance to NFPA 24.

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(2) Approved visually indicating sectional control valves such as post-indicator valves should be provided to isolate portions of the main for maintenance or repair without shutting off the supply to primary and backup fire suppression systems serving areas that contain or expose safety-related equipment.	Comply.
(3) Valves should be installed to permit isolation of outside hydrants from the fire main for maintenance or repair without interrupting the water supply to automatic or manual fire suppression systems in any area containing or presenting a fire hazard to safety-related or safe shutdown equipment.	Comply.
(4) The fire main system piping should be separate from service or sanitary water system piping, except as described in Position C.5.c.(4).	Comply, except for connections to service water system, demineralized water system, the service air compressor, and temporary cross-tie capabilities to the centrifugal charging pump oil coolers.
(5) A common yard fire main loop may serve multiunit nuclear power plant sites if cross-connected between units. Sectional control valves should permit maintaining independence of the individual loop around each unit. For such installations, common water supplies may also be utilized. For multiple-reactor sites with widely separated plants (approaching 1 mile or more), separate yard fire main loops should be used.	Comply. Byron has only one loop in the auxiliary building which serves both units.

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(6) If pumps are required to meet system pressure or flow requirements, a sufficient number of pumps should be provided to ensure that 100% capacity will be available assuming failure of the largest pump or loss of offsite power (e.g., three 50% pumps or two 100% pumps). This can be accomplished, for example, by providing either: (a) Electric motor-driven fire pump(s) and diesel-driven fire pump(s); or (b) Two or more seismic Category I Class 1E electric motor-driven fire pumps connected to redundant Class 1E emergency power buses (see Regulatory Guides 1.6, 1.32, and 1.75). Individual fire pump connections to the yard fire main loop should be separated with sectionalizing valves between connections. Each pump and its driver and controls should be located in a room separated from the remaining fire pumps by a fire wall with a minimum rating of 3 hours. The fuel for the diesel fire pump(s) should be separated so that it does not provide a fire source exposing safety-related equipment. Alarms indicating pump running, driver availability, failure to start, and low fire-main pressure should be provided in the control room.	Comply.

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	The fire pump installation should conform to NFPA 20, "Standard for the Installation of Centrifugal Fire Pumps."	See Table 3-1 for delineation of conformance with NFPA 20.
(7)	Outside manual hose installation should be sufficient to provide an effective hose stream to any onsite location where fixed or transient combustibles could jeopardize safety-related equipment. Hydrants should be installed approximately every 250 feet on the yard main system. A hose house equipped with hose and combination nozzle and other auxiliary equipment recommended in NFPA 24, "Outside Protection," should be provided as needed, but at least every 1,000 ft. Alternatively, mobile means of providing hose and associated equipment, such as hose carts or trucks, may be used. When provided, such mobile equipment should be equivalent to the equipment supplied by three hose houses.	See Table 3-1 for delineation of conformance with NFPA 24.
(8)	Threads compatible with those used by local fire departments should be provided on all hydrants, hose couplings, and standpipe risers.	Comply.
(9)	Two separate, reliable freshwater supplies should be provided. Saltwater or brackish water should not be used unless all freshwater supplies have been exhausted. If tanks are used, two 100% (minimum of 300,000 gallons each) system capacity tanks should be installed. They should be so interconnected that pumps can take suction	Not applicable.

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from either or both. However, a failure in one tank or its piping should not cause both tanks to drain. Water supply capacity should be capable of refilling either tank in 8 hours or less.	
(10) Common tanks are permitted for fire and sanitary or service water storage. When this is done, however, minimum fire water storage requirements should be dedicated by passive means, for example, use of a vertical standpipe for other water services. Administrative controls, including locks for tank outlet valves, are unacceptable as the only means to ensure minimum water volume.	Not applicable.
(11) The fire water supply should be calculated on the basis of the largest expected flow rate for a period of 2 hours, but not less than 300,000 gallons. This flow rate should be based (conservatively) on 500 gpm for manual hose streams plus the largest design demand of any sprinkler or deluge system as determined in accordance with NFPA 13 or NFPA 15. The fire water supply should be capable of delivering this design demand over the longest route of the water supply system.	Comply. The original calculations on the fire protection system were based on a line break that creates the greatest friction loss in the system per NEIL requirements. This has the same effect as delivering water over the longest route even though the longest route was not considered in the calculation. It would take four line breaks to restrict the flow to only the longest route. See Table 3-1 for delineation of conformance to NFPA 13 and NFPA 15.
(12) Freshwater lakes or ponds of sufficient size may qualify as sole source of water for fire protection but require separate redundant suctions in one or more intake structures. These supplies should be separated so that a failure of one supply will not result in a failure of the other supply.	Comply. At Byron, the natural draft cooling tower basin serves as the sole source of water for fire protection. As described in a January 6, 1983 letter from T. R. Tramm to H. R. Denton responding to a CMEB request, the required volume of fire protection water will always be available from this source.

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(13) When a common water supply is permitted for fire protection and the ultimate heat sink, the following conditions should also be satisfied: (a) The additional fire protection water requirements are designed into the total storage capacity, and (b) Failure of the fire protection system should not degrade the function of the ultimate heat sink.	Comply. This is not applicable to Byron since different sources of water are utilized for the ultimate heat sink and fire protection.
(14) Other water systems that may be used as one of the two fire water supplies should be permanently connected to the fire main system and should be capable of automatic alignment to the fire main system. Pumps, controls, and power supplies in these systems should satisfy the requirements for the main fire pumps. The use of other water systems for fire protection should not be incompatible with their functions required for safe plant shutdown. Failure of the other system should not degrade the fire main system.	Service Water and Essential Service Water tie-ins are manual; however, these are not designed to be redundant to the fire water pumps.
c. Water Sprinkler and Hose Standpipe	
(1) Sprinkler systems and manual hose station standpipes should have connections to the plant underground water main so that a single active failure or a crack in a moderate-energy line cannot impair both the primary and backup fire suppression systems. Alternatively, headers fed from each end are permitted inside buildings to	See paragraph 3.1c(2).

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supply both sprinkler and standpipe systems, provided steel piping and fittings meeting the requirements of ANSI B31.1, "Power Piping," are used for the headers up to and including the first valve supplying the sprinkler systems where such headers are part of the seismically analyzed hose standpipe system. When provided, such headers are considered an extension of the yard main system. Each sprinkler and standpipe system should be equipped with OS&Y (outside screw and yoke) gate valve or other approved shutoff valve and waterflow alarm. Safety-related equipment that does not itself require sprinkler water fire protection but is subject to unacceptable damage if wet by sprinkler water discharge should be protected by water shields or baffles.	
(2) Control and sectionalizing valves in the fire water systems should be electrically supervised or administratively controlled. The electrical supervision signal should indicate in the control room. All valves in the fire protection system should be periodically checked to verify position (see NFPA 26, "Supervision of Valves").	Electrical supervision is generally provided for valves controlling individual, fixed extinguishing systems. These valves alarm in the control room. Although interior and exterior sectional control valves are not electrically supervised, their positions are administratively controlled by station operating procedures. See Table 3-1 for delineation of conformance to NFPA 26.
(3) Fixed water extinguishing systems should conform to requirements of appropriate standards such as NFPA 13, "Standards for the Installation of Sprinkler Systems," and NFPA 15, "Standard for Water Spray Fixed Systems."	See Table 3-1 for delineation of conformance to NFPA 13 and NFPA 15.

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(4)	Interior manual hose installation should be able to reach any location that contains, or could present a fire exposure hazard to, safety-related equipment with at least one effective hose stream. To accomplish this, standpipes with hose connections equipped with a maximum of 100 feet of 1-1/2-inch woven-jacket, lined for hose and suitable nozzles should be at least 4 inches in diameter for multiple hose connections and 2-1/2 inches in diameter for single hose connections. These systems should follow the requirements of NFPA 14, "Standpipe and Hose Systems," for sizing, spacing, and pipe support requirements. Hose stations should be located as dictated by the fire hazard analysis to facilitate access and use for firefighting operations. Alternative hose stations should be provided for an area if the fire hazard could block access to a single hose station serving that area. Provisions should be made to supply water at least to standpipes and hose connections for manual firefighting in areas containing equipment required for safe plant shutdown in the event of a safe shutdown earthquake. The piping system serving such hose stations should be analyzed for SSE loading and should be provided with supports to ensure system pressure integrity. The piping and valves for the portion of hose standpipe system affected by this functional requirement	Hose stations are generally located outside of unoccupied areas. Shutoff valves are provided for all standpipes or sections of interior piping. Generally, these standpipe hose stations are located throughout the plant at approximately 100-foot intervals on each floor. Most of the hoses and associated hose reels have been removed per EC 626870 as the fire brigade utilizes high-rise hose packs transported to the scene. The standpipes used have a varying diameter of 2-1/2 inches to 4 inches. Portions of the Fire Protection System that service safety-related equipment or run through areas where safety-related equipment is housed use Seismic Category I piping. The majority of the Fire Protection System previously classified as Safety Category I, Quality Group C has been reclassified as Safety Category II, Quality Group D (Ref. EC 626662); and remains classified as Seismic Category I. Hose stations at the River Screen House have been abandoned. These stations are not needed as a means of backup fire suppression. (Reference EC #351113). See Table 3-1 for delineation of conformance to NFPA 14.

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should, as a minimum, satisfy ANSI B31.1, "Power Piping." The water supply for this condition may be obtained by manual operator actuation of valves in a connection to the hose standpipe header from a normal seismic Category I water system such as the essential service water system. The cross connection should be (a) capable of providing flow to at least two hose stations (approximately 75 gpm per hose station), and (b) designed to the same standards as the seismic Category I water system; it should not degrade the performance of the seismic Category I water system.	
(5) The proper type of hose nozzle to be supplied to each area should be based on the fire hazard analysis. The usual combination spray/straight-stream nozzle should not be used in areas where the straight stream can cause unacceptable mechanical damage. Fixed fog nozzles should be provided at locations where high-voltage shock hazards exist. All hose nozzles should have shutoff capability. (Guidance on safe distances for water application to live electrical equipment may be found in the "NFPA Fire Protection Handbook.")	The proper type of hose nozzle is brought to scene and utilized by the fire brigade based on the type of fire and surrounding environment. Straight stream nozzles are supplied to areas of new fuel storage.

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(6) Fire hose should be hydrostatically tested in accordance with the recommendations of NFPA 1962, "Fire Hose - Care, Use, Maintenance." Hose stored in outside hose houses should be tested annually. Interior standpipe hose should be tested every 3 years.	Comply by satisfying the recommendations of NFPA 1962.
(7) Certain fires, such as those involving flammable liquids, respond well to foam suppression. Consideration should be given to use of mechanical low-expansion foam systems, high-expansion foam generators, or aqueous film-forming foam (AFFF) systems, including the AFFF deluge system. These systems should comply with the requirements of NFPA 11, NFPA 11A, NFPA 11B, and NFPA 16, as applicable.	See Table 3-1 for delineation of conformance with NFPA 11 and NFPA 16. NFPA 11A and 11B are not applicable.
d. Halon Suppression Systems	
Halon fire extinguishing systems should comply with the requirements on NFPA 12A and NFPA 12B, "Halogenated Fire Extinguishing Agent Systems - Halon 1301 and Halon 1211." Only UL-listed or FM-approved agents should be used. Provisions for locally disarming automatic Halon systems should be key locked and under strict administrative control. Automatic Halon extinguishing systems should not be disarmed unless controls as described in Position C.2.c. are provided.	Comply, except as noted below. See Table 3-1 for delineation of conformance with NFPA 12A. Interlock and alarms are tested initially by technical staff. The halon is bought listed with a Certification of Conformance. The control panels will be locked with the keys controlled by operating. The disarming of the system will alarm in the control room.

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In addition to the guidelines of NFPA 12A and 12B, preventive maintenance and testing of the systems, including check-weighing of the Halon cylinders, should be done at least quarterly.	Testing of halon cylinders will be performed semiannually, as allowed by NFPA 12A Section 1-11.1.6. Pre-discharge alarms are provided locally, except for the Halon system protecting the QA Records Vault. Pre-discharge timers delay the discharge to allow personnel time to leave the area. The Halon systems for the Upper Cable Spreading Rooms also alarm in the control room.
Particular consideration should also be given to: (1) Minimum required Halon concentration, distribution, soak time, and ventilation control; (2) Toxicity of Halon; (3) Toxicity and corrosive characteristics of the thermal decomposition products of Halon; and (4) Location and selection of the activating detectors.	Concentration testing is done by the vendor. They verify hold time and ventilation openings are controlled by fire dampers held by electro-thermal links. There are only ventilation ducts and cables in the area. Neither is likely to experience serious corrosive damage. The rooms will be vented per the prefire plans. The halon test results obtained from the Byron site testing indicate concentrations in the upper cable spreading room over 6%. These rooms are not normally occupied.

e. Carbon Dioxide Suppression Systems		
	Carbon dioxide extinguishing systems should comply with the requirements of NFPA 12, "Carbon Dioxide Extinguishing Systems." Where automatic carbon dioxide systems are used, they should be equipped with a predischarge alarm system and a discharge delay to permit personnel egress. Provisions for locally disarming automatic carbon dioxide systems should be key locked and under strict administrative control. Automatic carbon dioxide extinguishing systems should not be disarmed unless controls as described in Position C.2.c. are provided.	Comply. Byron has an evacuation time with alarm on CO_2 systems. Local disarming will be electrically supervised and controlled by Operating. Disarming the system will alarm in the control room. Normally open valves will be verified every 92 days for position. See Table 3-1 for delineation of conformance with NFPA 12.

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Particular consideration should also be given to:	
(1) Minimum required CO_2 concentration, distribution, soak time, and ventilation control;	Concentration and hold times are verified by a vendor test during the construction phase. Ventilation is controlled by fire dampers with electrothermal links.
(2) Anoxia and toxicity of CO_2;	In addition to a pre-discharge alarm for personnel protection, an odorizer has been added to the CO_2 systems, which adds a wintergreen odor to the CO_2.
(3) Possibility of secondary thermal shock (cooling) damage;	
(4) Conflicting requirements for venting during CO_2 injection to prevent overpressurization versus sealing to prevent loss of agent; and	
(5) Location and selection of the activating detectors.	
f. Portable Extinguishers	
Fire extinguishers should be provided in areas that contain, or could present a fire exposure hazard to, safety-related equipment in accordance with guidelines of NFPA 10, "Portable Fire Extinguishers, Installation, Maintenance and Use." Dry chemical extinguishers should be installed with due consideration given to possible adverse effects on safety-related equipment installed in the area.	See Table 3-1 for delineation of conformance with NFPA 10.

3.7 GUIDELINES FOR SPECIFIC PLANT AREAS

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a. Primary and Secondary Containment	
(1) Normal Operation - Fire protection requirements for the primary and secondary containment areas should be provided for hazards identified by the fire hazards analysis.	Byron complies except as identified below.
Examples of such hazards include lubricating oil or hydraulic fluid system for the primary coolant pumps, cable tray arrangements and cable penetrations, and charcoal filters. Because of the general inaccessibility of primary containment during normal plant operation, protection should be provided by automatic fixed systems. The effects of postulated fires within the primary containment should be evaluated to ensure that the integrity of the primary coolant system and the containment is not jeopardized assuming no action is taken to fight the fire.	Fixed automatic suppression is not provided. Hose stations and portable extinguishers are available throughout the containment. Ionization (or photoelectric) detectors provide local coverage over cable penetrations. Heat detectors are provided over the reactor coolant pumps. The charcoal filter units within containment are provided with manual deluge systems. Temperature switches provide detection alarms to the control room for the charcoal units. Note: The charcoal is removed and deluge piping isolated
(a) Operation of the fire protection systems should not compromise the integrity of the containment or other safety-related systems. Fire protection activities in the containment areas should function in conjunction with total containment requirements such as ventilation and control of contaminated liquid and gaseous release.	Comply. Manual hose stations are relied upon for primary suppression inside the containment. Safety-related equipment inside the containment is qualified for a post-LOCA environment, including water spray. Firefighting activities are thus not expected to adversely affect safe shutdown components or the containment integrity.

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	(b) Inside noninerted containment one of the fire protection means stated in Positions C.5.b.1 and C.5.b.2 or the following fire protection means should be provided: separation of cables and equipment and associated nonsafety circuits of redundant trains by a noncombustible radiant energy shield having a minimum fire rating of one-half hour.	Division 11 and 12 cable come in close proximity. Descriptions of such occurrences and justification are provided in Appendix A5.7.
	(c) In primary containment, fire detection systems should be provided for each fire hazard. The type of detection used and the location of the detectors should be the most suitable for the particular type of fire hazard identified by the fire hazard analysis. A general area fire detection capability should be provided in the primary containment as backup for the above described hazard detection. To accomplish this, suitable smoke or heat detectors compatible with the radiation environment should be installed.	Fire detection systems are provided over reactor coolant pumps, electrical penetrations, and in the charcoal absorber banks. A general area fire detection system is not employed in the containment at Byron. Note: The Charcoal is removed and deluge pipe isolated, but the fire detection system remains functional
	(d) Standpipe and hose stations should be inside PWR containments and BWR containments that are not inerted. Standpipe and hose stations inside containment may be connected to a high quality water supply of	Comply. Standpipes and hose stations are provided inside the containment. The normal fire protection system water supply is used. The containment penetrations comply with the stated requirements.

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	sufficient quantity and pressure other than the fire main loop if plant-specific features prevent extending the fire main supply inside containment. For BWR drywells, standpipe and hose stations should be placed outside the drywell with adequate lengths of hose, no longer than 100 feet, to reach any location inside the drywell with an effective hose stream. The containment penetration of the standpipe system should meet the isolation requirements of General Design Criterion 56 and should be seismic Category I and Quality Group B.	
(e)	The reactor coolant pumps should be equipped with an oil collection system if the containment is not inerted during normal operation. The oil collection system should be so designed, engineered, and installed that failure will not lead to fire during normal or design basis accident conditions and that there is reasonable assurance that the system will withstand the safe shutdown earthquake. Such collection systems should be capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil	Comply. Refer to Section III.O of Appendix A5.7.

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	systems. Leakage should be collected and drained to a vented closed container that can hold the entire lube oil system inventory. A flame arrester is required in the vent if the flash point characteristics of the oil present the hazard of fire flashback. Leakage points to be protected should include lift pump and piping overflow lines, lube oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines, and lube oil reservoirs where such features exist on the reactor coolant pumps. The drain line should be large enough to accommodate the largest potential oil leak.	
(f)	For secondary containment areas, cable fire hazards that could affect safety should be protected as described in Position C.5.e(2). The type of detection system for other fire hazards identified by the fire hazards analysis should be the most suitable for the particular type of fire hazard.	Byron does not have a secondary containment area.
(2)	Refueling and Maintenance - Refueling and maintenance operations in containment may introduce additional hazards such as contamination control materials, decontamination supplies, wood planking, temporary wiring, welding, and flame cutting (with portable compressed-gas fuel supply).	Comply. Administrative procedures ensure adequate fire protection for transient fire loads.

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Possible fires would not necessarily be in the vicinity of fixed detection and suppression systems. Management procedures and controls necessary to ensure adequate fire protection for transient fire loads are discussed in Position C.1.	
Adequate self-contained breathing apparatus should be provided near the containment entrances for firefighting and damage control personnel. These units should be independent of any breathing apparatus or air supply systems provided for general plant activities and should be clearly marked as emergency equipment.	Two self-contained breathing units are provided at each entrance to the containment and at selected locations in the containment. These air packs will provide the necessary air for firefighting and damage control personnel. These units are independent from the station's supplied air system.
b. Control Room Complex	
The control room complex (including galleys, office spaces, etc.) should be protected against disabling fire damage and should be separated from other areas of the plant by floors, walls, and roof having minimum fire resistance ratings of 3 hours. Peripheral rooms in the control room complex should have automatic water suppression and should be separated from the control room by noncombustible construction with a fire resistance rating of 1 hour. Ventilation system openings between the control room and peripheral rooms should have automatic smoke dampers that close on operation of the fire detection or suppression system. If a halon flooding system is used for fire suppression, these dampers	The walls, floor, and roof are 3 hour fire barriers as shown in Fire Protection Report Figures 2.3-7 and 2.3-8 Sheets 1 and 3. Neither automatic fixed suppression systems nor smoke dampers are provided for peripheral rooms (i.e., offices) in the control room complex. For details see FSAR Subsections 6.4.2.3, 6.4.2.4, and Fire Protection Report Subsection 2.3.2.1. Control room fire dampers are held by thermal links not hooked to the detectors. Portable fire extinguishers in the control room will carry either a 3A-80 B:C or a 10 B:C rating. A hose station will be available near the entrance to the control room.

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	should be strong enough to support the pressure rise accompanying halon discharge and seal tightly against infiltration of halon into the control room. Carbon dioxide flooding systems are not acceptable for these areas.	
	Manual firefighting capability should be provided for both:	The approximate locations of extinguishers and hoses are shown on Fire Protection Report Figures 2.3-8 Sheets 1 and 3.
	(1) Fire originating within a cabinet, console, or connecting cables; and	
	(2) Exposure fires involving combustibles in the general room area.	
	Portable Class A and Class C fire extinguishers should be located in the control room. A hose station should be installed immediately outside the control room.	
	Nozzles that are compatible with the hazards and equipment in the control room should be provided for the manual hose station. The nozzles chosen should satisfy actual fire-fighting needs, satisfy electrical safety, and minimize physical damage to electrical equipment from hose stream impingement.	Comply.
	Smoke detectors should be provided in the control room, cabinets, and consoles. If redundant safe shutdown equipment is located in the same control room cabinet or console, additional fire protection measures should be provided. Alarm and local	Do not comply fully. Smoke detectors are installed in the vents of the cabinets. Detectors are installed at the ceiling. Additional protection is not provided. Fire Hazards panel provides an additional location for indication where separation was not met. Ceiling detectors alarm on

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	indication should be provided in the control room.	1PM09J, and the duct detectors alarm on OPM02J and the SER. Additionally, fire protection features are not provided for panels containing redundant safe shutdown equipment; however, this equipment is addressed in Section 2.4.
	Breathing apparatus for control room operators should be readily available.	Comply. S.C.B.A. is provided for the control room emergency personnel. Seven units plus two extra units for single failure criteria will be provided. For details see FSAR Subsection 6.4.1.f.
	The outside air intake(s) for the control room ventilation system should be provided with smoke detection capability to alarm in the control room to enable manual isolation of the control room ventilation system and thus prevent smoke from entering the control room.	Comply in terms of providing ionization (or photoelectric) detectors at outside air intakes, as well as isolating the intakes on ionization detection with provision to use alternate intakes for makeup air. In addition, all the air is passed through recirculation charcoal filters. The detectors alarm at OPM02J and the SER. The manual damper controls are on OPM02J. For details see FSAR Subsections 9.4.1.2b and 9.4.1.1.1e, and 6.4.1h.
	Venting of smoke produced by fire in the control room by means of the normal ventilation system is acceptable; however, provision should be made to permit isolation of the recirculating portion of the normal ventilation system. Manually operated venting of the control room should be available to the operators.	Comply. The manual controls for air intake are on OPM02J. For details see FSAR Subsection 9.4.1.3d and Fire Protection Report Subsection 2.3.2.1.

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All cables that enter the control room should terminate in the control room. That is, no cabling should be routed through the control room from one area to another. Cables in underfloor and ceiling spaces should meet the separation criteria necessary for fire protection.	Comply. All cables that enter the control room terminate in the control room. The ESF Division 11 cables enter from the ceiling and ESF Division 12 cables enter from the floor. Cable separation is defined in IEEE Standard 384-1974 and NRC Regulatory Guide 1.75.
Air-handling functions should be ducted separately from cable runs in such spaces; i.e., if cables are routed in underfloor or ceiling spaces, these spaces should not be used as air plenums for ventilation of the control room. Fully enclosed electrical raceways located in such underfloor and ceiling spaces, if over 1 square foot in cross-sectional area, should have automatic fire suppression inside. Area automatic fire suppression should be provided for underfloor and ceiling spaces if used for cable runs unless all cable is run in 4-inch or smaller steel conduit or the cables are in fully enclosed raceways internally protected by automatic fire suppression.	Comply, except as explained below. Ceiling and floor are not used as a plenum. Ducts are not used for cable runs. There are no electrical cable trays located under floor and ceiling spaces. This is currently also true for the raised floor in the Byron computer room, which is part of the control room complex. There are some conduits above the dropped ceiling. Upper cable spreading room has automatic halon and lower cable spreading room has automatic CO_2. Upper cable spreading room has a manual CO_2 system as a backup.
There should be no carpeting in the control room.	Carpeting in the main control room has a Class 1 rating.
c. Cable Spreading Room	
The primary fire suppression in the cable spreading room should be an automatic water system such as closed-head sprinklers, open-head deluge system, or open directional water spray system. Deluge and open spray systems should have provisions for manual operation at a	Comply, except as explained below: The Byron design includes several cable spreading rooms at elevation 439'-0" and 463'-4-1/2". The rooms are designed such that redundant safe shutdown cabling is routed through separate rooms (except as noted in Section 2.4.2) and isolated by 3-hour fire barriers. The upper cable spreading rooms are protected

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remote station; however, there should be provisions to preclude inadvertent operation. Location of sprinkler heads or spray nozzles should consider cable tray arrangements and possible transient combustibles to ensure adequate water coverage for areas that could present exposure hazards to the cable system. Cables should be designed to allow wetting down with water supplied by the fire suppression system without electrical faulting.	by an automatic Halon 1301 system with a manual CO_2 backup system. Manual hose stations and portable extinguishers provide additional backup. The lower cable spreading areas are protected by an automatic CO_2 System. Backup is provided by manual hose stations and portable extinguishers. The Halon and CO_2 systems as installed at Byron meet the requirements of the governing NFPA codes 12 and 12A.
Open-head deluge and open directional spray system should be zoned. The use of foam is acceptable. Cable spreading rooms should have: (1) At least two remote and separate entrances for access by fire brigade personnel;	Cable spreading rooms 3.3B-1 and 3.3B-2 have only one access door. The BTP position is that an automatic water suppression system should be installed in the cable spreading rooms. The Byron system provides adequate fire protection in the cable spreading rooms without an automatic water system. Hose stations are available for use in the cable spreading rooms if required.
(2) An aisle separation between tray stacks at least 3 feet wide and 8 feet high; (3) Hose stations and portable extinguishers installed immediately outside the room; (4) Area smoke detection; and (5) Continuous line-type heat detectors for cable trays inside the cable spreading room. Drains to remove firefighting water should be provided. When gas systems are installed,	An automatic water suppression system was not installed in the cable rooms because of concerns about the probability and effects of inadvertent actuations. The thermal elements in the Fenwall rate compensated heat detectors are very similar to the thermal elements in the automatic water suppression systems. Since a cable fire would generate large quantities of smoke in a very early stage of a fire, the ionization (or photoelectric) detectors would be very effective in detecting small cable fires and annunciating in the Control Room. If the fire was of such magnitude that the thermal detectors sensed the fire, the actuation of the fire suppression system would then be initiated. The

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drains should have adequate seals or the gas extinguishing systems should be sized to compensate for losses through the drains. A separate cable spreading room should be provided for each redundant division. Cable spreading rooms should not be shared between reactors. Each cable spreading room should be separated from the others and from other areas of the plant by barriers with a minimum fire rating of 3 hours. If this is not possible, a dedicated system should be provided. The ventilation system to each cable spreading room should be designed to isolate the area upon actuation of any gas extinguishing system in the area. Separate manually actuated smoke venting that is operable from outside the room should be provided for the cable spreading room.	detector circuits are designed that if either of the redundant detection zones failed, the remaining detection zone could then solely initiate the automatic suppression system. For this application the cross-zoning of rate compensated heat detectors with ionization (or photoelectric) detectors would not reduce the responsiveness of a fire detection system compared to a closed head sprinkler system. A deluge system which indiscriminately sprays a large area will result in a significant effort to restore the cable spreading room to normal conditions and could potentially cause other problems if water leaks into adjacent areas such as the control room which is below the upper cable spreading room, or the ESF switchgear room which is below the lower cable spreading room. Inadvertent actuation of a Halon or CO_2 system would have no adverse effects. The probability of a fire in a cable spreading room is quite low. The main combustible material is cable insulation. The cables are covered with EPR or EPDM insulation with hypalon jackets. The cables have passed IEEE 383-1974 flame tests. In the event of a fire in a cable spreading room, spread of the fire would be prevented by 3-hour fire barriers. Disabling of one full cable spreading room would not prevent safe shutdown of the plant due to the redundancy and separation criteria used in design. The fire barrier construction ensures a long residence time in the event of a Halon or CO_2 discharge. In the unlikely event that water is required to quench hot areas after a fire, manual application of water using the nearby hose stations will

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	provide localized control without the effects to the general area which could result from actuation of a deluge system. As shown in the Byron Fire Protection Report, hose stations are located in each compartment of the upper and lower cable spreading areas. Hose stations are located adjacent to each doorway so that application of water is available. In summary, the Byron cable spreading area fire protection system design ensures that fire will not compromise plant safety. Use of automatic halon or CO_2 systems instead of water deluge reduces the probability of a plant shutdown or equipment damage in the event of a spurious actuation. Additionally, the area is well supplied with manual hose stations and portable hand extinguishers.
d. Plant Computer Rooms Computer rooms for computers performing safety-related functions that are not part of the control room complex should be separated from other areas of the plant by barriers having a minimum fire resistance rating of 3 hours and should be protected by automatic detection and fixed automatic suppression. Computers that are part of the control room complex but not in the control room should be separated and protected as described in Position C.7.b. Computer cabinets located in the control room should be protected as other control room equipment and cable runs therein. Non-safety-related computers outside the control room complex should be separated	The process computer at Byron is non-safety-related and is part of the control room complex. Automatic fixed suppression is not provided. Fire protection features which are provided are described in Subsection 2.3.4 of this report.

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from safety-related areas by fire barriers with a minimum rating of 3 hours and should be protected as needed to prevent fire and smoke damage to safety-related equipment.	
e. Switchgear Rooms	
Switchgear rooms containing safety-related equipment should be separated from the remainder of the plant by barriers with a minimum fire rating of 3 hours. Redundant switchgear safety divisions should be separated from each other by barriers with a 3-hour fire rating. Automatic fire detectors should alarm and annunciate in the control room and alarm locally. Cables entering the switchgear room that do not terminate or perform a function there should be kept at a minimum to minimize the combustible loading. These rooms should not be used for any other purpose. Fire hose stations and portable fire extinguishers should be readily available outside the area.	Comply, except as noted below: Alarms do not annunciate locally. Doors in the L-line on El. 426'-0" that separate the Switchgear Rooms and adjacent turbine building fire zones are non-labeled fire doors. The subject doors are addressed in Generic Letter 86-10 Evaluation EC-EVAL 392628; this evaluation determined that the doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled fire door. Refer to EC 391812 and EC-EVAL 392627.
Equipment should be located to facilitate access for manual firefighting. Drains should be provided to prevent water accumulation from damaging safety-related equipment (see NFPA 92M, "Waterproofing and Draining of Floors"). Remote manually actuated ventilation should be provided for venting smoke when manual fire suppression effort is needed (see Position C.5.f).	See Table 3-1 for discussion of conformance with NFPA 92M.

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f. Remote Safety-Related Panels	
Redundant safety-related panels remote from the control room complex should be separated from each other by barriers having a minimum fire rating of 3 hours. Panels providing remote shutdown capability should be separated from the control room complex by barriers having a minimum fire rating of 3 hours. Panels providing remote shutdown capability should be electrically isolated from the control room complex so that a fire in either area will not affect shutdown capability from the other area. The general area housing remote safety-related panels should be provided with automatic fire detectors that alarm locally and alarm and annunciate in the control room. Combustible materials should be controlled and limited to those required for operation. Portable extinguishers and manual hose stations should be readily available in the general area.	Comply, except as noted below: The remote shutdown panels can be electrically isolated from control room equipment by transfer switches located on the panels. For control room evacuation or damage, this isolates the remote shutdown panels from the control room, but also renders the control room panels inoperable. The remote shutdown panels are not separated from each other by 3-hour rated barriers. The automatic detectors provided for the remote shutdown control room do not alarm locally. Alternate shutdown is provided for a fire in the remote shutdown control room by operating equipment from the switchgear rooms and locally. This is covered by Byron abnormal operating procedures.
g. Safety-Related Battery Rooms	
Safety-related battery rooms should be protected against fires and explosions. Battery rooms should be separated from each other and other areas of the plant by barriers having a minimum fire rating of 3 hours inclusive of all penetrations and openings. DC switchgear and inverters should not be located in these battery rooms. Automatic fire detection should be provided to alarm and annunciate in the control room	Comply, with exception noted below: The safety-related batteries are located in the same room with their associated battery charger, inverter, and dc switchgear and distribution panels. The battery itself is located in a separate area of the room with its own ventilation system, separated from the associated electrical panels by a 3-hour rated fire barrier. Each battery and electrical equipment room is separated from its redundant

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and alarm locally. Ventilation systems in the battery rooms should be capable of maintaining the hydrogen concentration well below 2 vol-%. Loss of ventilation should be alarmed in the control room. Standpipe and hose and portable extinguishers should be readily available outside the room.	counterpart and other fire zones by 3-hour rated fire barriers. Detectors do not alarm locally.
h. Turbine Building	
The turbine building should be separated from adjacent structures containing safety-related equipment by a fire barrier with a minimum rating of 3 hours. The fire barriers should be designed so as to maintain structural integrity even in the event of a complete collapse of the turbine structure. Openings and penetrations in the fire barrier should be minimized and should not be located where the turbine oil system or generator hydrogen cooling system creates a direct fire exposure hazard to the barrier. Considering the severity of the fire hazards, defense in depth may dictate additional protection to ensure barrier integrity.	The Applicant complies with this position with two exceptions. The complete collapse of the turbine building structure is not a design basis event for the Byron plant. This building, although not a Category I structure, is designed for the SSE and other Category I loads. Fire protection features are adequate to prevent a fire of sufficient severity to threaten the integrity of the structure from developing. Additionally, four fire doors in the L-line wall that separate the turbine building on El. 401'-0" and adjacent DG Rooms and four fire doors in the L-line wall that separate the turbine building on El. 426'-0" and adjacent Switchgear Rooms are non-labeled fire doors. The subject doors are addressed in Generic Letter 86-10 Evaluation EC-EVAL 392627; this evaluation determined that the doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled fire door. Refer to EC 391812 and EC-EVAL 392627. Additionally, two fire doors that separate the turbine building and adjacent Fire Zone 11.5-0 are non-labeled fire doors. The subject doors are addressed in Generic Letter 86-10 Evaluation EC-EVAL393650; this evaluation determined that the doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled fire door.

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
i. Diesel Generator Areas	
Diesel generators should be separated from each other and from other areas of the plant by fire barriers having a minimum fire resistance rating of 3 hours.	Comply, except as noted below: UV detectors do not alarm locally. Thermal detectors do not alarm locally prior to CO_2 discharge. Doors in the L-line on El. 401'-0" that separate the dg Rooms and adjacent turbine building fire zones are non-labeled fire doors. The subject doors are addressed in Generic Letter 86-10 Evaluation EC-EVAL 392627; this evaluation determined that the doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled fire door. Refer to EC 391812 and EC-EVAL 292627. Some diesel oil piping associated with one ESF train is routed through redundant train's room. Calculations have been performed to demonstrate that even if this DO piping is unprotected, a fire in this zone does not affect the operability of the redundant diesel generator. Therefore, a fire in this zone would not affect the ability to shut down the plant safely (reference Calculations MAD 90-0079 and 3C8-0890-001). However, fire wrap was added as a conservative measure on most DO lines associated with the ESF train credited for safe shutdown.

SECTION	NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
	Automatic fire suppression should be installed to combat any diesel generator or lubricating oil fires; such systems should be designed for operation when the diesel is running without affecting the diesel. Automatic fire detection should be provided to alarm and annunciate in the control room and alarm locally. Hose stations and portable extinguishers should be readily available outside the area. Drainage for firefighting water and means for local manual venting of smoke should be provided. Day tanks with total capacity up to 1100 gallons are permitted in the diesel generator area under the following conditions: (1) The day tank is located in a separate enclosure with a minimum fire resistance rating of 3 hours, including doors or penetrations. These enclosures should be capable of containing the entire contents of the day tanks and should be protected by an automatic fire suppression system, or (2) The day tank is located inside the diesel generator room in a diked enclosure that has sufficient capacity to hold 110% of the contents of the day tank or is drained to a safe location.	

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
j. Diesel Fuel Oil Storage Areas Diesel fuel oil tanks with a capacity greater than 1,100 gallons should not be located inside buildings containing safety-related equipment. If above-ground tanks are used, they should be located at least 50 feet from any building containing safety-related equipment or, if located within 50 feet, they should be housed in a separate building with construction having a minimum fire resistance rating of 3 hours. Potential oil spills should be confined or directed away from buildings containing safety-related equipment. Totally buried tanks are acceptable outside or under buildings (see NFPA 30, "Flammable and Combustible Liquids Code," for additional guidance). Above-ground tanks should be protected by an automatic fire suppression system.	Comply, except as noted below: Diesel fuel oil tanks are located within the auxiliary building. See Table 3-1 for delineation of conformance with NFPA 30. The outdoor above-ground diesel fuel oil storage tanks (located more than 50 feet away from any building containing safety-related equipment) are not protected by an automatic fire suppression system. Potential fuel oil spills are confined within a berm. Manual suppression capability from nearby hydrants will prevent the fire from spreading from the berm.
k. Safety-Related Pumps l. Pump houses and rooms housing redundant safety-related pump trains should be separated from each other and from other areas of the plant by fire barriers having at least 3-hour ratings. These rooms should be protected by automatic fire detection and suppression unless a fire hazards analysis can demonstrate that a fire will not endanger other safety-related equipment required for safe plant shutdown. Fire detection should alarm and annunciate in the control room and alarm locally. Hose	Comply, except as noted below: Most safety-related pumps are located in the auxiliary building. Most pumps are located in individual rooms separated from other plant areas by walls of substantial construction, but which generally do not carry fire ratings. Automatic fire detection is provided for all pumps, but automatic suppression is in general not provided. Refer to the applicable portions of Sections 2.3 and 2.4 of this Fire Protection Report for a description of individual pumps and the fire hazards and safe shutdown analyses. Automatic suppression is provided for the essential service water makeup pumps. Portable extinguishers are available as backup

SECTION	NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
	stations and portable extinguishers should be readily accessible.	Deviations from the 10 CFR 50 Appendix R criteria are listed in Appendix A5.7. Ionization detectors are provided which annunciate and alarm in the control room. Detectors do not alarm locally.
	Floor drains should be provided to prevent water accumulation from damaging safety-related equipment (see Position C.5.a.(14)). Provisions should be made for manual control of the ventilation system to facilitate smoke removal if required for manual firefighting operation (see Position C.5.f).	
l.	New Fuel Area	
	Hand portable extinguishers should be located within this area. Also, hose stations should be located outside but within hose reach of this area. Automatic fire detection should alarm and annunciate in the control room and alarm locally. Combustibles should be limited to a minimum in the new fuel area. The storage area should be provided with a drainage system to preclude accumulation of water. The storage configuration of new fuel should always be so maintained as to preclude criticality for any water density that might occur during fire water application.	Comply, except as noted below: Ionization (or photoelectric) detectors are provided which annunciate and alarm in the control room. Detectors do not alarm locally.

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
m. Spent Fuel Pool Area	
Protection for the spent fuel pool area should be provided by local hose stations and portable extinguishers. Automatic fire detection should be provided to alarm and annunciate in the control room and to alarm locally.	Comply, except as noted below: Ionization (or photoelectric) detectors are provided which annunciate and alarm in the control room. Detectors do not alarm locally.
n. Radwaste and Decontamination Areas	
Fire barriers, automatic fire suppression and detection, and ventilation controls should be provided.	Comply, except as noted below: Radwaste areas within the auxiliary building are separated from other auxiliary building areas by non-fire-rated walls. The radwaste areas within the service building are provided with 3-hour rated barriers between the adjacent turbine building and between other service building areas. Most radwaste areas are not provided with automatic fire suppression systems. Automatic suppression with only partial coverage is provided for radwaste areas within the service building. Refer to Subsection 2.3.14 for detailed description of the various radwaste areas of the plant. Decontamination areas at Byron are not treated as separate fire areas, and hence do not have fire barriers or automatic suppression systems. Four such areas are identified on plant drawings. A decontamination skid is shown on the ground floor of the service building. It is part of fire zone 14.6-0. A decontamination station is shown in the radwaste tunnel on Elevation 383 feet 0 inch near column-row 26/N. It is part of fire zone 14.1-0. In the fuel handling building, a decontamination area is shown on Elevation 401 feet 0 inch near column-row 17/Z. It is a pit for washing down spent fuel

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
	casks and has neither rated fire barriers nor automatic suppression. It is part of fire zone 12.1-0 (refer to Subsection 2.3.12). Finally, a decontamination/change area and a decontamination pad are shown on Elevation 426 feet 0 inch in the general area of the auxiliary building between column-rows 15-21/U-V. These rooms are separated from the rest of the auxiliary building by non-fire-rated walls, and they do not have automatic suppression. Refer to Subsection 2.3.11 for a detailed description of these areas.
o. Safety-Related Water Tanks	
Storage tanks that supply water for safe shutdown should be protected from the effects of an exposure fire. Combustible materials should not be stored next to outdoor tanks.	Comply.
p. Records Storage Areas	
Records storage areas should be so located and protected that a fire in these areas does not expose safety-related systems or equipment (see Regulatory Guide 1.88, "Collection, Storage, and Maintenance of Nuclear Power Quality Assurance Records").	Comply. The record storage areas are located such that there is no exposure to safety-related systems. The main record storage facility is located in the service building. For compliance with Regulatory Guide 1.88, see B/B-FSAR Page A1.88-1.
q. Cooling Towers	Comply.
Cooling towers should be of noncombustible construction or so located and protected that a fire will not adversely affect any safety-related systems or equipment. Cooling towers should be of noncombustible construction when the basins	

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
are used for the ultimate heat sink or for the fire protection water supply.	
r. Miscellaneous Areas	
Miscellaneous areas such as shops, warehouses, auxiliary boiler rooms, fuel oil tanks, and flammable and combustible liquid storage tanks should be so located and protected that a fire or effects of a fire, including smoke, will not adversely affect any safety-related systems or equipment.	Comply.

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
3.8 SPECIAL PROTECTION GUIDELINES	
a. Storage of Acetylene-Oxygen Fuel Gases	
Gas cylinder storage location should not be in areas that contain or expose safety-related equipment or the fire protection systems that serve those safety-related areas. A permit system should be required to use this equipment in safety-related areas of the plant (also see Position C.2).	Comply. Administrative procedures cover the permit needed to use acetylene-oxygen fuel gases.
b. Storage Areas for Ion Exchange Resins	
Unused ion exchange resins should not be stored in areas that contain or expose safety-related equipment.	Comply.
c. Hazardous Chemicals	
Hazardous chemicals should not be stored in areas that contain or expose safety-related equipment.	Hazardous chemicals such as caustic soda, sulfuric acid, etc., are kept in proper containers in accordance with fire protection recommendations. Ventilation and flood protection are provided. Storage areas have curbs, good drainage, and sump capability.
d. Materials Containing Radioactivity	
Materials that collect and contain radioactivity such as spent ion exchange resins, charcoal filters, and HEPA filters should be stored in closed metal tank or containers that are located in areas free from ignition sources or combustibles. These materials should be protected from exposure to fires in adjacent areas as well. Consideration	Comply.

SECTION NRC POSITION	IMPLEMENTATION OR JUSTIFICATION FOR NONCOMPLIANCE
3.8 SPECIAL PROTECTION GUIDELINES	
should be given to requirements for removal of decay heat from entrained radioactive materials.	

NATIONAL FIRE PROTECTION ASSOCIATION

FIRE CODE REVIEW

BYRON NUCLEAR STATION
UNIT NO. 1 AND COMMON AREAS WITH UNIT NO. 2
DEVIATION REPORT

INTRODUCTION

A National Fire Protection Association (NFPA) fire code review was conducted at the Byron Station. A fire code review was performed for Byron Units 1 and 2. This review included the applicable referenced NFPA fire codes contained within the branch technical position CMEB 9.5-1 entitled, "Fire Protection Program Requirements." The code review consisted of a review and an evaluation of the fire protection design, installation, original acceptance testing, and periodic surveillance and maintenance as recommended by the respective NFPA standards. In addition, the Byron Station has been reviewed against the most current edition of the National Fire Protection Association codes as contained in the 1983 and 1984 publication of the fire codes. Commonwealth Edison recognizes that the National Fire Protection Association codes are consensus documents which by committee attempt to reflect the state-of-the-art in fire protection and loss prevention practices, and provide the guidance and criteria intended to be applicable to all industry. As fire protection engineering, and the application of fire protection engineering, is not an exact science, good engineering judgment must be relied on in utilizing and applying the NFPA standards and criteria contained within the individual sections of the standards.

Within the fire protection industry, the NFPA fire codes and the application of the guidance provided is subjective at best and regularly subject to change. Therefore, Commonwealth Edison maintains that using the NFPA codes and criteria provided as guidance, applying good engineering judgment, provides the high level of reliability and availability of fire protection program which NFPA is attempting to achieve through providing such guidance. Furthermore, it was determined that the review of the Byron Station against the most current edition of the fire codes was prudent as the codes generally attempt to reflect the state-of-the-art in fire protection and loss prevention practices. A sample review of the deviations identified in the review of the 1983/1984 fire codes was performed against the earlier editions of the codes that were in place during the original design of the Byron Station. It was determined that the earlier codes had no significant impact on the deviations identified.

A list of the National Fire Protection Association fire codes reviewed for this submittal follows. The date of the current edition of each code used for this review and the date of the edition for each code which applied during the original design at the Byron Station are listed. The NFPA code deviation table is an attempt to address the major deviation noted from the wording of the respective NFPA codes. They are listed in certain instances by fire zone, where applicable.

A majority of the deviations identified address items not in compliance with the wording of the standard; however, they are not considered applicable or necessary and so are designated as being acceptable. This exemplifies that the application of such standards is again subjective and requires engineering judgment. Minor deviations identified during the performance of the review were corrected at the time. In Table 3-1 a disposition of the deviation has been provided for areas containing equipment related to

the safe shutdown of the plant. Deviations which were deemed to affect safe shutdown equipment of the plant have also been dispositioned. The review also included common fire protection areas such as standpipes and hose, fire pumps, underground fire mains and hydrants, and the private fire brigade.

Inspection, testing and maintenance surveillance/predefine activities for the fire protection systems are controlled by the Company's Predefine Program, as described by administrative procedure. This program utilizes an electronic predefine database designed to prompt the scheduling and performance of all predefine activities entered into the system.

A 25% extension of the frequency interval specified for the surveillance/predefine activity is permitted to facilitate scheduling of the activity and to provide consideration for unit operating conditions that may not be suitable for conducting the surveillance maintenance activities). This 25% extension does not significantly degrade the reliability that results from performing the surveillance/predefine activity at its specified frequency. This is based on the recognition that the most probable result of any particular surveillance/predefine activity being performed is the verification of conformance with the requirements for the surveillance/predefine activity.

The 25% surveillance/predefine activity frequency interval extension is not intended to be used repeatedly merely as an operational convenience to extend surveillance/predefine activity frequency intervals.

In conclusion, as originally stated, the NFPA fire codes should be utilized as guidance and cannot be applied effectively without utilizing the necessary engineering judgment.

NFPA Standard No. 4, "Organization for Fire Services," and NFPA Standard No. 4A, "Organization of a Fire Department," deal primarily with municipal or governmental organizations. These NFPA standards do not directly apply or should not be applied in the strict sense to the Byron fire protection program. NFPA Standard No. 6, "Organization of Industrial Fire Loss Prevention," and NFPA Standard No. 7, "Management Control of Fire Emergencies," and NFPA Standard No. 8, "Management Responsibilities for Effects of Fire on Operations" contain information which can serve as a useful tool in the development of a fire protection program. Based on a review of the Byron Station procedures addressing this area, the guidance provided in these documents has been adequately addressed, where applicable, and in some instances exceeds the scope of the standards. The guidance provided in the above referenced standards, which are no longer published, has been used in the development and implementation of the fire protection program at the Byron Station. Therefore, deviation reports have not been provided for these standards.

In dealing with NFPA 70, "National Electrical Code," Commonwealth Edison adequately addresses the national electric code in their design and installation. As referenced in the BTP Section 450-C, the electric code refers to oil-filled transformers installed inside the buildings. No deviation report was developed for the code.

All internal transformers at the Byron Station are of the dry type. NFPA Standard No. 92M, "Water-Proofing and Draining of Floors," is no longer in existence in the current fire codes. The purpose of the standard, as originally issued, is adequately addressed in the applicable sections of the NFPA codes reviewed. Therefore, no deviation report was developed for this code.

NFPA CODE NO.	TITLE	DATE OF ISSUE FOR CODE 1977 CODES	DATE OF ISSUE FOR CODE 1984 CODES
4	Organization for Fire Services	1971	No Listing
4A	Organization of a Fire Department	1971	No Listing
6	Organization of Industrial Fire Loss Prevention	1974	No Listing
7	Management Control of Fire Emergencies	1974	No Listing
8	Management Responsibilities for Effects of Fire on Operations	1974	No Listing
10	Portable Fire Extinguisher, Installation Maintenance and Use	1975	1981
11	Foam Extinguishing Systems	1976	1983
11A	High Foam Extinguishing Systems (Does not apply)	1976	1983
11B	Synthetic Foam Extinguishing Systems (Does not apply)	1974	No Listing
12	CO_2 Systems	*	1980
12A	Halon 1301 Systems	1973	1980
12B	Halon 1211 Systems (Does not apply)	1973	1980
13	Standards for the Installation of Sprinkler Systems	1976	1983
14	Standpipe and Hose Systems	1976	1983
15	Standards for Water Spray Fixed Systems	1973	1982
16	Foam - Water Sprinkler Systems and Foam - Water Spray Systems	1974	1980
20	Standard for the Installation of Centrifugal Fire Pumps	1976	1983
24	Standard for Outside Protection	**	1984
26	Supervision of Valves	1975	1983
27	Private Fire Brigades	1975	No Listing
30	Flammable and Combustible Liquids Code	1976	1981
37	Stationary Combustion Engines and Gas Turbine	1975	1979
50A	Gaseous Hydrogen Systems	1973	1984
70	National Electrical Code	1977	1984
72D	Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems	1975	1979
72E	Automatic Fire Detectors	1974	1982
80	Fire Doors and Windows	1975	1983
90A	Air Conditioning and Ventilation Systems	1976	1981
92M	Waterproofing and Draining of Floors (Does not apply)	1972	No Listing
204	Smoke and Heat Venting 84 code = 204 M	1968	1982

* NFPA Standard and No. 12 - 1977 (NFPA Fire Codes - 1978 Edition)
**NFPA Standard and No. 24 - 1981 (NFPA Fire Codes - 1982 Edition)

TABLE 3-1
NFPA CODE DEVIATION REPORT

NFPA 10, 1981 Edition - Portable Extinguishers

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
1.1-1(S)*	10-1981-1-6.12	1	Verify that dry chemical extinguishers installed in the containment building will not be exposed to ambient temperatures exceeding 120ºF. Otherwise, they must be designed for the expected temperature.	Leave extinguishers as is.	Ambient temperatures will not exceed 122°F maximum according to the Technical Specifications. Since normal ambient temperatures will be less than 120°F, the temperature exposure to dry chemical extinguishers is minimal.
A11(S&NS)	10-1981-4-4.1.1	2	Verify that all stored pressure extinguishers will annually be discharged and disassembled.	-	addresses loaded type water extinguishers. Byron does not use this type of extinguisher but uses stored pressure type of water extinguishers. The inspection procedures for these extinguishers have been reviewed by M&MPC and found acceptable

* Note: An S following the fire zone number indicates that equipment required for safe shutdown of the plant is present. NS indicates that no safe shutdown equipment is present.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 10, 1981 Edition - Portable Extinguishers

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
1-1, 2 (S)*	10-1981-4-3.1	-	Extinguishers shall be inspected monthly.	Extinguishers are inspected quarterly, except for fire extinguishers located inside the containment building during at-power conditions.	Performance based historical reviews of previously performed monthly inspections have demonstrated few inspection failures, sufficient to justify extending the inspections to a quarterly basis. This evaluation was conducted in accordance with the approved administrative procedure for "Performance Based Evaluation for Fire Protection". During at-power conditions, access to the containment building is controlled administratively to prevent unauthorized entry. There is very small risk that fire extinguishers located within the containment will be tampered with or removed during at-power conditions. An inspection of fire extinguishers is performed at the beginning of each plant refueling outage.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 10, 1981 Edition - Portable Extinguishers

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
1-1, 2 (S)*	10-1981-4-4.1	-	Extinguishers shall be subjected to maintenance not more than 1 year apart.	Comply, except for extinguishers located inside the containment building during at-power conditions.	During at-power conditions, access to the containment building is controlled administratively to prevent unauthorized entry. There is very small risk that fire extinguishers located within containment will be tampered with during at-power conditions. Maintenance or replacement of fire extinguishers inside the containment building is performed at the beginning of each plant refueling outage.
1-1, 2 (S)*	10-1981-4-4.3	-	Extinguishers shall have a tag or label securely attached.	Comply, except for fire extinguishers located inside the containment building.	Fire extinguishers located inside the containment building will not have an attached inspection / maintenance tag. Tags capable of being routinely signed and dated are not compatible with the plant requirement to prohibit potential debris that may clog the containment recirculation sump. The extinguisher inspection and maintenance data sheets from plant procedures provide retrievable records of the required inspections and maintenance and satisfy the intent of the code for the fire extinguishers located within the containment building.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 11, 1983 Edition - Foam Systems

18.20-0(NS) (Previous NFPA 11 review recommendations are deleted because the foam system previously protecting the outdoor fuel oil storage tank has been abandoned and is no longer used.)

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 12, 1980 Edition - Carbon Dioxide

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All CO2 Systems (S&NS	12-1980-1-10.3.2	1	Provide the hydrostatic test pressure used on the valves controlling the low pressure CO2 systems.	-	UL listing of test pressure satisfies NFPA 12..
LCSR Pneumatic timer testing	12-1980-1-11.2	2	Verify that all carbon dioxide systems will be thoroughly inspected and tested at least annually.	-	System demonstration procedure was reviewed; will be 18 month surveillance. This frequency is considered to be satisfactory.
8.3-1 18.11-0	12-1980-1-9.6.1	5	Verify that the CO2 storage tanks (10 ton and 2 ton) were tested and marked in accordance with specifications of ASME for unfired pressure vessels.	-	Both the 2 ton and 10 ton tanks were certified and stamped in accordance with ASME VIII.
9.1-1, 9.2-1, 9.3 1, 9.4-1, 11.4 A 1(S	12-1980-1-8.3.8	7	Fuel supply should be automatically shut off to the diesel generators and diesel driven auxiliary feedwater pump in case of fire in those areas.	-	Diesel engine is required for safe shutdown and fuel will not be interlocked to shut off. The room is protected by automatic CO2 in the event of a fire.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 12, 1980 Edition - Carbon Dioxide

3.3 A-1 3.3 A-2 3.3 B-1 3.3 B-2 3.3 C-1 3.3 C-2 3.3 D-1 3.3 D-2	NFPA 12 paragraph 2-4.1.	-	-	-	System is administratively operated to perform an additional manual actuation after 10 minutes, to provide a hold time equal to 20 minutes (M&MPCS letter dated Oct. 3, 1984).
All carbon dioxide systems with the exception of LCSR pneumatic timer testing	12-1980-1-11.2	-	Verify that all carbon dioxide systems will be thoroughly inspected and tested at least annually.	Justification for deviation is documented in Performance Based Evaluation 389723	All carbon dioxide systems with the exception of the fire zone 18.11-0, 18.11-1, and 18.11-2 will be inspected and tested every 3 years.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 12A, 1980 Edition - Halon 1301 Fire Extinguishing Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
13.0(NS)	NFPA 12A-1980 1-7.4	6	The completed system shall be tested to meet the approval of the authority having jurisdiction.	To assure that the Freon substitute test gas provided a meaningful test, list the weight(s) of the Freon for the 1/28/81 test.	The system was tested using 2 test cylinders containing 82 pounds of Halon 122 each.
13.0(NS)	NFPA 12A-1980	8	Plans and specifications shall include all pertinent items necessary for the proper design.	The Viking 1/28/81 test report refers to 1-100 lb reserve halon cylinder; however, there is no reserve backup for this system	In a letter from Viking dated 12/11/84, Attachment A states that this system does not have a connected reserve.
All Halon Systems	NFPA 12 A – 1980 1-11.1.1		At least annually, all systems shall be thoroughly inspected and tested for proper operation by competent personnel.	Justification for this deviation is documented in Performance Based Evaluation 389723 and 623789	Halon system are inspected and tested every 3 years.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 13 - Sprinkler Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All zones sprinklered All System	13-1983 2-9.2.2	1	Gauges on system risers shall have a maximum limit not less than twice the normal working pressure.	Gauges on riser are 300 psi.	Gauges with pressure of 300 psi are considered more than adequate on the systems in the plant.
Stairwell sprinklers in 3 fire (S) zones Aux. Bldg. P-18	13-1983 1-8.1.1	2	Only approved devices should be installed on sprinkler systems (shutoff valve).	"N" stamped and approved (UL) may not be available. The valve fits the descrip¬tion in NFPA 13 other than it closes much faster than the required 5 seconds.	Present valve arrangement does not compromise system integrity. U.L. listed valves will not be installed in lieu of "N" stamp valves.
8.3-2(NS) 8.5-2(NS)	13-1989 4-4.18	3.1	Baffles shall be installed whenever sprinklers are less than 6 ft. apart to prevent the sprinkler opening first from wetting adjoining sprinklers.	Spacing criteria is not met on certain hatchway sprinklers. Ref. Drawings M-603, Sht17, 24, 25, 26, 27, 28, 29, 38, 39,40,41, 42, 43, 44, 45, 46, 47, 48	Sidewall sprinklers are shielded by structural steel from the upright sprinkler discharge.
8.6-0	13-1983 3-8.4	-	For sprinklers installed in pendant position below ceiling, return bend shall be used when the water supply is from a raw water source. When water supply is potable, return bends are not required.	Pendant style sprinklers for Unit 2 startup bldg. are locking return bends.	Resolved to the fact that the system is adequately flushed, main drain tests are performed quarterly (further flushing the system piping) and the water supply is strained through a screen prior to its introduction into the system.
All zones(S) sprinklered	13-1983 3-13.1.3	8	Sprinkler system fittings should be examined to determine if they are of the heavy pattern type due to pressure on systems exceeding 175 psi.	-	The design of the pipe and fittings has been verified to be adequate for the maximum operating pressure of the system.

Note: Some areas could not be visually inspected due to obstructions and measurements could not be obtained. These areas were reviewed against as-built drawings indicating piping dimensions and no deviations were observed in the sprinkler systems.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 13 - Sprinkler Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
10.2-1, 10.1-1, 10.2-2, 10.1-2	13-1983 4.3-1	8	Deflectors of sprinklers shall be located 1 in. to 10 in. (25mm to 243mm) below combustible ceilings or 1 in. to 12 in. (25mm to 305mm) below noncombustible ceilings. The operating elements of sprinklers shall be located below the ceiling.	-	Suppression systems will function as intended even though multiple sprinklers exceed the maximum allowable distance of 12 inches from the ceiling. As the systems are manually actuated and consist of open sprinklers without thermal elements, they do not rely on the collection of heat at the ceiling to activate the sprinklers. The presence of combustibles in the form of gaskets above the sprinklers will not contribute to fire sustainability or growth as the combustibles do not represent a significant fire hazard and are mainly contained within the ductwork. Reference EC/EVAL 381603 for details.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 13 - Sprinkler Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.10A-1, 18.10B-1, 18.10A-2, 18.10B-2	N/A		The deluge systems piping for Main Power Transformers 1E, 1W, 2E, and 2W are designed in accordance with applicable sections of NFPA 13-2013		The deluge systems piping for Main Power transformers are redesigned (Reference EC # 397983 and 397984). It is acceptable to design the new systems to the latest available code year (2013)
18.10C-1 18.10D-1	N/A		The deluge systems piping for Unit Auxiliary Transformers (UATs) 141-1 and 141-2 are designed in accordance with applicable sections of NFPA 13-2019.		The deluge system piping for UATs 141-1 and 141-2 are redesigned (Reference EC # 626215). It is acceptable to design the new systems to the latest available code year (2019).

Note: Some areas could not be visually inspected due to obstructions and measurements could not be obtained.
These areas were reviewed against as-built drawings indicating piping dimensions and no deviations were observed in the sprinkler systems.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 13A, 1981 Edition - Inspection, Testing, and Maintenance of Sprinkler System

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All Sprinklered Zones (S&NS)	13A-1981-3-5.1.1	1	A stock of 24 sprinklers should be maintained at all times including all temperature types that are utilized in the plant.	-	Actions are in place to maintain a spare stock of at least 24 sprinkler heads.
All Exterior Zones (S&NS)	13A-1981-2-7.3.1	4	Quarterly each post indicator valve should be given a "spring" or torsion test.	-	Quarterly the station verifies that the lock is on and annually opens and closes the valve. This is considered adequate .
All Exterior Zones	13A-1981-2-1.21		-	NFPA 13A specifies a monthly inspection to verify that hydrants are not obstructed and that they are accessible, visible, and with caps in place.	Yard hydrants are inspected annually to NFPA 25 inspection, test, and maintenance requirements.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 14, 1983 Edition - Standpipe and Hose

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All	14-1983-4-43.3	1	Each hose reel or hose rack throughout the station should be provided with a label affixed to include "Fire Hose for Use by Occupants" and operating instructions.	-	Fire hose will be utilized by trained fire brigade personnel only. Other than red color-coded piping, no further instructions will be provided.
All	14-1983-4-2.1	3	Verification should be made to assure that all existing angle valves on the standpipe systems are U.L. listed or F.M. approved.	Could not find listing on Anderson Greenwood Co. or Conval Valves. Other valves have no Mfg. NA. or Model No.	Existing valves do not compromise system integrity. ASME Section III valves are required and will remain in place, as these valves are considered of equal quality to a listed valve. Note: The majority of the Fire Protection System previously classified as Safety Category I, quality Group C has been reclassified as Safety Category II, Quality Group D (Ref. EC 626662); and remains classified as Seismic Category I. The use of ASME Section III valves to justify the use of non-listed valves remains valid; however, with reclassification of the piping, future valve replacements may require the use of listed valves if the replacements are performed with non-ASME section III valves.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 14, 1983 Edition - Standpipe and Hose

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All	14-1983-7-5.1.3	5	Verification should be made to assure that fittings used on the standpipe systems are "extra-heavy" where pressures exceed 175 psi.	-	The design of the pipe and fittings has been verified to be adequate for the maximum operating pressure of the system.
All	14-1983-4-7.1	8	The flowing pressures at hose outlets exceed 100 psi each. Outlet shall be provided with an approved device to reduce to reduce the pressure with required flow at the outlet to 100 psi.	-	Fire brigade members are being trained for working pressures in excess of 150 psi. Brigade training is being documented.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 14, 1983 Edition - Standpipe and Hose

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All	14-1983-7-7.1	10	An approved 3-1/2" dial spray pressure gauge should be provided at the top of each standpipe. Gauges shall be located in a suitable place where water will not freeze. Each gauge will be controlled by a valve having arrangements for draining.	The purposes of these gauges is to assure that minimum pressure requirements at the hose stations are met.	The normal operating pressures of the fire protection system have been reviewed and calculations indicate adequate pressure will be maintained. Therefore the gauges are not considered necessary.
All	14-1983-4.1.1, 4-3.1 and 4-4.1	11	Elevation No. 412 in containment No. 1 is adequately covered by hose connections from other levels. Elevation No. 412 does not have any hose connection in containment.	-	Elevation 412' is adequately covered by hose stations from adjacent levels in containment.
All	14-1983-4-4.3.4	12	All nozzles for Class II service hose throughout the plant should be listed for use on Class A, B, and C fires.	-	The proper type of hose nozzle is brought to scene and utilized by the fire brigade based on the type of fire and surrounding environment. Straight stream nozzles are supplied to areas of new fuel storage.
12.1-0	14-1983-4-4.3.4	15	Replace the straight-steam nozzles on hose reels 170, 171, and 173 with U.L. listed nozzles rated for Class A, B, and C fires. These hose stations are located in fuel handling areas.	-	Solid stream nozzles will remain in fuel handling areas.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 14, 1983 Edition - Standpipe and Hose

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.11-0,1,2	14-1983-3-2	-	Hose stations should be provided for the River Screen House such that all portions of the building are within 30ft of a nozzle when attached to not more than 100 ft of a hose.	Hose stations in the River Screen House have been abandoned.	Hose stations are not required as a backup suppression system to protect safety related equipment. (Reference EC #351113).
-	14-1983-4-2.1	27	Provide a U.L. listed valve at the standpipe outlet of hose station 270 for attachment of hose.	-	Non-listed valve does not affect operability of hose station.
-	14-1983-4-4.3.2	28	Verification should be made on all hose racks to assure they are suitable for the hose installed. Each rack should be U.L. listed for lined or unlined hose.	Check hose rack at station Nos. 179, 180, 256, 263, 264, 184, 265, and 178. U.L. listed replacement hose reels are no longer available. They will be replaced with similar nonlisted hose reels, as needed.	Fire hose is used by trained fire brigade personnel only. Nonlisted hose reels do not affect the firefighting performance of the hose station. Most of the hoses and associated hose reels have been removed per EC 626870 as the fire brigade utilizes high-rise hose packs transported to the scene.
-	14-1983-2-1.3.1 and 2-1.3.2	40	Verification should be made on all standpipe under 50 ft in height to be a minimum of 2 inches in size and all in excess of 50 ft shall be at least 2-1/2 in. in size	-	M&MPC has determined existing design is acceptable.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 14, 1983 Edition - Standpipe and Hose

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
-	14-1983-2-1.3 and 5-4.1	41	Verification should be made to assure that all Class II standpipe systems are sized for a minimum flow of 100 gpm for 30 minutes. Where one or more standpipes are required, all common supply piping should be hydrostatically sized for a minimum flow of 100 gpm. The supply shall be sufficient to maintain a residual pressure of 65 psi at the topmost outlet of each standpipe.	-	The normal operation pressures of the fire protection system have been reviewed and calculations indicate that adequate pressure and flow will be maintained.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 15, 1983 Edition - Water Spray Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.10E-1(NS)	15-1983-2-1.1	1	A cock handle should be installed on the alarm test connection for the water spray system protecting the system auxiliary transformer 142-1.	-	An operator carries a valve handle during testing and attaches it to the stem. This guards against malicious operation.
8.3-1, 18.10A-1, 18.10B-1, 18.10C-1, 18.10D 1, 18.10E 1(NS)	15-1983-2-5.1	2	The Viking model D-5 deluge valves for the water spray systems protecting the transformers, lube oil storage tank, and turbine bearings are listed for maximum working pressures of 175 psi. The static pressure on the systems was approximately 180 psi. Higher pressure fittings should be used on these systems.	A static pressure slightly above the working pressure would probably not be harmful to the equipment. Higher pressure rated valves and fittings should not be needed if the static stays not more than 5 to 10 psi above the rated working pressure of 175 psi.	Static pressure slightly above the working pressure would not be harmful to the equipment.
18.10A-1, 18.10B 1, 18.10C 1, 18.10D 1, 18.10E 1(NS)	15-1983-2-1.2	3	The equipment used to automatically actuate the transformer water spray systems should be listed by Underwriters' Laboratories for the purpose. The heat detection equipment is not listed in the 1983 Fire Protection Equipment directory.	-	The detection equipment only supply on alarm function and do not actuate the water spray. Thus the unlisted equipment is considered acceptable.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 15, 1983 Edition - Water Spray Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.10A-1 (NS)	15-1983-2-1.1	5	A cock handle should be installed on the alarm test connection for the main transformer 1E.	-	An operator carries a valve handle during testing and attaches it to the stem. This guards against malicious operation.
18-10B-1 (NS)	15-1983-2-1.1	6	A cock handle should be installed on the alarm test connection for the main transformer 1W.	-	An operator carries a valve handle during testing and attaches it to the stem. This guards against malicious operation.
18.10C-1 (NS)	15-1983-2-1.1	7	A cock handle should be installed on the alarm test connection for the water spray system protecting the unit auxiliary transformer 141-1.	-	An operator carries a valve handle during testing and attaches it to the stem. This guards against malicious operation.
18.10D-1 (NS)	15-1983-2-1.1	8	A cock handle should be installed on the alarm test connection for the water spray system protecting the unit auxiliary transformer 141-2.	-	An operator carries a valve handle during testing and attaches it to the stem. This guards against malicious operation.
11.7-0 (S)	15-1983-4-7.1.1	9	The main control valves supplying water to all the individual manual water spray systems protecting the charcoal filters for the auxiliary building should be supervised.	The individual valves are supervised but not the main valve.	Valve has been locked open and is surveilled on a monthly basis.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 15, 1983 Edition - Water Spray Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
11.7-0(S)	15-1983-4-3	10	The thermostat sensing line on the charcoal filter water spray systems should extend farther than two filter sections to cover the hazard.	There are approximately 6 sections each with 9 levels of filter trays.	The lines were extended per Design Change FP-196 and installed per Modification M6-0-86-0039.
18.10A-1, 18.10B-1, 18.10C-1, 18.10D-1, 18.10E-1(NS)	15-1983-4-3	11	The transformer water spray systems should operate automatically upon actuation of the heat detection system for proper hazard protection.	The only automatic operation is on failure of the transformer.	Station does not intend redesign. Actuation of deluge valve trips transformer.
All(NS)	15-1983-8-6	14	Provide water spray system test data to verify that, under test conditions, heat detectors operate within 40 seconds when exposed to standard heat test source.	-	Test procedure requires work request to be initiated if response times are in excess of maximum allowable time specified in 1-3-85 M&M letter.
All	15-1983-6-2.5	15	Verify that water spray system control valves and automatic detection equipment is tested at least annually.	-	Procedures require testing to be conducted every 18 months. This is considered adequate.
All	15-1983-6-2.6	16	Verify that manual tripping devices and valves for water spray systems are operated at least annually.	-	Procedures require testing to be conducted every 18 months. This is considered adequate.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 15, 1983 Edition - Water Spray Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All	15-1983-6-2.8	17	Verify that all spray nozzles are visually inspected and cleaned, if necessary, at least annually.	-	Procedures established for 18-month surveillance. This is considered adequate.
All	15-1983-6-1.3	20	Provide the frequency of regularly scheduled plant inspections at which water spray equipment is to be visually checked.	-	Procedure for 18 months surveillance has been written. This is considered adequate.
All	15-1983-4-6.2	21	Verify that provisions are made for effective drainage of water from the filter area during the operation of the systems.	-	Drains are purposely closed. Operators would manually open drains upon system operation.
18.10A-1, 18.10B-1, 18.10A-2, 18.10B-2	N/A		The deluge systems piping for Main Power transformers 1E, 1W, 2E and 2W are designed in accordance with applicable sections of NFPA 15-2012.		The deluge systems piping for Main Power Transformers are redesigned (Reference EC #397983 and 397984). It is acceptable to design the new systems to the latest available code year (2012).
18.10C-1, 18.10D-1	N/A		The deluge systems piping for the Unit Auxiliary Transformers (UATs) 141-1 and 141-2 are designed in accordance with applicable sections of NFPA 15-2017		The deluge systems piping for UATs 141-1 and 141-2 are redesigned (References EC # 626215). It is acceptable to design the new systems to the latest available code year (2017).

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 16, 1980 Edition - Foam Water Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
10.1-1 10.2-1(S)	16-1980-2-1	1	All component parts including the foam water sprinkler system shall be listed.	The A-20 activator is pneumatic but is hydraulically supplied. Valves were noted not to be listed. The Alison control panel is not listed.	Listing of these valves is not considered necessary since this system will be manually actuated. A review of the non-listed panels by S&L and M&MPC considers the non-listed panels that were supplied equally reliable to the Alison panels that are listed. Preoperational tests verified that the panels function as designed.
10.1-1 10.2-1(S)	16-1980-4-3.3	2	All fittings shall be listed for pressures greater than 175 psig.	-	The design of the pipe and fittings has been verified to be adequate for the maximum operating pressure of the system.
10.1-1 10.2-1(S)	16-1980-5-2	4	Verification should be given that hydrostatic testing has been conducted at 50 psig over the fire pump's churn.	System pressure relief set at 180 psi.	Hydrostatic testing at 225 psi is considered adequate.
10.1-1 10.2-1(S)	16-1980-7-1.1	5	The foam water sprinkler system shall be serviced by qualified personnel semiannually.	Procedures are for servicing every 18 months.	The procedure has been reviewed and approved (including a review by M&MPC).

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 20, 1984 Edition - Fire Pumps

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.12-0	20-1983-2-7.1	1	The electrical motor-driven fire pump shall be protected against possible interruption of service.	Protected by distance and redundancy.	The electric fire pump is detached a minimum of 34 feet from a possible oil fire exposure from the circulating water pumps. The electric pump is also backed up by a redundant diesel engine-driven fire pump that is located and protected in a 3-hour fire-rated room.
18.12-0	20-1983-7-1.1.1	6	The electric motor-driven fire pump controller shall be listed for electric motor- driven service.	The controller is not listed.	Justification has been provided to the NRC in a December 14, 1983 letter from T. R. Tramm to H. R. Denton.
18.12-0	20-1983-7-1.1.3	7	The electric motor-driven fire pump controller shall be marked to show manufacturer's name and complete electrical rating.	-	Manufacturer's label not required. Refer to justification noted above.
18.13-0	20-1983-8-2.7.2	10	The automatic electric solenoid valve located in the exchanger supply line for the OB fire pump diesel engine should be specifically listed for fire protection service.	-	Existing design justified, "UL" does not label solenoid valve in the required range.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 20, 1984 Edition - Fire Pumps

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.13-0	20-1983-8-6.1	-	-	NFPA 20 specifies a weekly run of engines for not less than 30 minutes.	The diesel engine fire pump is started from ambient conditions and operated for greater than or equal to 30 minutes every 31 days.
18.12-0 & 18.13-0	20-1983-11-4.5	-	-	NFPA 20 specifies the units are to be operated weekly.	The motor- and diesel-driven fire pumps are operated every 31 days.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

Note NFPA 24, 1981 Edition - Fire Mains and Hydrants

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
Outside Ring Header	24-1981-3-3.2	1	The following post-indicator valve (PIVs) are located closer than 40 ft to the buildings: 0FP 560, 0FP 559, 0FP 561, 0FP 577	Not practical to relocate.	Isolation capabilities are considered adequate.
Outside Ring Header	24-1981-4-2.2	3	The following hydrants are located closer than 40 ft to buildings they are protecting: 0FP 10S, 0FP 12S, 0FP 13S, 0FP 23S	Not practical to relocate.	Loss of any single hydrant does not affect building coverage.
Outside Ring Header	24-1981-5-1.3	4	The existing practice is to secure one 2-1/2-inch hose to the hydrant, but with the remaining part of the hose located in the hose house. The hose should be disconnected and completely stored in the hose house.	-	The hose houses have been removed. A dedicated fire response truck or cart is now maintained with hoses and equipment equivalent to three hose houses.
Outside Ring Header	24-1981-8-6.2.9	10	Documentation should be provided that substantiates the decision to omit thrust blocking on underground piping at tees, elbows, etc.	Welded underground piping except connections to hydrants.	Restraints not needed on welded piping; thrust blocking provided at hydrant connections.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

Note NFPA 24, 1981 Edition - Fire Mains and Hydrants

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
Outside Ring Header	24-1981-8-4	12	Check valves should be installed in connections between the fire protection water system and service water system.	These connections are normally closed and automatic check valves are not needed.	Service water systems are third order backup water supply and procedures have been written to monitor potential leakage of butterfly valves installed.
Outside Ring Header	24-1981-8-4	13	The butterfly isolation valves on the connections between fire protection water system and service water system should be UL listed.	These valves are on service water system and listing is not necessary.	Valves are ASME Section III. Leakage monitoring procedure addresses leakage concerns. No further action is required.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 26, 1983 Edition - Valve Supervision

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
-	26-1983-3-1	-	-	NFPA 26 specifies that locked open valves should be inspected monthly.	Locked open valves are inspected every 92 days to verify the valve is in the correct position.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 27, 1981 Edition - Private Fire Brigades

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
-	NFPA 27-1981 4.3	-	NFPA specifies training sessions should be held at least monthly for one hour or more per shift.	Training sessions are conducted quarterly.	Training sessions conducted quarterly result in a total of 12 hours of training per year for each brigade member. This level of training is considered as satisfying NFPA.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 30, 1981 Edition - Flammable Liquids Code

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
8.2-1 Diesel lube oil drain tank 369(NS)	30-1981 2-4.2 30-1981 2-2.5	2	A 6.68" diameter emergency breather vent should be provided for the tank.	The subject tank is not safety-related and is not required for safe shutdown and a fire in this area will not affect safe shutdown of either unit. Area-wide automatic water suppression is provided for the area where this tank is located. The tank is provided with an existing vent.	The existing tank design will not be changed.
8.7B-0 Station Auxiliary Diesel F.O. Storage Tank(NS)	37-1979 5-5.3 30-1981 2-4.4.3	4	The liquid transfer connections beneath the liquid level of the tank should be provided with either (a) a normally closed remotely activated valve 95 or, (b) an automatic closing heat activated valve, or (c) another approved device to provide for quick cut-off of flow in the event of fire in the vicinity of the tank.	-	Heat activated valves were installed per Modification M6-0-84-0256.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 30, 1981 Edition - Flammable Liquids Code

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
8.7B-0 Station Auxiliary Diesel F.O. Storage Tank(NS)	37-1979 5.6-1 30-1981 2-4.2 30-1981 2-2.5	5	Tests should be performed on the 4" breather vent (BV) to determine whether the long length of pipe will create backpressures that can cause the internal pressures in the F.O. storage tank to exceed 2.5 psi when 78,900 CFH needs to be vented.	The subject tank is not safety-related, is not required for safe shutdown, and a fire in the area will not affect safe shutdown of either unit. An automatic suppression system is provided. Existing vents are provided.	The existing tank design will not change.
18.20-0 (125,000 gal. F.O. Storage Tank)(NS)	30-1981 2-4.2	6	Supplement the existing 6" breather vent (BV) and the 4" overflow line with an 8.8" diameter emergency breather vent (EBV).	The subject tank is not safety-related, is not required for safe shutdown, and a fire in the area will not affect safe shutdown of either unit. Existing vents are provided.	The existing tank design will not change.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 37, 1979 Edition - Stationary Combustion Engines

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
9.3-1 9.4-1 EMD's Day Tanks(S)	37-1979 5-4.1 5-4.2	1	The tank should be equipped with (1) a high level alarm, and (2) a high level shutoff.	-	The fuel oil circulates to storage tanks to maintain full capacity. Fuel does not overflow into room.
9.3-1 9.4-1 EMD's Day Tanks(S)	37-1979 5-5.3 30-1981 2-4.4.3	2	The liquid transfer connections beneath the liquid level of the tank should be provided with either (a) A normally closed remotely activated valve, (b) an automatic closing heat activated valve, or (c) another approved device to provide for quick cut-off of flow in the event of fire in the vicinity of the tank.	-	Shutoff will not be permitted for this equipment since it is safety-related.
10.1-1 10.2-1 (25,000-gallon diesel F.O. storage tanks)(S)	37-1979 5-5.3 30-1981 2-4.4.3	3	The liquid transfer connections beneath the liquid level of the tank should be provided with either (a) a normally closed remotely activated valve or (b) an automatic losing heat activated valve or (c) another approved device to provide for quick cut-off of flow in the event of fire in the vicinity of the tank.	-	Shutoff will not be permitted for this equipment since it is safety-related.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 37, 1979 Edition - Stationary Combustion Engines

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
8.7B-0(NS)	37-1979 5-4.1 5-4.2	5	The tank should be equipped with (1) an overflow line piped back to the supply tank (125,000-gallon F.O. storage tanks), (2) a high level alarm, and (3) a high level automatic shutoff.	The tank is already equipped with an overflow line but the line terminates on the floor of the room. The high level device should be interlocked to shut off the pump in the event of high tank levels.	A high-level automatic shutoff has been added.
10.1-1 10.2-1 (25,000-Gallon F.O. Storage Tank)(S)	37-1979 5-5.3 30-1981 2-4.4.8	6	The 4" overflow line should (1) be increased to one pipe size greater than the 4" inlet line, and (2) be liquid tight and discharging back to the outside source of liquid or to an approved location.	The overflow line is presently sized the same as the fill line. The overflow line terminates at floor level above a funnel piped to a sump below the room. The overflow arrangement of the tanks was reviewed and a high-level alarm on the tank is considered necessary.	A high-level alarm was installed on the tank.
10.1-1 10.2-1 (25,000-Gallon F.O. Storage Tanks)(S)	37-1979 5-6.1 30-1981 2-4.2 30-1981 2-2.5	7	Supplement the 3" breather vent (BV) with an emergency breather vent (EBV) of at least 9.14" diameter piped to the outside.	-	M&M has accepted S&L calculation justifying present design.
11.4A-1 (Auxiliary Feedwater Diesel F.O. Storage Tank)(S)	37-1979 5-4.2	8	The overflow line (10 59A-1-1/2) to the 1B in the diesel oil storage room should be increased in size to 2".	The return line and the fill line are the same size (1-1/2")	M&M has accepted S&L calculation justifying present design.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 37, 1979 Edition - Stationary Combustion Engines

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
11.4A-1 (Auxiliary Feedwater Diesel F.O. Storage Tank)(S)	37-1979 5-4.1 5-4.2	9	The tank should be equipped with (1) high-level alarm, and (2) high-level shutoff.	-	Tank is manually filled. Any overflow is piped back to 25,000-gal. storage tanks. This is considered adequate.
11.4A-1 (Auxiliary Feedwater Diesel F.O. Storage Tanks)(S)	37-1979 5-5.3 30-1981 2-4.4.3	10	The liquid transfer connection beneath the liquid level of the tank should be provided with (a) A normally closed remotely activated valve, (b) an automatic closing heat activated valve, or (c) another approved device to provide for quick cut-off of flow in the event of fire in the vicinity of the tank.	-	Shutoff is not permitted on safety-related equipment.
11.4A-1 Auxiliary Feedwater Diesel F.O. Storage Tank(S)	37-1979 5.6-1 30-1981 2-4.2	11	Tests should be performed on the 2" vent pipe to determine whether the long length of pipe will create back-pressures that can cause the internal pressures in the tank to exceed 2.5 psi when 73,700 cfh needs to be vented.	-	M&M has accepted S&L calculation justifying present design.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 37, 1979 Edition - Stationary Combustion Engines

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.12-0 (Diesel fire pump F.O. Storage Tank)	37-1979 5-5.3 30-1981 2-4.4.3	12	The liquid transfer connections beneath the liquid level of the tank should be provided with (a) a normally closed remotely activated valve, (b) an automatic closing heat activated valve, or (c) another approved device to provide for quick cut-off of flow in the event of fire in the vicinity.	-	Shutoff is not provided on safety-related equipment.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 50A, 1984 Edition - Gaseous Hydrogen Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.18-0 and all interior zones in which the piping crosses (NS areas)	50A-1984 2-6.1	4	All piping, tubing, and fittings shall be tested and proven gas-tight at maximum operating pressure.	-	The hydrogen system and components have been designed and fabricated to meet all requirements of NFPA Bulletin 50A, Gaseous Hydrogen Systems, with the following exception. Brazed joints are fabricated with experienced operators who have followed industry proven procedures, however, the performance and procedure qualifications per ASME Section IX have not been documented.
-	50A-1984 2-4.1	5	All valves, gauges, and other accessories shall be proven suitable for hydrogen services.	-	The hydrogen system and components have been designed and fabricated to meet all requirements of NFPA Bulletin 50A, Gaseous Hydrogen Systems, with the following exception. Brazed joints are fabricated with experienced operators who have followed industry proven procedures, however, the performance and procedure qualifications per ASME Section IX have not been documented

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 72D, 1979 Edition - Proprietary Protective Signaling Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
-	72D-75-1232(b)/ 1234 72D-79-2-4.3	1	Test gate valve supervising switches semiannually and perform drain test.	-	Switches are periodically tested annually. Drain tests are conducted. The annual testing period is considered adequate. The procedure has been written and approved.
-	72D-75-1254 72D-79-4-7.3	3	Upon receipt of trouble signals, the control room operator shall notify the authority having jurisdiction where interruption of normal service will exist for more than four hours and provide written notice to the authority having jurisdiction when equipment has been out of service for eight hours.	-	The authority having jurisdiction is not notified when detection equipment is out of service for an extended period. Rather, the limiting conditions for operation are specified in the Technical Requirements Manual, Section 3.10.a. Additional fire protection measures are specified for such cases. This is considered to be adequate.
-	72D-75-2022 72D-79-2-2.2	4	All devices, combinations of devices and equipment constructed shall be approved/listed for the purposes intended. (This pertains to the Alison Control Panels).	Alison panels in the control room and local panels 0FP01J, 0FP04J, and 0FP05J are not UL listed or FM approved.	MCR and local panels are custom designed for Byron. Based upon reviews by M&MPC, S&L and Byron Site Engineering and pre-operational tests, the original and modified panels are considered to be equivalent to approved/listed panels (Reference M&MPC letters dated Sept 5 & 22, 1986).

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 72D, 1979 Edition - Proprietary Protective Signaling Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
-	72D-79-3-5.12	6	Automatic fire detectors which have integral trouble contacts shall be wired on the initiating device circuit so that a trouble condition on one detector will not impair the alarm operation from other initiating devices.	-	Upon receipt of a trouble alarm, an operator is dispatched to the area and a fire watch may be initiated until trouble is cleared. This is considered to be acceptable.
-	72D-79-3-6.2.2	7	Automatic sprinkler system signals shall indicate distinctively the particular function (valve position, grounds, opens, etc.).	-	Upon receipt of a trouble alarm, an operator is dispatched to the area and a fire watch may be initiated until trouble is cleared. This is considered to be acceptable.
-	72D-75-2223 72D-79-2-6.2.3	8	When central station primary power is provided from a commercial light and power source and engine-driven generator, storage batteries having the capacity to operate the system under maximum load for four hours shall be provided.	Bus 132 (ESF Bus) is the primary power supply to the proprietary alarm systems. Bus 134 is the secondary power supply. An impairment in Bus 142 could impair all sources of power to Bus 132.	Bus 142 is a safety-related ESF power source. It is normally fed from the system auxiliary transformer, but is also has a diesel generator backup in case of a loss-of-offsite power. In addition, a manual crosstie to Unit 2 Bus 242 is provided. This supply is as reliable as was intended by the NFPA code, and is

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 72D, 1979 Edition - Proprietary Protective Signaling Systems

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
-	72D-75-2224 72D-79-2-6.24	9	A separate power supply, independent of the main power supply, shall be provided for the operation of trouble signals (may use the secondary power supply).	Trouble signals are fed from the primary source.	Due to the high reliability of the primary power supply, as mentioned above, this is considered to be acceptable.
-	72D-75-2461	11	Provide distinctive trouble and alarm signals in the control room for Units No. 1 and No. 2.	Signals used for Unit 1 and No. 2 are distinctive from other plant signals but not from the Unit No. 1 and Unit No. 1 control panels.	The Unit 1 and Unit 2 fire alarm panels are located not adjacent to one another in the control room. It will be obvious to an operator responding to a fire alarm which unit is affected. The existing design is considered to be acceptable.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 72E, 1982 Edition - Fire Detectors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
All zones except 1.2-1, 1.2-2, 8.1-0, 8.3-1, 14.6-0, 18.11-0, 18.12-0, 18.35-0, 18.36-0, 18.38-0 and QA vault	72E-1982-8.3.3	-	Test smoke detectors semiannually.	Previous deviation tested smoke detectors every 18 months as documented in PSD FP transmittal 92-113. Justification for this deviation is documented in Performance Based Evaluation 389723	Smoke detectors are tested every 3 years.
All zones except U1 and U2 containment.	72E-1982-8.3.2.2	-	Test a restorable heat detector on each circuit semiannually. After 5 years all must be tested.	Previous deviation tested heat detectors every 18 months as documented in PSD FP transmittal 92-113. Justification for the deviation is documented in Performance Based Evaluation 389723.	Restorable heat detectors are tested every 3 years.
9.1-1, 9.2-1, 9.1-2, 9.2-2, 12.1-0	72E-1982-8.3.4		All flame detectors, fire-gas detectors and other fire detectors shall be tested at least semiannually as prescribed by the manufacturer and more often if found to be necessary for the application.	Justification for this deviation is documented in Performance Based Evaluation 389723.	Ultraviolet (UV) detectors are tested every 3 years.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 72E, 1982 Edition - Fire Detectors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.10A-1, 18.10B-1, 18.10A-2, 18.10B-2	N/A		The thermistor wire detection for Main Power Transformers 1E, 1W, 2E, and 2W is designed in accordance with applicable sections of NFPA 72-2013		The thermistor wire detection for Main Power Transformers is redesigned. (Reference EC # 397983 and 397984). It is acceptable to design the new detection to the latest available code year (2013)
18.10C-1 18.10D-1	N/A		The thermistor wire for the Unit Auxiliary Transformers (UATs) 141-1 and 141-2 is designed in accordance with applicable sections of NFPA 72-2019		The thermistor wire detection for UATs 141-1 and 141-2 is redesigned (Reference EC # 616215). It is acceptable to design the new detection to the latest available code year (2019).

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
288 291	80-1981 1-6.1	1	Only labeled or listed doors shall be used.	It should be verified that all doors in fire rated barriers have UL labels affixed, indicating appropriate fire ratings.	The justification for the use of non label doors in certain instances is contained on page 2.1-8 of the FPR.
SD 175-319 373-383 348-374 392-351 357-381-382 411-432 415-440 420-460 427-463 538-551 552-669	80-1981 1-6.1	2	Only labeled or listed doors shall be used.		The justification for the use of non label doors in certain instances is contained on page 2.1-8 of the FPR.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
SD 171-180 181-212 292-295 298-299 300-336 302-340 319-348 329-349 350-374 351-381 370-382 373-383 398 400-411 412-413 420-425 427-428 430-431 432-440 441-461 462-477 489 500-501 523-538 545-548 551-552 648-649 682-693 695-701	80-1981 2-1.2	3	Weather stripping or gasketing of any kind on fire doors (or frames) shall be furnished only in accordance with the manufacturer's published listings. Exception: Where acceptable to authority having jurisdiction, gasketing of noncombustible or limited combustible material may be applied to the frame providing closing and latching of the door is not inhibited.	-	Gaskets or weather- stripping for air tightness does not appreciably affect the fire resistance rating of the door. No further action is required.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
SD 180 SD 181 167-317 318-336 398 442-553 669-720 See also Doors listed in Paragraph 1-6.1	80-1981 2-5.1	4	Only labeled door frame shall be used.	-	The justification for the use of non label doors in certain instances is contained on page 2.1-8 of the FPR.
Various, as applicable	80-1981 2-5.4	5	The clearance between the door and the frame and between meeting edges of doors swinging in pairs shall not exceed 1/8 inch.	The clearance between the door and the frame and between meeting edges of doors swinging in pairs may exceed 1/8 inch.	The clearances may be increased as stated and justified in EC-EVAL#339805. Clearances that satisfy the criteria specified in the EC-EVAL represent an acceptable minor deviation from NFPA 80 and may be considered operable without additional evaluation or corrective action.
Various, as applicable	80-1981 2-5.4	6	The clearance between the bottom of the door and a raised noncombustible sill shall not exceed 3/8 inch. Where there is no sill, the maximum clearance between the bottom of the door and floor shall not exceed 3/4 inch.	The clearance between the bottom of the door and a raised noncombustible sill may exceed 3/8 inch. Where there is no sill, the maximum clearance between the bottom of the door and floor may exceed 3/4 inch.	The clearances may be increased as stated and justified in EC-EVAL#339805. Clearances that satisfy the criteria specified in the EC-EVAL represent an acceptable minor deviation from NFPA 80 and may be considered operable without additional evaluation or corrective action.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
SD 169-170 SD 171-175 SD 180-181 234 319-348 351-373 381-383 398-400 411-415 420-427 477-489 538-551 552-648 649-701 729-730	80-1981 2-8.5 2-8.8	8	Holder/release devices shall be permitted when acceptable to the authority having jurisdiction. The devices shall be installed in accordance with the manufacturer's instructions and only in conformance with the individual manufacturer's published listings.	-	Security hardware is necessary for controlled areas. Refer to page 2.1-9 of the FPR.
Various, as applicable	80-1983 2-8.4.1 3-7	-	Coordinating Device: When there is an astragal or projecting latch bolt that prevent the inactive door of a pair of doors from closing and latching before the active door closes and latches, a coordinating device shall be used. A coordinating device shall not be required where each door closes and latches independent of the other door.	-	For a double leaf fire door, which is controlled by plant security card reader system, a door Coordinating Device is not required. Justification is contained in ECs 347761 and 362746.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
9.1-1, 9.1-2, 9.2-1, 9.2-2	80-1983 6-6.2	-	The DG rollup doors and normally closed. For this case, the rollup doors are already in their fire-related safe shutdown position (i.e., closed) and initiation of a close signal via a fusible link is not required. When a DG rollup door is opened, the appropriate LCOAR for fire barriers, 0BOL 10.g, is entered and a fire watch is posted for the zone.	-	Where fusible links are used, one fusible link shall be located near the top of the opening and additional links shall be located at or near the ceiling on each side of the wall.
5.1-1, 5.1-2, 5.2-1, 5.2-2, 9.1-1, 9.1-2, 9.2-1, 9.2-2	80-1981 1-6.1	-	Only labeled or listed doors shall be used.	Several doors at El. 401'-0" and El. 426'-0" in the L-line wall are reinforced with steel plates for HELB pressure loading in conjunction with seismic loading under HELB design basis analysis. The doors are not labeled.	The subject doors are addressed in Generic Letter 86-10 Evaluation EC-EVAL 392627; this evaluation determined that the modified doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled door. Refer to EC 391812 and EV-EVAL 392627.
5.1-1, 5.1-2, 5.2-1, 5.2-2, 9.1-1, 9.1-2, 9.2-1, 9.2-2	80-1981 2-5.1	-	Only labeled or listed doors shall be used.	The frames for several doors at El. 401'-0" and El. 426'-0" in the L-line wall are reinforced for HELB pressure loading in conjunction with seismic loading under HELB design basis analysis. The door frames are not labeled.	The subject door frames are addressed in Generic Letter 86-10 Evaluation EC-EVAL 392627; this evaluation determined that the modified doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled door. Refer to EC 391812 and EV-EVAL 392627.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
5.1-1, 5.1-2, 5.2-1, 5.2-2, 9.1-1, 9.1-2, 9.2-1, 9.2-2	80-1981 2-8.1.1, 80-1981 Table 2-8A, 80-1981 2-8.1.3	-	Hinges shall be as required in Table 2-8A. Doors up to 60 in. in height shall be provided with two hinges and an additional hinge for each additional 30 in. of door height or fraction thereof. Hinges shall be secured to frames with steel screws. Types of screws will vary depending on material used for the manufacture of labeled door frames. Refer to labeled door frame manufacturers' instructions and published listings for specific screw requirements.	The hinges for several doors at El. 401'-0" and El. 426'-0" in the L-line wall are replaced to support reinforcing steel plates for HELB pressure loading in conjunction with seismic loading under HELB design basis analysis. The number of hinges is reduced from three to two; the new hinges are not attached to the door frame.	The number and attachment of the subject door hinges is addressed in Generic Letter 86-10 Evaluation EC-EVAL 392627; this evaluation determined that the modified doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled door and hinge configuration. Refer to EC 391812 and EC-EVAL 392627.
8.3-2, 11.5-0	80-1981 1-6.1	-	Only labeled or listed doors shall be used.	Two doors at El. 401'-0" in the L-line wall are reinforced with steel plates for HELB pressure loading in conjunction with seismic loading under HELB design basis analysis. One door also has horizontal stiffeners. The doors are not labeled.	-

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
8.3-2, 11.5-0	80-1981 2-5.1		Only labeled door frame shall be used.	The frames for two doors at El. 401'-0" in the L-line wall are reinforced for HELB pressure loading in conjunction with seismic loading under HELB design basis analysis. The door frames are not labeled.	-
8.3-2, 11.5-0	80-1981 2-8.1.3		Hinges shall be secured to frames with steel screws. Types of screws will vary depending on material used for the manufacture of labeled door frames. Refer to labeled door frame manufacturers' instructions and published listings for specific screw requirements.	The hinges for the two doors at El. 401'-0" in the L-line wall are replaced to support steel plates added to reinforce the doors for HELB pressure loading in conjunction with seismic loading under HELB design basis analysis. The replacement hinges are not attached to the door frame; they are welded to a short hollow steel section, which is welded to a plate that is attached to the concrete wall and/or structural steel. Attachments to the wall are made with ¾" concrete expansion anchors. The other hinge leaf is attached to the door with through-bolts.	ATTACHMENT OF THE SUBJECT DOOR HINGES IS ADDRESSED IN Generic Letter 86-10 Evaluation EC-EVAL 393650; this evaluation determined that the modified doors are adequate for the fire hazards to which they are exposed and justifies the use of each non-labeled door and hinge configuration. Refer to EC 393481 and EC EVAL 393650.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 80, 1981 Edition - Fire Doors

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
5.1-1, 5.1-2, 5.2-1, 5.2-2	80-1983, 4-1.2		Center parting doors shall have an astragal securely attached in place so as to project a minimum of ¾ in.	The astragal for fire doors 0DSD351, 348, 377, and 380 was removed and replaced per station drawings as a result of HELB modifications. New installation criteria allows a 3 inch gap between the floor and the astragal.	These fire doors were evaluated in GL 86-10 Evaluation EC 392627. While this specific deviation was not addressed, the conclusion of EC 392627 remains valid. A 3 inch gap between the floor and the astragal is bound by EC 392627.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 90A, 1981 Edition - Air Conditioning and Ventilation

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
18.1-1 (ESF Div. elev. 426') 18.2-1 (ESF Div. 11 elev. 426') 18.1-1 (Lower cable sprd. rm. elev. 439') 11.7-1 (Cont. purge supply elev. 467') 11.7-0 (Cont. purge exhaust elev. 451') 18.2-1 (Non-ESF supply unit elev. 451') 18.4-1 (Control Rm. HVAC elev. 451')(S)	90A-1981-2-4.1.1	1	Air filters shall be approved such as Class 1 and Class 2 that will not burn or emit excessive smoke.	These filter enclosures contain Class 2 filters with combustible pegboard panels in the frame. Combustible pegboard should be removed.	Temporary condition. Pegboard was removed when systems were required to be operable.
11.3F-1 and 11.3G-1(S)	90A-1981-3-3.1	2	Duct openings through fire walls shall be protected by an automatic closing 3-hr-rated fire damper.	(f) Common 3-hr fire wall between safety inj. pump and charging pump/cooler is violated by common duct system outside the room that does not have fire dampers.	Neither area comprises a 3-hr fire-rated room. Safe shutdown does not require 3-hr rated separation. Not necessary to install damper in duct.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 90A, 1981 Edition - Air Conditioning and Ventilation

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
11.7-0 (Cont. purge exhaust duct elev. 475')(S)	90A-1981-4-3(b)	4	Duct smoke detectors shall be installed in the return air stream prior to exhausting from the building or being diluted by outside air.	(b) Couldn't locate detector if any. Containment purge system may be connected to Aux. Bldg. exhaust shaft.	S&L review with M&M resulted in cancel-lation of change. Existing design is acceptable.
5.6-1(S)	90A-1981-4-3(a)	5	Duct smoke detectors shall be installed in the main supply duct downstream of filters.	(b) 32" x 18" supply duct from Div. 12 Elec. Equipment Room (zone 5.4-1) to Div. 11 Elec. Equipment Room (zone 5.6-1)	Adequate area smoke detection has been provided. This is adequate in lieu of duct detector.
All Zones	90A-1981-2-1.4.2	7	Service openings shall be identified with letters to indicate location of fire protection devices.	Pertains to all dampers and detectors for entire plant.	Location of fire protection equipment including dampers has been identified.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 90A, 1981 Edition - Air Conditioning and Ventilation

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
8.3-1 (Supply duct for heater drain pump area, elev. 401') (NS) 8.3-1 (Boiler Room exhaust (72,000 cfm elev. 418') (NS) 8.5-1 (Air return @ col. F1 (14,000 cfm) elev. 426')(NS) 5.2-1 (ESF Div. 11 supply) (S) 8.3-1 (Supply for cond. pump area, elev. 401')(NS) 18.3-1 (Steam pipe tunnel and safety valve vent, system Area 2 col. 27 elev. 416')(S) 11.6A-0 (Lab fume exhaust duct elev. 426')(S)	90A-1981-4-5.1 (9) & 72E-1982-9-1.1.4	9	Detectors shall be installed in accordance with NFPA 72E.	The pyrotronics model CA-4 is listed for air velocities of 500-3100 FPM. In reference to the S&L HVAC drawings and actual detector location, the following areas exceed 3100 FPM; should verify actual airflows.	New detectors have been furnished for the VT and VA Systems.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 90A, 1981 Edition - Air Conditioning and Ventilation

FIRE ZONES	NFPA REFERENCE	NUMBER	RECOMMENDATION	COMMENTS	RESOLUTION
8.6-0 (Control Room office supply fans A&B elev. 468')		10	Detectors shall be installed in accordance with NFPA 72E.	(e) Detectors adjacent to fans. Sampling tubes should be a minimum of two duct widths from sources of turbulence.	Per conversation with S&L, detectors do not need to be moved.
Generic to all duct smoke detectors(S)	90A-1981-4-3 (a)&(b)	11	Detectors in the main supply and return air ducts shall automatically stop the fan(s).	-	All systems are compliant with the exception of the VA, VC, and VP systems, which were evaluated and deemed acceptable as is due to nuclear safety functions.
Generic to all HVAC systems(S)	90A-1981-4-4	12	Smoke dampers shall be installed in systems over 15,000 cfm.	Describe where and what HVAC systems are utilized for smoke control.	Smoke dampers are not required per letter from M&MPC dated 12/3/85.
Generic to all detectors	90A-1981-4-5.1	13	Detectors shall be installed in accordance with NFPA 72E. Initial and periodic tests shall be conducted.	Provide documentation for testing sensitivity, interlocks, alarms, smoke test, in accordance mfg's instructions.	Functional system testing procedures are adequate. Agreement reached with NRC.
18.13-0, 18.14A-1, 18.14A-2, 18.14B-1, 18.14B-2	90A-1981-3-3.1		When the penetration of a fire wall by the duct system cannot be avoided, the opening shall be protected by an approved automatic-closing fire damper or fire door assembly having a fire protection rating not less than 3 hours and shall be installed within the wall.	-	Per EC's 395618 and 397405, non-fire rated dampers and louvers located within the 3-hour fire walls of these zones are of adequate protection and will maintain the required 3-hour fire barrier.

TABLE 3-1 (Cont'd)
NFPA CODE DEVIATION REPORT

NFPA 10, 1981 Edition - Portable Extinguishers

FIRE ZONES	NFPA REFERENCE	NUMBER	DEVIATION	COMMENTS	RESOLUTION
3.1-1 3.2A-1 5.1-1 5.2-1	NFPA 90A para 3 3.7.1.5, Fusible links shall have a temperature rating approximately 50°F above the maximum temperature that normally is encountered when the system is in operation or shut down, but not less than 160°F.		Some fusible links have a temperature rating greater than 50 F above the normally encountered maximum room temperature due to ab normal accident conditions associated with a HELB.	-	The fusible link temperature rating is significantly below typical fire temperatures and below ignition temperature of the material on either side of the wall. A Certificate of Conformance was provided by SR Products for non-UL listed ETLs stating that the ETLs are designed and manufactured with the same parts and standards as their UL listed devices. Refer to EC 388895, 388896, or 392208.

INTRODUCTION

Table 3.2 is a listing of NFPA deviations identified for safety-related areas on Byron Unit 2. This list indicates deviations which were not identified on the Unit 1 NFPA deviation list.

TABLE 3-2 (Cont'd)
NFPA CODE DEVIATION REPORT

FIRE ZONES	NFPA REFERENCE	RECOMMENDATION	RESOLUTION
All water spray systems	15 – 1985 2-13	A suitable flushing connection should be incorporated into the water spray systems to facilitate routine flushing.	System main drain tests are performed which will flush piping up to system piping. The system can be pneumatically cleaned if determined necessary. No further action required.
All automatic water spray systems	15 - 1985 4-9.25	A gauge connection should be provided at or near the nozzle calculated as having the least pressure under normal flow conditions.	Hydraulic analysis verified the adequacy of the water supply to meet the greatest hydraulic demand. A review of the individual water spray systems calculation against the design and water supply confirm the calculation with respect to the system design. A gauge on this system is not considered necessary. No further action required.
3.3A-2 3.3B-2 3.3C-2 3.3D-2	12A - 1985 2-7.4	Only listed or approved equipment and devices shall be used in the system. Halon check valves Model No. 1-061-733, Serial No. M-2964.	The Halon check valves are not specifically listed independently; however, provided as a component of this halon system design which was reviewed and found to have been designed, installed and tested in accordance with the recommendation of NFPA. The preoperational test of these systems will verify operability of these valves. These valves are considered to be adequate. No further action required.
All automatic water spray systems	15 - 1985 2-1.2	The solenoid switch manufactured by Automatic Switch Company and installed on the automatic water spray systems should be U.L. listed.	The testing procedures confirm component operability. This is considered acceptable.
11.7-0, 11.7-1, 11.7-2, 18.4-2, 3.3A-2, 3.3A-1	15 - 1985 4-11.3	Individual strainers should be provided at each nozzle where water passageways are smaller than 1/8 inch.	Strainers are provided upstream of the fire pumps. Also, flushing procedures will eliminate any debris.

TABLE 3-2 (Cont'd)
NFPA CODE DEVIATION REPORT

FIRE ZONES	NFPA REFERENCE	RECOMMENDATION	RESOLUTION
-	NFPA 13, para. 3-8.4, Return bends shall be used when pendent sprinklers are supplied from a raw water source.	Return bends are not provided for pendent sprinklers.	The sprinkler systems have been adequately flushed; main drain tests are performed quarterly (which will further serve to flush the lead-in piping) and the plant fire protection water is strained through a screen prior to its introduction into the system.
-	NFPA 90A, para. 3-3.7.1.5, Fusible links shall have a temperature rating approximately 50°F above the maximum temperature that normally is encountered when the system is in operation or shut down, but not less than 160°F.	Some fusible links have a temperature rating greater than 50°F above the normally encountered maximum room temperature due to abnormal accident conditions associated with a HELB.	The fusible link temperature rating is significantly below typical fire temperatures and below ignition temperature of the materials on either side of the wall. A certificate of Conformance was provided by SR Products for non-UL listed ETLs slating that the ETLs are designed and manufactured with the same parts and standards as their UL listed devices. Refer to EC 388442, 388443, or 392209.