

TABLE 4.13-1
JACKPLATE LOCATIONS

UNIT	AREA	FIRE ZONE(S)
1	Control Room	0-26H
1	Turbine Building 13.8K Switchgear	0-TB
1	Reactor Building - 4.16KV Emerg Switchgear Rooms - Remote Shutdown Panel - Reactor Protection System Dist. Panel - 120V AC Distribution Panels	1-4C, 1-4D, 1-5F, 1-5G 1-2D 1-5A-S 1-4A-N, 1-4A-W
1	Lower Relay Room	0-24D
1	Upper Relay Room	0-27E
2	Control Room	0-26H
2	Turbine Building 13.8KV Switchgear	0-TB
2	Reactor Building - 4.16KV Emerg Switchgear Rooms - Remote Shutdown Panel - Reactor Protection System Dist. Panel	2-4C, 2-4D, 2-5F, 2-5G 2-2A 2-5A-N
2	Lower Relay Room	0-24G
2	Upper Relay Room	0-27A
Common	Diesel Generator Bays A, B, C, D, E	0-41A, 0-41B, 0-41C, 0-41D, 0-41E
Common	Control Structure H&V Equipment Room	0-29B

5.0 COMPARISON OF SUSQUEHANNA SES DESIGN AND FIRE PROTECTION FEATURES TO REGULATORY REQUIREMENTS

The purpose of this section is to compare the fire protection provisions of Susquehanna Steam Electric Station (SSES) Units 1 and 2 with the guidelines in Appendix A of Branch Technical Position APCSB 9.5-1 Rev. 0 and Appendix R to 10CFR50.

To identify areas of impact and to facilitate comparison, matrices for items in Appendix A and Appendix R were developed. Table 5.0-1 contains the matrix which compares Susquehanna SES with Appendix A. Table 5.0-2 contains the matrix which compares Susquehanna SES with Appendix R.

TABLE 5.0-1

**SUSQUEHANNA SES AS COMPARED WITH
BRANCH TECHNICAL POSITION 9.5-1, APPENDIX A, REV. 0**

BRANCH TECHNICAL POSITION GUIDELINE	SUSQUEHANNA SES COMPLIANCE
<p>A. <u>Overall Requirements of Nuclear Plant Fire Protection Program</u></p> <p>1. <u>Personnel</u></p> <p>Responsibility for the overall Fire Protection Program should be assigned to a designated person in the upper level of management. This person should retain ultimate responsibility even though formulation and assurance of program implementation is delegated. Such delegation of authority should be to staff personnel prepared by training and experience in fire protection and nuclear plant safety to provide a balanced approach in directing the Fire Protection Programs for nuclear power plants. The qualification requirements for the fire protection engineer or consultant who will assist in the design and selection of equipment, inspect and test the completed physical aspects of the system, develop the Fire Protection Program, and assist in the fire-fighting training for the operating plant should be stated. Subsequently, the FSAR should discuss the training and the updating provisions such as fire drills provided for maintaining the competence of the station fire-fighting and operating crew, including personnel responsible for maintaining and inspecting the fire protection equipment.</p> <p>The fire protection staff should be responsible for:</p> <ul style="list-style-type: none"> (a) Coordination of building layout and systems design with fire area requirements, including consideration of potential hazards associated with postulated design basis fires, (b) Design and maintenance of fire detection, suppression, and extinguishing systems, (c) Fire prevention activities, (d) Training and manual fire-fighting activities of plant personnel and the fire brigade. 	<p>The Fire Protection Program is the responsibility of the Senior Vice President-Chief Nuclear Officer. Responsibilities for design are delegated to the Vice President-Nuclear Engineering/Support. The responsibilities for the operational phase of the Fire Protection Program are delegated to the Vice President-Nuclear Site Operations.</p> <p>Within the organization, reporting to the Vice President-Nuclear Engineering/Support is a qualified fire protection engineer who is responsible for formulation and evaluation of the Fire Protection Program.</p> <p>The Susquehanna SES procedures describe the qualification requirements, training requirements, and tasks for personnel assigned fire protection responsibilities.</p>

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<p>2. <u>Design Bases</u></p> <p>The overall Fire Protection Program should be based upon evaluation of potential fire hazards throughout the plant and the effect of postulated design basis fires relative to maintaining ability to perform safety shutdown functions and minimize radioactive releases to the environment.</p>	<p>The Susquehanna SES fire hazards analysis provided in Section 6.0 of this report demonstrates 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.</p>
<p>3. <u>Backup</u></p> <p>Total reliance should not be placed on a single automatic fire suppression system. Appropriate backup fire suppression capability should be provided.</p>	<p>All fixed fire suppression systems have manual backup systems of either standpipe and hose reels, portable extinguishers, or fire hydrants.</p>
<p>4. <u>Single Failure Criterion</u></p> <p>A single failure in the fire suppression system should not impair both the primary and backup fire suppression capability. For example, redundant fire water pumps with independent power supplies and controls should be provided. Postulated fires or fire protection system failures need not be considered concurrent with other plant accidents or the most severe natural phenomena.</p> <p>The effects of lightning strikes should be included in the overall plant Fire Protection Program.</p>	<p>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 will result in loss of function of both sprinkler and hose standpipe systems in an area protected by such primary and backup systems.</p> <p>Two 100% capacity pumps (one electric and one diesel driven) are provided, each capable of supplying the design flow rate at design pressure. By use of sectional control valves and cross-connecting, damaged fire yard mains can be isolated. Separate supplies are provided for sprinkler and standpipe/hose reel stations.</p> <p>Protection from lightning strikes is a part of the Susquehanna SES design.</p>
<p>5. <u>Fire Suppression Systems</u></p> <p>Failure or inadvertent operation of the fire suppression system should not incapacitate safety-related systems or components. Fire suppression systems that are pressurized during normal plant operation should meet the guidelines specified in APCSB Branch Technical Position 3-1, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment."</p>	<p>This item is addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in Section 6.1 of this report. (See response to Item E.3.a of Section 5.0-1)</p>

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<p>6. <u>Fuel Storage Areas</u></p> <p>The Fire Protection Program (plans, personnel, and equipment) for buildings storing new reactor fuel and for adjacent fire zones which could affect the fuel storage zone should be fully operational before fuel is received at the site.</p>	<p>The Fire Protection Program at Susquehanna SES was in operation prior to fuel being received on site.</p>
<p>7. <u>Fuel Loading</u></p> <p>The Fire Protection Program for an entire reactor unit should be fully operational prior to initial fuel loading in that reactor unit.</p>	<p>The Fire Protection Program at Susquehanna SES was in operation prior to fuel loading.</p>
<p>8. <u>Multiple-Reactor Sites</u></p> <p>On multiple-reactor sites where there are operating reactors and construction of remaining units is being completed, the Fire Protection Program should provide continuing evaluation and include additional fire barriers, fire protection capability, and administrative controls necessary to protect the operating units from construction fire hazards. The superintendent of the operating plant should have the lead responsibility for site fire protection.</p>	<p>Prior to operation of both units at Susquehanna SES, the Fire Protection Program under the responsibility of the Superintendent of the Plant was operational and included fire barriers, fire protection capability, and administrative controls to protect the operating unit from construction fire hazards. Both units at Susquehanna SES are currently operating units.</p>
<p>9. <u>Simultaneous Fires</u></p> <p>Simultaneous fires in more than one reactor need not be postulated, where separation requirements are met. A fire involving more than one reactor unit need not be postulated except for facilities shared between units.</p>	<p>This item is addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in Section 3.0 of this report.</p>

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<p>B. <u>Administrative Procedures, Controls, and Fire Brigade</u></p> <p>1. Administrative procedures consistent with the need for maintaining the performance of the fire protection system and personnel in nuclear power plants should be provided.</p> <p>Guidance is contained in the following publications:</p> <ul style="list-style-type: none"> NFPA 4 - Organization for Fire Services NFPA 4A - Organization for Fire Department NFPA 6 - Industrial Fire Loss Prevention NFPA 7 - Management of Fire Emergencies NFPA 8 - Management Responsibility for Effects of Fire on Operations NFPA 27 - Private Fire Brigades <p>2. Effective administrative measures should be implemented to prohibit bulk storage of combustible materials inside or adjacent to safety-related buildings or systems during operation or maintenance periods. Regulatory Guide 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants," provides guidance on housekeeping, including the disposal of combustible materials.</p>	<p>The Susquehanna SES Plant Procedures include the necessary administrative and technical procedures required to implement the Fire Protection Program.</p> <p>National Fire Protection Association (NFPA) codes and standards were used as guidance for the Susquehanna Fire Protection Program. The date of the NFPA code or standard used corresponds with the date in effect when the original design document or procedure was approved. It is not PPL's nor NFPA's intent that code changes be retroactively applied to existing conditions.</p> <p>Administrative procedures control the storage of combustible materials including prohibiting bulk storage of combustible materials in areas where they might endanger safety-related equipment.</p>

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<p>3. Normal and abnormal conditions or other anticipated operations such as modifications (e.g., breaking fire stops, impairment of fire detection and suppression systems) and refueling activities should be reviewed by appropriate levels of management and appropriate special actions and procedures such as fire watches or temporary fire barriers implemented to assure adequate fire protection and reactor safety. In particular:</p> <ul style="list-style-type: none"> (a) Work involving ignition sources such as welding and flame cutting should be done under closely controlled conditions. Procedures governing such work should be reviewed and approved by persons trained and experienced in fire protection. Persons performing and directly assisting in such work should be trained and equipped to prevent and combat fires. If this is not possible, a person qualified in fire protection should directly monitor the work and function as a fire watch. (b) Leak testing, and similar procedures such as air flow determination, should use one of the commercially available aerosol techniques. Open flames or combustion generated smoke should not be permitted. 	<p>Administrative controls used at Susquehanna SES maintain the performance of the fire protection system and personnel. These controls establish procedures that:</p> <ul style="list-style-type: none"> a. Prohibit bulk storage of combustible materials inside or adjacent to safety-related buildings or systems during operation or maintenance periods. b. Govern the handling and limitation of the use of ordinary combustible materials, combustible and flammable gases, liquids, or other combustible supplies in safety-related areas. c. Govern the handling of and limit transient fire loads. d. Designate the onsite staff member responsible for the in-plant fire protection review of proposed work activities to identify potential transient fire hazards and specify required additional fire protection in the work activity procedure. e. Govern the use of ignition sources by use of a Hot Work permit system to control welding, flame cutting, brazing, or other open flame operations. f. Control the removal of all waste material in a timely manner. g. Prohibit the use of open flames or combustion-generated smoke for leak testing. h. Maintain the periodic housekeeping inspections. i. Control the use of specific combustibles in safety-related areas. j. Disarm fire detection or fire suppression systems.

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<p>(c) Use of combustible material, e.g., HEPA and charcoal filters, dry ion exchange resins or other combustible supplies, in safety-related areas should be controlled. Use of wood inside buildings containing safety-related systems or equipment should be permitted only when suitable non-combustible substitutes are not available. If wood must be used, only fire retardant treated wood (scaffolding, lay down blocks) should be permitted. Such materials should be allowed into safety-related areas only when they are to be used immediately. Their possible and probable use should be considered in the fire hazard analysis to determine the adequacy of the installed fire protection systems.</p>	<p>k. Test plant fire protection and detection systems.</p> <p>l. Provide guidance on actions to be taken by an individual discovering a fire.</p> <p>m. Provide guidance on actions to be taken by the fire brigade.</p>
<p>4. Nuclear power plants are frequently located in remote areas, at some distance from public fire departments. Also, first response fire departments are often volunteer. Public fire department response should be considered in the overall Fire Protection Program. However, the plant should be designed to be self-sufficient with respect to fire-fighting activities and rely on the public response only for supplemental or backup capability.</p>	<p>Susquehanna SES has been designed to be self-sufficient with respect to fire protection and relies on the public fire departments for supplemental and backup capability.</p>
<p>5. The need for good organization, training, and equipping of fire brigades at nuclear power plant sites requires effective measures be implemented to assure proper discharge of these functions. The guidance in Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants," should be followed as applicable.</p> <p>(a) Successful fire fighting requires testing and maintenance of the fire protection equipment, emergency lighting and communication, as well as practice as brigades for the people who must utilize the equipment. 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.</p>	<p>See Item B.3. above.</p>

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<p>(b) Basic training is a necessary element in an effective fire-fighting operation. In order for a fire brigade to operate effectively, it must operate as a team. All members must know what their individual duties are. They must be familiar with the layout of the plant and equipment location and operation in order to permit effective fire-fighting operations during times when a particular area is filled with smoke or is insufficiently lighted. Such training can only be accomplished by conducting drills several times a year (at least quarterly) so that all members of the fire brigade have had the opportunity to train as a team, testing itself in the major areas of the plant. The drills should include the simulated use of equipment in each area and should be preplanned and post-critiqued to establish the training objective of the drills and determine how well these objectives have been met. These drills should periodically (at least annually) include local fire department participation where possible. Such drills also permit supervising personnel to evaluate the effectiveness of communications within the fire brigade and with the on-scene fire team leader, the reactor operator in the control room, and the offsite command post.</p>	<p>Plant procedures detail the organization and actions necessary to accomplish the self-sufficient fire-fighting response. The training intervals and persons to be trained are set forth in FPRR Section 1.4. Local fire departments are invited and encouraged to attend training provided by PPL. The fire-fighting program utilizes the appropriate National Fire Protection Association codes and standards as guidance.</p>
<p>6. To have proper coverage during all phases of operation, members of each shift crew should be trained in fire protection. 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 implemented into the training of the local fire department staff. Local fire departments should be educated in the operational precautions when fighting fires on nuclear power plant sites. Local fire departments should be made aware of the need for radioactive protection of personnel and the special hazards associated with a nuclear power plant site.</p>	<p>See Item B.5. above.</p>

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<p>7. 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 fire-fighting equipment. Among the standards referenced in this document, the following should be utilized: NFPA 194 - "Standard for Screw Threads and Gaskets for Fire Hose Couplings," NFPA 196 - "Standard for Fire Hose," NFPA 197 - "Training Standard on Initial Fire Attacks," NFPA 601 - "Recommended Manual of Instructions and Duties for the Plant Watchman on Guard." NFPA booklets and pamphlets listed on page 27-11 of Volume 8, 1971-72 are also applicable for good training references. In addition, courses in fire prevention and fire suppression which are recognized and/or sponsored by the fire protection industry should be utilized.</p>	<p>The Fire Protection Program utilizes the appropriate NFPA codes and standards as guidance.</p>
<p>C. <u>Quality Assurance Program</u></p> <p>Quality Assurance (QA) programs of applicants and contractors should be developed and implemented to assure that the requirements for design, procurement, installation, and testing and administrative controls for the Fire Protection Program for safety-related areas as defined in this Branch Position are satisfied. The program should be under the management control of the QA organization. The QA program criteria that apply to the Fire Protection Program should include the following:</p>	<p><u>Construction Phase</u></p> <p>A program was provided for the design and construction phases of the fire protection installation. The program was not under the control of the QA organization. The following is a description of that program.</p>
<p>1. <u>Design Control and Procurement Document Control</u></p> <p>Measures should be established to assure that all design-related guidelines of the Branch Technical position are included in design and procurement documents and that deviations therefrom are controlled.</p>	<p>Procedures were followed by both PP&L and Bechtel, whereby appropriate existing NRC safety guides and other regulatory documents including new revision were included in design documents in accordance with Bechtel Division Engineering Standards. Plant procurement specifications were reviewed and controlled in accordance with the current procedures, design criteria, regulatory documents, and codes and standards referenced in the specific design criteria.</p>

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<p>2. <u>Instructions, Procedures, and Drawings</u></p> <p>Inspections, tests, 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.</p>	<p>Appropriate procurement and drawing procedures existed in Bechtel for the control of inspections, tests, and instructions for the fire protection equipment and systems during the procurement and construction phases. Specific care was taken to formulate adequate tests, equipment procurement, and fire drill procedures to ensure maximum fire protection capability following plant construction.</p>
<p>3. <u>Control of Purchased Material, Equipment, and Services</u></p> <p>Measures should be established to assure that purchased material, equipment, and services conform to the procurement documents.</p>	<p>Materials, services, and equipment purchased were supplied and subcontracted by individuals who have demonstrated their ability to the industry to provide quality material, equipment, and services. Bid evaluations were performed in accordance with Bechtel procedures. Surveillance inspections were performed on suppliers work (other than that performed by recognized national laboratories) in accordance with the inspection requirements of the particular equipment or material specification. Receiving inspections were performed in accordance with the Quality Control Instructions and normal warehouse procedures.</p>
<p>4. <u>Inspection</u></p> <p>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.</p>	<p>Bechtel field personnel witnessed the fire protection installation and verified conformance with design drawings.</p>
<p>5. <u>Test and Test Control</u></p> <p>A test program should be established and implemented to assure 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.</p>	<p>Not applicable to the design and construction phase.</p>

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<p>6. <u>Inspection, Test, and Operating Status</u></p> <p>Measures should be established to provide for the identification of items that have satisfactorily passed required tests and inspections.</p>	<p>Not applicable to the design and construction phase.</p>
<p>7. <u>Non-Conforming Items</u></p> <p>Measures should be established to control items that do not conform to specified requirements to prevent inadvertent use of installation.</p>	<p>Materials received by either Bechtel personnel or PP&L personnel, which did not comply with the purchase specification and equipment found not operating satisfactorily during testing, were segregated or identified as nonconforming items in accordance with Bechtel Quality Control Instructions, PP&L Warehouse procedures, or PP&L Testing Program Procedures.</p>
<p>8. <u>Corrective Action</u></p> <p>Measures should be established to assure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and non-conformances are promptly identified, reported, and corrected.</p>	<p>Conditions or equipment which would be adverse to fire protection were identified and a corrective course of action recommended to PP&L by Bechtel.</p>
<p>9. <u>Records</u></p> <p>Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the Fire Protection Program.</p>	<p>Records in the form of design drawings, letters, comment, etc., were prepared and stored to furnish evidence that fire protection criteria have been met.</p>
<p>10. <u>Audits</u></p> <p>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.</p>	<p>None.</p> <p><u>Operational Phase</u></p> <p>Following the turnover of the fire protection systems to PP&L, the PP&L OQA program took effect. The Operation Quality Assurance Program concerning fire protection is discussed in FSAR Section 17.2.2.</p>

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BRANCH TECHNICAL POSITION GUIDELINE	SUSQUEHANNA SES COMPLIANCE
<p>D. <u>General Guidelines for Plant Protection</u></p> <p>1. <u>Building Design</u></p> <p>(a) Plant layouts should be arranged to:</p> <ul style="list-style-type: none"> (1) Isolate safety-related systems from unacceptable fire hazards, and (2) Separate redundant safety-related systems from each other so that both are not subject to damage from a single fire hazard. <p>(b) In order to accomplish 1.(a) above, safety-related systems and fire hazards should be identified throughout the plant. Therefore, a detailed fire hazard analysis should be made. The fire hazards analysis should be reviewed and updated as necessary. Additionally, the fire hazards analysis should be done after any plant modification.</p> <p>(c) For multiple reactor sites, cable spreading rooms should not be shared between reactors. Each cable spreading room should be separated from other areas of the plant by barriers (walls and floors) having a minimum fire resistance of three hours. Cabling for redundant safety divisions should be separated by walls having three-hour fire barriers.</p> <p>(d) Interior wall and structural components, thermal insulation materials and radiation shielding materials, and sound-proofing should be non-combustible. Interior finishes should be non-combustible or listed by a nationally recognized testing laboratory, such as Factory Mutual or Underwriters' Laboratory, Inc. for flame spread, smoke and fuel contribution of 25 or less in its use configuration (ASTM E-84 Test, "Surface Burning Characteristics of Building Materials").</p> <p>(e) Metal deck roof construction should be non-combustible (see the building materials directory of the Underwriters' Laboratory, Inc.) or listed as Class I by Factory Mutual System Approval Guide.</p>	<p>Safe shutdown systems are addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in Section 3.0 and 6.0 of this report.</p> <p>A fire hazards analysis has been completed as part of Susquehanna SES compliance with 10CFR50, Appendix R. This fire hazards analysis will be revised after any plant modifications as necessary.</p> <p>Cable spreading rooms are enclosed by 3-hour barriers. Beams supporting the upper cable spreading room floor slabs are not fire proofed; however, they are addressed and justified in Deviation Request No. 6. The upper and lower cable spreading rooms primarily contain different divisions of safety-related cable. The separation of redundant safe shutdown cabling complies with the requirements of 10CFR50, Appendix R.</p> <p>The interior walls and structural sound proofing and radiation shielding materials are non-combustible. The interior finishes are either non-combustible or listed by a testing laboratory for flame spread, smoke, and fuel contribution of 25 or less in its use configuration.</p> <p>Non-combustible roof construction is used at Susquehanna SES.</p>

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<p>(f) Suspended ceilings and their supports should be of non-combustible construction. Concealed spaces should be devoid of combustibles. Adequate fire detection and suppression systems should be provided where full implementation is not practicable.</p> <p>(g) High voltage - High amperage transformers installed inside buildings containing safety-related systems should be of the dry type or insulated and cooled with non-combustible liquid.</p> <p>Safety-related systems that are exposed to flammable oil filled transformers should be protected from the effects of a fire by:</p> <ul style="list-style-type: none"> (i) Replacing with dry transformers or transformers that are insulated and cooled with non-combustible liquid; or (ii) Enclosing the transformer with a three-hour fire barrier and installing automatic water spray protection. <p>(h) Buildings containing safety-related systems, having openings in exterior walls closer than 50 feet to flammable oil filled transformers should be protected from the effects of a fire by:</p> <ul style="list-style-type: none"> (i) Closing of the opening to have fire resistance equal to three hours, (ii) Constructing a three-hour fire barrier between the transformers and the wall openings; or (iii) Closing the opening and providing the capability to maintain a water curtain in case of a fire. 	<p>Non-combustible suspended ceiling is used at Susquehanna SES. Concealed spaces and suspended ceilings are devoid of combustibles with the exception of cables. Where cables are present in these areas, fixed fire suppression and detection are provided.</p> <p>It is PP&L's practice to install dry type transformers in buildings. All transformers have been taken into account as part of the combustible loading analysis in compliance with Appendix R.</p> <p>Engineered safeguard auxiliary transformers (non-safety related) OX-201 and OX-203 are located more than 25 feet from the wall on column line U of the reactor building. The wall is 36 inches thick poured concrete which has a fire resistance rating of more than three hours, but there are two openings for the steam vents for the RHR pump rooms. The openings are protected by poured concrete walls. The walls have more than three hours fire resistance rating. Transformers are protected by individual deluge systems specifically designed for each transformer. Gravel filled pits surrounding each transformer base pad are sized to hold a full charge of oil and sufficient water to allow 10 minutes of deluge operation plus storm water.</p>

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<p>(i) Floor drains, sized to remove expected fire-fighting water flow should be provided in those areas where fixed water fire suppression systems are installed. Drains should also be provided in other areas where hand hose lines may be used if such fire-fighting water could cause unacceptable damage to equipment in the area. Equipment should be installed on pedestals, or curbs should be provided as required to contain water and direct it to floor drains. (See NFPA 92M, "Waterproofing and Draining of Floors.") Drains in areas containing combustible liquids should have provisions for preventing the spread of the fire throughout the drain system. Water drainage from areas which may contain radioactivity should be sampled and analyzed before discharge to the environment.</p> <p>(j) Floors, walls, and ceilings enclosing separate fire areas should have minimum fire rating of three hours. Penetrations in these fire barriers, including conduits and piping, should be sealed or closed to provide a fire resistance rating at least equal to that of the fire barrier itself. Door openings should be protected with equivalent rated doors, frames, and hardware that have been tested and approved by a nationally recognized laboratory. Such doors should be normally closed and locked or alarmed with alarm and annunciation in the control room. Penetrations for ventilation system should be protected by a standard "fire door damper" where required. (Refer to NFPA 80, "Fire Doors and Windows.")</p> <p>The fire hazard in each area should be evaluated to determine barrier requirements.</p> <p>If barrier fire resistance cannot be made adequate, fire detection and suppression should be provided, such as:</p> <ul style="list-style-type: none"> (i) Water curtain in case of fire, (ii) Flame retardant coatings, (iii) Additional fire barriers. 	<p>The floor drains at Susquehanna SES are required and are sized to accommodate the expected fire-fighting water flow from the fixed suppression systems or hose stations. Curbs are used where necessary to divert water to floor drains. Floor drains in potentially radioactive areas are routed to liquid radwaste. The water from these floor drains is monitored prior to release to the environment.</p> <p>Fire barriers required to separate redundant safe shutdown equipment are addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as described in Section 6.0 of this report.</p> <p>Additional fire barriers as required by Appendix A have a rating exceeding the combustible loading in the adjacent areas. Openings in these barriers are protected to ensure the fire rating integrity of the barrier.</p> <p>One of the following measures is employed to ensure that fire doors which separate fire areas protect openings as required in case of fire:</p> <ul style="list-style-type: none"> 1) Fire doors are kept closed and electrically supervised at a continuously manned location; or 2) Fire doors are locked closed; or 3) Fire doors are provided with automatic hold-open and release mechanisms and inspected weekly to verify that doorways are free of obstructions; or 4) Fire doors are kept closed and inspected weekly to verify that they are in the closed position.

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<p>2. <u>Control of Combustibles</u></p> <p>(a) 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:</p> <ul style="list-style-type: none"> (1) Emergency diesel generator fuel oil day tanks. (2) Turbine-generator oil and hydraulic control fluid systems. (3) Reactor coolant pump lube oil system. 	<p>This item is addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in this report.</p>

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<p>(b) 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 equipment. (Refer to NFPA 50A, "Gaseous Hydrogen Systems.")</p> <p>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.")</p>	<p>Bulk gas storage at Susquehanna SES is not permitted inside buildings housing safety-related systems. The bulk storage of hydrogen is located outdoors away from any buildings housing safety-related equipment. The orientation of the bulk hydrogen storage containers is with the long axes parallel to the Circulating Water Pumphouse west wall. The bulk storage of nitrogen is located in a vertical tank oriented with its long axis parallel to the north wall of the Radwaste Building. Bulk chlorine is not currently stored at Susquehanna SES.</p> <p>The Hydrogen Water Chemistry System storage facility is located southwest of the South Gatehouse, outside of the plant security Protected Area. This facility consists of cryogenic liquid storage tanks (one each for hydrogen, oxygen and nitrogen), ambient air vaporizers, automatic valves to isolate the tanks, liquid hydrogen pumps, hydrogen gas receivers and excess flow control devices to protect against a large system leak. This facility is designed and installed in accordance with NRC approved report EPRI NP-5283-SR-A, "Guidelines for Permanent BWR Hydrogen Water Chemistry Installation-1987 Revision". The high pressure gas receivers are located so their long axis is not pointed at any safety related buildings. This will minimize the possibility of wall penetration in the event of a container failure that might generate a missile.</p> <p>The use of compressed gas inside plant buildings is controlled by administrative procedures.</p>

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(c) 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 non-combustible 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.

Plastic architectural materials are used only where no suitable substitute material is available. These materials include plastic laminate flooring on some access floor areas, vinyl asbestos tile and seamless vinyl flooring, vinyl wall base, laminated plastic countertops, vinyl edge trim on access floor panels, and vinyl coated acoustic ceiling panels. Acrylic lenses are used in fluorescent lighting fixtures.

Cable insulation and jacketing is evaluated to assure that the use of plastic, elastomeric, combustible materials is minimized.

Local panel 1CO40 for cleanup filter/demineralizer located in Fire Zone 1-6A contains PVC insulated wiring which is not in compliance.

The PVC insulation and jacketing of cables for Unit 1 computer is not in compliance.

The PVC insulation material employed in the Unit 1 and Unit 2 Reactor Building elevator traveling cables and the Control Structure passenger elevator traveling cable are not in compliance. Elevator traveling cables are specially constructed and non-PVC cables are unavailable to the industry.

The PVC insulation and jacketing of cables for Time Response Testing is not in compliance.

Fiber optic cables designated as Cable Code FB8 and installed prior to Feb. 1998 contain PVC material. Fiber optic cables installed after Feb. 1998 should not contain PVC material.

The carpeting installed in areas containing safety-related equipment has been tested for fire safety with the following results:

Pill Test (Doc. FF1-70)
Test Results: Pass

NFPA 253 - Critical Radiant Panel Test
Test Results: 0.45 watts/cm² or higher

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<p>(d) Storage of flammable liquids should, as a minimum, comply with the requirements of NFPA 30, "Flammable and Combustible Liquids Code."</p>	<p>These results ensure that the carpet will not spread flame in the initial growth stage of a fire and the carpet will not contribute to flame spread in the event of a fire due to other combustibles.</p> <p>Procurement of additional or replacement carpeting for installation in areas housing safety-related equipment will be subject to quality assurance control.</p> <p>The storage of flammable liquids at Susquehanna SES uses the guidance within the applicable sections of NFPA 30.</p>
<p>3. <u>Electric Cable Construction, Cable Trays, and Cable Penetrations</u></p> <p>(a) Only non-combustible materials should be used for cable tray construction.</p> <p>(b) See Section F.3 for fire protection guidelines for cable spreading rooms.</p> <p>(c) Automatic water sprinkler systems should be provided for cable trays outside the cable spreading room. Cables should be designed to allow wetting down with deluge water without electrical faulting. Manual hose stations and portable hand extinguishers should be provided as backup. Safety-related equipment in the vicinity of such cable trays, that does not itself require water fire protection, but is subject to unacceptable damage from sprinkler water discharge, should be protected from sprinkler system operation of malfunction.</p> <p>When safety-related cables do not satisfy the provisions of Regulatory Guide 1.75, all exposed cables should be covered with an approved fire retardant coating and a fixed automatic water fire suppression system should be provided.</p>	<p>Susquehanna SES cable trays are constructed of non-combustible material.</p> <p>See Section F.3.</p> <p>Protection of redundant safe shutdown cabling is addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in Section 6.0 of this report.</p> <p>The tray configuration outside the cable spreading rooms complies with the separation criteria of Regulatory Guide 1.75. Manual hose stations and portable hand extinguishers are provided for fire protection.</p> <p>Cables procured for use at Susquehanna SES have been designed for installation in a wet or dry location.</p>

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<p>(d) Cable and cable tray penetration of fire barriers (vertical and horizontal) should be sealed to give protection at least equivalent to that fire barrier. The design of fire barriers for horizontal and vertical cable trays should, as a minimum, meet the requirements of ASTM E-119, "Fire Test of Building Construction and Materials," including the hose stream test. Where installed penetration seals are deficient with respect to fire resistance, these seals may be protected by covering both sides with an approved fire retardant material. The adequacy of using such material should be demonstrated by suitable testing.</p> <p>(e) Fire breaks should be provided as deemed necessary by the fire hazards analysis. Flame or flame retardant coatings may be used as a fire break for grouped electrical cables to limit spread of fire in cable ventings.</p> <p>(Possible cable derating owing to use of such coating materials must be considered during design.)</p> <p>(f) Electric cable constructions should as a minimum pass the current IEEE No. 383 flame test. (This does not imply that cables passing this test will not require additional fire protection.)</p> <p>For cable installation in operating plants and plants under construction that do not meet the IEEE No. 383 flame test requirements, all cables must be covered with an approved flame retardant coating and properly derated.</p>	<p>Vertical and horizontal cable and cable tray penetrations are sealed. The design of penetration seals for horizontal and vertical cable and cable trays have been qualified by standard fire testing methods in accordance with either ASTM E119 "Fire Test of Building Construction and Materials", IEEE 634 "Standard Cable Penetration Fire Stop Qualification Test", or ASTM E814 "Fire Tests of Through-Penetration Fire Stops". All fire testing for these penetration seals considered the exposure fire time-temperature curve as defined in ASTM E119. Thermal responses at representative locations (i.e. sealant surface, through penetrant, or interface of sealant/through penetrant) on the unexposed sides of the tested assemblies were recorded for comparison to the appropriate acceptance criteria identified in the above referenced standard fire tests. Hose stream testing has been performed on all fire-tested configurations. The majority of the hose stream testing meets the ASTM E119 requirements. However, several configurations were qualified by alternative hose stream testing applications deemed acceptable by Generic Letter 86-10 Supplement 1, Information Notice 88-04, Appendix A, and NUREG-0800, Section 9.5.1.</p> <p>Although fire breaks have been installed at Susquehanna SES, they are not deemed necessary as a result of the fire hazards analysis. Therefore, it is not intended that new breaks will be installed nor will existing breaks be maintained unless the fire break is specifically described in Section 6.0, a deviation request, or is part of a fire barrier.</p> <p>All Class 1E scheduled cable types used at Susquehanna SES have been qualified in accordance with IEEE 383 except for small quantities of PVC insulated and jacketed cables identified in our response to Item D.2.c. above.</p>

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<p>(g) To the extent practical, cable construction that does not give off corrosive gases while burning should be used in new cable installations.</p> <p>(h) Cable trays, raceways, conduit, trenches, or culverts should be used only for cables. Miscellaneous storage should not be permitted, nor should piping for flammable or combustible liquids or gases be installed in these areas.</p> <p>Previously installed equipment in cable tunnels or culverts need not be removed if they present no hazard to the cable runs as determined by the fire hazards analysis.</p> <p>(i) The design of cable tunnels, culverts, and spreading rooms should provide for automatic or manual smoke venting as required to facilitate manual fire-fighting capability.</p> <p>(j) Cables in the control room should be kept to the minimum necessary for operation of the control room. All cables entering the control room should terminate there. Cables should not be installed in floor trenches or culverts in the control room.</p> <p>Existing cabling installed in concealed floor and ceiling spaces should be protected with an automatic total flooding halon system.</p>	<p>Cable types which give off highly corrosive gases while burning such as PVC cabling are not used for new cable installations at Susquehanna SES except for small quantities of PVC insulated and jacketed cables identified in our response to Item D.2.c above.</p> <p>Fiber optic cables designated as Cable Code FB8 and installed prior to Feb. 1998 contain PVC material. Fiber optic cables installed after Feb. 1998 should not contain PVC material.</p> <p>At Susquehanna SES, the raceways (cable trays and conduits) are used only for cables. Piping for flammable or combustible liquids or gases is not routed near safe shutdown systems.</p> <p>The Control Structure, including the cable spreading rooms, is provided with a manual smoke removal system to facilitate manual fire-fighting capability.</p> <p>Cables installed in the control room (Fire Zone 0-26H) have been kept to the minimum necessary for operation of the control room. Design practice is not to route cables into the control room without terminating them there.</p> <p>Cabling installed in concealed floor and ceiling spaces are protected with total flooding CO₂ systems.</p>

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4. Ventilation

- (a) The products of combustion that need to be a specific fire area should be evaluated to determine how they will be controlled. Smoke and corrosive gases should generally be automatically discharged directly outside to a safe location. Smoke and gases containing radioactive materials should be monitored in the fire area to determine if release to the environment is within the permissible limits of the plant Technical Specifications.

The products of combustion which need to be removed from a specific fire area should be evaluated to determine how they will be controlled.

The SSES ventilation exhaust system is described below. Not all rooms and areas have fixed exhaust systems to remove combustion products. The rooms and areas that do have exhaust systems capable of removing smoke do not automatically discharge directly outside as specified in the guideline. This specified discharge is contrary to effective fire-fighting guidelines, which refer to automatic room isolation in the event of fire, and guidelines and regulations that govern the release of radioactivity. In all cases the operator will have the option of controlling the various systems manually.

The exhaust systems contain fire dampers and doors where penetrations are made in fire-rated walls, floors, or ceilings.

Products of combustion emanating from areas that could contain radioactive materials are continuously monitored prior to discharge. These monitors do not monitor a given single-fire area.

The following described the method used in controlling smoke from various areas:

Control Structure: In case of fire in any room in the control structure between elevations 698'-0" through 771'-0", the fire dampers of the supply and return air ducts will close automatically and isolate the room. After the fire has been extinguished, the smoke removal fan can be started manually and the required dampers necessary for smoke removal from the affected room will be opened by remote manual operation. The exhausted smoke is monitored for radiation in the exhaust stack.

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Turbine Building: The turbine lube oil reservoir room, hydraulic control power room, lube oil centrifuge and conditioner room, and upper and lower switchgear rooms in the turbine building are provided with fire dampers in their supply and return air ducts. The above listed rooms will be isolated in case of fire.

There is no dedicated smoke removal system in the turbine building. Smoke and heat vents on a ratio of 1 sq. ft. of effective vent area to each 100 sq. ft. of floor area and heat vents are operated either by fusible link or manually.

Reactor Building: The heating and ventilating system of the reactor building is a 100 percent outside air operation. The reactor building has no dedicated smoke removal system. Only the emergency load center and emergency switchgear rooms are provided with fire dampers at the ventilation system penetrations for isolation in case of fire. Portable smoke ejectors are provided if required. Once control of the fire is established, the ventilation system serving the affected area can be activated.

Radwaste Building: The heating and ventilating system of the radwaste building is a 100 percent outside air operation. In case of fire, the supply and exhaust fans can be stopped manually by the operator. Smoke could be removed after a fire by using a portable smoke ejector. There is no dedicated smoke removal system in the radwaste building.

Diesel Generator, ESSW Pumphouse, and Circulating Water Pumphouse: None of these buildings are provided with a dedicated smoke removal system. Upon receiving an alarm in the control room, the operator can remotely stop the ventilation systems in either the diesel generator building or the ESSW pumphouse. The circulating water pumphouse requires local tripping of each fan system in order to isolate the building. All systems for the subject buildings are capable of exhausting and supplying fresh air by manually activating the ventilation systems.

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- (b) Any ventilation system designed to exhaust smoke or corrosive gases should be evaluated to ensure that inadvertent operation or single failures will not violate the controlled areas of the plant design. This requirement includes containment functions for protection of the public and maintaining habitability for Operations personnel.
- (c) The power supply and controls for mechanical ventilation systems should be run outside the fire area served by the system.
- (d) Fire suppression systems should be installed to protect charcoal filters in accordance with Regulatory Guide 1.52, "Design Testing and Maintenance Criteria for Atmospheric Cleanup Air Filtration."
- (e) 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.
- (f) Stairwells should be designed to minimize smoke infiltration during a fire. Staircases should serve as escape routes and access routes for fire fighting. Fire exit routes should be clearly marked. Stairwells, elevators, and chutes should be enclosed in masonry towers with a minimum fire rating of three hours and automatic fire doors at least equal to the enclosure construction at each opening into the building. Elevators should not be used during fire emergencies. Where stairwells or elevators cannot be enclosed in three-hour fire-rated barrier with equivalent fire doors, escape and access routes should be established by pre-fire plan and practiced in drills by operating and fire brigade personnel.

Other than the smoke vents in the turbine building roof and the smoke exhaust system for the control structure, there are no portions of the ventilation system specifically dedicated to smoke removal. The basic design of the overall plant ventilation system considers the effects of inadvertent operation and single failure. The effects of inadvertent operation of the control room ventilation system (pressurization) are minimized by administrative controls. The fire dampers provided within the ventilation system affect only those portions isolated by the dampers with no adverse effects on the balance of the systems.

The controls for all fans are in the same fire area they serve except for hand switches located in the control room.

The suppression systems for charcoal filters are designed in accordance with the recommendation of Regulatory Guide 1.52.

No basis for determining the acceptability of intake and exhaust separation is given in the guideline. Because the requirements of the Uniform Building Code and standard practice are met, existing plant design is considered in compliance with the guideline. The minimum distance between an exhaust system and fresh air intake is approximately 90 feet.

Although the stairwells are not ventilated by the HVAC system, they are provided with fire doors which are normally closed which minimize smoke infiltration. The stairways are clearly marked and are enclosed in two-hour shafts which is the industry standard construction. This provides a three-hour floor-to-floor separation.

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<p>(g) Smoke and heat vents may be useful in specific areas such as cable spreading rooms and diesel fuel oil storage areas and switchgear rooms. When natural-convection ventilation is used, a minimum ratio of 1 sq. foot of venting area per 200 sq. feet of floor area should be provided. If forced-convection ventilation is used, 300 CFM should be provided for every 200 sq. feet of floor area. See NFPA No. 204 for additional guidance on smoke control.</p> <p>(h) 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. Control room personnel may be furnished breathing air by a manifold system piped from a storage reservoir if practical. Service or operating life should be a minimum of one half except for the self-contained units.</p> <p>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 should be used. Special care must be taken to locate the compressor in areas free of dust and contaminants.</p> <p>(i) Where total flooding gas extinguishing systems are used, area intake and exhaust ventilation dampers should close upon initiation of gas flow to maintain necessary gas concentration. (See NFPA 12, "Carbon Dioxide Systems," and 12A, "Halon 1301 Systems.")</p>	<p>Smoke and heat vents are provided in the turbine building at a ratio of 1 sq. ft. of venting area to each 100 sq. ft. of floor area. The upper and lower switch gear room fire doors would need to be opened manually and exhausted with a portable smoke ejector.</p> <p>The cable spreading rooms are provided with a separate smoke removal system as described in Item D.4.a. of this table.</p> <p>The self-contained breathing apparatus available on site are full face positive pressure masks. This apparatus is provided to the fire brigade, damage control, and control room personnel. Each self-contained breathing apparatus has a minimum of one half hour service time. Each has an adequate supply of bottles and an air recharging system is on site which satisfies the six-hour supply of reserve air requirement.</p> <p>Initiation of a total flooding gas extinguishing system automatically closes the inlet and exhaust dampers in ventilation ducts serving the areas protected by the system.</p> <p>The Halon 1301 systems are totally enclosed within the PGCC units and do not require dampers to isolate.</p>

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5. 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 to satisfy the following requirements:

- (a) Fixed emergency lighting should consist of sealed beam units with individual 8-hour minimum battery power supplies.
- (b) Suitable sealed beam battery powered portable hand lights should be provided for emergency use.
- (c) Fixed emergency communication should use voice powered head sets at preselected stations.
- (d) Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage.

Sealed beam units with individual eight-hour minimum battery power supplies are addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in this report. Additional lighting which meets Pennsylvania State requirements for emergency egress is provided throughout the facility.

Sealed beam battery-powered portable hand lights are provided for emergency use.

The communication system consists of four separate and independent networks:

- 1. Radio system - 5 channel UHF Security (1 primary, 1 backup)
Operations (1 for Unit 1, 1 for Unit 2)
Other Talk Groups (1 Channel)
- 2. Public address - 6 channels, 1 page and 5 talk
- 3. Private auto branch exchange telephone system
- 4. Voice Powered Communication System

Repeaters for the radio system are not protected since they are located in an area of the turbine building which contains low combustibles and no safety-related equipment.

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<p>E. <u>Fire Detection and Suppression</u></p> <p>1. <u>Fire Detection</u></p> <p>(a) Fire detection systems should as a minimum comply with NFPA 72D, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems."</p> <p>(b) Fire detection system should give audible and visual alarm and annunciation in the control room. Local audible alarms should also sound at the location of the fire.</p> <p>(c) Fire alarms should be distinctive and unique. They should not be capable of being confused with any other plant system alarms.</p> <p>(d) Fire detection and actuation systems should be connected to the plant emergency power supply.</p>	<p>The system complies with the requirements of NFPA 72D, Proprietary Protective Signaling Systems, except as follows:</p> <ul style="list-style-type: none"> - Operation and supervision of the system is not the primary function of the operators. - Only a low-level alarm is provided for the clarified water storage tank to indicate level is at 300,000 gallons. - Water storage containers are not provided with alarm annunciation when water temperature is below 40°F. - Local alarms are as follows: <ul style="list-style-type: none"> 1) Deluge and preaction systems - no local audible alarm 2) CO₂ - 1 common local audible alarm 3) Ionization, combustion, and fire detectors - no local audible alarm <p>The AC power supplied to the fire detection and actuation systems is fed from the vital AC system.</p>

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2. Fire Protection Water Supply Systems

- (a) An underground yard fire main loop should be installed to furnish anticipated fire 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). Lined steel or cast iron pipe should be used to reduce internal tuberculation. Such tuberculation deposits in an unlined pipe over a period of years can significantly reduce water flow through the combination of increased friction and reduced pipe diameter. Means for treating and flushing the systems should be provided. 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 entire system.

The fire main system piping should be separate from service or sanitary water system piping.

- (b) A common yard fire main loop may serve multi-unit 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. The water supply should be sized for the largest single expected flow. For multiple reactor sites with widely separated plants (approaching 1 mile or more), separate yard fire main loops should be used.

The underground yard fire main loop complies with NFPA 24. It is made of mortar-lined ductile iron pipe to reduce tuberculation.

Water used for fire service meets requirements of NFPA 22 and does not require treatment. Flushing of the fire main is possible by sectionalized control of the main fire loop.

Post indicator valves provide sectionalized control and isolation to portions of the fire main loop.

The fire main system piping is separate from the service and domestic water system piping.

Susquehanna SES is a two-unit plant site. A common underground fire loop serves both units of the plant. Since both units are in a single plant structure, it is not possible to run an individual loop around each unit. The fire main includes post indicator valves for sectionalizing control of the fire protection water distribution system. A common water supply is used and sized for the maximum expected flow of a single plant fire since fires in both units simultaneously are not a design consideration.

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<p>(c) If pumps are required to meet system pressure or flow requirements, a sufficient number of pumps should be provided so that 100% capacity will be available with one pump inactive (e.g., three 50% pumps or two 100% pumps). The connection to the yard fire main loop from each fire pump should be widely separated, preferably located on opposite sides of the plant. Each pump should have its own driver with independent power supplies and control. At least one pump (if not powered from the emergency diesels) should be driven by non-electrical means, preferably diesel engine. Pumps and drivers should be located in rooms separated from the remaining pumps and equipment by a minimum three-hour fire wall. Alarms indicating pump running, driver availability, or failure to start should be provided in the control room.</p> <p>Details of the fire pump installation should as a minimum conform to NFPA 20, "Standard for the Installation of Centrifugal Fire Pumps."</p>	<p>Two 100% redundant 2500 gpm, 125 psi fire pumps are provided. One pump is diesel driven and the other pump is electric.</p> <p>SSES is provided with three separate sources of water to be used for fire protection. The three sources (clarified water storage tank, Unit 1 and Unit 2 cooling tower basis) are interconnected, allowing the pumps to draw water from any or all sources.</p> <p>Individual fire pump connections to the yard fire main loop are separated with sectionalizing valves between connections.</p> <p>The diesel engine driven fire pump is located in a room enclosed by three-hour fire rated walls, doors, and duct penetrations. The motor driven fire pump is located in the main pump room with the service water pumps and circulating water pumps. This area has a low combustible loading and is protected by hose reels and portable fire extinguishers. The diesel engine driven fire pump is protected by a wet pipe sprinkler system.</p> <p>Alarms indicating pump running, driver availability, or failure to start have been provided in the control room.</p> <p>The fire pump installation conforms to NFPA 20 with the exception that the electric fire pump feeder circuit conductors, which are physically routed inside of the turbine building, are not protected with two inches of concrete.</p>

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<p>(d) Two separate reliable water supplies should be provided. 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 from either or both. However, a leak in one tank or its piping should not cause both tanks to drain. The main plant fire water supply capacity should be capable of refilling either tank in a minimum of eight hours.</p> <p>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 means of a vertical standpipe for other water services.</p> <p>(e) The fire water supply (total capacity and flow rate) should be calculated on the basis of the largest expected flow rate for a period of two hours, but not less than 300,000 gallons. This flow rate should be based (conservatively) on 1,000 gpm for manual hose streams plus the greater of:</p> <ol style="list-style-type: none"> (1) All sprinkler heads opened and flowing in the large designed fire area, or (2) The largest open head deluge system(s) operating. <p>(f) Lakes or fresh water ponds of sufficient size may qualify as sole source of water for fire protection but require at least two intakes to the pump supply. When a common water supply is permitted for fire protection and the ultimate heat sink, the following conditions should also be satisfied:</p> <ol style="list-style-type: none"> (1) The additional fire protection water requirements are designed into the total storage capacity, and (2) Failure of the fire protection system should not degrade the function of the ultimate heat sink. 	<p>At Susquehanna SES, there are three separate sources of water to be used for fire protection. The three sources (clarified water storage tank, Unit 1 and Unit 2 cooling tower basins) are available to be interconnected.</p> <p>The capacity of the clarified water storage tank used for fire protection is 300,000 gallons. Each of the cooling tower basins contain 6,000,000 gallons.</p> <p>Not applicable to Susquehanna SES.</p>

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<p>(g) Outside manual hose installation should be sufficient to reach any location with an effective hose stream. To accomplish this, hydrants should be installed approximately every 250 feet on the yard main system. The lateral to each hydrant from the yard main should be controlled by a visually indicating or key-operated (curb) valve. 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 feet.</p> <p>Threads compatible with those used by local fire departments should be provided on all hydrants, hose couplings, and standpipe risers.</p>	<p>The outside hose stations were equipped using NFPA 24 as guidance and can reach all safety-related buildings location. The yard main laterals to the hydrants are controlled by a post indicating valve.</p> <p>PP&L has standardized on American National Fire Hose connection screw thread (NST) as set forth in the National Fire Protection Association Standard 1963.</p> <p>Equipment and material is provided to support the plant's need to be self-reliant; adapters from American National Fire Hose connection screw threads (NST) to the thread type of the local fire department are provided for fire department use.</p>
<p>3. <u>Water Sprinklers and Hose Standpipe Systems</u></p> <p>(a) Each automatic sprinkler system and manual hose station standpipe should have an independent connection to the plant underground water main. Headers fed from each end are permitted inside buildings to supply multiple sprinkler and standpipe systems. When provided, such headers are considered an extension of the yard main system. The header arrangement should be such that no single failure can impair both the primary and backup fire protection systems.</p> <p>Each sprinkler and standpipe system should be equipped with OS&Y (outside screw and yoke) gate valve, or other approved shut-off valve, and water flow alarm. Safety-related equipment that does not itself require sprinkler water fire protection but is subject to unacceptable damage if wetted by sprinkler water discharge should be protected by water shields or baffles.</p>	<p>Sprinkler systems and manual hose station standpipes are connected to the plant underground water main separately so that no single active failure or crack in a moderate-energy line can impair both the primary and backup fire suppression systems. Hose, standpipe, and automatic water suppression systems serving a single fire area have independent connections to the yard main system.</p> <p>Headers fed from each end are not used at Susquehanna SES.</p> <p>The effect of fire protection on safe shutdown equipment is addressed as part of the Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in this report.</p> <p>All sprinkler systems in safety-related buildings are equipped with an approved shutoff valve and a water flow alarm. All standpipes in safety-related buildings are equipped with approved shutoff valves.</p>

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<p>(b) All valves in the fire water systems should be electrically supervised. The electrical supervision signal should indicate in the control room and other appropriate command locations in the plant. (See NFPA 26, "Supervision of Valves.")</p> <p>When electrical supervision of fire protection valves is not practicable, an adequate management supervision program should be provided. Such a program should include locking valves open with strict key control, tamper proof seals, and periodic, visual check of all valves.</p> <p>(c) Automatic sprinkler systems should as a minimum conform to requirements of appropriate standards such as NFPA 13, "Standard for the Installation of Sprinkler Systems," and NFPA 15, "Standard for Water Spray Fixed Systems."</p> <p>(d) Interior manual hose installation should be able to reach any location with at least one effective hose stream. To accomplish this, standpipes with hose connections equipped with a maximum of 75 feet of 1-1/2 inch woven jacket lined fire hose and suitable nozzles should be provided in all buildings, including containment, on all floors and should be spaced at not more than 100-foot intervals. Individual standpipes should be of at least 4-inch diameter for multiple hose connections and 2-1/2 inch diameter for single hose connections. These systems should follow the requirements of NFPA No. 14 for sizing, spacing, and pipe support requirements.</p>	<p>All major fire-protection control valves are provided with electrical supervision or locked in the open position with the exception of normally closed valves.</p> <p>The appropriate requirements of NFPA 13 and NFPA 15 were used as guidance for the design and installation of automatic sprinkler systems.</p> <p>A general system description for standpipes and hose stations at Susquehanna is included in FPRR section 4.6. The standpipes and hose stations were installed prior to the issue date of BTP 9.5-1. There are no standpipes or hose stations inside of primary containment.</p> <p>Hose stations are strategically located throughout the plant using the guidance of NFPA 14. Each hose station in the power block contains 100 feet of 1-1/2 inch fire hose with an appropriate nozzle. Hose stations were originally designed to assure that each room or plant area would be within the effective range of a 100' fire hose with suitable nozzle. This resulted in most of the hose stations being spaced at greater than 100' intervals. However, areas have been identified in the plant where an effective hose stream from the installed 100' fire hose at the hose station may not be sufficient to fully reach all extents of each area. The site Fire Brigade is trained in fighting fires using hose stations and actions to be taken should additional fire hose be required. For those areas where the installed fire hose is not long enough, high rise fire hose packs are available for Fire Brigade use.</p>

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<p>Hose stations should be located outside entrances to normally unoccupied areas and inside normally occupied areas. Standpipes serving hose stations in areas housing safety-related equipment should have shut off valves and pressure reducing devices (if applicable) outside the area.</p> <p>(e) The proper type of hose nozzles to be supplied to each area should be based on the fire hazard analysis. The usual combination spray/straight-stream nozzle may cause unacceptable mechanical damage (for example, the delicate electronic equipment in the control room) and be unsuitable. Electrically safe nozzles should be provided at locations where electrical equipment or cabling is located.</p> <p>(f) Certain fires such as those involving flammable liquids respond well to foam suppression. Consideration should be given to use of any of the available foams for such specialized protection application. These include the more common chemical and mechanical low expansion foams, high expansion foam, and the relatively new aqueous film forming foam (AFFF) for the portion of hose standpipe system affected by this functional requirement should at least satisfy ANSI Standard B31.1, "Power Piping." The water supply for this condition may be obtained by manual operator actuation of valve(s) in a connection to the hose standpipe header from a normal Seismic Category I water system such as Essential Service Water System. The cross-connection should be (a) capable of providing flow to at least two hose stations (approximately 75 gpm/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.</p>	<p>There are no standpipes or hose stations inside of the ESSW pumphouse or the A, B, C, and D diesel generator buildings. Both the ESSW pumphouse and the diesel generator building are in close proximity to outside yard fire hydrants. These fire hydrants are provided with hose houses which are outfitted with 2-1/2 inch and 1-1/2 inch hoses and nozzles.</p> <p>All normally occupied areas have hose stations provided inside with the exception of the Control Room, where they are located adjacent to the Control Room. Standpipes serving hose stations in areas housing safety-related equipment have post indicator valves located outside the building.</p> <p>The hose nozzles are selected based on the fire hazards analysis. Electrically safe nozzles are provided where electrical equipment or cabling is located.</p> <p>Automatic foam fire suppression is not used at Susquehanna SES.</p>

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<p>4. <u>Halon Suppression Systems</u></p> <p>The use of Halon fire extinguishing agents should as a minimum comply with the requirements of NFPA 12A and 12B, "Halogenated Fire Extinguishing Agent Systems - Halon 1301 and Halon 1211." Only UL or FM approved agents should be used.</p> <p>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.</p> <p>Particular consideration should also be given to:</p> <ul style="list-style-type: none"> (a) Minimum required Halon concentration and soak time. (b) Toxicity of Halon. (c) Toxicity and corrosive characteristics of thermal decomposition products of Halon. 	<p>The appropriate requirements of NFPA 12A and 12B were used for the design and installation of Halon systems. Preventive maintenance and testing are performed in accordance with the plant technical specifications.</p>
<p>5. <u>Carbon Dioxide Suppression Systems</u></p> <p>The use of carbon dioxide extinguishing systems should as a minimum comply with the requirements of NFPA 12, "Carbon Dioxide Extinguishing Systems."</p> <p>Particular consideration should also be given to:</p> <ul style="list-style-type: none"> (a) Minimum required CO₂ concentration and soak time. (b) Toxicity of CO₂. (c) Possibility of secondary thermal shock (cooling) damage. (d) Offsetting requirements for venting during CO₂ injection to prevent overpressurization versus sealing to prevent loss of agent. 	<p>The appropriate requirements of NFPA 12 were used for the design and installation of the CO₂ systems.</p>

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<p>6. <u>Portable Extinguishers</u></p> <p>Fire extinguishers should be provided in accordance with guidelines of NFPA 10 and 10A, "Portable Fire Extinguishers, Maintenance and Use." Dry chemical extinguishers should be installed with due consideration given to cleanup problems after use and possible adverse effects on equipment installed in the area.</p> <p>F. <u>Guidelines for Specific Plant Areas</u></p> <p>1. <u>Primary and Secondary Containment</u></p> <p>(a) <u>Normal Operation</u></p> <p>Fire protection requirements for the primary and secondary containment areas should be provided on the basis of specific identified hazards. For example:</p> <ul style="list-style-type: none"> • Lubricating oil or hydraulic fluid system for the primary coolant pumps. • Cable tray arrangements and cable penetrations. • Charcoal filters. <p>Because of the general inaccessibility of these areas during normal plant operations, protection should be provided by automatic fixed systems. Automatic sprinklers should be installed for those hazards identified as requiring fixed suppression.</p> <p>Fire suppression systems should be provided based on the fire hazards analysis.</p>	<p>The appropriate requirements of NFPA 10 were used for the selection and location of plant portable fire extinguishers. The effectiveness, nature, and clean-up associated with each fire extinguishing agent is considered in placement of fire extinguishers.</p> <p>This item is addressed as part of the Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in Section 6.0 of this report.</p> <p>Safety related HVAC charcoal filters for SGTS and CREOAS are protected with manually operated deluge systems.</p>

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<p>Fixed fire suppression capability should be provided for hazards that could jeopardize safe plant shutdown. Automatic sprinklers are preferred. An acceptable alternate is automatic gas (Halon or CO₂) for hazards identified as requiring fixed suppression protection.</p> <p>Operation of the fire protection systems should not compromise integrity of the containment or the other safety-related systems. Fire protection activities in the containment areas should function in conjunction with total containment requirements such as control of contaminated liquid and gaseous release and ventilation.</p> <p>An enclosure may be required to confine the agent if a gas system is used. Such enclosures should not adversely affect safe shutdown or other operating equipment in containment.</p> <p>Fire detection systems should alarm and annunciate in the control room. The type of detection used and the location of the detectors should be most suitable to the particular type of fire that could be expected from the identified hazard. A primary containment general area fire detection capability should be provided as backup for the above described hazard detection. To accomplish this, suitable smoke detection (e.g., visual obscuration, light scattering and particle counting) should be installed in the air recirculation system ahead of any filters.</p> <p>Automatic fire suppression capability need not be provided in the primary containment atmospheres that are inerted during normal operation. However, special fire protection requirements during refueling and maintenance operations should be satisfied as provided below.</p>	<p>See the response to Item E.3.a of Table 5.0-1.</p>

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<p>(b) <u>Refueling and Maintenance</u></p> <p>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 fuel gas supply). Possible fires would not necessarily be in the vicinity of fixed detection and suppression systems.</p> <p>Management procedures and controls necessary to assure adequate fire protection are discussed in Section 3a.</p> <p>In addition, manual fire-fighting capability should be permanently installed in containment. Standpipes with hose stations and portable fire extinguishers should be installed at strategic locations throughout containment for any required manual fire-fighting operations.</p> <p>Equivalent protection from portable systems should be provided if it is impractical to install standpipes with hose stations.</p> <p>Adequate self-contained breathing apparatus should be provided near the containment entrances for fire fighting and damage control personnel. These units should be independent of any breathing apparatus or air supply systems provided for general plant activities.</p>	<p>The Susquehanna SES plant procedures govern transient combustibles and ignition sources in the primary and secondary containments.</p> <p>The atmosphere inside the primary containment area is inerted with nitrogen during operation. There are no standpipes with hose stations installed within the primary containment. During maintenance and refueling, a hose from the standpipe/hose reel located inside the shielding wall of the equipment and personnel access door can be brought into the containment.</p> <p>Portable fire extinguishers are also provided at the containment during refueling and major maintenance outages.</p> <p>Adequate self-contained breathing apparatus are provided at several locations within the plant in designated fire brigade sheds.</p>
<p>2. <u>Control Room</u></p> <p>The control room is essential to safe reactor operation. It must be protected against disabling fire damage and should be separated from other areas of the plant by floors, walls, and roofs having minimum fire resistance ratings of three hours.</p>	<p>The control room fire area is bounded on all sides by three-hour fire-rated barriers except for the structural steel beams supporting the floor slab over the control room which are not fire proofed. This barrier is addressed and justified in Deviation Request No. 6.</p>

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<p>Control room cabinets and consoles are subject to damage from two distinct fire hazards:</p> <ul style="list-style-type: none"> (a) Fire originating within a cabinet or console; and (b) Exposure fire involving combustibles in the general room area. <p>Manual fire-fighting capability should be provided for both hazards. Hose stations and portable water and Halon extinguishers should be located in the control room to eliminate the need for operators to leave the control room. An additional hose piping shutoff valve and pressure reducing device should be installed outside the control room.</p> <p>Hose stations adjacent to the control room with portable extinguishers in the control room are acceptable.</p> <p>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.</p> <p>Fire detection in the control room cabinets and consoles should be provided by smoke and heat detectors in each fire area. Alarm and annunciation should be provided in the control room. Fire alarms in other parts of the plant should also be alarmed and annunciated in the control room.</p> <p>Breathing apparatus for control room operators should be readily available. Control room floors, ceiling, supporting structures, and walls, including penetrations and doors, should be designed to a minimum fire rating of three hours. All penetration seals should be airtight.</p>	<p>A standpipe with a hose reel is located at the control room elevation in each of the two control structure stairwells. Electrically safe nozzles have been provided.</p> <p>Portable fire extinguishers are located both inside and outside adjacent to the control room.</p> <p>Fire detection is provided under the false floor, above the false ceiling, in cable chases, and in the normally occupied areas.</p> <p>Breathing apparatus for control room operators is readily available.</p> <p>Cables located in concealed floor and ceiling spaces are provided with fixed automatic total flooding or manual spurt CO₂ protection.</p> <p>A duct ionization smoke detector is installed in the outside air intake plenum, which alarms in the control room if smoke is about to enter the control room. The operator can manually isolate the control room ventilation system.</p> <p>Automatically isolating the control room ventilation system by the detection system would be degrading to the safety-related ventilation system since the fire detection system is non-safety related.</p> <p>Cables in the PGCC floor sections are protected by an automatic Halon system.</p> <p>See Section D.3.(j) for a discussion of cable terminations.</p>

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<p>The control room ventilation intake should be provided with smoke detection capability to automatically alarm locally and isolate the control room ventilation system to protect operators by preventing smoke from entering the control room.</p> <p>Manually operated venting of the control room should be available so that operators have the option of venting for visibility. Manually operated ventilation systems are acceptable.</p> <p>Cables should not be located in concealed floor and ceiling spaces. All cables that enter the control room should terminate in the control room. That is, no cabling should be simply routed through the control room from one area to another. If such concealed spaces are used, however, they should have fixed automatic total flooding halon protection.</p>	
<p>3. <u>Cable Spreading Room</u></p> <p>(a) The preferred acceptable methods are:</p> <p>(1) Automatic water system such as closed head sprinklers, open head deluge, or open directional spray nozzles. Deluge and open spray systems should have provisions for manual operation at a remote station; however, there should also be provisions to preclude inadvertent operation. Location of sprinkler heads or spray nozzles should consider cable tray sizing and arrangements to assure adequate water coverage. Cables should be designed to allow wetting down with deluge water without electrical faulting. Open head deluge and open directional spray systems should be zoned so that a single failure will not deprive the entire area of automatic fire suppression capability. The use of foam is acceptable, provided it is of a type capable of being delivered by a sprinkler or deluge system, such as an Aqueous Film Forming Foam (AFFF).</p>	<p>Automatic pre-action water system using closed head directional spray nozzles is provided to protect the cable spreading rooms.</p>

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<p>(2) Manual hoses and portable extinguishers should be provided as backup.</p> <p>(3) Each cable spreading room of each unit should have divisional cable separation and be separated from the other and the rest of the plant by a minimum three-hour rated fire wall. (Refer to NFPA 251 or ASTM E-119 for fire test resistance rating.)</p> <p>(4) At least two remote and separate entrances are provided to the room for access by fire brigade personnel.</p> <p>(5) Aisle separation provided between tray stacks should be at least three feet wide and eight feet high.</p> <p>(b) For cable spreading rooms that do not provide divisional cable separation of a(3), in addition to meeting a(1), (2), (4), and (5) above, the following should also be provided:</p> <p>(1) Divisional cable separation should meet the guidelines of Regulatory Guide 1.75, "Physical Independence of Electric Systems".</p> <p>(2) All cabling should be covered with a suitable fire retardant coating.</p> <p>(3) As an alternate to a(1) above, automatically initiated gas systems (Halon or CO₂) may be used for primary fire suppression, provided a fixed water system is used as a backup.</p> <p>(4) Plants that cannot meet the guidelines of Regulatory Guide 1.75, in addition to meeting a(1), (2), (4), and (5) above, an auxiliary shutdown system with all cabling independent of the cable spreading room should be provided.</p>	<p>Manual fire hose stations and portable fire extinguishers are provided as backup.</p> <p>Each unit has two cable spreading rooms which generally contain separate electrical divisions and are separated from the remainder of the plant and each other by a minimum three-hour rated fire barrier. The ability to safely shut down the plant is addressed as part of the Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in this report.</p> <p>Two remote and separate entrances are provided to each of the cable spreading rooms.</p> <p>The aisle separation between tray stacks in the upper cable spreading room, for the most part, satisfy with the width and height recommendations of Appendix A. However, due to space limitations in some areas, the aisle height clearance is between 7 feet and 3 feet 6 inches.</p> <p>N/A</p>

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<p>4. <u>Plant Computer Room</u></p> <p>Safety-related computers should be separated from other areas of the plant by barriers having a minimum three-hour fire resistant rating. Automatic fire detection should be provided to alarm and annunciate in the control room and alarm locally. Manual hose stations and portable water and Halon fire extinguishers should be provided.</p>	<p>The computers at Susquehanna SES are not safety related, but a three-hour barrier separates the computer room from the relay rooms. The computer room is protected by a CO₂ system. The computer room fire detection system is automatic and is alarmed in the control room. No local annunciation is provided. Portable extinguishers are provided.</p>
<p>5. <u>Switchgear Rooms</u></p> <p>Switchgear rooms should be separated from the remainder of the plant by minimum three-hour rated fire barriers to the extent practicable. Automatic fire detection should alarm and annunciate in the control room and alarm locally. Fire hose stations and portable extinguishers should be readily available.</p> <p>Acceptable protection for cables that pass through the switchgear room is automatic water or gas agent suppression. Such automatic suppression must consider preventing unacceptable damage to electrical equipment and possible necessary containment of agent, following discharge.</p>	<p>Switchgear rooms are enclosed by concrete or concrete block walls of sufficient thickness and density to qualify as three-hour rated barriers. Floor slabs and overhead slabs are of sufficient thickness to qualify as three-hour rated barriers. Exposed floor steel framing is not fireproofed. However, it is justified in Deviation Request No. 6.</p> <p>The fire detection system in the switchgear rooms alarm on the fire protection control panel in the control room. No automatic water or gas agent suppression is provided for cables passing through the switchgear rooms.</p> <p>Fire hose stations and portable extinguishers are readily available.</p>
<p>6. <u>Remote Safety-Related Panels</u></p> <p>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 provided.</p>	<p>The fire detection system in the area of remote safety-related panels will alarm on the fire protection control panel in the control room. Fire hose stations and portable extinguishers are provided.</p> <p>Combustible material is controlled through the plant procedures.</p>

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<p>7. <u>Station Battery Rooms</u></p> <p>Battery rooms should be protected against fire explosions. Battery rooms should be separated from each other and other areas of the plant by barriers having a minimum fire rating of three hours inclusive of all penetrations and openings. (See NFPA 69, "Standard on Explosion Prevention Systems.") Ventilation systems in the battery rooms should be capable of maintaining the hydrogen concentration well below 2 volume % hydrogen concentration. Standpipe and hose and portable extinguishers should be provided.</p> <p>Alternatives:</p> <p>(a) Provide a total fire-rated barrier enclosure of the battery room complex that exceeds the fire load contained in the room.</p> <p>(b) Reduce the fire load to be within the fire barrier capability of 1-1/2 hours.</p> <p align="center">OR</p> <p>(c) Provide a remote manual actuated sprinkler system in each room and provide the 1-1/2 hour fire barrier separation.</p>	<p>The appropriate requirements, including protection against fire and explosions, of NFPA 69 were used as guidance for the design of the battery rooms.</p> <p>Battery rooms containing combustible batteries are separated from each other and other plant areas by three-hour fire-rated barriers.</p> <p>The ventilation system is capable of maintaining the hydrogen concentration below 2% by volume.</p> <p>Portable extinguishers and hose stations are provided.</p>
<p>8. <u>Turbine Lubrication and Control Oil Storage and Use Areas</u></p> <p>A blank fire wall having a minimum resistance rating of three hours should separate all areas containing safety-related systems and equipment from the turbine oil system.</p> <p>When a blank wall is not present, open head deluge protection should be provided for the turbine oil hazards, and automatic open head water curtain protection should be provided for wall openings.</p>	<p>This item is addressed as part of the Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in Section 6.0 of this report.</p>

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9. Diesel Generator Areas

Diesel generators should be separated from each other and other areas of the plant by fire barriers having a minimum fire resistance rating of three hours.

Automatic fire suppression such as AFFF foam or sprinklers should be installed to combat any diesel generator or lubricating oil fires. Automatic fire detection should be provided to alarm and annunciate in the control room and alarm locally. Drainage for fire-fighting 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:

- (a) The day tank is located in a separate enclosure with a minimum fire resistance rating of three hours, including doors or penetrations. These enclosures should be capable of containing the entire contents of the day tanks. The enclosure should be ventilated to avoid accumulation of oil fumes.
- (b) The enclosure should be protected by automatic fire suppression systems such as AFFF or sprinklers.

When day tanks cannot be separated from the diesel-generator, one of the following should be provided for the diesel generator area:

- (a) Automatic open head deluge or open head spray nozzle systems.

The diesel generator buildings A, B, C, and D are separated from each other and other plant areas by minimum three-hour fire barriers.

The E Diesel Generator Building is physically detached from all other plant buildings.

An automatic pre-action fire suppression system and a fire detection system are provided for each diesel generator building. The systems alarm on the fire protection control panel in the control room. Drainage is provided for fire-fighting water. The ventilation systems for the diesel generator areas are discussed in Item E.4 (a) above.

A 550-gallon capacity day tank is mounted on the skid of each diesel engine. The whole area is protected by a preaction sprinkler system. This is in accordance with the guidance provided in NFPA 37.

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<ul style="list-style-type: none"> (b) Automatic closed head sprinklers. (c) Automatic AFFF that is delivered by a sprinkler deluge or spray system. (d) Automatic gas system (Halon or CO₂) may be used in lieu of foam or sprinklers to combat diesel generator and/or lubricating oil fires. 	
<p>10. <u>Diesel Fuel Oil Storage Areas</u></p> <p>Diesel fuel oil tanks with a capacity greater than 1100 gallons should not be located inside the buildings containing safety-related equipment.</p> <p>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 three hours. Buried tanks are considered as meeting the three-hour fire resistance requirements. See NFPA 30, "Flammable and Combustible Liquids Code," for additional guidance.</p> <p>When located in a separate building, the tank should be protected by an automatic fire suppression system such as AFFF or sprinklers.</p> <p>Tanks, unless buried, should not be located directly above or below safety-related systems or equipment regardless of the fire rating of separating floors or ceilings. In operating plants where tanks are located directly above or below the diesel generators and cannot reasonably be moved, separating floors and main structural members should, as a minimum, have fire resistance rating of three hours. Floors should be liquid tight to prevent leaking of possible oil spills from one level to another. Drains should be provided to remove possible oil spills and fire-fighting water to a safe location.</p> <p>One of the following acceptable methods of fire protection should also be provided:</p> <ul style="list-style-type: none"> (a) Automatic open head deluge or open head spray nozzle system(s), (b) Automatic closed head sprinklers, or (c) Automatic AFFF that is delivered by a sprinkler system or spray system. 	<p>The diesel fuel storage tanks are buried outside and adjacent to the diesel generator buildings.</p>

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<p>11. <u>Safety-Related Pumps</u></p> <p>Pump houses and rooms housing safety-related pumps should be protected by automatic sprinkler protection unless a fire hazards analysis can demonstrate that a fire will not endanger other safety-related equipment required for safe plant shutdown. Early warning fire detection should be installed with alarm and annunciation locally and in the control room. Local hose stations and portable extinguishers should also be provided.</p>	<p>The pumps needed to achieve safe shutdown have been addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R.</p> <p>Local hose stations and portable extinguishers are available at these areas.</p>
<p>12. <u>New Fuel Area</u></p> <p>Hand portable extinguishers should be located within this area. Also, local 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.</p> <p>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.</p>	<p>The new fuel area is a vault with top access covered with a watertight cover plate over a removable aluminum grating. Portable fire extinguishers have been provided adjacent to the top access of the new fuel area.</p> <p>The new fuel area is within the range of hose reel 1HR-201 or 2HR-201. There are no automatic fire detectors within the vault, but there are smoke detectors on the ceiling above the vault. The new fuel is stored in a configuration such that criticality is precluded by administrative controls. Straight stream nozzles are provided in the area of the new fuel storage area. The plant procedures provide control of combustible material in the area.</p>
<p>13. <u>Spent Fuel Pool Area</u></p> <p>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.</p>	<p>Hose stations and portable extinguishers are provided in the area of the spent fuel pool. The automatic fire detection system above the spent fuel pool area alarms on the fire protection control panel in the control room.</p>

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<p>14. <u>Radwaste Building</u></p> <p>The radwaste building should be separated from other areas of the plant by fire barriers having at least three-hour ratings. Automatic sprinklers should be used in all areas where combustible materials are located. Automatic fire detection should be provided to annunciate and alarm in the control room and alarm locally. During a fire, the ventilation systems in these areas should be capable of being isolated. Water should drain to liquid radwaste building sumps.</p> <p>Acceptable alternative fire protection is automatic fire detection to alarm and annunciate in the control room, in addition to manual hose stations and portable extinguishers consisting of hand-held and large wheeled units.</p>	<p>The radwaste building is separated from the other plant areas by a three-hour fire-rated barrier except for the internal conduit seals as described in Deviation Request No. 20.</p> <p>The controlled zone shops and the access control and laundry area are provided with automatic wet pipe sprinklers. The charcoal portion of the tank vent filter unit is provided with a deluge system. All areas in the radwaste building are within reach of at least one water stream from a hose reel. The cable trays in the corridors and pipeway are not provided with automatic sprinklers or fire detectors since they are not controlling or supplying power to safety-related equipment, and a fire in the cable trays will not endanger safety-related equipment.</p> <p>Portable fire extinguishers are located in all areas containing combustible materials.</p> <p>Smoke detectors are located in the elevator foyers, the radwaste control center, and the electrical equipment room. Fire detection alarms on the fire protection control panel in the control room and not locally.</p> <p>Ventilation for the radwaste building is discussed in Section E.4. (a) above.</p> <p>Floor drains which drain to liquid radwaste sumps are provided.</p>
<p>15. <u>Decontamination Areas</u></p> <p>The decontamination areas should be protected by automatic sprinklers if flammable liquids are stored. Automatic fire detection should be provided to annunciate and alarm in the control room and alarm locally. The ventilation system should be capable of being isolated. Local hose stations and hand portable extinguishers should be provided as backup to the sprinkler system.</p>	<p>Flammable liquids are not stored in decontamination areas.</p>

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BRANCH TECHNICAL POSITION GUIDELINE	SUSQUEHANNA SES COMPLIANCE
<p>16. <u>Safety-Related Water Tanks</u></p> <p>Storage tanks that supply water for safe shutdown should be protected from the effects of fire. Local hose stations and portable extinguishers should be provided. Portable extinguishers should be located in nearby hose houses. Combustible materials should not be stored next to outdoor tanks. A minimum of 50 feet of separation should be provided between outdoor tanks and combustible materials where feasible.</p>	<p>Safety-related water tanks are not used at Susquehanna SES.</p>
<p>17. <u>Cooling Towers</u></p> <p>Cooling towers should be of non-combustible construction or so located that a fire will not adversely affect any safety-related systems or equipment. Cooling towers should be of non-combustible construction when the basins are used for the ultimate heat sink or for the fire protection water supply.</p> <p>Cooling towers of combustible construction so located that a fire in them could adversely affect safety-related systems or equipment should be protected with an open head deluge system installation with hydrants and hose houses strategically located.</p>	<p>The cooling towers at Susquehanna SES are used as a source of water for the fire protection system and are constructed of concrete and non-combustible fill.</p>
<p>18. <u>Miscellaneous Areas</u></p> <p>Miscellaneous areas such as records storage areas, shops, warehouses, and auxiliary boiler rooms should be so located that a fire or effects of a fire, including smoke, will not adversely affect any safety-related systems or equipment. Fuel oil tanks for auxiliary boilers should be buried or provided with dikes to contain the entire tank contents.</p>	<p>The affect of a fire in miscellaneous areas on safe shutdown equipment is addressed as part of Susquehanna SES compliance with 10CFR50, Appendix R, as discussed in Section 6.0 of this report.</p> <p>The auxiliary boilers at Susquehanna SES are electric and, therefore, do not have any fuel oil tanks.</p>

TABLE 5.0-1

BRANCH TECHNICAL POSITION GUIDELINE	SUSQUEHANNA SES COMPLIANCE
<p>G. <u>Special Protection Guidelines</u></p> <p>1. <u>Welding and Cutting, Acetylene - Oxygen Fuel Gas Systems</u></p> <p>This equipment is used in various areas throughout the plant. Storage locations should be chosen to permit fire protection by automatic sprinkler systems. Local hose stations and portable equipment should be provided as backup. The requirements of NFPA 51 and 51B are applicable to these hazards. A permit system should be required to utilize this equipment. (Also refer to 2f herein.)</p> <p>2. <u>Storage Area for Dry Ion Exchange Resins</u></p> <p>Dry ion exchange resins should not be stored near essential safety-related systems. Dry unused resins should be protected by automatic wet pipe sprinkler installations. Detection by smoke and heat detectors should alarm and annunciate in the control room and alarm locally. Local hose stations and portable extinguishers should provide backup for these areas. Storage areas of dry resin should have curbs and drains. (Refer to NFPA 92M, "Waterproofing and Draining of Floors.")</p> <p>3. <u>Hazardous Chemicals</u></p> <p>Hazardous chemicals should be stored and protected in accordance with the recommendations of NFPA 49, "Hazardous Chemicals Data." Chemicals storage areas should be well ventilated and protected against flooding conditions since some chemicals may react with water to produce ignition.</p> <p>4. <u>Materials Containing Radioactivity</u></p> <p>Materials that collect and contain radioactivity such as spent ion exchange resins, charcoal filters, and HEPA filters should be stored in closed metal tanks 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 should be given to requirements for removal of isotopic decay heat from entrained radioactive materials.</p>	<p>Use and storage of all compressed gas cylinders, including Acetylene and Oxygen, within the plant are controlled by plant procedures. Bulk storage of compressed gas cylinders is located outside of and remote from safety-related buildings. The applicable requirements of NFPA 51 and 51B were used as guidance in the preparation of plant procedures.</p> <p>Bulk storage of dry ion exchange resins are not located near essential safety-related systems or safe shutdown systems. Small amounts (less than 40 c.f.) of dry ion exchange resin are stored in safety related buildings in the plant, all of which are not stored near essential safety-related or safe shutdown equipment. Automatic fire suppression, smoke detection, manual hose stations, and fire extinguishers are provided in these areas except as noted below:</p> <p>1) Units 1 and 2 Reactor Building elev. 779' (no suppression), 2) Units 1 and 2 Turbine Building elev. 699' (no detection or suppression), 3) Radwaste Building elevation 676' (no detection or suppression).</p> <p>The applicable requirements of NFPA 49 were used as guidance for the storage and protection of hazardous chemicals. Where necessary, chemical storage areas are ventilated and protected against flooding conditions.</p> <p>Closed metal tanks or containers are used to store contaminated materials. Administrative procedures for handling, storage, and protection of radioactive materials are used at Susquehanna SES.</p> <p>The containers for waste, requiring special considerations for removal of isotopic decay heat, are designed for sufficient heat removal, heat generation, and radiation protection.</p>

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TABLE 5.0-2

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COMPARISON WITH 10 CFR 50 APPENDIX R

REQUIREMENTS	SUSQUEHANNA SES POSITION
<p>III.G. <u>Fire Protection of Safety Shutdown Capability</u></p> <p>1. Fire Protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:</p> <ul style="list-style-type: none"> a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; 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. 	<p>The design of the fire protection features at Susquehanna SES is such that both units can achieve and maintain a safe shutdown condition assuming a fire anywhere on site by the use of at least one safe shutdown path. The philosophy used to determine the safe shutdown paths is given in Section 3.0 of this report. Cold shutdown systems can be repaired within 72 hours.</p>
<p>2. Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:</p>	<p>As discussed in Section 3.0 of this report, the safe shutdown paths system components and cabling including support systems and associated circuits were identified. At least one shutdown path is available in each fire area. (See Section 6.0 of this report for a description of each fire area.) Where separation and protection did not meet the requirements of this Section of 10CFR50 Appendix R, deviations were requested. These deviation requests are contained in Section 7.0 of this report. Also, the guidance in NRC Generic Letter 86-10, Section 3.1.2 states that rated fire boundaries which have been evaluated and accepted in a published SER, need not be reviewed as part of the reanalysis for compliance with Section III.G of Appendix R. A number of fire barriers at Susquehanna SES have been evaluated and accepted in NUREG 0776 and its supplements and are therefore considered fire rated.</p>

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TABLE 5.0-2

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COMPARISON WITH 10 CFR 50 APPENDIX R

REQUIREMENTS	SUSQUEHANNA SES POSITION
<p>a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a three-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;</p> <p>b. Separation of cables and equipment and associated non-safety 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 shall be installed in the fire area; or</p> <p>c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a one-hour rating. In addition fire detectors and an automatic fire suppression system shall be installed in the fire area.</p> <p>Inside noninerted containments one of the fire protection means specified above or one of the following fire protection means shall be provided:</p> <p>d. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards;</p> <p>e. Installation of fire detectors and an automatic fire suppression system in the fire area; or</p> <p>f. Separation of cables and equipment and associated non-safety circuits of redundant trains by a noncombustible radiant energy shield.</p>	<p>Since the primary containments at Susquehanna SES are inerted during normal operation, these requirements do not apply.</p>

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TABLE 5.0-2

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COMPARISON WITH 10 CFR 50 APPENDIX R

REQUIREMENTS	SUSQUEHANNA SES POSITION
<p>3. Alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room or zone under consideration, shall be provided:</p> <p>a. Where the protection of systems whose function is required for hot shutdown does not satisfy the requirement of paragraph G2 of this section; or</p> <p>b. Where redundant trains of systems required for hot shutdown located in the same fire area may be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems.</p> <p>In addition, fire detection and a fixed fire suppression system shall be installed in the area, room or zone under consideration.</p>	<p>The design of the alternative shutdown path meets the criteria as set forth in 10CFR50, Appendix R, Section III.L as required by Generic Letter 86-10. The description of this path is discussed in Section 3.0 of this report. Where separation and protection did not meet the requirements of 10CFR50 Appendix R, deviations were requested. These deviation requests are contained in Section 7.0 of this report.</p>
<p>III.J <u>Emergency Lighting</u></p> <p>Emergency lighting units with at least an 8-hour battery power supply shall be provided in all areas needed for manual control of safe shutdown equipment and in access and egress routes thereto.</p>	<p>Eight-hour battery powered emergency lighting is provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto except as noted in the deviation requests.</p>

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TABLE 5.0-2

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COMPARISON WITH 10 CFR 50 APPENDIX R

REQUIREMENTS	SUSQUEHANNA SES POSITION
<p>III.L <u>Alternative and Dedicated Shutdown Capability</u></p> <p>1. Alternative or dedicated shutdown capability provided for a specific fire area shall be able to (a) achieve and maintain subcritical reactivity conditions in the reactor; (b) maintain reactor coolant inventory; (c) achieve and maintain hot standby conditions for a PWR (hot shutdown for a BWR); (d) achieve cold shutdown conditions within 72 hours; and (e) 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 A.C. power, and the fission product boundary integrity shall not be affected; i.e., there shall be no fuel clad damage, rupture of any primary coolant boundary, or rupture of the containment boundary.</p> <p>2. The performance goals for the shutdown functions shall be:</p> <ul style="list-style-type: none"> a. The reactivity control function shall be capable of achieving and maintaining cold shutdown reactivity conditions. b. The reactor coolant makeup function shall be capable of maintaining the reactor coolant level above the top of the core for BWRs and be within the level indication in the pressurizer for PWRs. c. The reactor heat removal function shall be capable of achieving and maintaining decay heat removal. d. The process monitoring function shall be capable of providing direct readings of the process variables necessary to perform and control the above functions. 	<p>The design of the alternative shutdown path meets the criteria as set forth in this section. The description of the alternative shutdown path is discussed in Section 3.0 of this report.</p>

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COMPARISON WITH 10 CFR 50 APPENDIX R

REQUIREMENTS	SUSQUEHANNA SES POSITION
e. The supporting functions shall be capable of providing the process cooling, lubrication, etc., necessary to permit the operation of the equipment used for safe shutdown functions.	
3. 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) and shall accommodate postfire conditions where off-site power is available and where off-site power is not available for 72 hours. Procedures shall be in effect to implement this capability.	
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 on-site and off-site electric power systems because of fire damage, an independent on-site 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 on site at all times.	

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TABLE 5.0-2

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COMPARISON WITH 10 CFR 50 APPENDIX R

REQUIREMENTS	SUSQUEHANNA SES POSITION
<p>5. Equipment and systems comprising the means to achieve and maintain cold shutdown conditions shall not be damaged by fire; or the fire damage to such equipment and systems shall be limited so that the systems can be made operable and cold shutdown can be achieved within 72 hours. Materials for such repairs shall be readily available on site and procedures shall be in effect to implement such repairs. If such equipment used prior to 72 hours after the fire will not be capable of being powered by both on-site and off-site electric power systems because of fire damage, an independent on-site power system shall be provided. Equipment and systems used after 72 hours may be powered by off-site power only.</p>	
<p>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.</p>	
<p>7. The safe shutdown equipment and systems for each fire area shall be known to be isolated from associated non-safety 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 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, shall be such that a postulated fire involving associated circuits will not prevent safe shutdown.</p>	

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TABLE 5.0-2

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COMPARISON WITH 10 CFR 50 APPENDIX R

REQUIREMENTS	SUSQUEHANNA SES POSITION
<p>III.O <u>Oil Collection System for Reactor Coolant Pump</u></p> <p>The reactor coolant pump shall be equipped with an oil collection system if the containment is not inerted during normal operation. The oil collection system shall 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 systems will withstand the Safe Shutdown Earthquake.</p> <p>Such collection systems shall be capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems. Leakage shall 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 and the flash point characteristics of the oil present the hazard of fire flashback. Leakage points to be protected shall 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 shall be large enough to accommodate the largest potential oil leak.</p>	<p>Since Susquehanna SES Unit 1 and 2 primary containments are inerted during normal operation, compliance with Section III.O is achieved.</p>

6.0 FIRE HAZARDS ANALYSIS

6.1 INTRODUCTION

6.1.1 Purpose

The purpose of this section is to demonstrate that a postulated fire anywhere at the plant will not affect the ability of both units to be brought and to be maintained in cold shutdown condition. Section 6.1 describes the general fire protection features used in the fire hazards analysis of each fire area. This discussion serves as an overview to the detailed fire area analysis in Section 6.2. Section 6.2 examines each fire area within the plant and assesses the capability to safely shutdown based on the fire area configuration, combustible loading, specific fire hazards, safe shutdown equipment in each fire zone within the fire area and the deviation requests which directly impact that fire area.

Table 6.1-1 lists each fire area in the plant and provides a description of each area, the required safe shutdown path for each area, the FPRR section where its fire hazards analysis is presented and a list of all the fire zones in each fire area.

6.1.2 Fire Protection Features

Our safe shutdown criteria is based on the premise that a fire initiated within any given fire area will be contained within that fire area and not damage safe shutdown equipment in any other fire area. Furthermore, as presented in Deviation Request No. 7, a fire initiated in any given fire zone is postulated to spread to each adjacent fire zone which is not separated from the fire zone of origin by fire rated construction. In this manner, safe shutdown components and cables in unaffected fire areas and fire zones will be used to safely shutdown both reactors.

As discussed in Section 3.3.4, the plant was divided into specific fire areas with each fire area consisting of one or more fire zones. Fire areas were selected to optimally separate the safe shutdown components and cables in each redundant division. This selection process was used to divisionally separate those systems and components in each redundant division required for safe shutdown as identified in Table 3.1-1.

6.1.2.1 Establishing Fire Areas Boundaries

In accordance with NRC guidelines, the term "fire area" as used in Appendix R is an area sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect important equipment within the area from a fire outside the area. At Susquehanna SES, a fire area is separated from all other fire areas in the plant by fire-rated construction or spatial separation. The fire rating of the fire-rated construction is designed to withstand the fire load of the fire area or any specific combustible configuration within the fire area. Where relied upon, spatial separation between two fire areas precludes the propagation of the postulated fire from one fire area to another.

In order to determine the adequacy of the fire rating of the fire area boundaries, the physical fire area boundaries (i.e., walls and floors/ceilings) were evaluated. The majority of these barriers consist of 12" minimum thick reinforced concrete. Fire-rated gypsum board has also been used for wall construction in some areas. Structural steel and openings in these barriers have been provided with fire rated components or have been justified by deviation requests. Spatial separation has been used as a fire area boundary where sufficient physical distance, lack of intervening combustibles and/or fire protection features exist to adequately separate the redundant safe shutdown equipment of two different areas. At Susquehanna SES two distinct methods of spatial separation were used; the wraparound zone and the buffer zone. A brief description of both concepts is provided here.

The wraparound zone exists at three elevations in each Reactor Building. These are areas of the plant which are corridors that connect Fire Areas R-1A with R-1B (Unit 1) and R-2A with R-2B (Unit 2). The construction of a fire-rated wall is impractical due to the plant configuration in these areas. The wraparound zone was initially a spatial separation of 50 ft. between the two communicating fire areas. Due to field conduit routing tolerances of ± 8 ft., the wraparound zone was expanded 8 ft. on each side to account for cabling designed to be in the 50 foot area. Hence, the wraparound zone became a 66 foot wide area. Within the wraparound zone, both redundant divisions of required safe shutdown cables are either protected by fire protective wrapping, by spatial separation of 50 feet (minimum), or justified by a fire hazards analysis. Safe shutdown components within the wraparound zone have been analyzed and are addressed in deviation requests. The fire hazards and combustible configuration of each wraparound area was examined to determine the acceptability of the zone as a spatial separation barrier. A fire initiated in either of the two fire areas connected by the wraparound zone will not propagate through the wraparound zone and into the adjacent fire-free area. Additionally, a fire initiated within the wraparound zone will not propagate to both adjacent fire areas. Our long-term compliance program prohibits the location of any safe shutdown components within the wraparound zone unless a specific evaluation is conducted. The wraparound zone concept is presented in more detail in Deviation Request No. 4.

The buffer zone concept is used in the upper elevations of both Reactor Buildings where little or no safe shutdown equipment exists. Using the buffer zone concept, fire areas are separated by two intervening fire zones (buffer zones). Within these buffer zones, both redundant divisions of safe shutdown components and cables are required to be protected or justified by analysis. The combustible loading of the buffer zones is low and there is no specific combustible configurations which would act to propagate a fire between fire areas. Deviation Request No. 7 discusses the buffer zone concept in more detail.

6.1.2.2 Combustible Loading

A fire zone specific combustible loading analysis has been performed. This analysis identifies all combustible items within each fire zone and assigns each one a conservative heat load value. All of this heat load is summarized and divided by the area of the fire zone to yield an equivalent fire duration in minutes. This theoretical value is the time it would take for all the combustibles to be consumed by a fire in that fire zone assuming that the combustibles are evenly dispersed throughout the zone.

In our combustible loading analysis, types of combustibles were grouped into four major categories: 1) mechanical items (i.e., lube oil in pumps or valves, charcoal, etc.), 2) cables in unwrapped cable tray, 3) electrical panels and cabinets and 4) miscellaneous items.

Under the mechanical items category, the equipment name and number is listed and the quantity of combustibles is given for each piece of equipment in either gallons of lube oil, diesel fuel oil or pounds of charcoal. Gallons of lube, oil or diesel fuel oil is multiplied by 148,875 BTUs/gallon and charcoal quantity is multiplied by 14,730 BTUs/pound to establish the combustible content for each mechanical item. The combustible contents for all mechanical items are then added for the subtotal for each fire zone.

For cable trays, the combustible loading for the cable insulation in each fire zone was compiled. Initially, the heat released value per sq. ft. was determined for each tray depth and all trays were considered to have maximum fill of 30% cable. The long term program assures that trays more than 30% full are evaluated against the fire area minimum boundary rating or other limitations which may exist. The combustible loading for each cable tray was obtained by multiplying the heat release content of the cables (BTUs/sq. ft) by the surface area (sq. ft.) of the cable tray. For a 6" deep, 30% filled tray, the heat release value is 80,560 BTUs/sq ft and for a 4" deep, 30% filled tray, the heat release value is 48,710 BTUs/sq. ft. This value was then multiplied by the linear feet of cable tray within the zone. In accordance with NRC guidelines cables in metal conduits do not constitute combustibles and therefore, are not included in this analysis.

Electrical panels and cabinets were listed by name and number. All cabinets were grouped according to size or type. The combustibles in each cabinet were conservatively estimated assuming that each cabinet was full of the maximum amount of combustible materials which that type of cabinet could contain. This part of the analysis was considered very conservative since most cabinets actually contain less combustibles than the worst case cabinet types. The combustible content for all electrical cabinets was subtotaled for each fire zone.

In the miscellaneous item category, the combustible content for each combustible was established utilizing information from the National Fire Protection Association - Fire Protection Handbook, 16th Edition. Typical examples of these miscellaneous items are poly-propylene battery cases (19,970 BTUs/pound), protective clothing

(7,950 BTUs/pound) and hydrogen (61,064 BTU's/pound or 325 BTU's/ft³). All miscellaneous items were subtotaled for each fire zone.

Our analysis adds the subtotals of the four categories of combustibles for each fire zone giving the total combustibles in BTUS. This value is divided by the fire zone floor area to yield the fire zone fire load in BTUs/sq. ft. The equivalent fire duration in minutes is then calculated based on a value of 80,000 BTUs/sq ft for a fire of 60 minutes duration.

Although this classical approach is relied upon for a quantitative assessment of the fire severity in a given zone, it can be somewhat misleading due to the size of the zone and the location and configuration of the combustibles within the zone. In lieu of solely relying upon this method of fire loading severity, the specific combustible configurations within a zone or area and the heat release rate of those combustibles provide a more realistic determination of the fire hazards in the zone.

The purpose of the combustible loading analysis is to assure that the fire area boundaries are adequate to contain a fire within that fire area. Our combustible loading program at Susquehanna assures the integrity of our fire barriers and the compliance to deviation requests which rely on this information.

Therefore, rather than expressing specific combustible numbers for each fire area discussed in Section 6.2, each fire area discussion outlines any severe combustible configurations in the area and shows that fire barriers of the area are able to contain the fire hazards associated with the area.

6.1.2.3 Fire Detection and Suppression

Fire detection and suppression (manual and automatic) systems are an integral part of the plant design. The descriptions of the types of detection and suppression systems employed at Susquehanna SES are described in detail in Section 4.0. Each fire area discussion within this section includes information as to the extent and location of detection and suppression systems in that fire area.

The impact of the inadvertent operation or rupture of any fire suppression system in the plant has been evaluated and it has been determined that this condition would not affect the capability to achieve and maintain safe shutdown.

6.1.2.4 Consequences of a Fire In Each Fire Area

Each fire area of the plant requires the availability of one of the safe shutdown paths as noted in Table 6.1-1. Our safe shutdown analysis and the specific supporting engineering studies evaluate and assure the availability of the required safe shutdown path systems, components and raceway for each fire area.

In each fire area evaluated, the major safe shutdown components are listed by fire zone location. These components are broken down into two categories. The first grouping

are the safe shutdown components which are located in the fire zone but which would not be relied upon for use in the event of a fire in that fire zone. In other words, their redundant component is located in a fire free fire area. The second grouping are the Category I components. As previously described, these are components which are required for safe shutdown in the event of a fire in the fire zone where the component is located. All Category I components have been addressed by a deviation request, an engineering analysis or plant modification. Each Category I component is listed by component name and number with a reference to the Deviation Request in which it is addressed or a brief description of the engineering analysis which justified its acceptability.

Cables required to perform a safe shutdown function have been evaluated per the methodology described in Section 3.0. Cables designated as cable hits as described in Subsection 3.3.1.5 have been resolved by performing a plant modification (i.e., installing fire protective wrapping, cable relocation, circuit modification), a procedural action, an analysis which verified that fire-induced faults would not impact safe shutdown or by a deviation request. Each fire area description denotes which path of safe shutdown system cables has been protected in that fire area.

6.1.2.5 Special Features

In certain fire areas manual actions may be necessary to assure safe shutdown compliance to the Appendix R criteria. Each fire area description in Section 6.2 lists any specific manual actions required as the result of the Appendix R safe shutdown analysis. This section of the report also provides a description of any other features which may be unique to that fire area.

6.1.2.6 Deviation Requests

Due to specific configurations within the plant, certain conditions do not strictly conform to the regulations set forth in Appendix R. NRC Generic Letter 86-10 states that the licensee must develop its own criteria for a deviation request threshold and that a request need not be filed for each and every possible deviation from Appendix R. The general philosophy employed at PP&L in this regard is to submit those generic and specific plant conditions which do not meet the requirements of Appendix R or the intent of the Appendix R guidance documents:

In instances where it became difficult to determine the necessity of a deviation request, our general policy was to prepare and submit the request in order to clearly document the fire protection features at Susquehanna SES.

The purpose of a deviation request is to identify non-conforming conditions and to provide justification to demonstrate that the methods implemented at Susquehanna SES satisfy the intent of a specific Appendix R requirement. Some deviation requests are very specific and apply to systems and/or components which do not comply with Appendix R. Where these specific deviation requests affect a certain fire area, they are

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noted within the fire area discussion. The following deviation requests are generic in nature and apply to virtually all plant fire areas:

<u>Deviation Request No.</u>	<u>Title</u>
7	Fire Spread Limitation
13*	Redundant Raceway Protection
20	Penetration Seals – Conduits
33	Reactor Coolant Makeup and Depressurization System
*Applies to fire areas in the reactor buildings only.	

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TABLE 6.1-1
SUSQUEHANNA SES FIRE AREAS

FIRE AREA	SSD PATH	DESCRIPTION	FPRR SECTION	FIRE ZONES WITHIN AREA				
UNIT 1 REACTOR BUILDING								
R-1A	3	South Side of Unit 1 Reactor Building	6.2.1	1-1A 1-2A 1-3A 1-4A-S 1-5A-S 1-6B 1-7A	1-1F 1-2C 1-3B-S 1-4A-W 1-5A-W 1-6C 1-7B	1-1G 1-3B-W 1-4E 1-5E 1-6D 0-6G	1-3C-S 1-5H 1-6E 0-6H	1-3C-W 1-6F 0-8A
R-1B	1	North Side of Unit 1 Reactor Building	6.2.2	1-1B 1-1E 1-2B 1-3B-N 1-4A-N 1-5A-N 1-6A 1-6I	1-1C 1-1I 1-2D 1-3B-W 1-4A-W 1-5A-W 1-6B 1-7A	1-1D 1-1J 1-3C-N 1-4B 1-5C 1-6C 0-6G	1-3C-W 1-4G 1-5D 1-6D 0-6H	 1-6F 0-8A
R-1C	1,2,3	Unit 1 Primary Containment	6.2.3	1-1H	1-4F			
R-1D	1*	Valve Access Area	6.2.4	1-5B				
R-1E	1	Division II Switchgear Room – Elevation 719'-1"	6.2.5	1-4C				
R-1F	3	Division I Switchgear Room – Elevation 719'-1"	6.2.6			1-4D		
R-1G	1	Division II Switchgear Room – Elevation 749'-1"	6.2.7			1-5F		
R-1H	3	Division I Switchgear Room – Elevation 749'-1"	6.2.8			1-5G		
UNIT 2 REACTOR BUILDING								
R-2A	3	South Side of Unit 2 Reactor Building	6.2.9	2-1B 2-2A 2-3A 2-4A-S 2-5A-S 2-5D 2-6B 2-7A	2-1F 2-2C 2-3B-S 2-4A-W 2-5A-W 2-5E 2-6D 0-8A	2-1G 2-3B-W 2-4E 2-5C 2-5H 2-6E	2-1I 2-3C-S 2-6F	2-3C-W

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TABLE 6.1-1
SUSQUEHANNA SES FIRE AREAS

FIRE AREA	SSD PATH	DESCRIPTION	FPRR SECTION	FIRE ZONES WITHIN AREA				
R-2B	1	North Side of Unit 2 Reactor Building	6.2.10	2-1A 2-2B 2-3B-N 2-4A-N 2-5A-N 2-6A 2-6E	2-1C 2-3B-W 2-4A-W 2-5A-W 2-6B 2-6F	2-1D 2-3C-N 2-4B 2-6C 2-7A	2-1E 2-3C-W 2-4G 2-6D 0-8A	2-1J
R-2C	1,2,3	Unit 2 Primary Containment	6.2.11					
R-2D	1*	Valve Access Area	6.2.12	2-1H	2-4F			
R-2E	1	Division II Switchgear Room – Elevation 719'-1"	6.2.13	2-5B				
R-2F	3	Division I Switchgear Room – Elevation 719'-1	6.2.14			2-4C		
R-2G	1	Division II Switchgear Room – Elevation 749'-1	6.2.15			2-4D		
R-2H	3	Division I Switchgear Room – Elevation 749'-1	6.2.16			2-5F		
CONTROL STRUCTURE								
CS-1	1,3	Freight Elevator and South Stairway	6.2.17			0-21B	0-29A	
CS-2	1,3	Passenger Elevator and North Stairway	6.2.18			0-22B	0-29C	
CS-3	1	General Access Area	6.2.19	0-21A 0-24A	0-22A 0-24B	0-22C 0-24C	0-23 0-24E	
CS-4	1,3	HVAC Plenum, Fan Room and Duct Chases	6.2.20	0-24I 0-29B 0-30A	0-24K 0-29D 0-30B	0-28S		
CS-5	1	Unit 2 Lower Relay Room	6.2.21			0-24G		
CS-6	3	South Cable Chase	6.2.22	0-24J 0-26S	0-25B 0-27F	0-26B 0-28P		
CS-7	3	North and Center Cable Chases	6.2.23	0-24L 0-26C 0-27G	0-24M 0-26D 0-27H	0-25C 0-26T 0-28Q	0-25D 0-26V 0-28R	
CS-9	2	Main Control Room	6.2.25	0-26A 0-26H 0-26L 0-26R	0-26E 0-26I 0-26M	0-26F 0-26J 0-26N	0-26G 0-26K 0-26P	
CS-10	3	Upper Cable Spreading Room	6.2.26		0-27C	0-27D		

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TABLE 6.1-1
SUSQUEHANNA SES FIRE AREAS

FIRE AREA	SSD PATH	DESCRIPTION	FPRR SECTION	FIRE ZONES WITHIN AREA			
CS-11	1	Equipment Room	6.2.27		0-28A-I		
CS-12	3	125V Battery Room	6.2.28		0-28C		
CS-13	1	125V Battery Room	6.2.29		0-28E		
CS-14	1	250V Battery Room	6.2.30		0-28G		
CS-15	1	Instrument Repair Shop	6.2.31		0-28H		
CS-16	1	250V Battery Room	6.2.32			0-28J	
CS-17	1	Equipment Room	6.2.33			0-28B-I	
CS-18	1	125V Battery Room	6.2.34			0-28M	
CS-19	1	125V Battery Room	6.2.35			0-28N	
CS-20	3	Equipment Room	6.2.36			0-28A-II	
CS-21	3	125V Battery Room	6.2.37			0-28T	
CS-22	1	125V Battery Room	6.2.38			0-28D	
CS-23	3	250V Battery Room	6.2.39			0-28F	
CS-24	3	Equipment Room	6.2.40			0-28B-II	
CS-25	3	250V Battery Room	6.2.41			0-28I	
CS-26	3	125V Battery Room	6.2.42			0-28K	
CS-27	3	125V Battery Room	6.2.43			0-28L	
CS-28	1	Unit 1 Lower Relay Room	6.2.44			0-24D	
CS-29	1	Lower Cable Spreading Room	6.2.45			0-25A	
CS-30	1	Lower Cable Spreading Room	6.2.46			0-25E	
CS-31	3	Unit 2 Upper Relay Room	6.2.47			0-27A	
CS-32	3	Upper Cable Spreading Room	6.2.48			0-27B	
CS-33	3	Unit 1 Upper Relay Room	6.2.49			0-27E	
DIESEL GENERATORS							
D-1	2,3	Diesel Generator A	6.2.50			0-41A	
D-2	1,2	Diesel Generator B	6.2.51			0-41B	
D-3	2,3	Diesel Generator C	6.2.52			0-41C	
D-4	1,2	Diesel Generator D	6.2.53			0-41D	
D-5	1,2,3	Diesel Generator E	6.2.54			0-41E	

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TABLE 6.1-1
SUSQUEHANNA SES FIRE AREAS

TABLE 6.1-1								
SUSQUEHANNA SES FIRE AREAS								
FIRE AREA	SSD PATH	DESCRIPTION	FPRR SECTION	FIRE ZONES WITHIN AREA				
ESSW PUMPHOUSE								
E-1	3	East Side of ESSW Pumphouse	6.2.55			0.51		
E-2	1	West Side of ESSW Pumphouse	6.2.56			0.52		
TURBINE BUILDING								
T-1	1,2,3	Unit 1 and Unit 2 Turbine Building	6.2.57			0-TB**		
RADWASTE BUILDING								
W-1	1,3	Radwaste Building	6.2.58		0-61	0-62	0-63	0-64
OUTSIDE AREAS								
A-1	1,2,3	General Outside Areas, Circulating Water Pumphouse, Cooling Towers, Service & Administration Bldg., etc.	6.2.59		0-00			
<p>** Although there are various fire zones within the Turbine Buildings, Fire Zone 0-TB was assigned to both buildings for the purpose of the safe shutdown analysis.</p> <p>* Use Path 1 with the following system substitutions:</p> <p>1) Core Spray components for both units are not included in Path 1 and</p> <p>2) RCIC and RHR shutdown cooling components for both units are included in Path 1.</p>								

6.2 FIRE AREA DESCRIPTION

6.2.1 FIRE AREA R-1A

6.2.1.1 General Description

Fire Area R-1A is located in the Unit 1 Reactor Building and is comprised of fire zones which generally occupy the southern half of the building. This fire area is shown on Drawings E-205949 thru E-205956 in Section 8.0. Safe Shutdown Path 3 can be used to achieve safe shutdown in the event of a fire in this fire area.

6.2.1.2 Fire Zones

The following fire zones are located in Fire Area R-1A:

Fire Zone	Description
1-1A	Core Spray Pump Room
1-1F	RHR Pump Room
1-1G	Sump Room
1-2A	Core Spray Pump Room
1-2C	Railroad AirLock/Access Shaft
1-3A	Heat Exchanger and Pump Room
1-3B-S	Equipment Removal Area
1-3B-W*	Equipment Removal Area
1-3C-S	Equipment Access
1-3C-W*	Equipment Access
1-4A-S	Containment Access Area
1-4A-W*	Containment Access Area
1-4E	CRD Room
1-5A-S	Standby Control Systems Area
1-5A-W*	Access Corridor
1-5E	Penetration Room
1-5H	Instrument Repair Shop
1-6B**	Load Center Room
1-6C**	Electrical Equipment Room
1-6D**	HVAC Equipment Room
1-6E	HVAC Plenum Area
1-6F**	Spent Fuel Pool
1-7A**	HVAC Equipment Area
1-7B	Recirculation Fan Room
0-6G**	Surge Tank Vault
0-6H**	Cask Storage Pit
0-8A**	Refueling Floor
* This fire zone is a wraparound area (see Deviation Request No. 4)	
** This fire zone is a buffer zone (see Deviation Request No. 7)	

6.2.1.3 Combustible Loading

The combustible loading for each fire zone within this fire area has been compiled and has been used for specific fire hazards analysis within this fire area. The equivalent fire duration (for in-situ and transient combustibles) of each fire zone within Fire Area R-1A is less than 90 minutes. Since the minimum rating of any fire barrier bounding Fire Area R-1A is 90 minutes, a fire initiated in any fire zone in Fire Area R-1A will be contained in Fire Area R-1A. Specific combustible configurations in the fire area have also been reviewed for their fire hazard severity and for their impact on fire barrier integrity.

6.2.1.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection is provided throughout Fire Area R-1A except in the following fire zones:

1-2C	Railroad Airlock/Access Shaft
1-4E	CRD Room
1-6F	Spent Fuel Pool
1-7B	Recirculation Fan Room
0-6H	Cask Storage Pit

The justification for lack of automatic detection in these fire zones is given in Deviation Request No. 14.

Automatic fire suppression systems have been installed in local areas based upon fire hazards analysis. These systems are designed to control and suppress any fire which could develop in the fire zones which they protect. The fire zones listed below are equipped with full coverage of an automatic suppression system except where noted.

1-2C	Railroad Airlock/Access Shaft
1-3A	Heat Exchanger and Pump Room (partial sprinkler protection)
1-3B-S	Equipment Removal Area
1-3B-W	Equipment Removal Area
1-4A-S	Containment Access Area
1-4A-W	Containment Access Area
1-5A-W	Access Area
1-5A-S	Standby Control Systems Area

6.2.1.5 Consequences of a Fire in Fire Area R-1A

In the event of a fire in Fire Area R-1A, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-1A which is required to support the operation of Path 3 safe shutdown systems and components has been specifically evaluated to assure that its potential failure would not impact the

ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.1.5.1 Fire Zone 1-1A

The following major SSD components located in Fire Zone 1-1A are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Core Spray Pumps 1A & 1C
- Core Spray Loop A Suction Valve
- Division I Instrumentation

The following Category I components are located in Fire Zone 1-1A:

- Containment Atmosphere Control Isolation Valves (HV-15766/HV-15768) - these valves are assured closed since three phase hot shorts are not considered credible for non-high/low pressure interfaces.

6.2.1.5.2 Fire Zone 1-1F

The following major SSD components located in Fire Zone 1-1F are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- RHR Pump 1A
- RHR Pump Room Unit Cooler A
- RHR Loop A Valves
- RHR Service Water Loop A Heat Exchanger Isolation Valve

There are no Category I components located in Fire Zone 1-1F.

6.2.1.5.3 Fire Zone 1-1G

The following SSD major components located in Fire Zone 1-1G are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Division I Instrumentation

There are no Category I components located in Fire Zone 1-1G.

6.2.1.5.4 Fire Zone 1-2A

The following major SSD components located in Fire Zone 1-2A are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Division I Reactor Building Motor Control Centers
- Core Spray Loop A valve

There are no Category I components located in Fire Zone 1-2A.

6.2.1.5.5 Fire Zone 1-2C

There are no major SSD components or Category I components located in Fire Zone 1-2C.

6.2.1.5.6 Fire Zone 1-3A

The following major SSD components located in Fire Zone 1-3A are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Core Spray Loop A Instrumentation.
- RHR Loop A Instrumentation.
- Division I Electrical Distribution Components

The following Category I components are located in Fire Zone 1-3A.

- Control Structure Chilled Water ESW Control Valves A&B (HV-08693A and HV-08693B) - Analysis has shown that for a fire in this zone, the existence of fire detectors and automatic suppression, along with directional spray nozzles ensures the valves will perform their safe shutdown function. Also addressed in Deviation Request No. 36.
- Core Spray Loop B Instrumentation (FT-E21-1N003B and FI-SE21-1N006B) - Addressed in Deviation Request No. 25.

6.2.1.5.7 Fire Zone 1-3B-S

There are no major SSD components or Category I components located in Fire Zone 1 3B-S.

6.2.1.5.8 Fire Zone 1-3B-W

There are no major SSD components or Category I components located in Fire Zone 1-3B-W.

6.2.1.5.9 Fire Zone 1-3C-S

The following major SSD components located in Fire Zone 1-3C-S are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Core Spray Loop A Valve
- RHR Loop A Valve

There are no Category I components located in Fire Zone 1-3C-S.

6.2.1.5.10 Fire Zone 1-3C-W

The following major SSD components located in Fire Zone 1-3C-W are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- RCIC Valve

The following Category I components are located in Fire Zone 1-3C-W:

- RHR Shutdown Cooling Outboard Isolation Valve (HV-E11-1F008) - This valve has been protected via plant modification
- RHR Injection Inboard Isolation Valve (HV-E11-1F015A and HV-E11-1F0015B) - Addressed in Deviation Request No. 29.
- RHR Heat Exchanger Shell Side Bypass Valve (HV-E11-11F048A and HV-E11-1F048B). Addressed in Deviation Request No. 29.
- RHR Heat Exchanger Outlet Temperature Element (TE-E11-1N027A&B) - Addressed in Deviation Request No. 29.

6.2.1.5.11 Fire Zone 1-4A-S

The following major SSD components located in Fire Zone 1-4A-S are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Division I Nuclear Boiler Instrumentation
- Division I Electrical Distribution Components

The following Category I components are located in Fire Zone 1-4A-S:

- CRD Hydraulic Control Units - An analysis has been performed which shows that the scram capability is not defeated by a fire in this fire zone.

6.2.1.5.12 Fire Zone 1-4A-W

The following major SSD components located in Fire Zone 1-4A-W are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Drywell Instrumentation

The following Category I components are located in Fire Zone 1-4A-W:

- SCRAM Vent and Drain Valves (SV-C12-1F009 and SV-C12-1F182) - An analysis has been performed which shows that the scram capability will not be defeated by a fire in this fire zone.

6.2.1.5.13 Fire Zone 1-4E

There are no major SSD components or Category I components located in Fire Zone 1-4E.

6.2.1.5.14 Fire Zone 1-5A-S

The following major SSD components located in Fire Zone 1-5A-S are not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Division I Electrical Distribution Panel
- Division I Nuclear Boiler Instrumentation

The following Category I components are located in Fire Zone 1-5A-S:

- Confirmatory Level 3 for ADS (LIS-B21-1N042A and LIS-B21-1N042B) - Addressed by Deviation Request No. 27.
- 120 volt RPS Power Distribution Panel B (1Y201B) - An analysis has been performed which shows that a fire in this fire zone will not affect safe shutdown.
- Reactor Scram on Level 3 (LIS-B21-1N024C and LIS-B21-1N024D) - Addressed in Deviation Request No. 27.
- Level 1 Core Spray Start and ADS (LIS-B21-1N031B and LIS-B21-1N031D) - Addressed in Deviation Request No. 27.
- RPV Level Wide Range II (LT4201B) - Addressed in Deviation Request No. 27.
- Core Spray Instrument (PIS-B21-1N021B) - Addressed in Deviation Request No. 27

- High Pressure Reactor Scram (PSB-21-1N023C and PS-B21-1N023D) - Addressed in Deviation Request No. 27.
- RPV Wide Range (PT14201B) - Addressed in Deviation Request No. 27.
- SRV Pressure Switches (PS-B21-1N022A thru S) - An analysis has been performed which shows that a spurious SRV actuation can be terminated by manually operating the control switches to the off position in the control room.

6.2.1.5.15 Fire Zone 1-5A-W

There are no major SSD components or Category I components located in Fire Zone 1-5A-W.

6.2.1.5.16 Fire Zone 1-5E

The following major SSD component located in Fire Zone 1-5E is not required for achieving SSD in the event of a fire in Fire Area R-1A:

- Reactor Vessel Drywell Spray Valve A

There are no Category I components located in Fire Zone 1-5E.

6.2.1.5.17 Fire Zone 1-5H

There are no major SSD components or Category I components located in Fire Zone 1-5H.

6.2.1.5.18 Fire Zone 1-6B

There are no major SSD components or Category I components located in Fire Zone 1-6B.

6.2.1.5.19 Fire Zone 1-6C

There are no major SSD components or Category I components located in Fire Zone 1-6C.

6.2.1.5.20 Fire Zone 1-6D

There are no major SSD components located in Fire Zone 1-6D.

The following Category I components are located in Fire Zone 1-6D:

- Pressure Switch Primary Containment (PS-E11-1N010A and PS-E11-1N010C) – Addressed in Deviation Request No. 39.

6.2.1.5.21 Fire Zone 1-5E

There are no major SSD components or Category I components located in Fire Zone 1-6E.

6.2.1.5.22 Fire Zone 1-6F

There are no major SSD components or Category I components located in Fire Zone 1-6F.

6.2.1.5.23 Fire Zone 1-7A

There are no major SSD components or Category I components located in Fire Zone 1-7A.

6.2.1.5.24 Fire Zone 1-7B

There are no major SSD components or Category I components located in Fire Zone 1-7B.

6.2.1.5.25 Fire Zone 0-6G

There are no major SSD components or Category I components located in Fire Zone 0-6G.

6.2.1.5.26 Fire Zone 0-6H

There are no major SSD components or Category I components located in Fire Zone 0-6H.

6.2.1.5.27 Fire Zone 0-8A

There are no major SSD components or Category I components located in Fire Zone 0-8A.

6.2.1.6 Special Features

The following manual actions are required for a fire in the specific fire zone:

1. In Fire Zone 1-5A-S, the pump trip logic for RHRSW pump 1P506B must be reset in the Control Room for the loss of Distribution Panel 1Y201B.
2. In Fire Zone 1-5A-S, should the SRV's spuriously operate, the operator in the Control Room must take the control switches to the off position.

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3. In Fire Zones 1-3A, 1-4A-S and/or 1-5A-S, should a loss of automatic scram capability occur, the reactor would have to be manually scrammed from the control room.
4. In Fire Zones 1-2A, 1-3A, 1-3B-W, 1-3C-W, 1-4A-W or 1-4A-S, 1-5A or 1-6D, should RHR control logic be lost or adversely affected, manual control of the RHR system pumps locally at the respective pump breaker and valves from the Control Room is required.
5. In Fire Zones 1-1A, 1-1F, 1-1G or 1-6D should ADS spuriously actuate, operate the ADS Control Switch to "inhibit".
6. In Fire Zones 1-2A, 1-3A, 1-4A-S or 1-5A-S should ADS spuriously actuate, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.
7. Fire Zones 1-3A, 1-4A-S, 1-5A-S or 1-5A-W, should a fire prevent tripping of reactor recirculation pumps 1P401A, 1P401B stop the pumps by manually tripping their respective M-G set supply breaker.

6.2.1.7 Deviation Requests Affecting Fire Area R-1A:

The following is a list of the non-generic Deviation Requests that affect the fire zones in Fire Area R-1A. A brief description is provided in this listing for guidance, however, the complete Deviation Requests are presented in Section 7.0.

Deviation Request No.	Title
3	Non-rated Fire Doors
4	Wraparound Area
5	Partial Rating of Walls and Floor/Ceilings
6	Non-Fireproofed Structural Steel
11	HVAC Penetrations in Reactor Building Fire Walls
12	Fire Barriers without Fire Dampers in Vertical Ventilation Duct Penetrations
14	Reactor Building Fire Zones Without Fire Detection
17	Kaowool as an Acceptable 1 Hour Fire Barrier Wrap
25	Automatic Fire Suppression in Fire Zone 1-3A
27	Nuclear Boiler Instrumentation in Fire Zone 1-5A-S
29	Category 1 Components and Safe Shutdown Raceway in Fire Zones 1-3C-W and 2-3C-W

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Deviation Request No.	Title
39	Category 1 Components in Fire Zone 1-6D and 2-6D
42	Protection of Safe Shutdown Raceway in Fire Zones 1-3B-W and 2-3B-W

6.2.2 Fire Area R-1B

6.2.2.1 General Description:

Fire Area R-1B is located in the Unit 1 Reactor Building and is comprised of fire zones which generally occupy the northern half of the building. This fire area is shown on Drawings E-205949 thru E-205956 in Section 8.0. Fire Area R-1B predominately contains Division II equipment, components and cabling. Safe Shutdown Path 1 can be used to achieve safe shutdown in the event of a fire in this fire area.

6.2.2.2 Fire Zones

The following fire zones are located in Fire Area R-1B:

Fire Zone	Description
1-1B	Core Spray Pump Room
1-1C	HPCI Pump Room
1-1D	RCIC Pump Room
1-1E	RHR Pump Room
1-1I	Stairway No. 102 and Elevator Shaft
1-1J	Stairway No. 101
1-2B	Access Corridor
1-2D	Remote Shutdown Panel
1-3B-N	Equipment Removal Area
1-3B-W*	Equipment Removal Area
1-3C-N	Equipment Access Area
1-3C-W*	Equipment Access Area
1-4A-N	Containment Access Area
1-4A-W*	Containment Access Area
1-4B	Pipe Penetration Room
1-4G	Main Steam Pipeway
1-5A-N	General Access Area
1-5A-W*	Access Corridor
1-5C	Reactor Backwash Receiving Tank Room
1-5D	RWCU Pump Room and Heat Exchanger Cells
1-6A	General Access Area and Pump Rooms
1-6B**	Load Center Room
1-6C**	Electrical Equipment Room
1-6D**	HVAC Equipment Room
1-6F**	Spent Fuel Pool

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Fire Zone	Description
1-6I	Fuel Pool Hold Pump Room
1-7A**	HVAC Equipment Area
0-6G**	Surge Tank Vault
0-6H**	Cask Storage Pit
0-8A**	Refueling Floor
* This fire zone is a wraparound area (see Deviation Request No. 4)	
** This fire zone is a buffer zone (see Deviation Request No. 7)	

6.2.2.3 Combustible Loading

The combustible loading for each fire zone within this fire area has been compiled and has been used for specific fire hazards analysis within this fire area.

The equivalent fire duration (for in-situ and transient combustibles) of each fire zone within Fire Area R-1B is less than 90 minutes. Since the minimum rating of any fire barrier component bounding Fire Area R-1B is 90 minutes, a fire initiated in any fire zone in Fire Area R-1B will be contained within Fire Area R-1B. Specific combustible configurations in the fire area have also been reviewed for their fire hazard severity and for their impact on fire barrier integrity.

6.2.2.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection is provided throughout Fire Area R-1B except in the following fire zones:

1-1J	Stairway No. 101
1-6F	Spent Fuel Pool
0-6H	Cask Storage Pit

The justification for lack of detection in these fire zones is presented in Deviation Request No. 14.

Automatic fire suppression systems are installed in local areas where fire hazards have the most severe potential. These systems are designed to control and suppress any fire which could develop in the fire zones which they protect. Fire suppression has been provided in the following fire zones:

1-2B	Access Corridor
1-3B-N	Equipment Removal Area (partial sprinkler protection)
1-3B-W	Equipment Removal Area
1-4A-N	Containment Access Area (partial sprinkler protection)
1-4A-W	Containment Access Area
1-5A-W	Access Area

Automatic deluge systems are provided for the following equipment listed by fire zones:

1-1C	HPCI Pump
1-1D	RCIC Pump

6.2.2.5 Consequences of a Fire in Fire Area R-1B

In the event of a design basis fire in Fire Area R-1B, Safe Shutdown Path 1 systems will be available for safe shutdown. Electrical cabling located in Fire Area R-1B which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protection envelope or has been specifically evaluated to assure that its failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.2.5.1 Fire Zone 1-1B

The following major SSD components located in Fire Zone 1-1B are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- Core Spray Pumps 1B and 1D
- Core Spray Loop B Suction Valve
- Division II Instrumentation

There are no Category I components located in Fire Zone 1-1B.

6.2.2.5.2 Fire Zone 1-1C

The following major SSD components located in Fire Zone 1-1C are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- HPCI System

There are no Category I components located in Fire Zone 1-1C.

6.2.2.5.3 Fire Zone 1-1D

The following major SSD components contained Fire Zone 1-1D are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- RCIC System

There are no Category I components located in Fire Zone 1-1D.

6.2.2.5.4 Fire Zone 1-1E

The following major SSD components contained in Fire Zone 1-1E are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- RHR Service Water Loop B Heat Exchanger Isolation Valve
- RHR Pump 1B
- RHR Pump Room Unit Cooler B
- RHR Loop B Valves

There are no Category I components located in Fire Zone 1-1E.

6.2.2.5.5 Fire Zone 1-1I

There are no major SSD components or Category I components located in Fire Zone 1-1I.

6.2.2.5.6 Fire Zone 1-1J

There are no major SSD components or Category I components located in Fire Zone 1-1J.

6.2.2.5.7 Fire Zone 1-2B

The following major SSD components located in Fire Zone 1-2B are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- Core Spray Loop B Valve
- Division II Reactor Building Motor Control Center
- RCIC Components

There are no Category I components located in Fire Zone 1-2B.

6.2.2.5.8 Fire Zone 1-2D

The following major SSD components located in Fire Zone 1-2D are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- Reactor Vessel Level and Pressure Indicators
- RHR Loop B Flow Indication
- RCIC Flow Indicators
- RCIC Turbine Control Instrumentation
- RHR Service Water Loop B Flow Indication
- Remote Shutdown Panel Instrumentation

There are no Category I components located in Fire Zone 1-2D.

6.2.2.5.9 Fire Zone 1-3B-N

The following major SSD components located in Fire Zone 1-3B-N are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- Division II ADS Permissive Pressure Switches
- Division II Reactor Building ES Motor Control Centers
- Division II Electrical Distribution Components
- RHR Loop B Instrumentation
- RHR Service Water Loop B Instrumentation

There are no Category I components located in Fire Zone 1-3B-N.

6.2.2.5.10 Fire Zone 1-3B-W

There are no major SSD components or Category I components located in Fire Zone 1-3B-W.

6.2.2.5.11 Fire Zone 1-3C-N

The following major SSD components located in Fire Zone 1-3C-N are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- HPCI Instrumentation
- Core Spray Loop B Valve
- RHR Loop B Valves
- RCIC Instrumentation

There are no Category I components located in Fire Zone 1-3C-N.

6.2.2.5.12 Fire Zone 1-3C-W

The following major SSD components located in Fire Zone 1-3C-W are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- RCIC Valve

The following Category I components are located in Fire Zone 1-3C-W:

- RHR Injection Inboard Isolation Valve (HV-E11-1F015A&B) - Addressed in Deviation Request No. 29
- RHR Heat Exchanger Shell Side Bypass Valve (HV-E11-1F048A&B) - Addressed in Deviation Request No. 29

- RHR Shutdown Cooling Isolation Valve (HV-E11-1F008) - This valve has been protected via a plant modification.
- RHR Heat Exchanger Outlet Temperature Elements (TE-E11-1N027A&B) - Addressed in Deviation Request No. 29

6.2.2.5.13 Fire Zone 1-4A-N

The following major SSD components located in Fire Zone 1-4A-N are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- Division II Motor Control Centers
- Division II Instrumentation Panel
- Division II Nuclear Boiler Instrumentation

The following Category I components are located in Fire Zone 1-4A-N:

- CRD Hydraulic Control Units and Terminal Boxes - An analysis has been performed which shows that a fire in this fire zone will not defeat the scram capability of these components.

6.2.2.5.14 Fire Zone 1-4A-W

The following major SSD components located in Fire Zone 1-4A-W are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- Drywell Instrumentation

The following Category I components are located in Fire Zone 1-4A-W:

- SCRAM Vent and Drain Valves (SV-C12-1F009 and SV-C12-1F182) - An analysis has been performed which shows that a fire in this fire zone will not defeat the scram capability of these components.

6.2.2.5.15 Fire Zone 1-4B

There are no major SSD components or Category I components located in Fire Zone 1-4B.

6.2.2.5.16 Fire Zone 1-4G

The following major SSD components located in Fire Zone 1-4G are not required for achieving SSD in the event of a fire in Fire Area R-1B:

- Main Steam Line Division II Solenoid Valves
- RCIC Valve

The following Category I component is located in Fire Zone 1-4G:

- Main Steam Outboard Drain Isolation Valve (HV-B21-F019) - An analysis has shown that the redundant valve will remain closed.

6.2.2.5.17 Fire Zone 1-5A-N

There are no major SSD components or Category components located in Fire Zone 1-5A-N.

6.2.2.5.18 Fire Zone 1-5A-W

There are no major SSD Components or Category I components located in Fire Zone 1-5A-W.

6.2.2.5.19 Fire Zone 1-5C

There are no major SSD components or Category components located in Fire Zone 1-5C.

6.2.2.5.20 Fire Zone 1-5D

There are no major SSD components located in Fire Zone 1-5D.

The following Category I component is located in Fire Zone 1-5D:

- Reactor Water Cleanup Outboard Isolation Valve Flow Diversion (HV-G33-1F004) - An analysis has been performed which shows that the RWCU Inboard Isolation Valve will function to prevent flow diversion for a fire in this fire zone.

6.2.2.5.21 Fire Zone 1-6A

The following major SSD components located in Fire Zone 1-6A are not required for SSD in the event of a fire in Fire Area R-1B:

- Division II Containment Pressure Switches for ADS

There are no Category I Components located in Fire Zone 1-6A.

6.2.2.5.22 Fire Zone 1-6B

There are no major SSD components or Category I components located in Fire Zone 1-6B.

6.2.2.5.23 Fire Zone 1-6C

There are no major SSD components or Category I components located in Fire Zone 1-6C.

6.2.2.5.24 Fire Zone 1-6D

There are no major SSD components located in Fire Zone 1-6D.

The following Category I components are located in Fire Zone 1-6D:

- Primary Containment Pressure Switches (PS-E11-1N010A and PS-E11-1N010C)
- Addressed in Deviation Request No. 39.

6.2.2.5.25 Fire Zone 1-6F

There are no major SSD components or Category I components located in Fire Zone 1-6F.

6.2.2.5.26 Fire Zone 1-6I

There are no major SSD components or Category I components located in Fire Zone 1-6I.

6.2.2.5.27 Fire Zone 1-7A

There are no major SSD components or Category I components located in Fire Zone 1-7A.

6.2.2.5.28 Fire Zone 0-6G

There are no major SSD components or Category I components located in Fire Zone 0-6G.

6.2.2.5.29 Fire Zone 0-6H

There are no major SSD components or Category I components located in Fire Zone 0-6H.

6.2.2.5.30 Fire Zone 0-8A

There are no major SSD components or Category I components located in Fire Zone 0-8A.

6.2.2.6 Special Features

The following manual actions are required for a fire in the specific fire zone:

1. In Fire Zone 1-5A-N, should a loss of automatic scram capability occur, the reactor would have to be manually scrammed from the Control Room.
2. In Fire Zones 1-2D, 1-3B-N, 1-3B-W, 1-3C-N, 1-3C-W, 1-4A-N or 1-4A-W and 1-6D, should RHR control logic be lost or adversely affected, manual control of the RHR System Pumps locally at the respective pump breaker and valves from the Control Room is required.
3. In Fire Zones 1-3B-N, 1-4A-N, 1-4A-W, or 1-4B, should a fire prevent tripping of Reactor Recirculation pumps P401A and P401B, stop the pumps by manually tripping their respective M-G set supply breaker.
4. In Fire Zone 1-1B, should ADS spuriously actuate, operate ADS Control Switch to "inhibit".
5. In Fire Zones 1-2B, 1-2D, 1-3B-N, 1-4A-N or 1-4B, should ADS spuriously actuate, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.

6.2.2.7 Deviation Requests Affecting Fire Area R-1B:

The following is a list of the non-generic Deviation Requests that affect the fire zones in Fire Area R-1B. A brief description is provided in this listing for guidance, however, the complete Deviation Requests are presented in Section 7.0.

Deviation Request No.	Title
3	Non-rated Fire Doors
4	Wraparound Area
5	Partial Rating of Walls and Floor/Ceilings
6	Non-Fireproofed Structural Steel
8	One Hour Fire Barrier Wrap With Limited Suppression
11	HVAC Penetrations in Reactor Building Fire Walls
12	Fire Barriers without Fire Dampers in Vertical Ventilation Duct Penetrations
14	Reactor Building Fire Zones Without Fire Detection
17	Kaowool as an Acceptable 1 Hour Fire Barrier Wrap
29	Category 1 Components and Safe Shutdown Raceway in Fire Zones 1-3C-W and 2-3C-W
39	Category 1 Components in Fire Zone 1-6D and 2-6D
42	Protection of Safe Shutdown Raceway in Fire Zones 1-3B-W and 2-3B-W

6.2.3 Fire Area R-1C

6.2.3.1 General Description

Fire Area R-1C is the Unit 1 Primary Containment. Its location is shown on Drawings E-205949 thru E-205954 in Section 8.0. Primary containment has an inerted nitrogen environment during normal operation.

6.2.3.2 Fire Zones

The following fire zones are located in Fire Area R-1C:

Fire Zone	Description
1-1H	Unit 1 Suppression Pool Area
1-4F	Unit 1 Drywell

6.2.3.3 Combustible Loading

The inerted nitrogen atmosphere inside primary containment will prevent combustion at power operation.

6.2.3.4 Fire Detection/Suppression in the Fire Area

Due to the normally inerted nitrogen environment, there is no automatic fire detection or suppression in Primary Containment. Manual hose reels and portable extinguishers are located just outside the containment entrance. During extended outages additional portable extinguishers are placed inside the drywell.

6.2.3.5 Consequences of a Fire in Fire Area R-1C

The inerted nitrogen atmosphere of Primary Containment will prevent combustion at power operation.

6.2.3.6 Special Features

Primary containment has an inerted nitrogen atmosphere. Separation of redundant cable trays and conduits are in accordance with NRC Regulatory Guide 1.75.

6.2.3.7 Deviation Requests Affecting Fire Area R-1C

There are no non-generic deviation requests that directly affect this fire area.

6.2.4 Fire Area R-1D

6.2.4.1 General Description

Fire Area R-1D is the Valve Access Area located in the Unit 1 Reactor Building at Elevation 762'-10". This fire area is a single room. Its location is shown on Drawing E-205953 in Section 8.0. Safe Shutdown Path 1 with the following system substitutions can be used to achieve safe shutdown in the event of a fire:

- a) Core Spray components for both units are not included in path 1 and
- b) RCIC and RHR shutdown cooling components for both units are included in path 1.

6.2.4.2 Fire Zones

The following fire zones are located in Fire Area R-1D:

Fire Zone	Description
1-5B	Unit 1 Valve Access Area

6.2.4.3 Combustible Loading

The combustible loading in Fire Area R-1D is low and the only combustible material in the room is lube oil from the valves in the room. There are minimal unwrapped cables in this room and the long term compliance program prohibits routing new unprotected cables in this area in the future.

6.2.4.4 Fire Detection/Suppression in the Fire Area

The fire area has photoelectric smoke detectors which alarm in the main control room. There is no automatic suppression in the room, however, portable extinguishers and manual hose reels are located just outside the room. This equipment is not located inside the fire area since it is a high radiation area during normal operations.

6.2.4.5 Consequences of a Fire in Fire Area R-1D

Electrical cabling located in Fire Area R-1D which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition.

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The following major SSD components located in Fire Zone 1-5B are not required for achieving SSD in the event of a fire in Fire Area R-1D.

- Core Spray Loop A Inboard and Outboard Injection Valves.
- Core Spray Loop B Inboard and Outboard Injection Valves.
- Reactor Vessel Drywell Spray Valve

There are no Category I components located in Fire Zone 1-5B.

6.2.4.6 Special Features

This fire area is unique since it contains redundant components of the core spray system. However, by using the RCIC System and RHR shutdown cooling for safe shutdown in the event of a fire in this fire area, the loss of the core spray system would not prevent the unit from achieving safe shutdown. There are no manual actions required.

6.2.4.7 Deviation Requests Affecting Fire Area R-1D

The following non-generic deviation request directly affect Fire Area R-1D:

Deviation Request No.	Title
3	Fire Doors - Non-rated
6	Non-Fire Proofed Structural Steel
11	HVAC Duct Penetrations through Reactor Building Walls without Fire Dampers

6.2.5 Fire Area R-1E

6.2.5.1 General Description

Fire Area R-1E is the Division II 4.16 KV Switchgear Room at Elevation 719'-1" in the Unit 1 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205952 in Section 8.0. Safe Shutdown Path 1 can be used to achieve safe shutdown in the event of a fire in this fire area.

6.2.5.2 Fire Zones

The following fire zones are located in Fire Area R-1E:

Fire Zone	Description
1-4C	Division II 4.16 KV Switchgear Room at Elevation 719'-1"

6.2.5.3 Combustible Loading

The combustible loading in Fire Area R-1E is well below the fire barrier rating of the fire area boundary. The prime contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.5.4 Fire Detection/Suppression in the Fire Area

Fire Area R-1E is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.5.5 Consequences of a Fire in Fire Area R-1E

In the event of a fire in Fire Area R-1E, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-1E which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zones is detailed below.

6.2.5.5.1 Fire Zone 1-4C

The following major SSD components located in Fire Zone 1-4C are not required for achieving SSD in the event of a fire in Fire Area R-1E:

- Division II Electrical Components (Channel D)

There are no Category I components located in Fire Zone -4C.

6.2.5.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.5.7 Deviation Requests Affecting Fire Area R-1E

There are no non-generic deviation requests which directly affect Fire Area R-1E.

6.2.6 Fire Area R-1F

6.2.6.1 General Description

Fire Area R-1F is the Division I 4.16 KV Switchgear Room at Elevation 719'-1" in the Unit 1 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205952 in Section 8.0. Safe Shutdown Path 3 can be used to achieve safe shutdown in the event of a fire in this area.

6.2.6.2 Fire Zones

The following fire zones are located in Fire Area R-1F:

Fire Zone	Description
1-4D	Division I 4.16 KV Switchgear Room at Elevation 719'-1"

6.2.6.3 Combustible Loading

The combustible loading in Fire Area R-1F is well below the fire barrier rating of the fire area boundary. The prime contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.6.4 Fire Detection/Suppression in the Fire Area

Fire Area R-1F is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.6.5 Consequences of a Fire in Fire Area R-1F

In the event of a fire in Fire Area R-1F, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-1F which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.6.5.1 Fire Zone 1-4D

The following major SSD components located in Fire Zone 1-4D are not required for achieving SSD in the event of a fire in Fire Area R-1F:

- Division I Electrical Components (Channel C)

There are no Category I components located in Fire Zone 1-4D.

6.2.6.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.6.7 Deviation Requests Affecting Fire Area R-1F

There are no non-generic deviation requests which directly affect Fire Area R-1F.

6.2.7 Fire Area R-1G6.2.7.1 General Description

Fire Area R-1G is the Division II 4.16 KV Switchgear Room at Elevation 749'-1" in the Unit 1 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205953 in Section 8.0. Safe Shutdown Path 1 can be used to achieve safe shutdown in the event of a fire in this fire area.

6.2.7.2 Fire Zones

The following fire zones are located in Fire Area R-1G:

Fire Zone	Description
1-5F	Division II 4.16 KV Switchgear Room at Elevation 749'-1"

6.2.7.3 Combustible Loading

The combustible loading in Fire Area R-1G is well below the fire barrier rating of the fire area boundary. The principle contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.7.4 Fire Detection/Suppression in the Fire Area

Fire Area R-1G is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the

nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.7.5 Consequences of a Fire in Fire Area R-1G

In the event of a fire in Fire Area R-1G, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-1G which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.7.5.1 Fire Zone 1-5F

The following major SSD components located in Fire Zone 1-5F are not required for achieving SSD in the event of a fire in Fire Area R-1G:

- Division II Electrical Components (Channel B)

There are no Category I components located in Fire Zone 1-5F.

6.2.7.6 Special Features

1. Should a fire occur in Fire Area R-1G and prevent tripping of Reactor Recirculation pumps 1P401A, 1P401B stop the pumps by manually tripping their respective M-G set supply breaker.

6.2.7.7 Deviation Requests Affecting Fire Area R-1G

There are no non-generic deviation requests which directly affect Fire Area R-1G.

6.2.8 Fire Area R-1H

6.2.8.1 General Description

Fire Area R-1H is the Division I 4.16 KV Switchgear Room at Elevation 749'-1" in the Unit 1 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205953 in Section 8.0. Safe Shutdown Path 3 can be used to achieve safe shutdown in the event of a fire in this fire area.

6.2.8.2 Fire Zones

The following fire zones are located in Fire Area R-1H:

Fire Zone	Description
1-5G	Division I 4.16 KV Switchgear Room at Elevation 749'-1"

6.2.8.3 Combustible Loading

The combustible loading in Fire Area R-1H is well below the fire barrier rating of the fire area boundary. The principle contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.8.4 Fire Detection/Suppression in the Fire Area

Fire Area R-1H is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.8.5 Consequences of a Fire in Fire Area R-1H

In the event of a fire in Fire Area R-1H, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-1H which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.8.5.1 Fire Zone 1-5G

The following major SSD components located in Fire Zone 1-5G are not required for achieving SSD in the event of a fire in Fire Area R-1H:

- Division I Electrical Components (Channel A)

There are no Category I components located in Fire Zone R-1H.

6.2.8.6 Special Features

1. Should a fire occur in Fire Area R-1H and prevent tripping of Reactor Recirculation pumps 1P401A, and 1P401B, stop the pumps by tripping their respective M-G set supply breaker.

6.2.8.7 Deviation Requests Affecting Fire Area R-1H

There are no non-generic deviation requests which directly affect Fire Area R-1H.

6.2.9 Fire Area R-2A6.2.9.1 General Description

Fire Area R-2A is located in the Unit 2 Reactor Building and is comprised of fire zones which generally occupy the southern half of the building. This fire area is shown on Drawings E-205957 thru E-205964 in Section 8.0. Fire Area R-2A predominately contains Division I equipment, components and cabling. Safe Shutdown Path 3 can be used to achieve safe shutdown in the event of a fire in Fire Area R-2A.

6.2.9.2 Fire Zones

The following fire zones are located in Fire Area R-2A:

Fire Zone	Description
2-1B	Core Spray Pump Room
2-1F	RHR Pump Room
2-1G	Sump Room
2-1I	Stairway No. 202 and Elevator Shaft
2-2A	Remote Shutdown Panel and Access Area
2-2C	Vehicle Airlock
2-3A	Access Area
2-3B-S	Equipment Removal Area
2-3B-W*	Equipment Removal Area
2-3C-S	Equipment Access Area
2-3C-W*	Equipment Access Area
2-4A-S	Containment Access Area
2-4A-W*	Containment Access Area
2-4E	CRD Maintenance Room
2-5A-S	General Access Area
2-5A-W*	Access Corridor
2-5C	Reactor Backwash Receiving Tank Room
2-5D	RWCU Pump Room and Heat Exchanger Cells
2-5E	Pipe Penetration Room
2-5H	Instrument Repair Shop
2-6B**	Load Center Room
2-6D**	HVAC Equipment Room
2-6E**	HVAC Plenum Area
2-6F**	Spent Fuel Pool

Fire Zone	Description
2-7A**	HVAC Equipment Area
0-8A**	Refueling Floor
* This fire zone is a wraparound area (see Deviation Request No. 4)	
** This fire zone is a buffer zone (see Deviation Request No. 7)	

6.2.9.3 Combustible Loading

The combustible loading for each fire zone within this fire area has been compiled and has been used for specific fire hazards analysis within this fire area. The equivalent fire duration (for in-situ and transient combustibles) of each Fire Zone within Fire Area R-2A is less than 90 minutes. Since the minimum rating of any fire barrier component bounding fire area R-2A is 90 minutes, a fire initiated in any fire zone in Fire Area R-2A will be contained within Fire Area R-2A. Specific combustible configurations in the fire area have also been reviewed for their fire hazard severity and for their impact on fire barrier integrity.

6.2.9.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection is provided throughout Fire Area R-2A except in the following fire zones:

2-2C	Vehicle Airlock
2-4E	CRD Maintenance Room
2-6F	Spent Fuel Pool

The justification for lack of detection in these fire zones is presented in Deviation Request No. 14.

Automatic fire suppression systems have been installed in local areas where fire hazards have the most severe potential. These systems are designed to control and suppress any fire which could develop in the fire zones which they protect.

Fire suppression has been provided in the following fire zones:

2-2C	Vehicle Airlock
2-3B-S	Equipment Removal Area
2-3B-W	Equipment Removal Area
2-4A-S	Containment Access Area (partial sprinkler protection)
2-4A-W	Containment Access Area
2-5A-W	Access Corridor
2-5A-S	Valve Access Area Vestibule

6.2.9.5 Consequences of a Fire in Fire Area R-2A

In the event of a design basis fire in Fire Area R-2A, Safe Shutdown Path 3 systems will be available for safe shutdown. Electrical cabling located in Fire Area R-2A which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. Automatic suppression is provided in Fire Zone 2-5A-S. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.9.5.1 Fire Zone 2-1B

The following major SSD components located in Fire Zone 2-1B are not required for achieving SSD in the event of a fire in Fire Area R-2A:

- Division I Core Spray Pumps and Suction Valve
- Division I Suppression Pool Level Instrumentation
- Division I Core Spray Pump Discharge Pressure Switch For ADS

The following Category I components are located in Fire Zone 2-1B:

- Containment Atmosphere Control Isolation Valves (HV-25766 and HV-25768) - These valves are assumed closed since three-phase hot shorts are not considered credible for non-high/low pressure interfaces.

6.2.9.5.2 Fire Zone 2-1F

The following major SSD components located in Fire Zone 2-1F are not required for achieving SSD in the event of a fire in Fire Area R-2A:

- Division I RHR Pumps
- RHR Pump Coolers
- Division I RHR System Valves
- Division I RHR Service Water Isolation Valves

There are no Category I components located in Fire Zone 2-1F.

6.2.9.5.3 Fire Zone 2-1G

The following major SSD components located in Fire Zone 2-1G are not required for achieving SSD in the event of a fire in Fire Area R-2A:

- Division I RHR Service Water Instrumentation
- Division I RHR Pump Discharge Pressure Switch For ADS

There are no Category I components located in Fire Zone 2-1G.

6.2.9.5.4 Fire Zone 2-1I

There are no major SSD components or Category I components located in Fire Zone 2-1I.

6.2.9.5.5 Fire Zone 2-2A

The following major SSD components located in Fire Zone 2-2A are not required for achieving SSD in the event of a fire in Fire Area R-2A:

- Division I Core Spray Valves
- RCIC Instrumentation
- RHR Loop B Remote Shutdown Instrumentation
- RHR Service Water Instrumentation
- Remote Shutdown Panel Instrumentation

There are no Category I components located in Fire Zone 2-2A.

6.2.9.5.6 Fire Zone 2-2C

There are no major SSD components or Category I components contained in Fire Zone 2-2C.

6.2.9.5.7 Fire Zone 2-3A

The following major SSD components located in Fire Zone 2-3A are not required for achieving SSD in the event of a fire in Fire Area R-2A:

- Division I RHR Instrumentation
- Division I Electrical Equipment

There are no Category I components located in Fire Zone 2-3A.

6.2.9.5.8 Fire Zone 2-3B-S

There are no major SSD components or Category I components located in Fire Zone 2-3B-S.

6.2.9.5.9 Fire Zone 2-3B-W

There are no major SSD components or Category I components located in Fire Zone 2-3B-W.

6.2.9.5.10 Fire Zone 2-3C-S

The following major SSD components located in Fire Zone 2-3C-S are not required for achieving SSD in the event of a fire in Fire Area R-2A:

- Division I Core Spray Valves
- Division I RHR Valves

There are no Category I components located in Fire Zone 2-3C-S.

6.2.9.5.11 Fire Zone 2-3C-W

The following major SSD component is located in Fire Zone 2-3C-W and is not required for achieving SSD in the event of a fire in Fire Area R-2A:

- RCIC Outboard Steam Line Isolation Valve

The following Category I components are located in Fire Zone 2-3C-W:

- RHR Shutdown Cooling Outboard Isolation Valve (HV-E11-2F008) - This valve has been protected via a plant modification.
- RHR Injection Inboard Isolation Valve (HV-E11-2F015B) - Addressed by Deviation Request No. 29
- RHR Heat Exchange Shell Side Bypass Valve (HV-E11-2F048B) -Addressed by Deviation Request No. 29
- RHR Heat Exchanger Outlet Temperature Element (TE-E11-2N027B) - Addressed by Deviation Request No. 29

6.2.9.5.12 Fire Zone 2-4A-S

The following major SSD components located in Fire Zone 2-4A-S are not required for achieving SSD in the event of a fire in Fire Zone R-2A:

- Division I Electrical Distribution Components
- Nuclear Boiler Instrumentation

The following Category I components are located in Fire Zone 2-4A-S:

- CRD Hydraulic Control Units - An analysis has been performed which shows that the scram capability is not defeated by a fire in this fire zone.

6.2.9.5.13 Fire Zone 2-4A-W

The following major SSD components located in Fire Zone 2-4A-W are required for achieving SSD in the event of a fire in Fire Zone R-2A:

- Primary Containment Drywell Pressure Switch

The following Category I components are located in Fire Zone 2-4A-W:

- Reactor Scram Discharge Volume Vent and Drain Valves (SV-C12-2F009A&B) - An analysis has been performed which shows that the scram capability will not be defeated by a fire in this fire zone.

6.2.9.5.14 Fire Zone 2-4E

There are no major SSD components or Category I components located in Fire Zone 2-4E.

6.2.9.5.15 Fire Zone 2-5A-S

There are no major SSD components or Category I components located in Fire Zone 2-5A-S.

6.2.9.5.16 Fire Zone 2-5A-W

There are no major SSD components or Category I components located in Fire Zone 2-5A-W.

6.2.9.5.17 Fire Zone 2-5C

There are no major SSD components or Category I components located in Fire Zone 2-5C.

6.2.9.5.18 Fire Zone 2-5D

There are no major SSD components located in Fire Zone 2-5D.

The following Category I component is located in Fire Zone 2-5D:

- RWCU Outboard Isolation Valve (HV-G33-2F004) - An analysis has been performed which demonstrates assurance that the inboard valve will remain operable.

6.2.9.5.19 Fire Zone 2-5E

There are no major SSD components or Category I components located in Fire Zone 2-5E.

6.2.9.5.20 Fire Zone 2-5H

There are no major SSD components or Category I components located in Fire Zone 2-5H.

6.2.9.5.21 Fire Zone 2-6B

There are no major SSD components or Category I components located in Fire Zone 2-6B.

6.2.9.5.22 Fire Zone 2-6D

The following Category I component is located in Fire Zone 2-6D:

- Drywell Pressure Switches for ADS (PS-E11-2N010A&C) - Addressed in Deviation Request No. 39.

6.2.9.5.23 Fire Zone 2-6E

There are no major SSD components or Category I components located in Fire Zone 2-6E.

6.2.9.5.24 Fire Zone 2-6F

There are no major SSD components or Category I components located in Fire Zone 2-6F.

6.2.9.5.25 Fire Zone 2-7A

There are no major SSD components or Category I components located in Fire Zone 2-7A.

6.2.9.5.26 Fire Zone 0-8A

There are no major SSD components or Category I components located in Fire Zone 0-8A.

6.2.9.6 Special Features

The following manual actions are required for a fire in the specific fire zone:

1. In Fire Zones 2-3C-W or 2-5A-W, should the RHR control logic be lost, manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
2. In Fire Zone 2-6D, should the RHR control logic be adversely affected, manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
3. In Fire Zones 2-3A, 2-4A-S, 2-4A-W, or 2-5A-W should a fire prevent tripping of Reactor Recirculation pumps 2P401A and 2P401B, stop the pumps by manually tripping their respective M-G set supply breaker.
4. In Fire Zones 2-1B, 2-1F, 2-1G, 2-3C-W, 2-5A-S, or 2-5C should ADS spuriously actuate, operate the ADS control switch to "inhibit".
5. In Fire Zones 2-2A, 2-3A, or 2-4A-S should ADS spuriously actuate, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.

6.2.9.7 Deviation Requests Affecting Fire Area R-2A

The following is a list of the non-generic Deviation Requests that affect the fire zones in Fire Area R-2A. A brief description is provided in this listing for guidance, however, the complete Deviation Requests are presented in Section 7.0.

Deviation Request No.	Title
3	Non-rated Fire Doors
4	Wraparound Area
5	Partial Rating of Walls and Floor/Ceilings
6	Non-Fireproofed Structural Steel
11	HVAC Penetrations in Reactor Building Fire Walls
12	Fire Barriers without Fire Dampers in Vertical Ventilation Duct Penetrations
14	Reactor Building Fire Zones Without Fire Detection
24	Automatic Fire Suppression
29	Category 1 Components and Safe Shutdown Raceway in Fire Zones 1-3C-W and 2-3C-W
39	Protection of Safe Shutdown Raceway in Fire Zone 2-3-CW
42	Protection of Safe Shutdown Raceway in Fire Zones 1-3B-W and 2-3B-W

6.2.10 Fire Area R-2B6.2.10.1 General Description

Fire Area R-2B is located in the Unit 2 Reactor Building and is comprised of fire zones which generally occupy the northern half of the building and are shown on Drawings E-205957 thru E-205964 in Section 8.0. Fire Area R-2B predominantly contains Division II equipment, components and cabling. Safe Shutdown Path 1 can be used to achieve safe shutdown in the event of a fire in Fire Area R-2B.

6.2.10.2 Fire Zones

The following fire zones are located in Fire Area R-2B:

Fire Zone	Description
2-1A	Core Spray Pump Room
2-1C	HPCI Pump Room
2-1D	RCIC Pump Room
2-1E	RHR Pump Room
2-1J	Stairway No. 201
2-2B	Personnel Access Corridor
2-3B-N	Equipment Removal Area
2-3B-W*	Equipment Removal Area
2-3C-N	Equipment Access Area
2-3C-W*	Equipment Access Area
2-4A-N	Containment Access Area
2-4A-W*	Containment Access Area
2-4B	Pipe Penetration Room
2-4G	Main Steam Pipeway
2-5A-N	Standby Control Systems Area
2-5A-W*	Access Corridor
2-6A	General Access Area and Pump Rooms
2-6B**	Load Center Room
2-6C	Electrical Equipment Room
2-6D**	HVAC Equipment Room
2-6E**	HVAC Plenum
2-6F**	Spent Fuel Pool
2-7A**	HVAC Equipment Area
0-8A**	Refueling Floor
* This fire zone is a wraparound area (see Deviation Request No. 4)	
** This fire zone is a buffer zone (see Deviation Request No. 7)	

6.2.10.3 Combustible Loading

The combustible loading for each fire zone within this fire area has been compiled and has been used for specific fire hazards analysis within this fire area. The equivalent fire duration (for in-situ and transient combustibles) of each fire zone within Fire Area R-2B is less than 90 minutes. Since the minimum rating of any fire barrier bounding Fire Area R-2B is 90 minutes, a fire initiated in any fire zone in Fire Area R-2B will be contained within Fire Area R-2B. Specific combustible configurations in the fire area have also been reviewed for their fire hazard severity and for their impact on fire barrier integrity.

6.2.10.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection is provided throughout Fire Area R-2B except in the following fire zones:

2-1J	Stairway No. 201
2-6F	Spent Fuel Pool

The justification for lack of detection in these fire zones is presented in Deviation Request No. 14.

Automatic fire suppression systems have been installed in local areas based upon fire hazards. These systems are designed to control and suppress any fire which could develop in the fire zones which they protect. Fire suppression has been provided in the following fire zones:

2-3B-N	Equipment Removal Area (partial sprinkler protection)
2-3B-W	Equipment Removal Access Area
2-4A-N	Containment Access Area
2-4A-W	Containment Access Area
2-5A-N	Standby Control Systems Area
2-5A-W	Access Corridor

Automatic deluge systems are provided for the equipment listed by fire zone below:

2-1C	HPCI Pump
2-1D	HPCI Pump

6.2.10.5 Consequences of a Fire in Fire Area R-2B

In the event of a design basis fire in Fire Area R-2B, Safe Shutdown Path 1 systems will be available for safe shutdown. Electrical cabling located in Fire Area R-2B which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a

safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.10.5.1 Fire Zone 2-1A

The following major SSD components located in Fire Zone 2-1A are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- Division II Core Spray Pump Discharge Pressure Switches for ADS
- Division II Core Spray Pumps and Valves
- Division II Suppression Pool Instrumentation

There are no Category I components located in Fire Zone 2-1A.

6.2.10.5.2 Fire Zone 2-1C

There are no major SSD components or Category I components located in Fire Zone 2-1C.

6.2.10.5.3 Fire Zone 2-1D

The following major SSD components located in Fire Zone 2-1D are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- RCIC Components

There are no Category I components located in Fire Zone 2-1D.

6.2.10.5.4 Fire Zone 2-1E

The following major SSD components located in Fire Zone 2-1E are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- RHR Pump 2B
- RHR Loop B Valves
- RHR Pump Room Unit Cooler B
- RHR Pump D Shutdown Cooling Suction Valve
- RHR Service Water Heat Exchanger B Isolation Valve

There are no Category I components located in Fire Zone 2-1E.

6.2.10.5.5 Fire Zone 2-1J

There are no major SSD components or Category I components located in Fire Zone 2-1J.

6.2.10.5.6 Fire Zone 2-2B

The following major SSD components located in Fire Zone 2-2B are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- Division II Reactor Building ES MCC
- Division II, Loop B Core Spray Valves
- RCIC Valves used on the Remote Shutdown Path

There are no Category I components located in Fire Zone 2-2B.

6.2.10.5.7 Fire Zone 2-3B-N

The following major SSD components located in Fire Zone 2-3B-N are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- Division II RHR Pump Discharge Pressure Switches for ADS
- Core Spray Loop B Instrumentation
- Electrical Panels for Paths 2 & 3
- RHR Loop B Instruments
- Pressure switch used in shutdown cooling on Path 2
- Division II RHR Service Water Flow Instrumentation

The following Category I components are located in Fire Zone 2-3B-N:

- RHR Valve (HV-E11-2F009) Controls and Control Circuits (K-33 and Pressure Instrument B31-2N108A) - Addressed by Deviation Request No. 26
- Core Spray System Loop A (FIS-E21-2N006A and FIS-E21-2N003A) - Addressed by Deviation Request No. 26

6.2.10.5.8 Fire Zone 2-3B-W

There are no major SSD components or Category I components located in Fire Zone 2-3B-W.

6.2.10.5.9 Fire Zone 2-3C-N

The following major SSD components located in Fire Zone 2-3C-N are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- RHR Loop B Components
- Core Spray Loop B Valves

There are no Category I components located in Fire Zone 2-3C-N.

6.2.10.5.10 Fire Zone 2-3C-W

The following major SSD components located in Fire Zone 2-3C-W are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- RCIC Outboard Steam Line Isolation Valve

The following Category I components are located in Fire Zone 2-3C-W:

- RHR Inboard Isolation Valves (HV-E11-2F015A&B) - Addressed by Deviation Request No. 29
- RHR Shutdown Cooling Isolation Valve (HV-E11-2F008) - This valve has been protected by a plant modification
- RHR Hx Outlet Temperature Elements (TE-E11-2N027A&B) - Addressed by Deviation Request No. 29
- RHR Hx Shell Side Bypass Valve (HV-E11-2F048A&B) - Addressed by Deviation Request No. 29

6.2.10.5.11 Fire Zone 2-4A-N

The following major SSD components located in Fire Zone 2-4A-N are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- Division II Electrical Distribution Components
- Nuclear Boiler Instrumentation

The following Category I components are located in Fire Zone 2-4A-N:

- CRD Hydraulic Control Units - An analysis has been performed which shows that the scram capability is not defeated by a fire in this fire zone.

6.2.10.5.12 Fire Zone 2-4A-W

The following major SSD components located in Fire Zone 2-4A-W are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- Drywell Instrumentation

The following Category I components are located in Fire Zone 2-4A-W:

- SRV Vent and Drain Valves (SV-C12-2F009A and SV-C12-2F009B) - An analysis has been performed which shows that the scram capability will not be defeated by a fire in this fire zone.

6.2.10.5.13 Fire Zone 2-4B

There are no major SSD components or Category I components located in Fire Zone 2-4B.

6.2.10.5.14 Fire Zone 2-4G

The following major SSD components located in Fire Zone 2-4G are required for achieving SSD in the event of a fire in Fire Area (Fire Zone 2-4G only):

- Division II Pilot Solenoid Valves for Outboard Main Steam Isolation Valves HV-B21-2F028A, B and C - Addressed by Deviation Request No. 38.

The following major SSD component located in Fire Zone 2-4G is not required for achieving SSD in the event of a fire in Fire Area R-2B:

- RCIC Pump Injection Valve

The following Category I component is located in Fire Zone 2-4G:

- Main Steam Line Drain Outboard Isolation Valve (HV-B21-2F019) - An analysis has shown that the redundant valve can be closed manually.

6.2.10.5.15 Fire Zone 2-5A-N

The following major SSD components located in Fire Zone 2-5A-N are not required for achieving SSD in the event of a fire in Fire Area R-2B:

- Division II Electrical Distribution Component

The following Category I components are located in Fire Zone 2-5A-N:

- Reactor Vessel Level 3 Confirmatory (LIS-B21-2N042A, LIS-B21-2N042B) - Addressed by Deviation Request No. 28
- 120 Volt RPS Power Distribution Panel (2Y201A) - An analysis has been performed which shows that a fire in this fire zone would not affect safe shutdown
- Nuclear Boiler Instrumentation - Addressed by Deviation Request No. 28
- Reactor Vessel Pressure Switches (PS-B21-2N022) - An analysis has been performed which shows that a spurious SRV actuation can be terminated by manually operating the control switches to the close position in the control room

6.2.10.5.16 Fire Zone 2-5A-W

There are no major SSD components or Category I components located in Fire Zone 2-5A-W.

6.2.10.5.17 Fire Zone 2-6A

The following major SSD component located in Fire Zone 2-6A is not required for achieving SSD in the event of a fire in Fire Areas R-2B:

- Division II Primary Containment Switches

There are no Category I components located in Fire Zone 2-6A.

6.2.10.5.18 Fire Zone 2-6B

There are no major SSD components or Category I components located in Fire Zone 2-6B.

6.2.10.5.19 Fire Zone 2-6C

There are no major SSD components or Category I components located in Fire Zone 2-6C.

6.2.10.5.20 Fire Zone 2-6D

There are no major SSD components located in Fire Zone 2-6D.

The following Category I components are located in Fire Zone 2-6D:

- Pressure Switches - Primary Containment (PS-E11-2N010A and PS-E11-2N010C) - Address in Deviation Request No. 39.

6.2.10.5.21 Fire Zone 2-6E

There are no major SSD components or Category I components located in Fire Zone 2-6E.

6.2.10.5.22 Fire Zone 2-6F

There are no major SSD components or Category I components located in Fire Zone 2-6F.

6.2.10.5.23 Fire Zone 2-7A

There are no major SSD components or Category I components located in Fire Zone 2-7A.

6.2.10.5.24 Fire Zone 0-8A

There are no major SSD components or Category I components located in Fire Zone 0-8A.

6.2.10.6 Special Features

The following manual actions are required for a fire in the specific fire zones:

1. In Fire Zone 2-5A-N, the pump trip logic for RHRSW pump must be reset in the control room for the loss of distribution panel 2Y201A.
2. In Fire Zone 2-5A-N, should the SRV's spuriously operate the operator in the control room must take the control switches to the close position.
3. In Fire Zones 2-2B, 2-3B-N, 2-3C-W, 2-4A-N, 2-4B, 2-4G or 2-5A-W, should the RHR control logic be lost, manual control of the RHR system pumps locally at the respective pump breaker and valves from the Control Room is required.
4. In Fire Zones 2-5A-N, 2-6C or 2-6D, should RHR control logic be adversely affected, manual control of the RHR system pumps locally at the respective pump breaker and valves from the Control Room is required.
5. In Fire Zones 2-4B, 2-4A-N or 2-5A-N, should a loss of automatic scram capability occur, the reactor would have to be manually scrammed from the Control Room.
6. In Fire Zones 2-3B-N, 2-4A-N, 2-4B, 2-4G, or 2-5A-N should a fire prevent tripping of Reactor Recirculation pumps (2P401A, 2P401B) stop the pumps by manually tripping their respective M G set supply breaker.
7. In Fire Zones 2-1A, 2-1C, 2-2B, 2-3B-N, or 2-3C-N should ADS spuriously actuate, operate the ADS control switch to 'inhibit'.
8. In Fire Zones 2-4A-N, 2-4B or 2-5A-N should ADS spuriously actuate, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.
9. In Fire Zone 2-4G should a fire prevent closing of the Main Steam Line Drain Inboard Isolation Valve HV-B21-2F016 or the Main Steam Line Drain Outboard Isolation Valve HV-B21-2F019, close the HV-B21-2F019 valve manually.

6.2.10.7 Deviation Requests Affecting Fire Area R-2B

The following is a list of the non-generic Deviation Requests that affect the fire zones in Fire Area R-2B. A brief description is provided in this listing for guidance, however, the complete Deviation Requests are presented in Section 7.0.

Deviation Request No.	Title
3	Non-rated Fire Doors
4	Wraparound Area
5	Partial Rating of Walls and Floor/Ceilings
6	Non-Fireproofed Structural Steel
11	HVAC Penetrations in Reactor Building Fire Walls
12	Fire Barriers without Fire Dampers in Vertical Ventilation Duct
14	Reactor Building Fire Zones Without Fire Detection
26	Automatic Fire Suppression in Fire Zone 2-3B-N
28	Nuclear Boiler Instrumentation in Fire Zone 2-5A-N
29	Category I Components and Safe Shutdown Raceway in Fire Zones 1-3C-W and 2-3C-W
38	Protection of Redundant Safe Shutdown Raceways in the Unit 2 Mainsteam Pipeway
39	Category I Components in Fire Zones 1-6D and 2-6D
42	Protection of Safe Shutdown Raceway in Fire Zones 1-3B-W and 2-3B-W

6.2.11 Fire Area R-2C

6.2.11.1 General Description

Fire Area R-2C is the Unit 2 Primary Containment. Its location is shown on Drawings E-205957 thru E-205962 in Section 8.0. Primary containment has an inerted nitrogen environment during normal operation.

6.2.11.2 Fire Zones

The following fire zones are located in Fire Area R-2C:

Fire Zone	Description
2-1H	Unit 2 Suppression Pool Area
2-4F	Unit 2 Drywell

6.2.11.3 Combustible Loading

The inerted nitrogen atmosphere inside primary containment will prevent combustion at power operation.

6.2.11.4 Fire Detection/Suppression in the Fire Area

Due to the normally inerted nitrogen environment, there is no automatic fire detection or suppression in Primary Containment. Manual hose reels and portable extinguishers are located just outside the containment entrance for use by the fire brigade. During extended outages additional portable extinguishers are placed inside the drywell.

6.2.11.5 Consequences of a Fire in Fire Area R-2C

The inerted nitrogen atmosphere of Primary Containment will prevent combustion at power operation.

6.2.11.6 Special Features

Primary containment has an inerted nitrogen atmosphere. Separation of redundant cable trays and conduits are in accordance with NRC Regulatory Guide 1.75. There are no manual actions required.

6.2.11.7 Deviation Requests Affecting Fire Area R-2C

There are no non-generic deviation requests that directly affect Fire Area R-2C.

6.2.12 Fire Area R-2D

6.2.12.1 General Description

Fire Area R-2D is the Valve Access Area located in the Unit 2 Reactor Building at Elevation 762'-10". This fire area is a single room. Its location is on Drawing E-205961 in Section 8.0. Safe shutdown Path 1 with the following system substitutions can be used to achieve safe shutdown in the event of a fire:

- | - Core Spray components for both units are not included in Path 1 and
- | - RCIC and RHR shutdown cooling components for both units are included in Path 1.

6.2.12.2 Fire Zones

The following fire zones are located in Fire Area R-2D:

Fire Zone	Description
2-5B	Unit 2 Valve Access Area

6.2.12.3 Combustible Loading

The combustible loading in Fire Area R-2D is low and the only combustible material in the room is lube oil from the valves in the room. There are minimal unwrapped cables in this room and the long term compliance program prohibits routing new unprotected cables in this area in the future.

6.2.12.4 Fire Detection/Suppression in the Fire Area

The fire area has photoelectric smoke detectors which alarm in the main control room. Automatic sprinkler protection is provided. Portable extinguishers and manual hose reels are located nearby the area. This equipment is not located inside the fire area since it is a high radiation area during normal operation.

6.2.12.5 Consequences of a Fire in Fire Area R-2D

Electrical cabling located in Fire Area R-2D which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. Automatic sprinkler protection is provided.

6.2.12.5.1 Fire Zone 2-5B

The following major SSD components located in Fire Zone 2-5B are not required for achieving SSD in the event of a fire in Fire Area R-2D:

- Core Spray Loop A Inboard and Outboard Injection Valves
- Core Spray Loop B Inboard and Outboard Injection Valves
- RHR Reactor Vessel Drywell Spray Valve B

There are no Category I components located in Fire Zone 2-5B.

6.2.12.6 Special Features

This fire area is unique since it contains redundant components of the core spray system. However, by using RCIC and RHR shutdown cooling for safe shutdown in the event of a fire in this fire area, the loss of the core spray system would not prevent either unit from achieving safe shutdown.

1. Should a fire occur in Fire Area R-2D which adversely affects the automatic scram capability, a manual scram from the control room would be required.
2. Should a fire occur in Fire Area R-2D which causes a loss of RHR control logic, manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.

6.2.12.7 Deviation Requests Affecting Fire Area R-2D

The following non-generic Deviation Requests directly affect Fire Area R-2D:

Deviation Request No.	Title
3	Non-rated Fire Doors
6	Non-Fireproofed Structural Steel
11	HVAC Duct Penetrations through Reactor Building Walls without Fire Dampers

6.2.13 Fire Area R-2E**6.2.13.1 General Description**

Fire Area R-2E is the Division II 4.16 KV Switchgear Room at Elevation 719'-1" in the Unit 2 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205960 in Section 8.0. Safe Shutdown Path 1 can be used to achieve safe shutdown in the event of a fire in Fire Area R-2E.

6.2.13.2 Fire Zones

The following fire zones are located in Fire Area R-2E:

Fire Zone	Description
2-4C	Division II 4.16 KV Switchgear Room at Elevation 719'-1"

6.2.13.3 Combustible Loading

The combustible loading in Fire Area R-2E is well below the fire barrier rating of the fire area boundary. The principle contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also

contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.13.4 Fire Detection/Suppression in the Fire Area

Fire Area R-2E is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.13.5 Consequences of a Fire in Fire Area R-2E

In the event of a fire in Fire Area R-2E, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-2E which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.13.5.1 Fire Zone 2-4C

The following major SSD components located in Fire Zone 2-4C are not required for achieving SSD in the event of a fire in Fire Area R-2E:

- Division II Electrical Components (Channel D)

There are no Category I components located in Fire Zone 2-4C.

6.2.13.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.13.7 Deviation Requests Affecting Fire Area R-2E

There are no non-generic deviation requests that directly affect Fire Area R-2E.

6.2.14 Fire Area R-2F

6.2.14.1 General Description

Fire Area R-2F is the Division I 4.16 KV Switchgear Room at Elevation 719'-1" in the Unit 2 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205960 in Section 8.0. Safe Shutdown Path 3 can be used to achieve safe shutdown in the event of a fire in Fire Area R-2F.

6.2.14.2 Fire Zones

The following fire zones are located in Fire Area R-2F:

Fire Zone	Description
2-4D	Division I 4.16 KV Switchgear Room at Elevation 719'-1"

6.2.14.3 Combustible Loading

The combustible loading in Fire Area R-2F is well below the fire barrier rating of the fire area boundary. The principle contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.14.4 Fire Detection/Suppression in the Fire Area

Fire Area R-2F is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.14.5 Consequences of a Fire in Fire Area R-2F

In the event of a fire in Fire Area R-2F, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-2F which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.14.5.1 Fire Zone 2-4D

The following major SSD components located in Fire Zone 2-4D are not required for achieving SSD in the event of a fire in Fire Area R-2F:

- Division I Electrical Components (Channel C)

There are no Category I components located in Fire Zone 2-4D.

6.2.14.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.14.7 Deviation Requests Affecting Fire Area R-2F

There are no non-generic deviation requests that directly affect Fire Area R-2F.

6.2.15 Fire Area R-2G

6.2.15.1 General Description

Fire Area R-2G is the Division II 4.16 KV Switchgear Room at Elevation 749'-1" in the Unit 2 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205961 in Section 8.0. Safe Shutdown Path 1 can be used to achieve safe shutdown in the event of a fire in Fire Area R-2G.

6.2.15.2 Fire Zones

The following fire zones are located in Fire Area R-2G:

Fire Zone	Description
2-5F	Division II 4.16 KV Switchgear Room at Elevation 749'-1"

6.2.15.3 Combustible Loading

The combustible loading in Fire Area R-2G is well below the fire barrier rating of the fire area boundary. The prime contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.15.4 Fire Detection/Suppression in the Fire Area

Fire Area R-2G is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.15.5 Consequences of a Fire in Fire Area R-2G

In the event of a fire in Fire Area R-2G, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-2G which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.15.5.1 Fire Zone 2-5F

The following major SSD components located in Fire Zone 2-5F are not required for achieving SSD in the event of a fire in Fire Area R-2G:

- Division II Electrical Components (Channel B)

There are no Category I components contained in Fire Zone 2-5F.

6.2.15.6 Special Features

1. Should a fire occur in Fire Zone 2-5F prevent tripping of Reactor Recirculation pumps 2P401A, 2P401B stop the pumps by manually tripping their respective M-G set supply breaker.

6.2.15.7 Deviation Requests Affecting Fire Area R-2G

There are no non-generic deviation requests which directly affect Fire Area R-2G.

6.2.16 Fire Area R-2H6.2.16.1 General Description

Fire Area R-2H is the Division I 4.16 KV Switchgear Room at Elevation 749'-1" in the Unit 2 Reactor Building. This fire area consists of a single room. Its location is shown on Drawing E-205961 Section 8.0. Safe Shutdown Path 3 can be used to achieve safe shutdown in the event of a fire in Fire Area R-2H.

6.2.16.2 Fire Zones

The following fire zones are located in Fire Area R-2H:

Fire Zone	Description
2-5G	Division I 4.16 KV Switchgear Room at Elevation 749'-1"

6.2.16.3 Combustible Loading

The combustible loading in Fire Area R-2H is well below the fire barrier rating of the fire area boundary. The principle contributor to the combustible loading in this fire area is cables in cable tray. Switchgear panels, motor control centers and load centers also contribute to the overall combustible loading. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.16.4 Fire Detection/Suppression in the Fire Area

Fire Area R-2H is equipped with ionization smoke detectors which alarm in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, manual hose reels and portable fire extinguishers are located nearby.

6.2.16.5 Consequences of a Fire in Fire Area R-2H

In the event of a fire in Fire Area R-2H, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area R-2H which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.16.5.1 Fire Zone 2-5G

The following major SSD components located in Fire Zone 2-5G are not required for achieving SSD in the event of a fire in Fire Area R-2H:

- Division I Electrical Components (Channel A)

There are no Category I components located in Fire Zone 2-5G.

6.2.16.6 Special Features

1. Should a fire occur in Fire Area R-2H prevent tripping of Reactor Recirculation pumps 2P401A, 2P401B stop the pumps by tripping their respective M-G set supply breaker.

6.2.16.7 Deviation Requests Affecting Fire Area R-2H

There are no non-generic deviation requests that directly affect Fire Area R-2H.

6.2.17 Fire Area CS-1

6.2.17.1 General Description

Fire Area CS-1 is the Control Structure freight elevator and access stairway. It extends from elevation 656'-0" to 825'-0". The location of this fire area is shown on Drawings E-205985 thru E-205995 in Section 8.0. Safe Shutdown Path 1 or 3 can be used to achieve safe shutdown in the event of a fire in Fire Area CS-1.

6.2.17.2 Fire Zones

The following fire zones are located in Fire Area CS-1:

Fire Zone	Description
0-21B	Freight Elevator and Stairway No. 221
0-29A	Stairway Vestibule

6.2.17.3 Combustible Loading

There are minimal combustibles in this fire area. The fire area boundaries are adequate to contain any fire initiated in Fire Area CS-1.

6.2.17.4 Fire Detection/Suppression in the Fire Area

Due to minimal amounts of combustibles, there is no automatic suppression in the fire area. Although there is no fire detection in this fire area, the ionization detectors located in the foyer at each elevation would serve to alert control room personnel of a fire in this fire area.

6.2.17.5 Consequences of a Fire in Fire Area CS-1

In the event of a fire in Fire Area CS-1, Safe Shutdown Paths 1 or 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-1 which is required to support the operation of the Path 1 or 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.17.5.1 Fire Zone 0-21B

There are no major SSD components or Category I components located in Fire Zone 0-21B.

6.2.17.5.2 Fire Zone 0-29A

There are no major SSD components or Category I components located in Fire Zone 0-29A.

6.2.17.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.17.7 Deviation Requests Affecting Fire Area CS-1

There are no non-generic deviation requests which directly affect this fire area.

6.2.18 Fire Area CS-2

6.2.18.1 General Description

Fire Area CS-2 is the Control Structure passenger elevator and access stairway. It extends from elevation 656'-0" to 806'-0". The location of this fire area is shown on Drawings E-205985 thru E-205994 in Section 8.0. Safe Shutdown Path 1 or 3 can be used to achieve safe shutdown in the event of a fire in Fire Area CS-2.

6.2.18.2 Fire Zones

The following fire zones are located in Fire Area CS-2:

Fire Zone	Description
0-22B	Passenger Elevator and Stairway No. 120
0-29C	Stairway Vestibule

6.2.18.3 Combustible Loading

There are minimal combustibles in this fire area. The fire area boundaries are adequate to contain any fire initiated in Fire Area CS-2.

6.2.18.4 Fire Detection/Suppression in the Fire Area

Due to the minimal amount of combustibles, there is no automatic fire suppression in the fire area. Although there is no fire detection in this fire area, the ionization detectors located in the foyer at each elevation would serve to alert control room personnel of a fire in this fire area.

6.2.18.5 Consequences of a Fire in Fire Area CS-2

In the event of a fire in Fire Area CS-2, Safe Shutdown Path 1 or 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-2 which is required to support the operation of the Path 1 or 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.18.5.1 Fire Zone 0-22B

There are no major SSD components or Category I components located in Fire Zone 0-22B.

6.2.18.5.2 Fire Zone 0-29C

There are no major SSD components or Category I components located in Fire Zone 0-29C.

6.2.18.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.18.7 Deviation Requests Affecting Fire Area CS-2

The following non-generic Deviation Request directly affects Fire Area CS-2:

Deviation Request No.	Title
6	Non-Fireproofed Structural Steel

6.2.19 Fire Area CS-36.2.19.1 General Description

Fire Area CS-3 is comprised of the Computer Room (located on Elevation 698'-0"), and is a general access area comprising some of the lower level rooms in the Control Structure from elevation 656'-0" to 714'-0". Its location is shown on Drawings E-205985 thru E-205988 in Section 8.0. Safe Shutdown Path 1 would be available to achieve safe shutdown in the event of a fire in Fire Area CS-3.

6.2.19.2 Fire Zones

The following fire zones are located in Fire Area CS-3:

Fire Zone	Description
0-21A	Common Equipment Room
0-22A	Central Access Area
0-22C	Entrance Corridor and Lobby
0-23	Control Room Egress Corridor
0-24A	UPS Panel Room
0-24B	Corridor
0-24C	UPS Panel Room
0-24F	Computer Service Room and Office
0-24E	Computer Room

6.2.19.3 Combustible Loading

The combustibles in this fire area are primarily computer and electrical panels and cables in cable tray in those fire zones containing the UPS equipment. Although the combustibles are low in these areas, the small area of these zones drives the equivalent fire duration to an amount which is unrepresentative of the low combustible quantities in each zone.

In Fire Zone 0-24E, the cable insulation in the Computer Room underfloor area is considered in the combustible loading for this area even though the General Electric Fire hazards analysis in Licensing Topical Report NEDO-10466A dated February 1979 which describes that even in a degraded condition with two floor plates removed, a fire does not propagate along the cables. Ionization type detectors in the PGCC floor provide an alarm in the Control Room and grates are installed in the floor to allow the CO₂ automatic flooding system in the room to migrate to the underfloor area.

In any case, the fire barrier rating of the fire area boundary is adequate to contain any fire initiated within the fire area and to prevent the propagation of the fire to any other fire area in the plant.

6.2.19.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-3 has fire detection and suppression in those portions of the area where potential fire hazards exist. In the UPS panel rooms and computer service areas there are heat detectors and ionization smoke detectors. These rooms also have a total flooding CO₂ system for fire suppression. In addition to these automatic suppression systems, manual hose reels and portable fire extinguishers are located throughout the fire area for use.

Fire Zone 0-24E is equipped with ionization type smoke detectors and heat detectors. Ionization detectors are located within the PGCC flooring system. An automatic total flooding CO₂ extinguishing system is located inside the room.

The lack of full fire detection and automatic suppression throughout Fire Area CS-3 is addressed in further detail in Deviation Request No. 21.

6.2.19.5 Consequences of a Fire in Fire Area CS-3

In the event of a fire in Fire Area CS-3, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-3 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.19.5.1 Fire Zone 0-21A

There are no major SSD components or Category I components located in Fire Zone 0-21A.

6.2.19.5.2 Fire Zone 0-22A

There are no major SSD components or Category I components located in Fire Zone 0-22A.

6.2.19.5.3 Fire Zone 0-22C

There are no major SSD components or Category I components located in Fire Zone 0-22C.

6.2.19.5.4 Fire Zone 0-23

There are no major SSD components or Category I components located in Fire Zone 0-23.

6.2.19.5.5 Fire Zone 0-24A

There are no major SSD components or Category I components located in Fire Zone 0-24A.

6.2.19.5.6 Fire Zone 0-24B

There are no major SSD components or Category I components located in Fire Zone 0-24B.

6.2.19.5.7 Fire Zone 0-24C

There are no major SSD components or Category I components located in Fire Zone 0-24C.

6.2.19.5.8 Fire Zone 0-24E

There are no major SSD components or Category I components located in Fire Zone 0-34E.

6.2.19.5.9 Fire Zone 0-24F

There are no major SSD components or Category I components located in Fire Zone 0-24F.

6.2.19.6 Special Features

1. Should a fire occur in Fire Zones 0-24B, 0-24E, or 0-24F which prevents tripping of Reactor Recirculation pumps 2P401A, 2P401B stop the pumps by manually tripping their respective M-G set supply breaker.
2. Should a fire occur in Fire Area CS-3 (Fire Zones 0-24E, 0-24F) which causes a loss of the RHR control logic (Unit 2), manual control of the RHR system pumps locally at the respective pump breaker and valves from the Control Room is required.
3. Should a fire occur in Fire Area CS-3 (Fire Zones 0-24E, 0-24F) Unit 2 may be shutdown using core spray/ADS, Unit 1 may be shutdown using RCIC.
4. Should a fire occur in Fire Area CS-3 which results in spurious ADS/SRV manually initiate core spray and/or LPCI to provide reactor vessel inventory control (Unit 2).

6.2.19.7 Deviation Requests Affecting Fire Area CS-3

The following non-generic deviation requests directly affect Fire Area CS-3:

Deviation Request No.	Title
6	Non-Fireproofed Structural Steel
21	Control Structure Fire Zones with Fire Detection and/or Fire Suppression

6.2.20 Fire Area CS-46.2.20.1 General Description

Fire Area CS-4 consists of the HVAC Plenum, Fan Room and Duct chases in the Control Structure. The location of the fan rooms and the plenum is shown on Drawings E-205994 and E-205995. The duct chases run vertically through various elevations along the west side of the Control Structure. Safe Shutdown Path 1 or 3 can be used in the event of a fire in Fire Area CS-4.

6.2.20.2 Fire Zones

The following fire zones are located in Fire Area CS-4:

Fire Zone	Description
0-24I	HVAC Duct Chase
0-24K	HVAC Duct Chase
0-28S	HVAC Duct Chase
0-29B	Fan Room and Associated HVAC Equipment

Fire Zone	Description
0-29D	Pipe and Duct Chase
0-30A	HVAC Plenum, SBGTS and Associated HVAC Equipment
0-30B	Stairway No. 125

6.2.20.3 Combustible Loading

The HVAC duct chases in this Fire Area have no combustible materials and they are isolated from other fire areas in the plant by fire rated dampers. The combustibles in Fire Zone 0-29B are minimal and consist of cables in electrical panels and cable tray. The major combustible materials in Fire Zone 0-30A are the charcoal in the Standby Gas Treatment System Filters and the charcoal in the Emergency Outside Air Filters.

6.2.20.4 Fire Detection/Suppression in the Fire Area

Fire detection is located throughout this fire area except in the HVAC duct chases and the stairway. The charcoal filter beds for the Standby Gas Treatment System and the Emergency Outside Air Filters have deluge systems specifically designed for the fire hazard posed by the charcoal. Additionally, Fire Zone 0-29B and 0-30A have an automatic suppression system installed throughout each zone. Manual hose reels and portable extinguishers are located throughout the fire area.

6.2.20.5 Consequences of a Fire in Fire Area CS-4

In the event of a fire in Fire Area CS-4, safe shutdown Path 1 or 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-4 which is required to support the operation of the Path 1 or 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.20.5.1 Fire Zone 0-24I

There are no major SSD components or Category I components located in Fire Zone 0-24I.

6.2.20.5.2 Fire Zone 0-24K

There are no major SSD components or Category I components located in Fire Zone 0-24K.

6.2.20.5.3 Fire Zone 0-28S

There are no major SSD components or Category I components located in Fire Zone 0-28S.

6.2.20.5.4 Fire Zone 0-29B

There are no major SSD components located in Fire Zone 0-29B.

There are no Category I components located in Fire Zone 0-29B.

6.2.20.5.5 Fire Zone 0-29D

There are no major SSD components or Category I components located in Fire Zone 0-29D.

6.2.20.5.6 Fire Zone 0-30A

There are no major SSD components located in Fire Zone 0-30A.

There are no Category I components located in Fire Zone 0-30A.

6.2.20.5.7 Fire Zone 0-30B

There are no major SSD components or Category I components located in Fire Zone 0-30B.

6.2.20.6 Special Features

The following manual actions are required for a fire in the specific fire zone:

1. Should a fire occur in Fire Zones 0-29B or 0-30A, Unit 2 may be shutdown using Core Spray/ADS and Unit 1 may be shutdown using HPCI or RCIC.

6.2.20.7 Deviation Requests Affecting Fire Area CS-4

The following non-generic Deviation Requests directly affect Fire Area CS-4:

Deviation Request No.	Title
6	Non-Fireproofed Structural Steel

6.2.21 Fire Area CS-5

6.2.21.1 General Description

Fire Area CS-5 is the Unit 2 Lower Relay Room located on elevation 698'-0" of the control structure. This fire area is a single room fire zone which primarily contains Division II equipment. The location of this fire area is shown on Drawing E-205988 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-5.

6.2.21.2 Fire Zones

The following fire zone is located in Fire Area CS-5:

Fire Zone	Description
0-24G	Unit 2 Division II Lower Relay Room

6.2.21.3 Combustible Loading

The major combustibles in this are cables located in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area. The cable insulation in the PGCC underfloor area is not considered in the combustible loading for this fire area based upon the General Electric fire hazards analysis in Licensing Topical Report NEDO-10466A dated February 1979 which describes the separation of Class 1E systems in the floor with 3/16" steel barriers, utilization of semi-permanent fire stop materials, provision of heat detectors in the PGCC flooring and rooms, ionization type smoke detectors in the PGCC flooring and rooms, CO₂ automatic total flooding system in the room and unitized halon system in the PGCC underfloor.

In the event of a fire in Fire Area CS-5, the fire area boundaries would be adequate to contain any fire initiated in the fire area.

6.2.21.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-5 is equipped with ionization detectors and heat detectors. The fire area has a Halon extinguishing system located in the PGCC modules which protect the safety related cabinets with the exception of panels 2C636 and 2C699B. The room is also equipped with an automatic total flooding CO₂ system. With the exception of panels 2C636 and 2C699B, safety related cabinets are protected with Halon. In addition, a manual hose station and portable fire extinguishers are located nearby.

6.2.21.5 Consequences of a Fire in Fire Area CS-5

In the event of a fire in Fire Area CS-5, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-5 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.21.5.1 Fire Zone 0-24G

The following major SSD components located in Fire Zone 0-24G are not required for achieving SSD in the event of a fire in Fire Area CS-5:

- RHR LOOP B Flow Instrumentation
- Core Spray System Control Components
- ADS Control Components
- RHR Control Components
- HPCI Control Components
- RCIC Control Components

There are no Category I components located in Fire Zone 0-24G.

6.2.21.6 Special Features

1. Should a fire occur in Fire Zone 0-24G, which adversely affects the RHR control logic the RHR control logic must be de-energized at the DC power panel and manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room (Unit 2) is required.
2. Should a fire occur in Fire Zone 0-24G which adversely affects the automatic and manual scram capability (Unit 2) from the Control Room, the reactor must be manually scrammed by venting the instrument air header to the scram valves.
3. Should a fire occur in Fire Zone 0-24G Unit 2 may be shutdown using core spray/ADS, Unit 1 may be shutdown using HPCI or RICl.
4. Should a fire occur in Fire Zone 0-24G which adversely affects Reactor Recirculation Pump trip, manually trip pumps 2P401A and 2P401B by tripping the M-G set supply breakers.
5. Should a fire occur in fire zone 0-24G which results in spurious ADS/SRV actuation, manually initiate core spray and/or LPCl to provide reactor vessel inventory control (Unit 2).
6. Should a fire occur in Fire Zone 0-24G which results in disabling the low pressure permissive required for opening of the Core Spray Inboard Injection Valve, manually open the valve by using the Low Pressure Permissive Bypass switch in the Control Room.

6.2.21.7 Deviation Requests Affecting Fire Area CS-5

The following non-generic Deviation Request directly affects Fire Area CS-5:

Deviation Request No.	Title
20	Penetration Seals – Conduits
33	Reactor Coolant Makeup and Depressurization Systems

6.2.22 Fire Area CS-6**6.2.22.1 General Description**

Fire Area CS-6 is a vertical electrical cable chase which extends from elevation 698'-0" to 783'-0" along the west wall of the control structure. The location of this fire area is shown on Drawings E-205988 thru E-205993 in Section 8.0. Safe Shutdown Path 3 would be available in the event of a fire in Fire Area CS-6.

6.2.22.2 Fire Zones

The following fire zones are located in Fire Area CS-6:

Fire Zone	Description
0-24J	South Electrical Cable Chase
0-25B	South Electrical Cable Chase
0-26B	South Electrical Cable Chase
0-26S	South Electrical Cable Chase
0-27F	South Electrical Cable Chase
0-28P	South Electrical Cable Chase

6.2.22.3 Combustible Loading

The combustible materials in this fire area are cables. Due to the nature of this fire area, the standard method of expressing the combustible loading in equivalent fire severity (in minutes) yields unrealistic results. This is due to the small cross-sectional floor area of each of the fire zones in this area. This cable chase is a vertical shaft with sealed barriers at each main floor elevation for the purpose of limiting fire spread and controlling the concentration of carbon dioxide if the fire protection system is activated. This cable chase is essentially 'gas tight' between each fire zone. Early detection and actuation of the CO₂ systems that protect these fire zones would quickly extinguish a fire within any fire zone and would prevent fire propagation into an adjacent fire zone or into another fire area.

6.2.22.4 Fire Detection/Suppression in the Fire Area

Fire Zones 0-24J, 0-25B, 0-26S, 0-27F and 0-28P contain one heat detector each and an automatic total flooding CO₂ extinguishing system. Fire Zone 0-26B is on the same

elevation as the main control room, contains one ionization smoke detector each and a manual spurt CO₂ system.

6.2.22.5 Consequences of a Fire in Fire Area CS-6

In the event of a fire in Fire Area CS-6, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-6 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.22.5.1 Fire Zone 0-24J

There are no major SSD components or Category I components located in Fire Zone 0-24J.

6.2.22.5.2 Fire Zone 0-25B

There are no major SSD components or Category I components located in Fire Zone 0-25B.

6.2.22.5.3 Fire Zone 0-26B

There are no major SSD components or Category I components located in Fire Zone 0-26B.

6.2.22.5.4 Fire Zone 0-26S

There are no major SSD components or Category I components located in Fire Zone 0-26S.

6.2.22.5.5 Fire Zone 0-27F

There are no major SSD components or Category I components located in Fire Zone 0-27F.

6.2.22.5.6 Fire Zone 0-28P

There are no major SSD components or Category I components located in Fire Zone 0-28P.

6.2.22.6 Special Features

1. Should a fire occur in Fire Zones 0-24J or 0-27F which prevents tripping of Reactor Recirculation pumps 2P401A, 2P401B stop the pumps by manually tripping their respective M-G set supply breaker.

6.2.22.7 Deviation Requests Affecting Fire Area CS-6

The following non-generic Deviation Request directly affects Fire Area CS-6:

Deviation Request No.	Title
37	Control Room Raised Floor Control Structure Cable Chase Fire Protection

6.2.23 Fire Zone CS-76.2.23.1 General Description

Fire Area CS-7 is a vertical electrical cable chase which extends from elevation 698'-0" to 783'-0" along the west wall of the control structure. The location of this fire area is shown on Drawings E-205988 thru E-205993 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-7.

6.2.23.2 Fire Zones

The following fire zones are located in Fire Area CS-7:

Fire Zone	Description
0-24L	Center Electrical Cable Chase
0-24M	North Electrical Cable Chase
0-25C	Center Electrical Cable Chase
0-25D	North Electrical Cable Chase
0-26C	Center Electrical Cable Chase
0-26D	North Electrical Cable Chase
0-26T	Center Electrical Cable Chase
0-26V	North Electrical Cable Chase
0-27G	Center Electrical Cable Chase
0-27H	North Electrical Cable Chase
0-28Q	Center Electrical Cable Chase
0-28R	North Electrical Cable Chase

6.2.23.3 Combustible Loading

The combustible materials in this fire area are cables. Due to the nature of this fire area, the standard method of expressing the combustible loading in equivalent fire severity in minutes yields unrealistic results. This is due to the small cross-sectional

floor area of each of the fire zones in this area. These cable chases are vertical shafts with sealed barriers at each main floor elevation for the purpose of limiting fire spread and controlling the concentration of carbon dioxide if the fire protection system is activated. These cable chases are essentially 'gas-tight' between each fire zone. Early detection and actuation of the CO₂ systems that protect these fire zones would quickly extinguish a fire within any zone and would prevent fire propagation into an adjacent fire zone or into another fire area.

6.2.23.4 Fire Detection/Suppression in the Fire Area

Fire Zones 0-24L, 0-24M, 0-25C, 0-25D, 0-26T, 0-26V, 0-27G, 0-27H, 0-28Q and 0-28R contain one heat detector each and an automatic total flooding CO₂ extinguishing system. Fire Zones 0-26C and 0-26D which are on the same elevations as the main control room fire area, contain one ionization smoke detector each and a manual spurt CO₂ extinguishing system.

6.2.23.5 Consequences of a Fire in Fire Area CS-7

In the event of a fire in Fire Area CS-7, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-7 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.23.5.1 Fire Zone 0-24L

There are no major SSD components or Category I components located in Fire Zone 0-24L.

6.2.23.5.2 Fire Zone 0-25C

There are no major SSD components or Category I components located in Fire Zone 0-25C.

6.2.23.5.3 Fire Zone 0-25D

There are no major SSD components or Category I components located in Fire Zone 0-25D.

6.2.23.5.4 Fire Zone 0-26C

There are no major SSD components or Category I components located in Fire Zone 0-26C.

6.2.23.5.5 Fire Zone 0-26D

There are no major SSD components or Category I components located in Fire Zone 0-26D.

6.2.23.5.6 Fire Zone 0-26T

There are no major SSD components or Category I components located in Fire Zone 0-26T.

6.2.23.5.7 Fire Zone 0-26V

There are no major SSD components or Category I components located in Fire Zone 0-26V.

6.2.23.5.8 Fire Zone 0-27G

There are no major SSD components or Category I components located in Fire Zone 0-27G.

6.2.23.5.9 Fire Zone 0-27H

There are no major SSD components or Category I components located in Fire Zone 0-27H.

6.2.23.5.10 Fire Zone 0-28Q

There are no major SSD components or Category I components located in Fire Zone 0-28Q.

6.2.23.5.11 Fire Zone 0-28R

There are no major SSD components or Category I components located in Fire Zone 0-28R.

6.2.23.6 Special Features

1. Should a fire occur in Fire Zone 0-26C or 0-26T which adversely affects the automatic closure and manual control of the below listed breakers from the control room, manual local control at the breaker is required.
2. Should a fire occur in Fire Zones 0-26C, 0-26T or 0-27G, Unit 1 may be shutdown using core spray/ADS and Unit 2 may be shutdown using HPCI or RCIC.

3. Should a fire occur in Fire Zone 0-24C which adversely affects Reactor Recirculation Pump Trip, manually trip pumps 1P401A, and 1P401B by tripping the M-G set supply breakers.
4. Should a fire occur in Fire Zones 0-26D, 0-26V, 0-27H, 0-26V or 0-27H which results in spurious ADS/SRV actuation, manually initiate core spray and/or LPCI to provide reactor vessel inventory control (Unit 1).

6.2.23.7 Deviation Requests Affecting Fire Area CS-7

The following non-generic Deviation Requests directly affect Fire Area CS-7:

Deviation Request No.	Title
37	Cable Room Raised Floor and Control Structure Cable Chase Fire Protection

6.2.24 Fire Area CS-9

6.2.24.1 General Description

Fire Area CS-9 is the Main Control Room and associated fire zones. The floor of the Main Control Room is at elevation 729'-0" of the Control Structure and the overlooking mezzanine Technical Support Center is at elevation 741'-1". This fire area is shown on Drawings E-205990 and E-205991 in Section 8.0. Safe Shutdown Path 2 would be available for use in the event of a fire in Fire Area CS-9.

6.2.24.2 Fire Zones

The following fire zones are located in Fire Area CS-9:

Fire Zone	Description
0-26A	Storage Room
0-26E	Service Room
0-26F	Vestibule
0-26G	Office Room
0-26H	Control Room
0-26I	Office Room
0-26J	Vestibule
0-26K	Technical Support Center
0-26L	Conference Room
0-26M	Office Room Soffit
0-26N	Control Room Unit 1 Soffit
0-26P	Control Room Unit 2 Soffit
0-26R	Office Room Soffit

6.2.24.3 Combustible Loading

The combustible loading in Fire Area C-9 consists primarily of cables in panels, cabinets and tray. Control Room reference manuals and drawings contribute a small portion to the combustible loading. Any fire initiated within this fire area will not propagate to any other fire area in the Control Structure.

6.2.24.4 Fire Detection/Suppression in the Fire Area

Fire detection is located throughout Fire Area CS-9. The control room has a manual spurt CO₂ system located under the floor and portable fire extinguishers. Manual hose reels are located outside the control room. Since the control room is constantly staffed, the early detection and suppression of any fire is assured.

6.2.24.5 Consequences of a Fire in Fire Area CS-9

In the event of a fire in Fire Area CS-9 which would cause evacuation of control room personnel, control room operators would manually scram both units and man each unit's remote shutdown panels. From each remote shutdown panel (Fire Zone 1-2D in Unit 1 and 2-2A in Unit 2) the operation could control each unit and maintain them in a safe shutdown condition. Control room operators would also man the alternate control structure HVAC control panel (Fire Zone 0-29B) to take manual control of the CSHVAC system to support safe shutdown. Due to the unique nature of this fire area, the standard format will not be used. Rather, a description of the detailed analysis performed for the above mentioned scenario follows.

In order to properly achieve and maintain safe shutdown in the event of a fire which causes evacuation of the main control room, the availability of all of the Path 2 components and cables was examined. The objective of this study was to ensure that any systems required for Path 2 shutdown from each units Remote Shutdown Panel would not be affected by a fire in Fire Area CS-9.

Our control room analysis has a fire in the main control room or any of its associated fire zones in Fire Area CS-9 would be contained within Fire Area CS-9 and would not propagate to any other fire area in the plant.

The results of this analysis for each cable and the final disposition for each cable is documented within the control room analysis. It was concluded that with the installation of the modifications identified by this study, safe shutdown could be achieved and maintained from each unit's respective Remote Shutdown Panel.

6.2.24.5.1 Fire Zone 0-26A

There are no major SSD components or Category I components located in Fire Zone 0-26A.

6.2.24.5.2 Fire Zone 0-26E

There are no major SSD components or Category I components located in Fire Zone 0-26E.

6.2.24.5.3 Fire Zone 0-26F

There are no major SSD components or Category I components located in Fire Zone 0-26F.

6.2.24.5.4 Fire Zone 0-26G

There are no major SSD components or Category I components located in Fire Zone 0-26G.

6.2.24.5.5 Fire Zone 0-26H

Due to the nature of the control room, numerous safe shutdown components are located in Fire Zone 0-26H. The Control Room Analysis for safe shutdown contains a complete listing of these components.

There are no Category I Components located in Fire Zone 0-26H, since Safe Shutdown is from the respective unit's Remote Shutdown Panel.

6.2.24.5.6 Fire Zone 0-26I

There are no major SSD components or Category I components located in Fire Zone 0-26I.

6.2.24.5.7 Fire Zone 0-26J

There are no major SSD components or Category I components located in Fire Zone 0-26J.

6.2.24.5.8 Fire Zone 0-26K

There are no major SSD components or Category I components located in Fire Zone 0-26K.

6.2.24.5.9 Fire Zone 0-26L

There are no major SSD components or Category I components located in Fire Zone 0-26L.

6.2.24.5.10 Fire Zone 0-26M

There are no major SSD components or Category I components located in Fire Zone 0-26M.

6.2.24.5.11 Fire Zone 0-26N

There are no major SSD components or Category I components located in Fire Zone 0-26N.

6.2.24.5.12 Fire Zone 0-26P

There are no major SSD components or Category I components located in Fire Zone 0-26P.

6.2.24.5.13 Fire Zone 0-26R

There are no major SSD components located in Fire Zone 0-26R.

6.2.24.6 Special Features

1. The control room is constantly staffed so that a fire in this room can be readily detected and suppressed. However, in the event the fire area must be evacuated, each unit has a remote shutdown panel where each unit can achieve safe shutdown.

In addition to controlling each unit and maintaining them in a safe shutdown condition using Path 2 at the Remote Shutdown Panels, the following manual actions may be required to ensure safe shutdown:

- a) De-energize the Reactor Protection System power supply to scram the reactor.
- b) De-energize the Reactor Protection System power supply to close the MSIV's.
- c) Take local control of the Diesel Generators.
- d) Trip the Reactor Recirculation Pump by tripping the pump's motor-generator power feed breaker.
- e) Take local control of the below listed breakers

BKR 1A20104
BKR 1A20204
BKR 1A20304
BKR 1A20404

BKR 2A20104
BKR 2A20204
BKR 2A20304
BKR 2A20404

SSES-FPRR

2. Should a fire occur in Fire Zone 0-26G and/or 0-26M which adversely affects automatic closure and manual control of the below listed breakers, local manual control at the breaker is required:

BKR 1A20304

BKR 2A20304

3. Should a fire occur in Fire Zone 0-26G and/or 0-26H which adversely affects the ability to close the MSIV's (Unit 1) from the Control Room, de-energize the reactor protection system power supply to close the valves.
4. Should a fire occur in Fire Zone 0-26I, 0-26J, or 0-26R which adversely affects the ability to close the MSIV's (Unit 2) from the Control Room, de-energize the reactor protection power supply to close the valves.
5. Should a fire in the Control Room result in spurious actuation of SV-14113A, B or C operate transfer switches HSS-15111B, HSS-15112B and HSS-15112A to "local" at the Remote Shutdown Panel 1C201. Should a fire in the Control Room result in spurious actuation of SV-24113A, B or C operate transfer switches HSS-25113A, HSS-25113B, and HSS-25114A to "local" at Remote Shutdown Panel 2C201.
6. Should a fire in the Control Room result in SRVs SV-14113A,B,C or SV-24113A,B,C being unavailable due to depletion of their respective accumulators, operate the Division II ADS valves from the lower relay rooms (0-24D Unit 1, 0-24G Unit 2)
7. Should a fire in Fire Zone 0-26H result in spurious starting of RHR pumps 1P202A and/or 2P202B, they must be manually tripped by pulling CSW handle out and tripping the respective breaker.
8. Should a fire in the Control Room prevent tripping of the reactor recirculation pumps, stop the pumps by manually tripping their respective M-G set supply breaker.
9. Should a fire in the Control Room result in loss of RHRSW valves HV-11210B, HV-11215B, HV-21210A, HV-21215A, take local control of the valves.

6.2.24.7 Deviation Requests Affecting Fire Area CS-9

The following non-generic Deviation Requests directly affect Fire Area CS-9:

Deviation Request No.	Title
2	Suppression Pool Temperature Indication
6	Non-Fire Proofed Structural Steel
23	Control Structure Fire Area CS-9 Partial Fire Suppression
37	Control Room Raised Floor and Control Structure Cable Chase Fire Protection

6.2.26 Fire Area CS-10**6.2.26.1 General Description**

Fire Area CS-10 is the Unit 1 Division I Upper Cable Spreading Room at elevation 754'-0" of the control structure. Its location is shown on Drawing E-205992 in Section 8.0. Safe Shutdown Path 3 is available for use in the event of a fire in Fire Area CS-10.

6.2.26.2 Fire Zones

The following fire zones are located in Fire Area CS-10:

Fire Zone	Description
0-27C	Unit 1 Division I Upper Cable Spreading Room
0-27D	Electrician's office

6.2.26.3 Combustible Loading

The principle combustibles in Fire Area CS-10 are cables in cable tray and are dispersed throughout the fire area. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.26.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-10 is equipped with ionization type smoke detectors and heat detectors. Some of these detectors are located within the PGCC flooring system. The entire area is covered by a pre-action sprinkler system, and manual hose reels and portable fire extinguishers are available. In addition, an automatic total flooding CO₂ system is located in the underflooring system portions of the room.

6.2.26.5 Consequences of a Fire in Fire Area CS-10

In the event of a fire in Fire Area CS-10, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-10 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.26.5.1 Fire Zone 0-27C

The following major SSD components contained in Fire Zone 0-27C are not required for achieving SSD in the event of a fire in Fire Area CS-10:

- 125VDC/120VAC Division I Inverter 1D115
- 120 VAC Distribution Panel 1Y115

There are no Category I components located in Fire Zone 0-27C.

6.2.26.5.2 Fire Zone 0-27D

There are no major SSD components or Category I components located in Fire Zone 0-27D.

6.2.26.6 Special Features

1. Should a fire occur in Fire Zone 0-27C which adversely affects the automatic and manual scram capability (Unit 1) from the control room, the reactor must be manually scrammed by venting the instrument air header to the scram valves.
2. Should a fire occur in Fire Zone 0-27C which caused a loss of the RHR control logic (Unit 1 & 2), manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
3. Should a fire occur in Fire Zone 0-27C Unit 1 may be shut down using core spray/ADS and Unit 2 may be shut down using HPCI or RCIC.
4. Should a fire occur in Fire Zone 0-27C which prevents reactor recirculation pump trip, pumps 1P401A and/or 1P401B can be stopped by manually tripping the M-G set supply breakers.
5. Should a fire occur in Fire Zone 0-27C which results in spurious actuation of ADS/SRV, initiate core spray and/or LPCI to provide reactor vessel inventory control (Unit 1).

6.2.26.7 Deviation Requests Affecting Fire Area CS-10

The following non-generic Deviation Requests affect Fire Area CS-10:

Deviation Request No.	Title
17	Kaowool as an Acceptable 1 - Hour Fire Barrier Wrap
34	Emergency Lighting to Perform Local Scram

6.2.27 Fire Area CS-116.2.27.1 General Description

Fire Area CS-11 is the Unit 2 Equipment Room which contains Division II load centers, battery chargers and distribution panels. It is located on elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 would be available in the event of a fire in Fire Area CS-11.

6.2.27.2 Fire Zones

The following fire zones are located in Fire Area CS-11:

Fire Zone	Description
0-28A-I	Unit 2 Division II Equipment

6.2.27.3 Combustible Loading

The combustible loading is relatively low in this fire area and any fire initiated within the fire area would be contained by the fire boundary. The principle combustibles in this area are cables in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.27.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-11 has ionization smoke detection which alarms in the main control room. The fire area does not have automatic suppression due to the nature of the electrical equipment in the area. However, a manual hose station and portable fire extinguishers are located nearby.

Deviation Request No. 15 further addresses the lack of an automatic suppression system in this fire area.

6.2.27.5 Consequences of a Fire in Fire Area CS-11

In the event of a fire in Fire Area CS-11, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-11 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.27.5.1 Fire Zone 0-28A-I

The following major SSD components located in Fire Zone 0-28A-I are not required for achieving SSD in the event of a fire in Fire Area ICS-11:

- 125 Volt DC Load Centers
- 125 Volt DC Battery Chargers
- 250 Volt DC Load Centers and Battery Charger

There are no Category I components located in Fire Zone 0-28A-I.

6.2.27.6 Special Features

1. Should a fire occur in Fire Area CS-11 Unit 2 may be shut down using core spray/ADS and Unit 1 may be shut down using HPCI or RCIC.

6.2.27.7 Deviation Requests Affecting Fire Area CS-11

The following non-generic Deviation Requests directly affect Fire Area CS-11:

Deviation Request No.	Title
6	Non-Fireproofed Structural Steel
15	Control Structure Fire Areas Without Fire Suppression

6.2.28 Fire Area CS-126.2.28.1 General Description

Fire Area CS-12 is the Unit 2 Division I 125V Battery Room located on elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-11.

6.2.28.2 Fire Zones

The following fire zones are located in Fire Area CS-12:

Fire Zone	Description
0-28C	Unit 2 Division I 125V Battery Room

6.2.28.3 Combustible Loading

The combustible loading in Fire Area CS-12 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell material. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.28.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-12 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.28.5 Consequences of a Fire in Fire Area

In the event of a fire in Fire Area CS-12, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-12 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.28.5.1 Fire Zone 0-28C

The following major SSD components located in Fire Zone 0-28C are not required for achieving SSD in the event of a fire in Fire Area CS-12:

- Channel A 125 Volt DC Battery Bank A
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28C.

6.2.28.6 Special Features

| There are no special features or manual actions required for Fire Zone 0-28C.

6.2.28.7 Deviation Requests Affecting Fire Area

There are no non-generic Deviation Requests which directly affect Fire Area CS-12.

6.2.29 Fire Area CS-13

6.2.29.1 General Description

Fire Area CS-13 is the Unit 2 Division II 125V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-13.

6.2.29.2 Fire Zones

The following fire zone is located in Fire Area CS-13:

Fire Zone	Description
0-28E	Unit 2 Division II 125V Battery Room

6.2.29.3 Combustible Loading

The combustible loading in Fire Area CS-13 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell materials. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.29.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-13 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.29.5 Consequences of a Fire in Fire Area CS-13

In the event of a fire in Fire Area CS-13, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-13 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.29.5.1 Fire Zone 0-28E

The following major SSD components located in Fire Zone 0-28E are not required for achieving SSD in the event of a fire in Fire Area CS-13:

- Channel B 125 Volt DC Battery Bank
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28E.

6.2.29.6 Special Features

There are no special features or manual actions required for Fire Zone 0-28E.

6.2.29.7 Deviation Requests Affecting Fire Area CS-13

There are no non-generic deviation requests which directly affect Fire Area CS-13.

6.2.30 Fire Area CS-14

6.2.30.1 General Description

Fire Area CS-14 is the Unit 2 Division II 250V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-14.

6.2.30.2 Fire Zones

The following fire zone is located in Fire Area CS-14:

Fire Zone	Description
0-28G	Unit 2 Division II 250V Battery Room

6.2.30.3 Combustible Loading

The combustible loading in Fire Area CS-14 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell materials. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.30.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-14 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.30.5 Consequences of a Fire in Fire Area CS-14

In the event of a fire in Fire Area CS-14, a Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-14 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown is detailed below.

6.2.30.5.1 Fire Zone 0-28G

The following major SSD components located in Fire Zone 0-28G are not required for achieving SSD in the event of a fire in Fire Area CS-14:

- Division II 250 Volt DC Battery Bank
- 250 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28G.

6.2.30.6 Special Features

There are no special features or manual actions required for Fire Zone 0-28G.

6.2.30.7 Deviation Requests Affecting Fire Area CS-14

There are no non-generic deviation requests which directly affect Fire Area CS-14.

6.2.31 Fire Area CS-15

6.2.31.1 General Description

Fire Area CS-15 is the Cold Instrument Repair Shop located on Elevation 771'-0" of the control structure. Although there is no safety related equipment in this fire area, there are cables in conduits which serve both Division I and Division II systems. The location of this Fire Area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-15.

6.2.31.2 Fire Zones

The following fire zone is located in Fire Area CS-15:

Fire Zone	Description
0-28H	Cold Instrument Repair Shop

6.2.31.3 Combustible Loading

There are minimal combustibles in this fire area. All cables in this area are in conduits and those conduits with safe shutdown cables are protected with fire wrapping material as required.

6.2.31.4 Fire Detection/Suppression in the Fire Area

This fire area has ionization smoke detectors. Manual hose reels and portable fire extinguishers are also located nearby.

6.2.31.5 Consequences of a Fire in Fire Area CS-14

In the event of a fire in Fire Area CS-15, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-15 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.31.5.1 Fire Zone 0-28G

There are no major SSD components or Category I components located in Fire Zone 0-28H.

6.2.31.6 Special Features

Should a fire occur in Fire Area CS-15 Unit 1 may be shutdown using core spray/ADS and Unit 2 may be shutdown using HPCI or RCIC.

6.2.31.7 Deviation Requests Affecting Fire Area CS-14

The following non-generic Deviation Requests directly affect Fire Area CS-15:

Deviation Request No.	Title
6	Non-Fireproofed Structural Steel
8	One Hour Fire Barrier Wrap with Limited Suppression

6.2.32 Fire Area CS-16

6.2.32.1 General Description

Fire Area CS-16 is the Unit 1 Division II 250V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 is available for use in the event of a fire in Fire Area CS-16.

6.2.32.2 Fire Zones

The following fire zone is located in Fire Area CS-16:

Fire Zone	Description
0-28J	Unit 1 Division II 250V Battery Room

6.2.32.3 Combustible Loading

The combustible loading in Fire Area CS-16 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell materials. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.32.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-16 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.32.5 Consequences of a Fire in Fire Area CS-16

In the event of a fire in Fire Area CS-16, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-16 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.32.5.1 Fire Zone 0-28J

The following major SSD components located in Fire Zone 0-28J are not required for achieving SSD in the event of a fire in Fire Area CS-16:

- Division II 250 Volt DC Battery Bank
- 250 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28J.

6.2.32.6 Special Features

| There are no special features or manual actions required for Fire Zone 0-28J.

6.2.32.7 Deviation Requests Affecting Fire Area CS-16

There are no non-generic deviation requests which directly affect Fire Area CS-16.

6.2.33 Fire Area CS-17**6.2.33.1 General Description**

Fire Area CS-17 is the Unit 1 Equipment Room which contains Division II load centers, battery chargers and distribution panels. It is located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 is available for use in the event of a fire in Fire Area CS-17.

6.2.33.2 Fire Zones

The following fire zones are located in Fire Area CS-17:

Fire Zone	Description
0-28B-I	Unit 1 Division II Equipment Room

6.2.33.3 Combustible Loading

The combustible loading is relatively low in this fire area and any fire initiated within the fire area would be contained by the construction of the fire area boundary. The principle combustibles in this area are cables in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.33.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-17 has ionization smoke detection which alarms in the main control room. The fire area does not have automatic suppression due to the nature of the electrical equipment in the area. However, a manual hose station and portable fire extinguishers

are located in the vicinity. Deviation Request No. 8 further addresses the lack of an automatic fire suppression system in this fire area.

6.2.33.5 Consequences of a Fire in Fire Area CS-17

In the event of a fire in Fire Area CS-17, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-17 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.33.5.1 Fire Zone 0-28B-I

The following major SSD components located in fire zone are not required for achieving SSD in the event of a fire in Fire Area CS-17:

- 125 Volt DC Load Centers
- 125 Volt DC Battery Chargers
- 250 Volt DC Load Centers
- 250 Volt DC Battery Chargers

There are no Category I components located in Fire Zone 0-28B-I.

6.2.33.6 Special Features

Should a fire occur in Fire Area 0-28B-I Unit 1 may be shutdown using core spray/ADS and Unit 2 may be shutdown using HPCI or RCIC.

6.2.33.7 Deviation Requests Affecting Fire Area CS-17

The following non-generic deviation requests directly affect Fire Area CS-17:

Deviation Request No.	Title
6	Non-Fireproofed Structural Steel
8	One Hour Fire Barrier Wrap with Limited Suppression

6.2.34 Fire Area CS-18

6.2.34.1 General Description

Fire Area CS-18 is the Unit 1 Division II 125V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 is available for use in the event of a fire in Fire Area CS-18.

6.2.34.2 Fire Zones

The following fire zones are located in Fire Area CS-18:

Fire Zone	Description
0-28M	Unit 1 Division II 125V Battery Room

6.2.34.3 Combustible Loading

The combustible loading in Fire Area CS-18 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell materials. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.34.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-18 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.34.5 Consequences of a Fire in Fire Area CS-18

In the event of a fire in Fire Area CS-18, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-18 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.34.5.1 Fire Zone 0-28M

The following major SSD components located in Fire Zone 0-28M are not required for achieving SSD in the event of a fire in Fire Area CS-18:

- Channel B 125 Volt DC Battery Bank
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28M.

6.2.34.6 Special Features

| There are no special features or manual actions required for Fire Zone 0-28M.

6.2.34.7 Deviation Requests Affecting Fire Area CS-18

There are no non-generic deviation requests which directly affect Fire Area CS-18.

6.2.35 Fire Area CS-19

6.2.35.1 General Description

Fire Area CS-19 is the Unit 1 Division II 125V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 is available for use in the event of a fire in Fire Area CS-19.

6.2.35.2 Fire Zones

The following fire zones are located in Fire Area CS-19:

Fire Zone	Description
0-28N	Unit 1 Division II 125V Battery Room

6.2.35.3 Combustible Loading

The combustible loading in Fire Area CS-19 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell materials. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.35.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-19 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.35.5 Consequences of a Fire in Fire Area CS-19

In the event of a fire in Fire Area CS-19, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-19 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.35.5.1 Fire Zone 0-28N

The following major SSD components located in Fire Zone 0-28N are not required for achieving SSD in the event of a fire in Fire Area CS-19:

- Channel D 125 Volt DC Battery Bank
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28N.

6.2.35.6 Special Features

| There are no special features or manual actions required for Fire Zone 0-28M.

6.2.35.7 Deviation Requests Affecting Fire Area CS-19

There are no non-generic deviation requests which directly affect Fire Area CS-19.

6.2.36 Fire Area CS-20

6.2.36.1 General Description

Fire Area CS-20 is the Unit 2 Equipment Room which contains Division I load centers, battery chargers and distribution panels. It is located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 is available for use in the event of a fire in Fire Area CS-20.

6.2.36.2 Fire Zones

The following fire zones are located in Fire Area CS-20:

Fire Zone	Description
0-28A-II	Unit 2 Division I Equipment Room

6.2.36.3 Combustible Loading

The combustible loading is relatively low in this fire area and any fire initiated within the fire area would be contained by the construction of the fire area boundary. The principle combustibles in this area are cables in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.36.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-20 has ionization smoke detection which alarms in the main control room. The fire area does not have automatic suppression due to the nature of the electrical equipment in the area. However, a manual hose station and portable fire extinguishers are located nearby.

Deviation Request No. 15 further addresses the lack of an automatic suppression system in this fire area.

6.2.36.5 Consequences of a Fire in Fire Area CS-20

In the event of a fire in Fire Area CS-20, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-20 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.36.5.1 Fire Zone 0-28A-II

The following major SSD components located in Fire Zone 0-28A-II are not required for achieving SSD in the event of a fire in Fire Area CS-20:

- Channel A 125 Volt DC Load Center
- 125 Volt DC ESS Distribution Panel
- Channel C 125 Volt DC Load Center
- Channel C 125 Volt DC Charger
- 125 Volt DC ESS Distribution Panel
- Channel A 250 VDC Load Center
- Channel A 250 Volt DC Battery Charger

The following Category I components are located in Fire Zone 0-28A-II:

- 125 Volt DC ESS Distribution Panels (2D624 and 2D644) - Addressed in Deviation Request No. 15.

6.2.36.6 Special Features

1. Should a fire occur in Fire Zone 0-28A-II which causes a loss of the RHR control logic (Unit 2), manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
2. Should a fire occur in Fire Zone 0-28A-II Unit 2 may be shut down using core spray/ADS and Unit 1 may be shut down using HPCI or RCIC.

3. Should a fire occur in Fire Zone 0-28A-II which prevents tripping of reactor recirculation pumps 2P401A, 2P401B, manually stop the pumps by tripping their respective M-G set supply breakers.

6.2.36.7 Deviation Requests Affecting Fire Area CS-20

The following non-generic deviation requests directly affect Fire Area CS-20:

Deviation Request No.	Title
6	Non-Fire Proofed Structural Steel
15	Control Structure Fire Areas Without Fire Suppression

6.2.37 Fire Area CS-21

6.2.37.1 General Description

Fire Area CS-21 is the Unit 2 Division I 125V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-21.

6.2.37.2 Fire Zones

The following fire zones are located in Fire Area CS-21:

Fire Zone	Description
0-28T	Unit 2 Division I 125V Battery Room

6.2.37.3 Combustible Loading

The combustible loading in Fire Area CS-21 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell materials. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.37.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-21 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.37.5 Consequences of a Fire in Fire Area CS-21

In the event of a fire in Fire Area CS-21, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-21 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.37.5.1 Fire Zone 0-28T

The following major SSD components located in Fire Zone 0-28T are not required for achieving SSD in the event of a fire in Fire Area CS-21:

- Channel C 125 Volt DC Battery Bank
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28T.

6.2.37.6 Special Features

There are no special features or manual actions required for Fire Zone 0-28T.

6.2.37.7 Deviation Requests Affecting Fire Area CS-21

There are no non-generic deviation requests which directly affect Fire Area CS-21.

6.2.38 Fire Area CS-22

6.2.38.1 General Description

Fire Area CS-22 is the Unit 2 Division I 125V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-22.

6.2.38.2 Fire Zones

The following fire zones are located in Fire Area CS-22:

Fire Zone	Description
0-28D	Unit 2 Division II 125V Battery Room

6.2.38.3 Combustible Loading

The combustible loading in Fire Area CS-22 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell material. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.38.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-22 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.38.5 Consequences of a Fire in Fire Area CS-22

In the event of a fire in Fire Area CS-22, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-22 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.38.5.1 Fire Zone 0-28D

The following major SSD components located in Fire Zone 0-28D are not required for achieving SSD in the event of a fire in Fire Area CS-22:

- Channel D 125 Volt DC Battery Bank
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28D.

6.2.38.6 Special Features

| There are no special features or manual actions required for Fire Zone 0-28D.

6.2.38.7 Deviation Requests Affecting Fire Area CS-22

There are no non-generic deviation requests which directly affect Fire Area CS-22.

6.2.39 Fire Area CS-23

6.2.39.1 General Description

Fire Area CS-23 is the Unit 2 Division I 250V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-23.

6.2.39.2 Fire Zones

The following fire zones are located in Fire Area CS-23:

Fire Zone	Description
0-28F	Unit 2 Division I 250V Battery Room

6.2.39.3 Combustible Loading

The combustible loading in Fire Area CS-23 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell material. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.39.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-23 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.39.5 Consequences of a Fire in Fire Area CS-23

In the event of a fire in Fire Area CS-23, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-23 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.39.5.1 Fire Zone 0-28F

The following major SSD components located in Fire Zone 0-28F are not required for achieving SSD in the event of a fire in Fire Area CS-23:

- Division I 250 Volt DC Battery Bank
- 250 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28F.

6.2.39.6 Special Features

| There are no special features or manual actions required for Fire Zone 0-28F.

6.2.39.7 Deviation Requests Affecting Fire Area CS-23

There are no non-generic deviation requests directly affect Fire Area CS-23.

6.2.40 Fire Area CS-24

6.2.40.1 General Description

Fire Area CS-24 is the Unit 1 Equipment Room which contains Division I load centers, battery chargers and distribution panels. It is located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 is available for use in the event of a fire in Fire Area CS-24.

6.2.40.2 Fire Zones

The following fire zones are located in Fire Area CS-24:

Fire Zone	Description
0-28-B-II	Unit 1 Division I Equipment Room

6.2.40.3 Combustible Loading

The combustible loading is relatively low in this fire area and any fire initiated within the fire area would be contained by the construction of the fire area boundary. The principle combustibles in this area are cables in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.40.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-24 has ionization smoke detection which alarms in the main control room. The fire area does not have automatic suppression due to the nature of the electrical

equipment in the area. However, a manual hose station and portable fire extinguishers are located nearby.

Deviation Request No. 8 further addresses the lack of an automatic fire suppression system in this fire area.

6.2.40.5 Consequences of a Fire in Fire Area CS-24

In the event of a fire in Fire Area CS-24, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-24 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.40.5.1 Fire Zone 0-28B-II

The following major SSD components contained in Fire Zone 0-28B-II are not required for achieving SSD in the event of a fire in Fire Area CS-24:

- Channel A 125 Volt DC Load Center
- Channel A 125 Volt DC Battery Charger
- 125 Volt DC ESS Distribution Panel
- Channel C 125 Volt DC Load Center
- Channel A 250 Volt DC Load Center
- Channel A 250 Volt DC Battery Charger

The following Category I components are located in Fire Zone 0-28B-II:

- 125 Volt DC ESS Distribution Panels (1D624 and 1D644) -Addressed in Deviation No. 8.

6.2.40.6 Special Features

1. Should a fire occur in Fire Zone 0-28B-II which causes a loss of the RHR control logic (Unit 1), manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
2. Should a fire occur in Fire Zone 0-28B-II Unit 1 may be shutdown using core spray/ADS and Unit 2 may be shutdown using HPCI or RCIC.
3. Should a fire occur in Fire Zone 0-28B-II which prevents tripping of reactor recirculation pumps 1P401A, 1P401B, manually stop the pumps by tripping their respective M-G set supply breaker.

6.2.40.7 Deviation Requests Affecting Fire Area CS-24

The following non-generic deviation requests directly affect Fire Area CS-24:

Deviation Request No.	Title
6	Non-Fireproofed Structural Steel
8	One Hour Fire Barrier Wrap With Limited Suppression

6.2.41 Fire Area CS-256.2.41.1 General Description

Fire Area CS-25 is the Unit 1 Division I 250V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 is available for use in the event of a fire in Fire Area CS-25.

6.2.41.2 Fire Zones

The following fire zones are located in Fire Area CS-25:

Fire Zone	Description
0-28I	Unit 1 Division I 250V Battery Room

6.2.41.3 Combustible Loading

The combustible loading in Fire Area CS-25 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell material. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.41.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-25 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.41.5 Consequences of a Fire in Fire Area CS-25

In the event of a fire in Fire Area CS-25, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-25 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of

both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.41.5.1 Fire Zone 0-28I

The following major SSD components located in Fire Zone 0-28I are not required for achieving SSD in the event of a fire in Fire Area CS-25:

- Division I 250 Volt DC Battery Bank
- 250 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28I.

6.2.41.6 Special Features

There are no special features or manual actions required for Fire Zone 0-28I.

6.2.41.7 Deviation Requests Affecting Fire Area CS-25

There are no non-generic deviation requests which directly affect Fire Area CS-25.

6.2.42 Fire Area CS-26

6.2.42.1 General Description

Fire Area CS-26 is the Unit 1 Division I 125V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-26.

6.2.42.2 Fire Zones

The following fire zones are located in Fire Area CS-26:

Fire Zone	Description
0-28K	Unit 1 Division I 125V Battery Room

6.2.42.3 Combustible Loading

The combustible loading in Fire Area CS-26 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables battery cell material. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.42.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-26 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.42.5 Consequences of a Fire in Fire Area CS-26

In the event of a fire in Fire Area CS-26, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-26 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.42.5.1 Fire Zone 0-28K

The following major SSD components located in Fire Zone 0-28K are not required for achieving SSD in the event of a fire in Fire Area CS-26:

- Channel A 125 Volt DC Battery Bank
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28K.

6.2.42.6 Special Features

| There are no special features or manual actions required for Fire Zone 0-28K.

6.2.42.7 Deviation Requests Affecting Fire Area CS-26

There are no non-generic deviation requests which directly affect Fire Area CS-26.

6.2.43 Fire Area CS-27

6.2.43.1 General Description

Fire Area CS-27 is the Unit 1 Division I 125V Battery Room located on Elevation 771'-0" of the control structure. The location of this fire area is shown on Drawing E-205993 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-27.

6.2.43.2 Fire Zones

The following fire zones are located in Fire Area CS-27:

Fire Zone	Description
0-28L	Unit 1 Division I 125V Battery Room

6.2.43.3 Combustible Loading

The combustible loading in Fire Area CS-27 is well below the fire barrier rating of the fire area boundary. The principle contributors to the combustible loading in this fire area are cables and the battery cell material. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.43.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-27 is equipped with ionization smoke detection which alarms in the main control room. The fire area does not have an automatic suppression system due to the nature of the electrical equipment in the room. However, a manual hose station and portable fire extinguishers are located nearby.

6.2.43.5 Consequences of a Fire in Fire Area CS-27

In the event of a fire in Fire Area CS-27, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-27 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.43.5.1 Fire Zone 0-28L

The following major SSD components located in Fire Zone 0-28L are not required for achieving SSD in the event of a fire in Fire Area CS-27:

- Channel C 125 Volt DC Battery Bank
- 125 Volt DC Fuse Box

There are no Category I components located in Fire Zone 0-28L.

6.2.43.6 Special Features

There are no special features or manual actions required for Fire Zone 0-28L.

6.2.43.7 Deviation Requests Affecting Fire Area CS-27

There are no non-generic deviation requests which directly affect Fire Area CS-27.

6.2.44 Fire Area CS-28

6.2.44.1 General Description

Fire Area CS-28 is the Unit 1 Lower Relay Room located on Elevation 698'-0" of the control structure. This fire area is a single room fire zone which primarily contains Division II equipment. The location of this fire area is shown on Drawing E-205988 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-28.

6.2.44.2 Fire Zones

The following fire zones are located in Fire Area CS-28:

Fire Zone	Description
0-24D	Unit 1 Division II Lower Relay Room

6.2.44.3 Combustible Loading

The combustible loading in Fire Area CS-28 has been conservatively calculated to be approximately half of the fire barrier rating of the fire area boundary. The principle combustibles in this fire area are cables located in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area. The cable insulation in the PGCC underfloor area is not considered in the combustible loading for this fire area based upon the General Electric Fire Hazards Analysis in the Licensing Topical Report, NEDO-10466A dated February 1979 which describes the separation of Class 1E systems in the floor with 3/16" steel barriers, utilization of semi-permanent fire stop materials, provision of heat detectors in the PGCC flooring and rooms, ionization type smoke detectors in the PGCC flooring and rooms, CO₂ automatic total flooding system in the room, unitized halon system in the PGCC underfloor.

In the event of a fire in Fire Area CS-28, the fire area boundaries would be adequate to contain any fire initiated in the fire area.

6.2.44.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-28 is equipped with ionization detectors and heat detectors. The fire area has a halon extinguishing system located in the PGCC modules which protect the safety related cabinets with the exception of panels 1C636 and 1C699B. The room is also equipped with an automatic total flooding CO₂ system. In addition, a manual hose station and portable fire extinguishers are located nearby.

6.2.44.5. Consequences of a Fire in Fire Area CS-28

In the event of a fire in Fire Area CS-28, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-28 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.44.5.1 Fire Zone 0-24D

The following major SSD components located in Fire Zone 0-24D are not required for achieving SSD in the event of a fire in Fire Area CS-28:

- HPCI Instrument Power Supplies
- RHR Loop B Instrumentation
- ADS Control Components
- Core Spray System Control Components
- HPCI Control Components
- Nuclear Boiler Instrumentation
- RHR System Control Components
- RCIC Control Components

There are no Category I components located in Fire Zone 0-24D.

6.2.44.6 Special Features

1. Should a fire occur in Fire Area CS-28 which adversely affects the RHR control logic or which causes it to be lost, manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room (Unit 1) is required.
2. Should a fire occur in Fire Area CS-28 which adversely affects the automatic and manual scram capability (Unit 1) from the control room, the reactor must be manually scrammed by venting the instrument air header to the scram valves.
3. Should a fire occur in Fire Area CS-28 Unit 1 may be shut down using core spray/ADS and Unit 2 may be shut down using HPCI or RCIC.
4. Should a fire occur in Fire Area CS-28 which prevents tripping of reactor recirculation pumps 1P401A, 1P401B manually stop the pumps by tripping their respective M-G set supply breaker.
5. Should a fire occur in Fire Area CS-28 which results in spurious actuation of ADS/SRV, manually initiate core spray and/or LPCI.

6.2.44.7 Deviation Requests Affecting Fire Area CS-28

The following non-generic Deviation Request directly affects Fire Area CS-28:

Deviation Request No.	Title
20	Penetration Seals – Conduits
33	Reactor Coolant Makeup and Depressurization Systems

6.2.45 Fire Area CS-296.2.45.1 General Description

Fire Area CS-29 is the Unit 2 Division II Lower Cable Spreading Room at Elevation 714'-0" of the control structure. Its location is shown on Drawing E-205989 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-29.

6.2.45.2 Fire Zones

The following fire zones are located in Fire Area CS-29:

Fire Zone	Description
0-25A	Unit 2 Division II Lower Cable Spreading Room

6.2.45.3 Combustible Loading

The principle combustibles in Fire Area CS-29 are cables in cable tray. The combustible loading in this area is bounded by the construction of the fire area boundary. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.45.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-29 is equipped with ionization type smoke detectors and heat detectors. The entire area is covered by a pre-action sprinkler system. Manual hose reels and portable fire extinguishers are located nearby.

6.2.45.5 Consequences of a Fire in Fire Area CS-29

In the event of a fire in Fire Area CS-29, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-29 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.45.5.1 Fire Zone 0-25A

There are no Category I components located in Fire Zone 0-25A.

The following major SSD components contained in Fire Zone 0-25A are not required for achieving SSD in the event of a fire in Fire Area CS-29:

- 125 VDC/120 VAC Division I Inverter 2D125
- 120 VAC Distribution Panel 2Y125

6.2.45.6 Special Features

1. Should a fire occur in Fire Area CS-29 which adversely affects the automatic and manual scram capability (Unit 2) from the control room, the reactor must be manually scrammed by venting the instrument air header to the scram valves.
2. Should a fire occur in Fire Area CS-29 which causes a loss of the RHR control logic (Unit 2), manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
3. Should a fire occur in Fire Area CS-29 Unit 2 may be shut down using core spray/ADS and Unit 1 may be shut down using HPCI or RCIC.
4. Should a fire occur in Fire Area CS-29 which prevents tripping of a reactor recirculation pumps 2P401A, 2P401B stop the pumps by tripping their respective M-G set supply breaker.
5. Should a fire occur in Fire Area CS-29 which results in spurious actuation of ADS/SRV manually initiate core spray and/or LPCI.

6.2.45.7 Deviation Requests Affecting Fire Area CS-29

The following non-generic Deviation Request directly affects Fire Area CS-29:

Deviation Request No.	Title
20	Penetration Seals - Conduits
33	Reactor Coolant Makeup and Depressurization Systems

6.2.46 Fire Area CS-306.2.46.1 General Description

Fire Area CS-30 is the Unit 1 Division II Lower Cable Spreading Room at Elevation 714'-0" of the control structure. Its location is shown on Drawing E-205989 in

Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area CS-30.

6.2.46.2 Fire Zones

The following fire zones are located in Fire Area CS-30:

Fire Zone	Description
0-25E	Unit 1 Division II Lower Cable Spreading Room

6.2.46.3 Combustible Loading

The principle combustibles in Fire Area CS-30 are cables in cable tray. The combustible loading in this area is bounded by the construction of the fire area boundary. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area.

6.2.46.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-30 is equipped with ionization type smoke detectors and heat detectors. The combustibles in the area are covered by a pre-action sprinkler system. Manual hose reels and portable fire extinguishers are located nearby.

6.2.46.5 Consequences of a Fire in Fire Area CS-30

In the event of a fire in Fire Area CS-30, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-30 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.46.5.1 Fire Zone 0-25E

The following major SSD components contained in Fire Zone 0-25E are not required for achieving SSD in the event of a fire in Fire Area CS-30:

- 125 VDC/120 VAC Division I Inverter 1D125
- 120 VAC Distribution Panel 1Y125

There are no or Category I components located in Fire Zone 0-25E.

6.2.46.6 Special Features

1. Should a fire occur in Fire Area CS-30 which adversely affects the automatic and manual scram capability (Unit 1) from the control room, the reactor must be manually scrammed by venting the instrument air header to the scram valves.
2. Should a fire occur in Fire Area CS-30 which adversely affects the RHR control logic (Unit 1) or causes it to be lost, manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
3. Should a fire occur in Fire Area CS-30 Unit 1 may be shut down using core spray/ADS and Unit 2 may be shut down using HPCI or RCIC.
4. Should a fire occur in Fire Area CS-30 which prevents tripping of reactor recirculation pumps 1P401A, 1P401B stop the pumps by manually tripping their respective M-G set supply breaker.
5. Should a fire occur in Fire Area CS-30 which results in spurious actuation of ADS/SRV, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.

6.2.46.7 Deviation Requests Affecting Fire Area CS-30

The following non-generic Deviation Requests directly affect Fire Area CS-30:

Deviation Request No.	Title
17	Kaowool System as an Acceptable 1-Hour Fire Barrier Wrap

6.2.47 Fire Area CS-31**6.2.47.1 General Description**

Fire Area CS-31 is the Unit 2 Upper Relay Room located on Elevation 754'-0" of the control structure. This fire area is a single room fire zone which primarily contains Division I equipment. The location of this fire area is shown on Drawing E-205992 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-31.

6.2.47.2 Fire Zones

The following fire zones are located in Fire Area CS-31:

Fire Zone	Description
0-27A	Unit 2 Division I Upper Relay Room

6.2.47.3 Combustible Loading

The principle combustibles in this fire area are cables located in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area. The cable insulation in the PGCC underfloor area is not considered in the combustible loading for this fire area based upon the General Electric Fire Hazards Analysis in Licensing Topical Report NEDO-10466A dated February 1979 which describes the separation of Class 1E systems in the floor with 3/16" steel barriers, utilization of semi-permanent fire stop materials, provision of heat detectors in the PGCC flooring and rooms, ionization type smoke detectors in the PGCC flooring and rooms, CO₂ automatic total flooding system in the room and unitized halon system in the PGCC underfloor.

In the event of a fire in Fire Area CS-31, the fire area boundaries would be adequate to contain any fire initiated in the fire area.

6.2.47.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-31 is equipped with ionization detectors and heat detectors. The fire area has a halon extinguishing system located in the PGCC modules which protect the safety related cabinets with the exception of panels 2C635 and 2C699A. The room is also equipped with an automatic total flooding CO₂ system. In addition, a manual hose station and portable fire extinguishers are located nearby.

6.2.47.5 Consequences of a Fire in Fire Area CS-31

In the event of a fire in Fire Area CS-31, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-31 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.47.5.1 Fire Zone 0-27A

The following major SSD components located in Fire Zone 0-27A are not required for achieving SSD in the event of a fire in Fire Area CS-31:

- RCIC Instrument Power Supply & Inverter
- Division I RHR Power Supply
- RHR Loop A Instrumentation
- ADS Control Components
- Core Spray System Control Components

SSES-FPRR

- HPCI Control Components
- RCIC Control Components
- RHR Control Components

There are no Category I components located in Fire Zone 0-27A.

6.2.47.6 Special Features

1. Should a fire occur in Fire Area CS-31 which adversely affects the automatic and manual scram capability (Unit 2) from the control room, the reactor must be manually scrammed by venting the instrument air header to the scram valves.
2. Should a fire occur in Fire Area CS-31 which adversely affects the RHR control logic (Unit 2) or causes it to be lost, manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
3. Should a fire occur in Fire Area CS-31 Unit 2 may be shut down using core spray/ADS and Unit 1 may be shut down using HPCI or RCIC.
4. Should a fire occur in Fire Area CS-31 which prevents tripping of reactor recirculation pumps 2P401A, 2P401B stop the pumps by manually tripping their respective M-G set supply breaker.
5. Should a fire occur in Fire Area CS-31 which results in spurious actuation of ADS/SRV, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.
6. Should a fire occur in Fire Zone 0-27A which results in disabling the low pressure permissive required for opening of the Core Spray Inboard Injection Valve, manually open the valve by using the Low Pressure Permissive Bypass Switch in the Control Room.

6.2.47.7 Deviation Requests Affecting Fire Area CS-31

The following non-generic Deviation Request directly affects Fire Area CS-31:

Deviation Request No.	Title
20	Penetration Seals – Conduits
33	Depressurization Systems

6.2.48 Fire Area CS-32

6.2.48.1 General Description

Fire Area CS-32 is the Unit 2 Division I Upper Cable Spreading Room at Elevation 754'-0" of the control structure. Its location is shown on Drawing E-205992 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-32.

6.2.48.2 Fire Zones

The following fire zones are located in Fire Area CS-32:

Fire Zone	Description
0-27B	Unit 2 Division I Upper Cable Spreading Room

6.2.48.3 Combustible Loading

The principle combustibles in Fire Area CS-32 are cables in cable tray. The combustible loading in this area is bounded by the construction of the fire area boundary. There is no mechanical equipment (i.e. pumps, valves, etc.) in this fire area.

6.2.48.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-32 is equipped with ionization type smoke detectors and heat detectors. Some of these detectors are located within the PGCC flooring system. The entire area is covered by a pre-action sprinkler system. Manual hose reels and portable fire extinguishers are located nearby. In addition, an automatic total flooding CO₂ system is located in the underflooring system portions of the room.

6.2.48.5 Consequences of a Fire in Fire Area CS-32

In the event of a fire in Fire Area CS-32, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-32 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.48.5.1 Fire Zone 0-27B

The following major SSD components contained in Fire Zone 0-27B are not required for achieving SSD in the event of a fire in Fire Area CS-32:

- 125 VDC/120 VAC Division I Inverter 2D115
- 120 VAC Distribution Panel 2Y115

There are Category I components located in Fire Zone 0-27B.

6.2.48.6 Special Features

1. Should a fire occur in Fire Area CS-32 which adversely affects the automatic and manual scram capability (Unit 2) from the control room, the reactor must be manually scrambled by venting the instrument air header to the scram valves.
2. Should a fire occur in Fire Area CS-32 which causes a loss of the RHR control logic (Unit 2), manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
3. Should a fire occur in Fire Area CS-32 Unit 2 may be shut down using core spray/ADS and Unit 1 may be shut down using HPCI or RCIC.
4. Should a fire occur in Fire Area CS-32 which prevents tripping of reactor recirculation pumps 2P401A, 2P401B stop the pumps by manually tripping their respective M-G set supply breaker.
5. Should a fire occur in Fire Area CS-32 which results in spurious actuation of ADS/SRV, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.

6.2.48.7 Deviation Requests Affecting Fire Area CS-32

The following non-generic Deviation Request directly affects Fire Area CS-32:

Deviation Request No.	Title
34	Emergency Lighting to Perform Local Scram

6.2.49 Fire Area CS-33**6.2.49.1 General Description**

Fire Area CS-33 is the Unit 1 Upper Relay Room located on Elevation 754'-0" of the control structure. This fire area is a single room fire zone which primarily contains Division I equipment. The location of this fire area is shown on Drawing E-205992 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area CS-33.

6.2.49.2 Fire Zones

The following fire zones are located in Fire Area CS-33:

Fire Zone	Description
0-27E	Unit 1 Division I Upper Relay Room

6.2.49.3 Combustible Loading

The principle combustibles in this fire area are cables located in electrical panels. There is no mechanical equipment (i.e., pumps, valves, etc.) in this fire area. The cable insulation in the PGCC underfloor area is not considered in the combustible loading for this fire area based upon the General Electric Fire Hazards Analysis in Licensing Topical Report NEDO-10466A dated February 1979 which describes the separation of Class 1E systems in the floor with 3/16" steel barriers, utilization of semi-permanent fire stop materials, provision of heat detectors in the PGCC flooring and rooms, ionization type smoke detectors in the PGCC flooring and rooms, CO₂ automatic total flooding system in the room, unitized halon system in the PGCC underfloor area.

In the event of a fire in Fire Area CS-33, the fire area boundaries would be adequate to contain any fire initiated in the fire area.

6.2.49.4 Fire Detection/Suppression in the Fire Area

Fire Area CS-33 is equipped with ionization detectors and heat detectors. The fire area has a halon extinguishing system located in the PGCC modules which protect the safety related cabinets with the exception of panels 1C635, 1C643 and 1C699A. The room is also equipped with an automatic total flooding CO₂ system. In addition, a manual hose station and portable fire extinguishers are located nearby.

6.2.49.5 Consequences of a Fire in Fire Area CS-33

In the event of a fire in Fire Area CS-33, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area CS-33 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been

specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.49.5.1 Fire Zone 0-27E

The following major SSD components located in Fire Zone 0-27E are not required for achieving SSD in the event of a fire in Fire Area CS-33:

- RCIC Instrument Power Supply
- RHR Loop A Instrumentation

There are no Category I components located in Fire Zone 0-27E.

6.2.49.6 Special Features

1. Should a fire occur in Fire Area CS-33 which adversely affects the automatic and manual scram capability (Unit 1) from the control room, the reactor must be manually scrammed by venting the instrument air header to the scram valves.
2. Should a fire occur in Fire Area CS-33 which causes a loss of the RHR control logic (Unit 1), manual control of the RHR system pumps locally at the respective pump breaker and valves from the control room is required.
3. Should a fire occur in Fire Area CS-33 Unit 1 may be shut down using core spray/ADS and Unit 2 may be shut down using HPCI or RCIC.
4. Should a fire occur in Fire Area CS-33 which prevents tripping of reactor recirculation pumps 1P401A, 1P401B stop the pumps by manually tripping their respective M-G set supply breaker.
5. Should a fire occur in Fire Area CS-33 which results in spurious actuation of ADS/SRV, manually initiate core spray and/or LPCI to provide reactor vessel inventory control.

6.2.49.7 Deviation Requests Affecting Fire Area CS-33

The following non-generic Deviation Request directly affects Fire Area CS-33:

Deviation Request No.	Title
20	Penetration Seals – Conduits
33	Reactor Coolant Makeup and Depressurization Systems

6.2.50 Fire Area D-1

6.2.50.1 General Description

Fire Area D-1 is Diesel Generator Bay A as shown on Drawings E-206000 through E-206002 in Section 8.0. This area is isolated from all adjacent safety related fire areas by 3-hour fire rated boundaries. Division I systems and equipment are located in Fire Area D-1. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area D-1. Offsite power sources are credited for Safe Shutdown Path 3 in this fire area, because it has been demonstrated that the fire cannot cause a loss of offsite power and, as such, it will be available for fires in this fire area. As a conservative measure, circuits required for the operation of Diesel Generator D located in this fire area are also protected and assured to be available. In addition, HPCI would be available to provide a source of high pressure make up to the reactor in the event of a fire in this fire area.

6.2.50.2 Fire Zones

The following fire zones are located in Fire Area D-1:

Fire Zone	Description
0-41A	Diesel Generator Bay A

6.2.50.3 Combustible Loading

The principle contributor to combustible loading is lube oil contained in the A diesel generator and fuel oil in its day tank. With a fire area boundary rating of 3-hours, a fire initiated in Fire Area D-1 will remain within the fire area.

6.2.50.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection and suppression is provided in the basement (El. 660'-0") and on the ground floor (El. 677'-0") of this fire area. The top floor (El. 710'-9") of this fire area does not contain any redundant safe shutdown components or cabling and is not provided with automatic fire detection or suppression. Manual suppression in the form of portable extinguishers is provided throughout the fire area and in the form of a fire hydrant outside of the building. Deviation Request No. 19 further addresses the lack of complete automatic fire detection and suppression in this fire area.

6.2.50.5 Consequences of a Fire in Fire Area

In the event of a fire in Fire Area D-1, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Offsite power sources are credited for Safe Shutdown Path 3 in this fire area, because it has been demonstrated that the fire cannot cause a loss of offsite power and, as such, it will be available for fires in this fire area. In addition, HPCI would be available to provide a source of high pressure make up to the reactor in the event of a fire in this fire area. Electrical cabling located in Fire

Area D-1 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. Due to the availability of offsite power for fires in this fire area, circuits for the 'B' Diesel Generator located in this fire area are not protected. As a conservative measure, however, circuits required for the operation of Diesel Generator D located in this fire zone are protected and assured to be available. Automatic functions associated with the operation of the HPCI System can be impacted by a fire in this fire area. The ability to manually operate the HPCI System from the Control Room is assured for fires in this fire area.

Also, the Condensate Storage Tank (CST) low level switch circuits can be impacted. The CST low level signal initiates automatic transfer of the HPCI Pump suction from the CST to the Suppression Pool. The fire is assumed to defeat the automatic HPCI Pump transfer logic on low CST level. Sufficient inventory exists in the CST for HPCI operation and completion of its Appendix R function without the need to transfer to the Suppression Pool. CST level recorder LR00812 at panel OC653 may be available to determine CST level and initiate manual HPCI Pump suction transfer. If CST level recorder LR00812 is not available HPCI Pump suction from the CST to the Suppression Pool must be transferred within 8 hours. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.50.5.1 Fire Zone 0-41A

The following major SSD components located in Fire Zone 0-41A are not required for achieving SSD in the event of a fire in Fire Area D-1:

- Diesel Generator A and Auxiliaries
- Channel A Electrical Components
- ESW Loops A&B Supply and Discharge Isolation Valves

There are no Category I components located in Fire Zone 0-41A.

6.2.50.6 Special Features

Should a fire occur in Fire Area D-1, each unit may be shutdown using HPCI along with ADS and Core Spray. The spurious opening of the ADS/SRV valves on each unit is prevented for fires in this fire area.

An operator action/note is included in the Off Normal procedure to notify the operator that automatic HPCI operation and the CST low level signal to initiate automatic transfer of HPCI Pump suction from the CST to the Suppression Pool may be lost. Manual HPCI operation and manual transfer of HPCI Pump suction is available to the operator.

6.2.50.7 Deviation Requests Affecting Fire Area D-1

The following non-generic Deviation Request directly affects Fire Area D-1:

Deviation Request No.	Title
19	Incomplete Fire Detection and Fire Suppression in Diesel Generator Fire Areas

6.2.51 Fire Area D-26.2.51.1 General Description

Fire Area D-2 is Diesel Generator Bay B as shown on Drawings E-206000 through E-206002 in Section 8.0. This area is isolated from all other fire areas by 3-hour fire rated boundaries. Division II systems and equipment are located in Fire Area D-2. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area D-2.

6.2.51.2 Fire Zones

The following fire zones are located in Fire Area D-2:

Fire Zone	Description
0-41B	Diesel Generator Bay B

6.2.51.3 Combustible Loading

The principle contributor to combustible loading is lube oil contained in the B diesel generator and fuel oil in its day tank. With a fire area boundary rating of 3-hours, a fire initiated in Fire Area D-2 will remain within the fire area.

6.2.51.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection and suppression is provided in the basement (El. 660'-0") and on the ground floor (El. 677'-0") of this fire area. The top floor (El. 710'-9") of this fire area does not contain any redundant safe shutdown components or cables and is not provided with automatic fire detection or suppression. Manual suppression in the form of portable extinguishers is provided throughout the fire area and in the form of a fire hydrant outside of the building.

6.2.51.5 Consequences of a Fire in Fire Area D-2

In the event of a fire in Fire Area D-2, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area D-2 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a

safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.51.5.1 Fire Zone 0-41B

The following major SSD components located in Fire Zone 0-41B are not required for achieving SSD in the event of a fire in Fire Area D-2:

- Diesel Generator B and Auxiliaries
- Channel B Electrical Components
- ESW Loop A&B Supply and Discharge Isolation Valves

There are no Category I components located in Fire Zone 0-41B.

6.2.51.6 Special Features

Should a fire occur in Fire Area D-2 Unit 1 may be shut down using core spray/ADS and Unit 2 may be shut down using HPCI or RCIC.

6.2.51.7 Deviation Requests Affecting Fire Area D-2

There are no non-generic deviation requests which directly affect Fire Area D-2.

6.2.52 Fire Area D-3

6.2.52.1 General Description

Fire Area D-3 is Diesel Generator Bay C as shown on Drawings E-206000 through E-206002 in Section 8.0. This area is isolated from all other fire areas by 3-hour fire rated boundaries. Division I systems and equipment are located in Fire Area D-3. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area D-3.

6.2.52.2 Fire Zones

The following fire zones are located in Fire Area D-3:

Fire Zone	Description
0-41C	Diesel Generator Bay C

6.2.52.3 Combustible Loading

The average in-situ combustible loading of Fire Area D-3 could exceed the fire area boundary limits. The combustible loading in this diesel bay is significantly higher than the other diesel bays since the lube oil drain tank and the dirty lube oil tank for the diesel generators is located in Fire Area D-3.

6.2.52.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection and suppression is provided in the basement (El. 660'-0") and on the ground floor (El. 677'-0") of this fire area. The top floor (El. 710'-9") of this fire area does not contain any essential redundant safe shutdown components or cables and is not provided with automatic fire detection or suppression. Manual suppression in the form of portable extinguishers is provided throughout the fire area and in the form of a fire hydrant outside of the building. Deviation Request No. 19 further addresses the lack of complete automatic fire detection and suppression in this fire area.

6.2.52.5 Consequences of a Fire in Fire Area D-3

In the event of a fire in Fire Area D-3, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area D-3 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.52.5.1 Fire Zone 0-41C

The following major SSD components located in Fire Zone 0-41C are not required for achieving SSD:

- Diesel Generator C and Auxiliaries
- Channel C Electrical Components
- ESW Loop A&B Supply and Discharge Isolation Valves

There are no Category I components located in Fire Zone 0-41C.

6.2.52.6 Special Features

Fire Area D-3 contains the oil storage facilities necessary for the proper maintenance of the diesel generators. The location of these combustibles in Fire Area D-3 causes the average combustible loading of the fire area to be in excess of its rated fire area boundaries.

6.2.52.7 Deviation Requests Affecting Fire Area D-3

The following non-generic Deviation Requests directly affect Fire Area D-3:

Deviation Request No.	Title
10	Fire Area D-3 Boundaries
17	Kaowool System as an Acceptable 1-Hour Fire Barrier Wrap
19	Incomplete Fire Detection and Fire Suppression in Diesel Generator Fire Areas

6.2.53 Fire Area D-4

6.2.53.1 General Description

Fire Area D-4 is Diesel Generator Bay D as shown on Drawings E-206000 through E-206002 in Section 8.0. This area is isolated from all other fire areas by 3-hour fire rated boundaries. Division II systems and equipment are located in Fire Area D-4. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area D-4.

6.2.53.2 Fire Zones

The following fire zones are located in Fire Area D-4:

Fire Zone	Description
0-41D	Diesel Generator Bay D

6.2.53.3 Combustible Loading

The principle contributor to combustible loading is lube oil contained in the D diesel generator and fuel oil in its day tank. With a fire area boundary rating of 3-hours, a fire initiated in Fire Area D-4 will remain within the fire area.

6.2.53.4 Fire Detection/Suppression in the Fire Area

Automatic fire detection and suppression is provided in the basement (El. 660'-0") and on the ground floor (El. 677'-0") of this fire area. The top floor (El. 710'-9") of this fire area does not contain any redundant safe shutdown components or cables and is not provided with automatic fire detection or suppression. Manual suppression in the form of portable extinguishers is provided throughout the fire area and in the form of a fire hydrant outside of the building.

6.2.53.5 Consequences of a Fire in Fire Area D-4

In the event of a fire in Fire Area D-4, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area D-4 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.53.5.1 Fire Zone 0-41D

The following major SSD components located in Fire Zone 0-41D are not required for achieving SSD in the event of a fire in Fire Area D-4:

- Diesel Generator D and Auxiliaries
- Channel D Electrical Components
- ESW Loop A&B Supply and Discharge Isolation Valves

There are no Category I components located in Fire Zone 0-41D.

6.2.53.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.53.7 Deviation Requests Affecting Fire Area D-4

There are no non-generic deviation requests which directly affect this fire area.

6.2.54 Fire Area D-5

6.2.54.1 General Description

Fire Area D-5 is the Diesel Generator E Building. This structure is remote from the plant power block and stands at least 50 feet from the nearest structure. The general layout of this is shown on Drawings E-213410 through E-213413 in Section 8.0. Safe Shutdown Path 1 or 3 would be available for use in the event of a fire in Fire Area D-5.

6.2.54.2 Fire Zones

The following fire zones are located in Fire Area D-5:

Fire Zone	Description
0-41E	Diesel Generator E Building

6.2.54.3 Combustible Loading

This fire area is remote from any other structures containing safe shutdown equipment. The principle combustible materials in this fire area are the lube oil and diesel fuel associated with operation of Diesel Generator E. Any fire initiated within this fire area would be isolated from any safe shutdown equipment and consequently, would have no effect on safe shutdown. Furthermore, a fire in this fire area would not propagate to any other fire area at the plant.

6.2.54.4 Fire Detection/Suppression in the Fire Area

Fire Area D-5 has fire detection and automatic suppression provided throughout the area. Manual suppression in the form of portable extinguishers and hose reels are also available in the fire area.

6.2.54.5 Consequences of a Fire in Fire Area D-5

Fire Area D-5 is a separate building from the four original diesels built during plant construction. This diesel generator is connected to the operating plant through a transfer switching system whenever this diesel is used to replace any one of the four original diesels. The transfer switching system assures that a fault in the cabling system caused by a fire in Fire Area D-5 will result in the isolation of this fire area from the remainder of the plant. Safe Shutdown Path 1 or 3 (depending on which existing diesel this diesel is being substituted for) would be used for safe shutdown.

6.2.54.5.1 Fire Zone 0-41E

The following major SSD components located in Fire Zone 0-41E are not required for achieving SSD in the event of a fire in Fire Area D-5:

- Diesel Generator E and Auxiliaries
- Diesel Generator E HVAC
- Electrical Components

There are no Category I components located in Fire Zone 0-41E.

6.2.54.6 Special Features

Fire Area D-5 is the Diesel Generator E Building and is a separate, remote structure from the four original diesel generators. It is connected to the original plant through a transfer switching system whenever the Diesel Generator E is used to replace any of the four original diesel generators.

The transfer switching system involves operation of transfer switches on panels located in the Diesel Generator Building and in each of the existing diesel generator buildings. Several of the controls, indications, alarms and computer inputs will be transferred.

The transfer switches in the specific transfer panels in the Diesel Generator "E" Facility are used to select the path to the controls of the specific diesel generator to be replaced. The transfer switch at the individual transfer panel in each existing diesel generator building is used to transfer controls of the specific diesel generator to be replaced to Diesel Generator E. These two switches in series provide a double break in the circuits to preclude problems (i.e., a fire) in the Diesel Generator E building from being propagated into any of the other diesel generator circuits.

This same double break principle also applies to the power circuits. There are always two breaks between Diesel Generator E and any of the other four diesel generators.

This double isolation provided by the two transfer switches in two different buildings precludes any cable faults from Diesel Generator E from affecting any of the other four diesel generators while Diesel Generator E is not substituted.

Similarly, when Diesel Generator E is substituted for any one of the existing diesel generators, this double-break concept prevents any cable faults from affecting more than the Diesel Generator E. Thus, the other diesel generators are unaffected by faults involving any of these cables for all conditions involving Diesel Generator E (i.e., test mode, not substituted and not running; substituted for an existing diesel generator). There are no manual actions required.

6.2.54.7 Deviation Requests Affecting Fire Area D-5

There are no non-generic Deviation Requests that directly affect Fire Area D-5.

6.2.55 Fire Area E-1

6.2.55.1 General Description

Fire Area E-1 is the east side of the Emergency Systems Service Water (ESSW) Pumphouse. This structure is located remotely from the power block at the spray pond. Its layout and fire area boundaries are shown on Drawing E-205998 in Section 8.0. Safe Shutdown Path 3 would be available for use in the event of a fire in Fire Area E-1.

6.2.55.2 Fire Zones

The following fire zones are located in Fire Area E-1:

Fire Zone	Description
0-51	East side of ESSW Pumphouse

6.2.55.3 Combustible Loading

There are minimal combustibles in this fire area. The principle contributor to the combustible loading in this area is the lube oil in the RHR service water and Emergency Service Water Pump motors. Cables inside electrical panels also contribute to the overall combustible loading. Any fire initiated within this fire area would be contained by the fire area barriers which would prevent propagation of the fire into Fire Area E-2.

6.2.55.4 Fire Detection/Suppression in the Fire Area

This fire area has ionization smoke detection but no automatic suppression system. Manual suppression in the form of portable fire extinguishers is provided throughout this fire area and in the form of a fire hydrant outside of the building.

6.2.55.5 Consequences of a Fire in Fire Area E-1

In the event of a fire in Fire Area E-1, Safe Shutdown Path 3 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area E-1 which is required to support the operation of the Path 3 safe shutdown systems and components has been wrapped in a fire protective envelope or has been valuated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.55.5.1 Fire Zone 0-51

The following major SSD components located in Fire Zone 0-51 are not required for achieving SSD in the event of a fire in Fire Area E-1:

- Common ESW Loop A Pumps
- Division I Common ESSW Pump House HVAC
- Unit 1 RHR Service Water Loop A Pump
- Unit 2 RHR Service Water Loop A Pumps

There are no Category I components located in Fire Zone 0-51.

6.2.55.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.55.7 Deviation Requests Affecting Fire Area E-1

There are no non-generic deviation requests which directly affect Fire Area E-1.

6.2.56 Fire Area E-2

6.2.56.1 General Description

Fire Area E-2 is the west side of the Emergency Systems Service Water (ESSW) Pumphouse. This structure is located remotely from the power block at the spray pond. Its layout and fire area boundaries are shown on Drawing E-205998 in Section 8.0. Safe Shutdown Path 1 would be available for use in the event of a fire in Fire Area E-2.

6.2.56.2 Fire Zones

The following fire zones are located in Fire Area E-2:

Fire Zone	Description
0-52	West Side of ESSW Pumphouse

6.2.56.3 Combustible Loading

There are minimal combustibles in this fire area. The principle contributor to the combustible loading in this area is the lube oil in the RHR service water and Emergency Service Water Pump motors. Cables inside electrical panels also contribute to the overall combustible loading. Any fire initiated within this fire area would be contained by the fire area barriers which would prevent propagation of the fire into Fire Area E-1.

6.2.56.4 Fire Detection/Suppression in the Fire Area

This fire area has ionization smoke detection but no automatic suppression system. Manual suppression in the form of portable fire extinguishers are provided throughout this fire area and in the form of a fire hydrant outside of the building.

6.2.56.5 Consequences of a Fire in Fire Area E-2

In the event of a fire in Fire Area E-2, Safe Shutdown Path 1 systems and components will be available for safe shutdown. Electrical cabling located in Fire Area E-2 which is required to support the operation of the Path 1 safe shutdown systems and components has been wrapped in a fire protective envelope or has been specifically evaluated to assure that its potential failure would not impact the ability of both reactors to reach a safe shutdown condition. A description of the effect of a fire on safe shutdown systems by fire zone is detailed below.

6.2.56.5.1 Fire Zone 0-52

The following major SSD components located in Fire Zone 0-52 are not required for achieving SSD in the event of a fire in Fire Area E-2:

- Common ESW Loop B Pumps
- Division II Common ESSW Pump House HVAC
- Unit 1 RHR Service Water Loop B Pump
- Unit 2 RHR Service Water Loop B Pump

There are no Category I components located in Fire Zone 0-52.

6.2.56.6 Special Features

Should a fire occur in Fire Area E-2 Unit 1 may be shut down using core spray/ADS and Unit 2 may be shut down using HPCI or RCIC.

6.2.56.7 Deviation Requests Affecting Fire Area E-2

There are no non-generic deviation requests which directly affect Fire Area E-2.

6.2.57 Fire Area T-1

6.2.57.1 General Description

Fire Area T-1 is the Unit 1 and Unit 2 Turbine Buildings. Its location is shown on Drawing E-105002 in Section 8.0. An analysis has been performed that considered the effects of a fire in the turbine building on the limited amount of Class 1E cable and on adjacent buildings. Safe shutdown Path 1 or 3 would be available for use in the event of a fire in Fire Area T-1.

6.2.57.2 Fire Zones

For the safe shutdown analysis, the Turbine Buildings were considered as one fire area. Although there are various fire zones within the Turbine Buildings, Fire Zone 0-TB was assigned to both buildings for the purpose of the safe shutdown analysis. The analysis for the Turbine Buildings considered the possible effects of a fire on the safe shutdown.

The following fire zone is located in Fire Area T-1:

Fire Zone	Description
0-TB	Unit 1 and Unit 2 Turbine Building

6.2.57.3 Combustible Loading

The common walls, doors, and penetrations between the Turbine Building and the Reactor Buildings, the Control Structure and the Radwaste Building, have 3-hour fire rated barriers. The principle combustibles located all within the turbine building lube oil in the six reactor feed pump turbines and their lube oil reservoirs, the two main turbine-generators and their lube oil systems and the hydrogen seal oil systems. Each of these hazards are protected by a fire suppression system. A fire initiated within the turbine building would not propagate to any other fire area outside the turbine building.

6.2.57.4 Fire Detection/Suppression in the Fire Area

Fire detection and suppression systems are located in the Turbine Building where specific fire hazards warrant. The major combustibles listed above are all protected by automatic suppression systems. Each truck/railroad bay in the Turbine Building are also protected by suppression systems.

The Hydrogen Water Chemistry System injects hydrogen into the suction of the reactor feed water pumps. The system has, for protection, hydrogen detectors installed in accordance with NRC approved report EPRI NP-5283-SR-A, "Guidelines for Permanent BWR Hydrogen Water Chemistry Installation-1987 Revision". In addition to the detectors, there are excess flow control devices to protect against a large system leak. Therefore, the system will not affect the safe shutdown capability of the plant.

Manual fire suppression in the form of hose reels and portable fire extinguishers are located throughout the turbine building.

6.2.57.5 Consequences of a Fire in Fire Area

A study has been performed and has shown that although some safe shutdown equipment is located in the turbine building, the redundancy of the instrumentation, the separation between the equipment of concern and the fire protection methods employed assure safe shutdown capability.

6.2.57.5.1 Fire Zone 0-TB

There are no major SSD components located in Fire Zone 0-TB.

The following Category I components are located in Fire Zone 0-TB:

- Loss of Vacuum Instrumentation - the failure modes analysis shows that the instrumentation will fail to the safe condition.

6.2.57.6 Special Features

1. Should a fire occur in Fire Area T-1 Unit 2 may be shut down using core spray/ADS and Unit 1 may be shut down using HPCI or RCIC.
2. Should a fire occur in Fire Area T-1 which prevents tripping of reactor recirculation pumps 1P401A, 1P401B, 2P401A, 2P401B stop the pumps by manually tripping either one of their respective M-G set output breakers.

6.2.57.7 Deviation Requests Affecting Fire Area T-1

There are no non-generic Deviation Requests which directly affect Fire Area T-1.

6.2.58 Fire Area W-1

6.2.58.1 General Description

Fire Area W-1 is the Radwaste Building. The Radwaste Building is separated from the Turbine Building and Service and Administration Building by walls, doors, and penetrations that have a 3-hour fire rating and does not share any common walls with either the control structure or the reactor building. The general location of the Radwaste Building is shown on Drawing E-105002 in Section 8.0. A fire in the Radwaste Building would have no impact on any of the safe shutdown paths described in Section 3.0.

6.2.58.2 Fire Zones

For the safe shutdown analysis, the Radwaste Building was considered as one fire area. Although there are various fire zones within the Radwaste Building, there are no components or cables in the building that will affect safe shutdown of either reactor unit. The fire hazard analysis for the Radwaste Building considered the possible effects of a fire in the building with respect to potential radioactive releases.

6.2.58.3 Combustible Loading

Fire Area W-1 is separated from the Turbine Building and the Service and Administration Building by 3-hour fire rated barriers. These fire barriers are sufficient to contain any fire originating in the Radwaste Building and would prevent the propagation of a fire to any other fire area in the plant.

6.2.58.4 Fire Detection/Suppression in the Fire Area

Fire detection and suppression systems are located in portions of the Radwaste Building. Additionally, manual hose reels and portable fire extinguishers are provided throughout the fire area.

Deluge type sprinkler systems are provided in the Tank Vent Filter Room, HVAC Filter and the Degasifier Filter.

6.2.58.5 Consequences of a Fire in Fire Area W-1

Within the Radwaste Building, there is located solid, liquid and gaseous radioactive waste treatment systems. A fire could occur in the main charcoal adsorber beds of the offgas treatment system. The probability of such a fire is rather low, since several factors preclude fire. The process stream is primarily air at a maximum pressure of 3 psig. Normal flow rate is 40 scfm with a maximum of 300 scfm during startup through over 15 tons of charcoal. No ignition sources are present other than the noble gas decay heat. This heat is removed by 100% redundant air conditioning which maintains the rooms below 65°F. Furthermore, the entire train of charcoal adsorber tanks can be isolated at both the inlet and outlet, thus if a fire were to start in a bed it would

self-extinguish once the available oxygen was consumed. The charcoal adsorber tanks are constructed of 1-3/16 inch carbon steel and this would act as a barrier to prevent the spread of the fire. The minimum design pressure of the tank is 375 psig at 150°F.

A fire in these charcoal beds might result in the release of some radioactive gases. This accident is analyzed in Subsection 15.7.1.1 of the Final Safety Analysis Report (FSAR) and, as indicated therein, the radiological dose consequences are a small percentage of the guideline values of 10CFR100.

A fire could also cause the rupture of a liquid radwaste tank. The tank with the worst radiological consequences selected for this evaluation was the radwaste evaporator concentrate storage tank. The probability of a fire in the immediate area of this tank is rather low since the combustible loading is insignificant. Nonetheless, even if it is that a fire caused the rupture of this tank, the radiological dose consequences would be a small fraction of the guideline values of 10CFR100. An analysis of the radiological consequences for this tank is provided in FSAR Subsection 15.7.2.

6.2.58.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.58.7 Deviation Requests Affecting Fire Area W-1

There are no non-generic Deviation Requests which directly affect Fire Area W-1.

6.2.59 Fire Area A-1

6.2.59.1 General Description

Fire Area A-1 is the general area outside of the power block. It includes site outside areas, the Cooling Tower, S&A Building, Circulating Water Pumphouse and other miscellaneous site support buildings & facilities. The general arrangement of the plant outside areas is shown on Drawing E-105002 in Section 8.0. Safe Shutdown Path 1 or 3 would be available for use in the event of a fire in Fire Area A-1.

6.2.59.2 Fire Zones

The following fire zones are located in Fire Area A-1:

Fire Zone	Description
0-00	General outside areas, S&A Buildings, Cooling Towers, Circulating Water Pumphouse, and miscellaneous site support buildings

6.2.59.3 Combustible Loading

A fire hazard analysis was performed to examine specific combustible configurations in the outside areas. This analysis studied the effect of an outside area fire on Class 1 electrical manholes which contain safe shutdown cables, the effect of an outside area fire on other safe shutdown cables, the effect of an outside area fire on other safe shutdown underground vaults and duct banks, a postulated fire during the filling operation of the underground and other outside fires involving transformers and transient combustibles. The cooling towers at Susquehanna are the natural draft gravity flow type and contain noncombustible fill.

The study concluded that adequate safe shutdown path separation exists for the fire hazards identified and that safe shutdown could be achieved by using safe shutdown path 1 or 3 in the event of a fire anywhere in the outside areas.

The Hydrogen Water Chemistry storage facility is located southwest of the South Gatehouse, outside of the plant security Protected Area. This facility consists of cryogenic liquid storage tanks (one each for hydrogen, oxygen and nitrogen), ambient air vaporizers, automatic valves to isolate the tanks, liquid hydrogen pumps, hydrogen gas receivers and excess flow control devices to protect against a large system leak. This facility is designed and installed in accordance with NRC approved report EPRI NP-5283-SR-A, "Guidelines for Permanent BWR Hydrogen Water Chemistry Installation-1987 Revision".

6.2.59.4 Fire Detection/Suppression in the Fire Area

Fire hydrants are located along the yard main at intervals not exceeding 250 ft. Each fire hydrant is controlled by a post indicator valve. Fire fighting equipment such as fire hose, nozzles, adapters, etc., are provided for each fire hydrant in accordance with the guidance of NFPA 24.

Fire detection and suppression equipment is provided in the site support structures for life safety. The in-service oil-filled transformers immediately adjacent to structures housing safe shutdown equipment are equipped with deluge systems and the transformers are provided with a pit to contain the oil and water released in the event of a fire.

6.2.59.5 Consequences of a Fire in Fire Area A1

Class I electrical manholes 16, 17, 18, 19, 22, 23, 27, 28, 31 and 32 are located at a sufficient distance from in-situ combustibles such as oil storage tanks and transformers to satisfy the separation criterion of 10CFR50, Appendix R, Par. III.G. The analysis also postulated various outdoor worst case accidents (i.e., oil truck overturned, oil seepage into manholes, etc.) and concluded that adequate redundancy and separation exist to satisfy the safe shutdown criteria of Appendix R.

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The Hydrogen Water Chemistry System storage facility is located away from safety related systems, structures and components, in accordance with NRC approved report EPRI NP-5283-SR-A, "Guidelines for Permanent BWR Hydrogen Water Chemistry Installation-1987 Revision", and will not affect the safe shutdown capability of the plant.

6.2.59.5.1 Fire Zone 0-00

There are no major SSD components located in Fire Zone 0-00.

The following Category I components are located in Fire Zone 0-00:

- Diesel Generator Fuel Oil Transfer Pumps - A fire hazard analysis on these buried pumps has concluded that the operating considerations, protective cover construction and lack of combustible loading provide acceptable fire protection equivalent to the technical requirements of 10CFR50, Appendix R, III.G.2.
- RHR Service Water Spray Pond Valves - The six valves are located in the spray pond valve vault. The Division I valves are located in the north compartment of the vault and the Division II valves are located in the south compartment of the vault.

6.2.59.6 Special Features

There are no special features in this fire area. There are no manual actions required.

6.2.59.7 Deviation Requests Affecting Fire Area A-1

The following non-generic Deviation Request directly affects Fire Area A-1.

Deviation Request No.	Title
32	Outside Areas Lack of Separation of Safe Shutdown Components and Electrical Cables

7.0 DEVIATION REQUESTS

7.1 INTRODUCTION

The purpose of Section 7.0 is to provide a complete listing of the deviations which were taken with respect to 10CFR50, Appendix R, Sections III.G, III.J, III.L and III.O.

Each deviation consists of the following sections: Deviation from Requirements, Fire Areas/Zones Affected, Reason for Deviation Request, Existing Arrangement, and Justification.

A deviation request reference matrix is provided as Table 7.1-1.

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TABLE 7.1-1								
APPENDIX R DEVIATION REQUEST REFERENCE MATRIX								
Unit 1 Reactor Building Fire Areas								
Deviation Request #	R-1A	R-1B	R-1C	R-1D	R-1E	R-1F	R-1G	R-1H
1								
2								
3	X	X		X				
4	X	X						
5								
6	X	X		X				
7	X	X						
8		X						
9								
10								
11	X	X		X				
12	X	X						
13	X	X		X	X	X	X	X
14	X	X						
15								
16								
17	X	X						
18								
19								
20	X	X		X	X	X	X	X
21								
22								
23								
24								
25	X							
26								
27	X							
28								
29	X	X						
30								
31								
32								
33	X	X			X	X	X	X
34								
35								
36								
37								
38								
39	X	X						
40								
41								
42	X	X						

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TABLE 7.1-1								
APPENDIX R DEVIATION REQUEST REFERENCE MATRIX								
Unit 2 Reactor Building Fire Areas								
Deviation Request #	R-2A	R-2B	R-2C	R-2D	R-2E	R-2F	R-2G	R-2H
1								
2								
3	X	X		X				
4	X	X						
5								
6	X	X		X				
7	X	X						
8								
9								
10								
11	X	X		X				
12	X	X						
13	X	X		X	X	X	X	X
14	X	X						
15								
16								
17								
18								
19								
20	X	X		X	X	X	X	X
21								
22								
23								
24	X							
25								
26		X						
27								
28		X						
29	X	X						
30								
31								
32								
33	X	X			X	X	X	X
34								
35								
36								
37								
38		X						
39								
40								
41								
42	X	X						

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TABLE 7.1-1 APPENDIX R DEVIATION REQUEST REFERENCE MATRIX										
Control Structure Fire Areas										
Deviation Request #	CS-01	CS-02	CS-03	CS-04	CS-05	CS-06	CS-07	CS-09	CS-10	CS-11
1										
2								X		
3										
4										
5										
6		X	X	X				X		X
7										
8										
9										
10										
11										
12										
13										
14										
15										X
16										
17									X	
18										
19										
20	X	X	X	X	X	X	X	X	X	X
21			X							
22										
23								X		
24										
25										
26										
27										
28										
29										
30										
31										
32										
33	X	X	X	X	X	X	X		X	X
34										
35										
36										
37						X	X	X		
38										
39										
40										
41										
42										

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TABLE 7.1-1

APPENDIX R DEVIATION REQUEST REFERENCE MATRIX

Control Structure Fire Areas											
Deviation Request #	CS-12	CS-13	CS-14	CS-15	CS-16	CS-17	CS-18	CS-19	CS-20	CS-21	CS-22
1											
2											
3											
4											
5											
6	X	X	X	X	X	X	X	X	X	X	X
7											
8				X		X					
9											
10											
11											
12											
13											
14											
15									X		
16											
17											
18											
19											
20	X	X	X	X	X	X	X	X	X	X	X
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33	X	X	X	X	X	X	X	X	X	X	X
34											
35											
36											
37											
38											
39											
40											
41											
42											

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TABLE 7.1-1											
APPENDIX R DEVIATION REQUEST REFERENCE MATRIX											
Control Structure Fire Areas											
Deviation Request #	CS-23	CS-24	CS-25	CS-26	CS-27	CS-28	CS-29	CS-30	CS-31	CS-32	CS-33
1											
2											
3											
4											
5											
6	X	X	X	X	X						
7											
8		X									
9											
10											
11											
12											
13											
14											
15											
16											
17								X			
18											
19											
20	X	X	X	X	X	X	X	X	X	X	X
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33	X	X	X	X	X	X	X	X	X	X	X
34											
35											
36											
37											
38											
39											
40											
41											
42											

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TABLE 7.1-1										
APPENDIX R DEVIATION REQUEST REFERENCE MATRIX										
Common Fire Areas										
Deviation Request #	D-1	D-2	D-3	D-4	D-5	E-1	E-2	T-1	W-1	A-1
1										
2										
3										
4										
5										
6										
7										
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9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19	X		X							
20	X	X	X	X		X	X	X		
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										X
33	X	X	X	X	X	X	X	X	X	X
34										
35										
36										
37										
38										
39										
40										
41										
42										

7.2 DEVIATION REQUEST INDEX

Deviation Request No.	Subject	Appendix R Requirement Deviated From
1	This Deviation Request has been Withdrawn	N/A
2	Suppression Pool Temperature Indication	Section III.L
3	Fire Doors - Non-Rated	Section III.G.2
4	Wraparound Area	Section III.G.2
5	This Deviation Request has been Withdrawn	N/A
6	Non Fireproofed Structural Steel	Section III.G.2
7	Fire Spread Limitations	Section III.G.2
8	One Hour Fire Barrier Wrap With Limited Suppression	Section III.G.2.a
9	This Deviation Request has been Withdrawn	N/A
10	This Deviation Request has been Withdrawn	N/A
11	HVAC Penetrations Reactor Building Fire Walls	Section III.G.2
12	Fire Barriers Without Fire Dampers in Vertical Ventilation Duct Penetrations	Section III.G.2
13	Essential Redundant Raceway Protection	Section III.G.2.a,b,c
14	Reactor Building Fire Zones Without Fire Detection	Section III.G.2
15	Fire Areas Control Structure Without Fire Suppression	Section III.G.2.c
16	This Deviation Request has been Withdrawn	N/A
17	Kaowool System as an Acceptable 1-Hour Fire Barrier Wrap	Section III.G.2.c
18	This Deviation Request has been Withdrawn	N/A
19	Incomplete Fire Suppression and Fire Detection In Diesel Generator Fire Areas	Section III.G.2
20	Penetration Seals – Conduits	Section III.G.2
21	Appendix R - Void	N/A
22	This Page Intentionally Left Blank	N/A
23	Control Structure Fire Area CS-9 Partial Fire Suppression	Section III.G.2
24	Automatic Fire Suppression in Fire Zone 2-5D	Section III.G.2.b
25	Automatic Fire Suppression and Intervening Combustibles in Fire Zone 1-3A	Section III.G.2.b

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Deviation Request No.	Subject	Appendix R Requirement Deviated From
26	Separation of Redundant Safe Shutdown Capability in Fire Zone 2-3B-N	Section III.G.2.b
27	Nuclear Boiler Instrumentation in Fire Zone 1-5A-S	Section III.G.2.b
28	Nuclear Boiler Instrumentation in Fire Zone 2-5A-N	Section III.G.2.b
29	Category I Components and Safe Shutdown Raceway in Fire Zones 1-3C-W and 2-3C-W	Section III.G.2.b
30	This Deviation Request has been Withdrawn	N/A
31	This Page Intentionally Left Blank	N/A
32	Lack of Separation of Safe Shutdown Components and Electrical Cables	Section III.G.2.b
33	Reactor Coolant Makeup and Depressurization Systems	Section III.G (Guidance provided in IN 84-09, Para. V)
34	This Page Intentionally Left Blank	N/A
35	This Page Intentionally Left Blank	N/A
36	This Deviation Request has been Withdrawn	N/A
37	Control Room Raised Floor and Control Structure Cable Chase Fire Protection	Section III.G.2.a,b,c
38	Protection of Redundant Safe Shutdown Raceways in the Unit 2 Main Steam Pipeway	Section III.G.2
39	Category I Components in Fire Zones 1-6D and 2-6D	Section III.G.2.b
40	This Deviation Request has been Withdrawn	NA
41	This Deviation Request has been Withdrawn	N/A
42	Protection of Safe Shutdown Raceway in Fire Zones 1-3B-W and 2-3B-W	Section III.G.2.b

DEVIATION REQUEST NO. 1 HAS BEEN WITHDRAWN

APPENDIX R DEVIATION REQUEST NO. 2

SUPPRESSION POOL TEMPERATURE INDICATION

DEVIATION REQUEST:

The existing Suppression Pool Temperature Monitoring System (SPOTMOS) configuration is considered acceptable. The alternative indirect methods (described herein) to determine suppression pool temperature are acceptable in the event both divisions of SPOTMOS becomes unavailable due to a fire in Fire Area CS-9.

FIRE AREAS/ZONES AFFECTED:

This condition would only occur due to a fire in Fire Area CS-9. The affected locations are the Unit 1 and 2 Remote Shutdown Panels. (Fire Zones 1-2D and 2-2A).

REASON FOR DEVIATION REQUEST:

Suppression pool temperature monitoring for the remote shutdown panels is provided by the SPOTMOS for each unit. While two redundant divisions of the system are provided for each unit and displayed at the units remote shutdown panel, there is a possibility that a failure induced by a control room fire could result in the loss of suppression pool temperature indication at the remote shutdown panels.

EXISTING ARRANGEMENT:

Fire Area CS-9

- Fire Area CS-9 has fire rated boundaries to all adjacent fire areas except at the boundary supporting floor elevator where structural steel at that elevation is addressed in Deviation Request No. 6.
- Fixed manual CO₂ protection is provided for under the floor space containing cables.
- Automatic detection is provided throughout the fire area.
- The control room fire zone is constantly staffed.
- Each division of the Unit's SPOTMOS provides a temperature averaging signal to the remote shutdown panel. Each division is contained in a separate control panel, located side by side and separated by steel plates totaling 3/8" in thickness.

JUSTIFICATION:

The primary function of the SPOTMOS is to monitor the suppression pool temperature to ensure that suppression pool temperatures will remain below defined limits and, thereby, containment integrity will be maintained. The system also functions as an indirect indication that the reactor is shutdown.

In the event of a fire resulting in a control room evacuation, the operators will scram the reactor before leaving the control room to go to the remote shutdown panel. When the remote shutdown panel is used, SPOTMOS serves solely to provide helpful confirmatory information on the condition of the reactor. The operator monitors and controls reactor pressure and water level from the remote shutdown panel. Procedures also direct operators to verify reactor pressure and level indication from local instrument racks. During operation from the remote shutdown panel, explicit procedures allow operators to provide makeup water to the reactor using the Reactor Core Isolation Cooling (RCIC) system and depressurize the reactor pressure vessel with safety relief valves.

In the event that both divisions of suppression pool temperature indication at the remote shutdown panel fail:

- Loss of temperature indication would be detected by operators by off-scale readings.
- Operators would be aware of heat transferred to the pool through observation of the reactor pressure vessel level and pressure and emergency core cooling system discharge valve alignment indication.
- Emergency remote shutdown procedures direct and instruct operators to start Suppression Pool Cooling.
- Emergency primary containment control procedures direct operators to start suppression pool cooling upon increasing temperature in the pool.

Verification of suppression pool cooling system function is accomplished by observing valve line-ups and primary (RHR) and secondary (RHRSW) flow indication.

Suppression pool temperature can be inferred from suppression chamber air temperature and air pressure indication which are available at the remote shutdown panel. Because the chamber remains a relatively constant volume, the pool heat-up or cooldown rate will be related to these two air parameters.

Control and indication for one loop of suppression pool cooling valves is available at the remote shutdown panel. This includes primary (RHR) and secondary (RHRSW) system valves and pumps presented in "mimic" board fashion for easy alignment verification.

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In addition an existing analysis demonstrates that suppression pool temperature during a shutdown will not exceed 200°F. This calculation conservatively assumes:

1. Lowest pool level and highest initial temperature
2. Full reactor vessel depressurization to the pool
3. HPCI or RCIC systems rejecting heat into pool
4. Minimum coolant level in the RPV (maximum heat to pool)
5. Absence of Suppression Pool cooling for approximately 30 minutes.

The required NPSH for the RHR pumps at their required 10,000 gpm rating is 7.3 feet.

Susquehanna SES FSAR calculations (Subsection 6.3.2.2.4.1) in accordance with Regulatory Guide 1.1 demonstrate that the RHR pumps have an NPSH of 20.25 feet at atmospheric pressure and 200°F suppression pool water temperature. Therefore the ECCS functions are not affected by a pool temperature of 200°F.

Primary containment integrity in this operating region is not in jeopardy until a static pressure of about 53 psig is reached, which cannot be achieved without a minimum temperature of 360°F (saturation). Again, both of these parameters are indicated at the remote shutdown panel and are more important for primary containment control than pool temperature.

APPENDIX R DEVIATION REQUEST NO. 3

FIRE DOORS - NON-RATED

DEVIATION REQUEST:

Existing unlabeled, untested, doors are acceptable for use as fire doors based on confirmation by Factory Mutual that the doors are of sufficient construction to provide equal or better fire resistance to that of a rated fire door.

Existing watertight doors which have not been fire tested are acceptable as 1-1/2 hour fire doors based on Factory Mutual's evaluation of these doors.

FIRE AREAS/ZONES AFFECTED:

For the effected fire zones see Table DR 3-1.

REASON FOR DEVIATION REQUEST:

Various fire barriers within the Unit 1 and 2 Reactor Buildings have been identified as requiring 3 hour fire rating to meet the requirements of Appendix R. Existing doors within these barriers are not fire rated (see Table DR 3-1 for a listing of these doors).

JUSTIFICATION:

There are three types of doors within the Reactor Buildings. Factory Mutual has reviewed each door type, and door within that type, and compared them to either known data or an existing fire rated door at Susquehanna.

Water Tight Doors (Type I)

Factory Mutual in their January 1985 and August 1987 Reports concluded that these special purpose (flood) doors would be expected to provide at least 1-1/2 hours of fire resistance (see Attachments 1 and 5).

Pressure Resistance Doors (Type II)

Factory Mutual in their August 1985 and June 1986 Reports compared various non-labeled pressure resistant doors, with pressure resistant door number 279 which is an Underwriter's Laboratories labeled 3 hour fire door. Factory Mutual concluded that the doors would be expected to provide at least 1-1/2 hours of fire resistance (see Attachments 2 and 3).

In their March 1994 Technical Report (Supplement 5), Factory Mutual compared door number 505 with the requirements for fire resistance ratings of fire doors. Factory Mutual concluded that door number 505 may be considered to be equivalent to a 1-1/2 hour rated assembly. (See Attachment 6).

Hollow Steel Doors (Type III)

Factory Mutual in their August 1985 and June 1986 Reports compared various non-labeled hollow metal doors with hollow metal door number 421 which is an Underwriter's Laboratories labeled 3 hour fire door. Factory Mutual concluded that the doors should be expected to provide at least 1-1/2 hours of fire resistance.

In their May 1987 Report (see Attachment 4), Factory Mutual compared various non-labeled hollow metal doors with hollow metal door number 115-R which is an Underwriter's Laboratories labeled 1-1/2 hour fire door. Factory Mutual concluded that these doors should be expected to provide at least 1-1/2 hours of fire resistance.

The combustible loadings in the Reactor Buildings have been conservatively calculated and the average combustible loading in each Reactor Building Fire Zone is less than 1-1/2 hours. Changes in these combustible loadings are programmatically controlled. This Deviation Request is valid so long as:

- The calculated maximum average combustible loading in the fire zones adjacent to these fire barriers is below the minimum rating of the door.
- The concentrated combustible loading adjacent to these fire barriers is calculated to be below the minimum fire rating of the door.

All the recommendations proposed by Factory Mutual for the fire doors listed in Table DR 3-1 have to be completed to meet the requested rates as specified in this deviation request.

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APPENDIX A
DEVIATION REQUEST NO. 3

FIRE PROTECTION PROGRAM – CONCERN #1

ATTACHMENT 1