APPENDIX 9.5A - DESIGN COMPARISON TO REGULATORY POSITIONS OF REGULATORY GUIDE 1.120, REVISION 1, DATED NOVEMBER 1977, TITLED "FIRE PROTECTION GUIDELINES FOR NUCLEAR POWER PLANTS"

The basis for compliance to Regulatory Guide 1.120 is the implementation of Appendix A of NRC Branch Technical Position (BTP) APCSB 9.5-1. The following provides a summary of the compliance with APCSB 9.5-1.

APPENDIX 9.5A

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A. Overall Requirements of Nuclear Plant Fire Protection Program	
A.1. Personnel	
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.	Refer to the Site Addendum.
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.	The basic design of the fire protection system, selection of equipment, and coordination of layout with fire area requirements was the direct responsibility of a licensed senior mechanical engineer assigned full time to the Callaway project.
The fire protection staff should be responsible for: (a) coordination of building layout and system 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 firefighting activities of plant personnel and the fire brigade.	Additional assistance has been provided by licensed fire protection, and graduate fire protection engineers. The entire fire protection system, including the fire hazards analyses, have been reviewed by a licensed fire protection engineer.
A.2. Design Bases	
The overall fire protection program should be based upon evaluation of potential fire hazards throughout the plant and the effect of postulated design basis fire relative to maintaining ability to perform safety shutdown functions and minimize radioactive releases to the environment.	The overall fire protection program is based upon evaluation of potential fire hazards throughout the plant and the effect of postulated design basis fires relative to maintaining ability to perform safe shutdown functions and minimize radioactive releases, as described in fire hazards analysis, Appendix 9.5B.
A.3. Backup	
Total reliance should not be placed on a single automatic fire suppression system. Appropriate backup fire suppression capability should be provided.	Where automatic extinguishing systems are provided, appropriate backup fire suppression capability is provided.

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A.4.	Single Failure Criterion	
	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.	A single active failure will not impair both the primary and backup fire suppression capability, as described in Section 9.5.1.2.1. Also refer to the Site Addendum.
	The effects of lightning strikes should be included in the overall plant fire protection program.	Lightning protection for the containment is provided in accordance with NFPA No. 78-1975 and the requirements of Underwriters' Laboratories, Inc. UL-96A-June, 1963.
A.5.	Fire Suppression Systems	
	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."	Failure or inadvertent operation of the fire suppression system will not incapacitate safe shutdown systems or components, as described in Section 9.5.1.2.1. Fire suppression systems that are pressurized during normal plant operation will meet the guidelines specified in APCSB Branch Technical Position 3-1, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment."
A.6.	Fuel Storage Areas	
	Schedule for implementation of modifications, if any, will be established on a case-by-case basis.	Modifications not applicable to Callaway. Fire fighting equipment will be installed in buildings storing new reactor fuel before the fuel is received at the site.
A.7.	Fuel Loading	
	Schedule for implementation of modifications, if any, will be established on a case-by-case basis.	Modifications not applicable to Callaway. Fire fighting equipment will be installed in all areas of the plant prior to fuel loading.
A.8.	Multiple-Reactor Sites	8. Not applicable to Callaway.
A.9.	Simultaneous Fires	9. Not applicable to Callaway.
B.	Administrative Procedures, Controls, and Fire Brigade	B. Refer to the Site Addendum.

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C. Quality Assurance Program 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:	C. The Fire Protection System Quality Assurance Program is described in a separate document entitled the Quality Assurance Programs for Design and Construction.
C.1. Design Control and Procurement Document Control 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.	
C.2. Instructions, Procedures, and Drawings 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.	
C.3. Control of Purchased Material, Equipment, and Services Measures should be established to assure that purchased material, equipment and services conform to the procurement documents.	
C.4. Inspection A program for independent inspection of activities affecting fire protection should be established. . .	
C.5. Test and Test Control 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.	
C.6. Inspection, Test and Operating Status Measures should be established to provide for identification of items that have satisfactorily passed required tests and inspections.	

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C.7. Non-Conforming Items Measures should be established to control items that do not conform. . .	
C.8. Corrective Action Measures should be established to assure that conditions adverse to fire protection,. . . identified, reported, and corrected.	
C.9. Records Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program.	
C.10. Audits Audits should be conducted and documented to verify compliance with fire protection program including design and procurement documents; instructions; procedures and drawings; and inspection and test activities.	
D. General Guidelines for Plant Protection	
D.1. Building Design	
(a) Plant Layouts should be arranged to:	(a) Where possible, plant layouts are arranged to:
(1) Isolate safety-related systems from unacceptable fire hazards, and	(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.	(2) Separate redundant safe shutdown systems from each other so that both are not subject to damage from a single fire hazard.
Alternatives: (a) Redundant safety-related systems that are subject to damage from a single fire hazard should be protected by a combination of fire retardant coatings and fire detection and suppression systems, or (b) a separate system to perform the safety function should be provided.	Where this is not possible, protection is provided by fire resistive wraps, fire detection, fire suppression systems, or a combination of these. The details of plant layout features designed to meet these guidelines are given in Appendix 9.5B.
(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. Additional fire hazards analysis should be done after any plant modification.	(b) Refer to Appendix 9.5B for the fire hazards analysis. The hazards analysis will be reviewed and updated, as necessary.

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(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 3 hours. Cabling for redundant safety divisions should be separated by walls having 3-hour fire barriers.	(c) Each CSR is separated from the other areas by walls, floor, and ceiling having a minimum fire resistance of 3 hours. Two CSRs are provided for each reactor unit. Cables for the two redundant pairs of shutdown divisions are routed separately into their respective CSR.
(d) Interior wall and structural components, thermal insulation materials and radiation shielding materials and sound-proofing should be noncombustible. Interior finishes should be noncombustible 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").	(d) Interior wall and structural components are steel, reinforced concrete, and other noncombustible materials. Thermal insulation and radiation shielding materials are also noncombustible. Interior wall surfaces are bare CMU or concrete, except walls in the access control area which are painted. Floor areas in the auxiliary building have a coating applied for ease of decontamination. These paints and coatings have been considered in the fire hazards analysis. Minimum drywall construction is used in the control room over steel stud framing.
(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 Factor Mutual System Approval Guide.	(e) Metal deck roof construction has not been utilized in safety-related structures, except as forms for the reinforced concrete roof; therefore, this guideline does not apply.
(f) Suspended ceiling 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.	(f) Suspended ceiling are noncombustible and exist in the control room and adjacent offices, hot chem lab, counting room, and access control area. Combustibles in concealed spaces in the control room, hot chem lab, and counting room consist only of insulation for electrical cables in trays which are not safety related. Combustibles in concealed spaces in the access area consist of safety-related electrical cables in trays. This area is sprinkled both above and below the ceiling.
(g) High voltage - high amperage transformers installed inside buildings containing safety-related systems should be of the dry type or insulated and cooled with noncombustible liquid.	(g) High voltage - high amperage transformers installed inside buildings containing safety-related systems are of the dry-type construction. Hence, safety-related systems are not exposed to oil-filled transformers.
(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 fire by:. . .	(h) Buildings containing safety-related systems having openings in exterior walls are not closer than 50 feet to flammable oil-filled transformers.

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(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, "Water-proofing 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. In operating plants or plants under construction, if accumulation of water from the operation of new fire suppression systems does not create unacceptable consequences, drains need not be installed.	(i) Adequate drainage is provided in all safe shutdown areas, including at each elevation of vertical electrical cable chases, to remove fire fighting water whether from fixed suppression systems or manual hose stations. Water-sensitive equipment components are situated above the floor level to prevent damage from extinguishing system discharge. The drainage system has no provisions for arresting the spread of fire within the system. However, the only safe shutdown area where an appreciable amount of combustibles could enter the drainage system is in the diesel generator building. Each of the two redundant diesels has a separate drainage system so that a fire could not spread from one diesel room to the other. All drainage (except sanitary) is monitored for radioactivity before release to the environment.
(j) Floors, walls, and ceilings enclosing separate fire areas should have minimum fire rating of 3 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.") The fire hazard in each area should be evaluated to determine barrier requirements. If barrier fire resistance cannot be made adequate, fire detection and suppression should be provided, such as: (i) water curtain in case of fire, (ii) flame retardant coatings, (iii) additional fire barriers.	(j) Where fire barriers are provided to separate redundant safe shutdown trains, floors, walls, and ceilings of the enclosures have a minimum fire rating of 3 hours. Refer to Section 9.5.1.2.2. Penetrations in these fire barriers, including conduits and piping, are sealed or closed to provide a fire resistance rating of 3 hours. Hatchways in the auxiliary building floors are protected as detailed in 9.5.1.2.2. Normally, doors, frames, and hardware have the same rating as the barrier. Elevator and dumbwaiter doors will be rated at 1-1/2 hours, since it is an industry standard and, as stated in ANSI A17.1, such doors are acceptable for use on a 2-hour rated shaft. For a fire to propagate from one floor elevation to another, it would have to penetrate two doors. Doors are normally closed and latched. Ventilation openings are protected by fire dampers having a rating equal to the barrier. The fire hazard in each area has been evaluated to determine barrier requirements. This analysis is presented in Appendix 9.5B. Control building floors and ceilings are rated as 3-hour fire barriers. Three-hour-rated fire stops are provided at each floor elevation in vertical cable chases. Auxiliary building floors and ceilings are rated as 3-hour fire barriers.

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D.2. Control of Combustibles	
(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: (1) Emergency diesel generator fuel oil day tanks (2) Turbine-generator oil and hydraulic control fluid systems (3) Reactor coolant pump lube oil system.	(a) Safety-related systems are isolated or separated from combustible materials, where practical. Where this is not practical, special protection is provided to prevent failure of both safe shutdown trains by a single fire. Refer to the Fire Hazards Analysis, Appendix 9.5B. Administrative controls will be established to control the introduction of transient combustibles into the safety-related areas.
(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 10A "Gaseous Hydrogen Systems.") Care should be taken to locate high-pressure gas storage containers with the long axis parallel to building walls. This will minimize the possibility of wall penetration in the event of a container failure. Use of compressed gases (especially flammable and fuel gases) inside buildings should be controlled. (Refer to NFPA 6, "Industrial Fire Loss Prevention.")	(b) Flammable bulk gas storage is not permitted inside structures housing safe shutdown equipment. Refer to the Site Addendum.
(c) The use of plastic materials should be minimized. In particular, haloginated plastics such as poly-vinyl 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 haloginated plastics also release free chlorine and hydrogen chloride when burning which are toxic to humans and corrosive to equipment.	(c) Halogenated materials are used for electrical cable insulation and jacketing. These materials exhibit acceptable electrical, mechanical, and environmental characteristics. The material is minimized to the extent practicable by limiting the wall thickness to the minimum permitted by applicable industry standards.
(d) Storage of flammable liquids should, as a minimum, comply with the requirements of NFPA 30, "Flammable and Combustible Liquids Code."	(d) Storage of flammable liquids complies with the requirements of NFPA 30-1973.
D.3. Electrical Cable Construction, Cable Trays and Cable Penetrations	

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(a) Only non-combustible materials should be used for cable tray construction.	(a) Galvanized steel is used for cable tray construction.
(b) See Section E.3 for fire protection guidelines for cable spreading rooms.	(b) See Section E.3.
(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 does not itself require water fire protection but is subject to unacceptable damage from sprinkler water discharge, should be protected from sprinkler system operation or malfunction. 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.	(c) Automatic sprinkler systems are provided for vertical cable chases, the cable area above the suspended ceiling in the access control area which contain Class IE cables, and zones in the auxiliary building with cable tray concentrations. Manually charged, closed head sprinkler systems are provided for the two cable penetration areas inside the containment. Cables are designed to allow wetting down without electrical faulting. Manual hose stations and portable hand extinguishers are provided as backup. Sprinkler systems are not installed in areas where sprinkler operation would cause damage to safe shutdown equipment. Safety-related cables satisfy the provisions of Regulatory Guide 1.75.
(d) Cable and cable tray penetration of fire barriers (vertical and horizontal) should be sealed to give protection at least equivalent to that fire barriers for horizontal and vertical cable trays should, as a minimum, met 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.	(d) Cable and cable tray penetration of fire barriers (vertical and horizontal) are sealed to give protection at least equivalent to the barrier which they penetrate. Typical horizontal and vertical cable tray penetrations are tested to prevent the spread of fire and retain structural soundness when exposed to a 3-hour fire as discussed in 9.5.1.2.2.
(e) Fire breaks should be provided as deemed necessary by the fire hazards analysis. Flame or fire retardant coatings may be used as a fire break for grouped electrical cables to limit spread of fire in cable ventings. (Possible cable derating owing to use of such coating materials must be considered during design.)	(e) Fire breaks are provided as deemed necessary by the fire hazards analysis. The cable rating is compatible with the construction of the fire break. Refer to Appendix 9.5B and Section 9.5.1.2.2.
(f) Electrical 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.) 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.	(f) Electrical cable passes the IEEE 383-1974 flame test or meets the intent of this requirement as discussed in Appendix 9.5B.
(g) To the extent practical, cable construction that does not give off corrosive gases while burning should be used. (Applicable to new cable installations.)	(g) See response to D.2(c) above.

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(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. Installed equipment in cable tunnels or culverts need not be removed if they present no hazard to cable runs as determined by the fire hazards analysis.	(h) Cable trays, raceways, conduit, and cable trenches are used for the routing of cables only.
(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.	(i) Smoke venting is discussed in Section D.4(a).
(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. Existing cabling installed in concealed floor and ceiling spaces should be protected with an automatic total flooding halon system.	(j) Cable in the control room is limited to that necessary for control room operation. Cables entering the control room terminate there. Floor trenches provide for cabling access to the operators console and other panels from the upper CSR. Cable trenches are provided with fixed automatic total flooding Halon systems.
D.4. <u>Ventilation</u>	
(a) The products of combustion that need to be removed from 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.	(a) Fire and smoke are automatically isolated in all areas of the auxiliary, radwaste, fuel, and control buildings by the fusible link actuated fire dampers in all rated fire barrier walls or by remote manual operations of area ventilation systems. Each level of the control building can be isolated from the building ventilation system by control switches in the control room. All exhaust fans, with the exception of the control building fans, are centrifugal with the motor located outside of the airstream, thus making them less susceptible to high gas temperatures. The fans are capable of processing air of temperatures at least as high as the fusible link melting temperature (160°F) of the fire dampers. The control building exhaust fans are vaneaxial with the motors located in the process airstream. The fan motor is designed for a minimum 150°F temperature rise. Since the exhaust fans are all downstream of the system filter units, they will not be subject to damage from high temperature particles.

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	The auxiliary building and fuel building can be exhausted by either the normal building system or the emergency (Class IE) system. The control building and reactor building can be exhausted by the normal system which is located remotely to the hazard. The diesel building utilizes the exhaust air flow path, including dampers, as the means of heat and smoke venting. For areas which have a potential for radioactivity, such as the radwaste building, releases will be through normal (or emergency) process points which are monitored for radioactivity releases.
(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.	(b) There are no fans provided specifically for the function of smoke exhaust. The normal and/or emergency exhaust fans may be used for the purpose. This arrangement will limit plant releases through normal process points, thus eliminating inadvertent releases to the environment.
(c) The power supply and controls for mechanical ventilation systems should be run outside the fire area served by the system.	(c) The power cables for exhaust fans are physically separated for Class IE fans. The non-IE exhaust fans for the reactor and control buildings are located in the auxiliary building. The diesel building utilizes the exhaust air flow path, including dampers, as the means of heat and smoke venting and takes no credit for mechanical exhaust. The control cable for isolation dampers may be located within the fire area.
(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."	(d) The charcoal adsorbers are sized for iodine loadings of 2.5 mg/gm. Where this loading may be approached, a low-flow air-bleed system is provided per Regulatory Guide 1.52. In addition, each charcoal adsorber unit is equipped with a high temperature detection system which alarms in the control room and a manually activated water spray system for the charcoal bed.
(e) The fresh air supply intakes to areas containing safety-related equipment or systems should be located remotely 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.	(e) Exhausts from safety-related buildings, except the diesel and control buildings, are through the unit vent. The diesel building takes suction and discharges through a penthouse which has the louvers separated by 34 feet and located on opposite sides of the structure. The control building exhaust is located approximately 30 feet away from the auxiliary building intake. The control building takes its intake air form the auxiliary building intake.

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(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 minimum fire rating of 3 hours and automatic fire doors, at least equal to the enclosure contruction, at each opening into the building. Elevators should not be used during fire emergencies. Where stairwells or elevators cannot be enclosed in 3-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.	(f) Stairwells which serve as escape routes and access routes for fire fighting are enclosed in reinforced masonry towers with a fire rating of 3 hours, including the doors. Elevators are enclosed in reinforced masonry towers with doors rated for 1-1/2 hours, B label. The reactor building elevator and stairs are not enclosed by preestablished escape routes will be used.
(g) Smoke and heat vents may be useful in specific areas such as cable spreading rooms and diesel fuel oil storage areas and switch-gear rooms. When natural-convection ventilation is used, a minimum ration of 1 foot^2 of venting area per 200 foot^2 of floor area should be provided. If forced-convection ventilation is used, 300 CFM should be provided for every 200 foot^2 of floor areas. See NFPA No. 204 for additional guidance or smoke control.	(g) Heat and smoke venting for each diesel generator room is provided by utilizing the exhaust air flow path. The free area of the exhaust air flow path provides at least 1.0 square feet of venting area for each 200 square feet of floor area. Smoke exhaust fans per se are not employed. Normal ventilation exhaust systems are utilized throughout for smoke removal.
(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 hour for the self-contained units. At least two extra air bottles should be located onsite for each self-contained breathing unit. In addition, an onsite 6-hour supply of reserve air should be provided and arranged to permit quick and complete replenishment of exhausted supply air bottles as they are returned. If compressors are used as a source of breathing air, only units approved for breathing air should be used. Special care must be taken to locate the compressor in areas free of dust and contaminants.	(h) Self-contained breathing apparatus, approved by NIOSH will be approved for control room personnel. At least five self-contained breathing apparatus will be available to the control room. A total of 30 man-hours of breathing air will be provided. Refer to the Site Addendum for additional information.
(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.")	(i) Ventilation systems serving areas protected by Halon 1301 are provided with isolation capabilities. The area is isolated either by positive closure dampers or by stopping the ventilation system fan. Closure is initiated automatically upon detector actuation.

D.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:

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(a) Fixed emergency lighting should consist of sealed beam units with individual 8-hour minimum battery power supplies.	(a) Fixed emergency lighting consists 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.	(b) Refer to the Site Addendum.
(c) Fixed emergency communication should use voice powered head sets at pre-selected stations.	(c) Fixed emergency communication is available by use of handset/speaker amplifier sets at preselected stations.
(d) Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage.	(d) Refer to the Site Addendum.

E. Fire Detection and Suppression

E.1. Fire Detection

(a) Fire detection systems should, as a minimum, comply with NFPA 72D, "Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems." Deviations from the requirements of NFPA 72D should be identified and justified.	(a) The fire detection system complies with NFPA 72D-1975 for Class A systems as detailed in 9.5.1.2.2.2 with the following exceptions. Supervision of the fire protection panel will not be the primary function of the plant operator assigned to monitoring the panel. Since there will be few and infrequent signals to this panel, a full-time supervisor is not justified. Supplemental to the requirements of NFPA 72D, Class A, the following provisions will be made: (1) All initiating device circuits (detection circuits) which actuate automatic suppression systems serving safe shutdown areas of the plant will be designed to perform their detection functions in the event of a single break or single ground fault in the circuits. For systems such as Halon extinguishing systems which are actuated by two zones of detection in the same hazard area, each zone is not designed to maintain detection capabilities during a single ground fault or break. Upon generation of a trouble signal in one of the fire detection zones, a trouble alarm will be sent to the control room. In this condition, the system will automatically discharge to Halon on receipt of an alarm signal from the second zone of detection. (2) Upon receipt of a trouble signal on the fire annunciation panel in the control room, a runner will be dispatched immediately to the respective zone to investigate the cause of the trouble signal.

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(b) Fire detection system should be audible and visual alarm and annunciation in the control room. Local audible alarms should also sound at the location of the fire.	(b) The detection system will give audible and visual alarm and annunciation in the control room and locally.
(c) Fire alarms should be distinctive and unique. They should not be capable of being confused with any other plant system alarms.	(c) Fire alarms are distinctive and unique. Horn and bell-type alarms are used in both the control room and locally.
(d) Fire detection and actuation systems should be connected to the plant emergency power supply.	(d) The detection and actuation systems are connected to the non-Class IE dc system which is backed by a battery charger supplied from the plant emergency power supply as described in 9.5.1.2.2.2.
E.2. Fire Protection Water Supply System	Refer to the Site Addendum.
E.3. Water Sprinklers and Hose Standpipe Systems	
(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. Each sprinkler and standpipe system should be equipped with OS&Y (outside screw and yoke) gate valve, or other approved shutoff 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.	(a) The sprinkler systems (both manual and automatic) are supplied from a header which is fed from each end. A separate header, also fed from both ends, is provided for all standpipes except the reactor, communications and RAM Storage buildings. The header arrangement is such that no single failure can impair both the sprinkler systems and the standpipe system. For reactor building system arrangement and single failure discussion, refer to Figure 9.5.1-1 and Section 9.5.1.2. Each sprinkler and standpipe system is equipped with OS&Y gate valves to isolate the system. Individual automatic sprinkler systems are equipped with water flow alarms. Water flow in the standpipe system will be indicated by fire pump annunciation. Where sprinkler systems are required in the vicinity of water-sensitive safe shutdown equipment, preaction-type sprinkler systems are installed. In no case are water extinguishing systems installed such that both safe shutdown trains would be damaged by system discharge or malfunction.
(b) All valves in the fire water systems should be electronically 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.") 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.	(b) Isolation valves for each fixed extinguishing system and each main fire protection system header are electrically supervised with indication to the control room. All other isolation and sectional control valves are locked with breakaway locks in the appropriate position and visually inspected monthly. Refer to the Site Addendum.

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(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."	(c) Automatic water extinguishing systems are designed, constructed, and tested based on NFPA 13-1975 and 15-1973, as applicable.
(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. 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 shutoff valves and pressure reducing devices (if applicable) outside the area.	(d) Interior hose stations are capable of reaching all accessible areas of the plant, including inside the reactor building, with an effective hose stream. In addition, a fire in the immediate vicinity of a hose station can be extinguished, using an adjacent hose station. All hose stations, except the hose stations protecting the diesel generator rooms and cable spreading rooms, are equipped with 75 feet of 1-1/2 inch woven-jacket-lined fire hose and adjustable nozzles. The hose stations protecting the diesel generator rooms and cable spreading rooms are equipped with 100 feet of hose to provide effective coverage for all accessible areas. The hose stations are spaced at not more than 100 feet from an adjacent hose station. Standpipe risers are of at least 4-inch diameter for multiple hose connections. The standpipe system is based on NFPA 14-1974. Hose stations are located outside entrances to normally occupied areas and inside normally occupied and unoccupied areas, where possible. All hose stations are equipped with pressure reducing devices where required by code. Standpipe isolation valves are located outside of safe shutdown equipment areas, where possible.
(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.	(e) Combination spray/straight-stream nozzles are provided for all interior hose stations, except in areas with sensitive electrical equipment. In these areas, nozzles will be class "C" type.
(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).	(f) No foam extinguishing systems are provided in the Callaway Plant power block buildings.
E.4. <u>Halon Suppression Systems</u>	
The use of Halon fire extinguishing agents should, as a minimum, comply with the requirements of NFPA 12A and	Halon extinguishing systems are based on NFPA 12A-1973. Only approved agents are used.

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12B, "Halogentated Fire Extinguishing Agent Systems - Halon 1301 and Halon 1211." Only UL or FM approved agents should be used. In addition to the guidelines of NFPA 12A and 12B, preventative maintenance and testing of the systems, including check weighing of the Halon cylinders should be done at least quarterly. Particular consideration should also be given to: (a) Minimum required Halon concentration and soak time (b) toxicity of Halon (c) toxicity and corrosive characteristics of thermal decomposition products of Halon.	With the exception of the control room cable chase and trench system, each Halon system is capable of attaining a 5-percent minimum concentration. Each system is designed to maintain a 5-percent minimum concentration at the height of the highest combustible material in the hazard area for 10 minutes. The control room cable chase and trench Halon system is capable of attaining an average concentration of 5 percent throughout the protected space. The system actuation is by a cross-zoned, ionization-type detection system. Detection by the first zone alarms locally and in the control room. Detection by both zones will sound a local horn, close required dampers, shut off associated ventilation and/or air conditioning fan motors, and will discharge after a time delay for personnel evacuation. A momentary contact abort switch is provided in each local panel to delay the discharge for evacuation purposes. Each local control panel has a separate key lock switch to disable system controls during maintenance operations. At such times, the system will indicate "trouble" on the annunciator panel in the control room. A 100-percent reserve bank is provided for each Halon system. The control room cable trench and chase Halon system performs as noted above and provides a secondary discharge after a delay of approximately 3 minutes from the start of the initial discharge. The Halon systems will be maintained and tested based on NFPA 12A-1973. The Halon system design and application considered concentration and soak time; toxicity and corrosive characteristics.
E.5. <u>Carbon Dioxide Suppression System</u> The use of carbon dioxide extinguishing systems should as a minimum comply with the requirements of NFPA 12, "Carbon Dioxide Extinguishing Systems."	No carbon dioxide extinguishing systems are used in the Callaway Plant power block buildings.
E.6. <u>Portable Extinguishers</u> Fire extinguishers should be provided in accordance with guidelines of NFPA 10 and 10A, "Portable Fire Extinguishers Installation, Maintenance and Use." Dry chemical extinguishers should be installed with due consideration give to cleanup problems after use and possible adverse effects on equipment installed in the area.	Fire extinguishers are provided based on NFPA 10-1975. (10A has been dropped from the NFPA Codes.) All extinguishers are installed with consideration given to cleanup problems and adverse effects to equipment in the hazard area.

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F. Guidelines for Specific Plant Areas

F.1. Primary and Secondary Containment

(a) Normal Operation

Fire protection requirements for the primary and secondary containment areas should be provided on the basis of specific identified hazards. For example:

- Lubricating oil or hydraulic fluid system for the primary coolant pumps
- Cable tray arrangements and cable penetrations
- Charcoal filters

Fire suppression systems should be provided based on the fire hazards analysis.

Fixed fan suppression capability should be provided for hazards that could jeopardize safe plant shutdown. Automatic sprinklers are preferred.

(a) The lubricating oil system for each reactor coolant pump is provided with enclosures and drip collection pans to contain and drain away from the pump any leakage from this system.

High pressure portions of the lube oil system are totally enclosed with low point drain connections. Low pressure portions of the system are provided with drip pans with low point connections. Remote lube oil fill lines for the upper and lower bearing reservoirs on each reactor coolant pump motor are not protected by drip pans. Due to the design of the fill lines, no lube oil leakage is postulated. All low point connections are piped to a remote oil collection tank (over 300-gallon tank for each two reactor coolant pumps - each pump lube oil system holds 265 gallons of oil) located inside the reactor building. The tanks have level indication and level alarm annunciation in the control room. The tank vent is equipped with a flame arrestor. Refer to Figure 9.5.1-3 for the general arrangement of the oil collection system. The location of cable trays in the vicinity of the reactor coolant pumps is also indicated in Figure 9.5.1-3.

A description of the Class IE cable trays in the vicinity of the reactor coolant pumps is described in Appendix 9.5B.

The cable penetration areas in the reactor building are protected by a remote, manually actuated preaction sprinkler system. A detection system is provided for the Class IE cable trays in the reactor building.

(b) Refueling and Maintenance

Refueling and maintenance operations in containment may introduce additional hazards such as contamination control materials, decontamination supplies, wood planking, temporary wiring, welding and flame cutting (with portable compressed fuel gas supply). Possible fires would not necessarily be in the vicinity of fixed detection and suppression systems.

Management procedures and controls necessary to assure adequate fire protection are discussed in Section 3a.

(Refer to the Site Addendum)

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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.	Standpipes with hose stations and portable fire extinguishers are located to protect all areas with fixed combustible materials.
Adequate self-contained breathing apparati 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.	
F.2. Control Room	
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 rating of 3 hours.	The control room is separated from other areas of the plant by 3-hour-rated walls, floor, and ceiling.
Control room cabinets and consoles are subject to damage from two distinct fire hazards: (a) Fire originating within a cabinet or console: and (b) Exposure fire involving combustibles in the general room area.	
Hose stations adjacent to the control room with portable extinguishers in the control room are acceptable.	Hose stations for the control room are located in the foyer and vestibule area just outside the control room. Portable extinguishers are located within the room. Hose stations are equipped with Class "C" spray nozzles with rubber bumpers. These hose stations permit coverage of the area above the suspended ceiling.
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 firefighting needs, satisfy electrical safety, and minimize physical damage to electrical equipment from hose steam impingement.	
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.	General area products of combustion detectors are provided in the ceiling of the control room and at the ceiling in the area behind the control room proper. Ionization duct detectors are provided in the cabinet area return air duct. In addition, cabinets which contain redundant safe shutdown circuits have detectors installed inside the cabinets. All fire alarms in the plant are alarmed and annunciated in the control room.

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Breathing apparatus for control room operators should be readily available. Control room floors, ceilings, supporting structures and walls, including penetrations and doors, should be designed to a minimum fire rating of 3 hours. All penetration seals should be airtight. 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. 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.	Breathing apparatus are available for control room operators. The control room is separated from adjacent areas by 3-hour-rated walls. The floor and ceiling, including structural steel, are also rated for 3 hours. All penetration seals are relatively airtight. The control building ventilation system is equipped with a smoke detector in the outside air intake. The control of the system for isolation or venting is manual.
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.	Cable trenches in the floor of the control room are provided with fixed automatic total flooding Halon systems.

F.3. Cable Spreading Room

(a) The preferred acceptable methods are:

(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 a type capable of being delivered by a sprinkler or deluge system, such as an Aqueous Film Forming Foam (AFFF).	(1) The cable spreading rooms are protected by an automatic preaction sprinkler system installed in the ceiling of each room. Location of the sprinkler heads considers cable tray sizing and arrangement. Cables are designed to allow wetting down with deluge water without electrical faulting. The sprinkler system is equipped with closed heads.
(2) Manual hoses and portable extinguishers should be provided as backup.	(2) Manual hose stations and portable extinguishers are located in the area for backup protection.
(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 3-hour rated fire wall (refer to NFPA 251 or ASTM E-119 for fire test resistance rating).	(3) The two cable spreading rooms are separated vertically by the control room. A 3-hour fire barrier separates the CSR from adjacent areas. The floor and ceiling are also 3-hour rated.
(4) At least two remote and separate entrances are provided to the room for access by fire brigade personnel; and	(4) Two remote and separate entrances are provided to the room.
(5) Aisle separation provided between tray stacks should be at least 3 feet wide and 8 feet high.	(5) Generally, aisle separation tray stacks is 3 feet wide by 7 feet high.

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	(b) For cable spreading rooms that do not provide divisional cable separation of (a)(3)	(b) Not applicable to Callaway.
	(c) As an alternate to (a)(1) above, automatically initiated gas systems (Halon or CO_2) may be used for primary fire suppression, provided a fixed water system is used as a backup.	(c) Not applicable to Callaway.
	(d) Plants that cannot meet the guidelines of Regulatory Guide 1.75. . . .	(d) Not applicable.
F.4.	Plant Computer Room	
	Safety-related computers should be separated from other areas of the plant by barriers having a minimum 3-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.	The computer is not safety related. The computer room is protected by detectors and an automatic preaction sprinkler system. Manual hose stations and portable extinguishers are provided.
F.5.	Switchgear Rooms	
	Switchgear rooms should be separated from the remainder of the plant by minimum 3-hour rated fire barriers to the extend 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.	Control building switchgear rooms are separated from the remainder of the plant and from each other by a 3-hour barrier. Automatic Halon 1301 extinguishing systems are provided in each ESF switchgear room. The detection system will alarm and annunciate in the control room and locally. Hose stations and portable extinguishers are available in the area.
	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.	Halon 1301 has been demonstrated as an effective suppression agent. The control building switchgear rooms were tested to ensure the design provides adequate containment of the Halon 1301.
F.6.	Remote Safety-Related Panels	
	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.	The areas housing the remote safety-related panels are protected by a detection system which alarms and annunciates locally and in the control room. Combustible materials are controlled and limited to those required for operation. Portable extinguishers and manual hose stations are provided.

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F.7. Station Battery Rooms

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 vol. % hydrogen concentration. Standpipe and hose portable extinguishers should be provided.

Alternatives

(a) Provide a total fire rated barrier enclosure of the battery room complex that exceeds the fire load contained in the room.

(b) Reduce the fire load to be within the fire barrier capability of 1-12 hours.

OR

(c) Provide a remote manual actuated sprinkler system in each room and provide the 1-1/2 hour fire barrier separation.

Battery rooms are separated from each other and from the rest of the plant by 3-hour fire barrier walls, floors, and ceilings. Ventilation systems in the battery rooms are capable of maintaining the hydrogen concentration well below two-volume percent. Portable extinguishers and hose stations are provided.

Portable extinguishers and hose stations are provided in the corridor outside of the rooms.

The battery rooms are served by two systems--the control building supply air system and the Class IE unit. Loss of either or both of these systems will be alarmed in the control room via the plant computer. Each battery room is also provided with a hydrogen detector which will alarm the control room whenever the hydrogen concentration exceeds 1 volume percent in any one of the battery rooms.

The control building supply air system supplies outside air to each of the four dc switchgear rooms. This air is exhausted from the switchgear rooms by means of the control building exhaust system. The supply air system provides approximately 1 air change per hour in each battery room.

Battery rooms 1 and 3 and 2 and 4 are each served by the Class IE ac system. Each battery room is supplied and exhausted separately. The Class IE ac systems each operate in a complete recirculating mode at all times. Since these systems also serve their respective ESF switchgear and dc switchgear rooms, it has been conservatively calculated that with no fresh air the system can operate for approximately 3 days before the hydrogen concentration reaches 3 volume percent.

All ductwork penetrations of the battery rooms are provided with 3-hour fire dampers.

F.8. Turbine Lubrication and Control Oil Storage and Use Areas

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.

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.

The turbine oil system is located in the turbine building which is separated by a 3-hour barrier from buildings housing safe shutdown equipment. Automatic wet sprinklers are provided in the turbine oil reservoir room and turbine oil storage tank room.

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F.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.	The diesel generators are separated from each other and other areas of the plant by fire barriers having a minimum fire resistance of 3 hours The ceiling is an 18-inch-thick concrete slab which is supported by structural steel which has been fireproofed for 3 hours. No safety-related equipment is located above the building's ceiling.
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.	Automatic preaction sprinkler system is provided in each room. Fire detectors are installed in the ceiling of the room. The detectors alarm locally and in the control room. Drainage is provided for firefighting water, and automatic smoke and heat vents are installed in the ceiling.
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 head spray nozzle system(s) (b) Automatic closed head sprinklers (c) Automatic AFFF that is delivered by a sprinkler deluge or spray system (d) Automatic gas system (Halon or CO_2) may be used in lieu of foam or sprinklers to combat diesel generator and/or lubricating oil fires.	Each diesel fuel oil day tank is provided with protection features to preclude the uncontrolled leakage of diesel fuel. The design features provided for the day tank were reviewed and accepted by the NRC at the Wolf Creek Fire Protection Audit of February 6 to 9, 1984. This audit was also applicable to the Callaway Plant.
F.10. Diesel Fuel Oil Storage Areas	
Diesel fuel oil tanks with a capacity greater than 1100 gallons should not be located inside the buildings containing safety-related equipment. They should be located at least 50 feet from any building containing safety-related equipment or, if located within 50 feet, they should be housed in a separate building with construction having a minimum fire resistance rating of 3 hours. Buried tanks are considered as meeting the 3-hour fire resistance requirements. See NFPA 30, "Flammable and Combustible Liquids Code", for additional guidance.	The diesel oil storage tanks are buried approximately 23 feet from the diesel generator building wall.
When located in a separate building, the tank should be protected by an automatic fire suppression system such as AFFF or sprinklers.	
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.	

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F.11. Safety-Related Pumps	
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.	The fire hazards analysis, Appendix 9.5B, indicates that fixed suppression system is not required in the safety-related pump rooms and houses. Early warning fire detection is installed with alarm and annunciation locally and in the control room. Local hose stations and portable extinguishers are provided.
F.12. New Fuel Area	
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.	Hand portable extinguishers and hose stations are located throughout the fuel building. An automatic fire detection system is installed which alarms and annunciates in the control room and locally. Combustibles are limited to a minimum. The storage area is provided with a drainage system to preclude accumulation of water.
The storage configuration of new fuels should always be so maintained as to preclude criticality for any water density that might occur during water application.	New fuel storage is designed for optimum moderation conditions. Refer to Section 9.1.
F.13. Spent Fuel Pool Area	
Protection for the spent fuel pool area should be provided by local hose stations and portable extinguishers. Automatic fire detection should be provided to alarm and annunciate in the control room and to alarm locally.	Local hose stations and portable extinguishers are provided in this area. Automatic fire detection is provided to alarm and annunciate in the control room and locally.
F.14. Radwaste Building	
The radwaste building should be separated from other areas of the plant by fire barriers having at least 3-hour ratings. Automatic sprinklers should be used in all areas where combustible materials are located. Automatic fire protection 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.	The radwaste building is physically separated from the rest of the plant by approximately 100 feet. An automatic sprinkler system is provided over the dry waste compactor. Automatic detection is provided to annunciate the alarm in the control room and locally. The ventilation systems in this building are capable of being isolated. Firefighting water will drain to liquid radwaste building sumps. Portable extinguishers and hose stations are provided throughout the building.
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.	

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F.15.	Decontamination Areas	
	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.	Decontamination areas (laundry decontamination facility) which contain flammable liquids are protected by automatic wet-pipe sprinklers and detectors which alarm locally and in the control room. Portable extinguishers and hose stations are also provided in these areas. The ventilation systems in these areas are capable of being isolated. The access control area of the control building is provided with an automatic wet-pipe sprinkler system.
F.16.	Safety-Related Water Tanks	
	Storage tanks that supply water for safe shutdown should be protected form 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.	Safety-related water tanks are located in areas which contain negligible quantities of combustibles. Also refer to the Site Addendum.
F.17.	Cooling Towers	Refer to the Site Addendum.
F.18.	Miscellaneous Areas	
	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.	Miscellaneous power block areas are located so that a fire or the effects of a fire, including smoke, will not adversely affect any safe shutdown equipment.
G.	Special Protection Guidelines	
G.1.	Welding and Cutting, Acetylene - Oxygen Fuel Gas Systems	
	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.)	Portable extinguishers and hose stations are provided throughout the plant.

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G.2. Storage Areas for Dry Ion Exchange Resins	
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.")	Dry ion exchange resins will not be stored near essential safety-related systems. New resins are received normally in a hydrated form and will not constitute a fire hazard. Only the containers in which the resins are stored are combustible. The spent resins are sluiced to the spent resin storage tank located in the radwaste building, which is not a safety-related building. Administrative controls will ensure that resin in quantities required for immediate use only will be introduced into safety-related areas, and the containers will be hauled away as soon as they are emptied. In addition, detection, portable extinguishers, and hose stations are provided in these areas. Storage areas are provided with drains.
G.3. Hazardous Chemicals	
Hazardous chemicals should be stored and protected in accordance with the reactor commendations of NFPA 49, "Hazardous Chemicals Data." Chemical storage areas should be well ventilated and protected against flooding conditions since some chemicals may react with water to produce ignition.	Hazardous chemicals are stored and protected in accordance with the recommendations of NFPA 49-1975. Storage areas are ventilated and drained.
G.4. Materials Containing Radioactivity	
Materials that collect and contain radioactivity such as spent ion exchange resins, charcoal filters, and HEPA filters should be stored in closed metal 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.	Materials that collect and contain radioactivity are stored in closed metal tanks or containers located in areas free from ignition sources.

Appendix 9.5B - FIRE HAZARDS ANALYSIS

APPENDIX INTRO 9.5B

FIRE HAZARDS ANALYSIS

APPENDIX 9.5B

9.5B.1 INTRODUCTION

This appendix provides a summary of the SNUPPS fire hazards analysis which was performed to ensure that the plant could be maintained in a safe condition following a major fire in any safety-related area of the plant. These analyses were performed to demonstrate that the SNUPPS plants could meet the requirements of 10 CFR 50 Appendix R and provide the associated fire hazards analysis.

Section 9.5.1 and Appendix 9.5A provide detailed information of the design provisions for fire protection, and that information augments the descriptions provided herein. NRC questions on previous revisions of the fire hazards analyses have been formally answered and are contained in Appendices 9.5C and 9.5D. The information contained in the responses to those questions has been incorporated into the text of Section 9.5.1, Appendix 9.5A, Appendix 9.5B, and Appendix 9.5E.

As shown on Figure 9.5.1-2, the safety-related areas of SNUPPS plant have been divided into numbered fire areas. This appendix is arranged by the fire area numbers shown on Figure 9.5.1-2. For each fire area, the following information is provided.

FIRE AREA DESCRIPTION - A definition of location and the rooms contained in the fire area and the major pieces of mechanical equipment.

DESIGN FEATURES - A description of the fire boundary provisions, fire detection and suppression provisions, and fire barrier design provisions.

COMBUSTIBLE LOADING - Classification of the quantity of fixed and expected transient combustibles. The classifications include the following:

Classification	Loading (BTU/sq. ft.)
Low	Less than 80,000
Moderate	80,000 to 159,999
High	160,000 to 239,999
Very High	240,000 and greater

FIRE PROTECTION - A further description of the installed systems and associated provisions such as water removal.

ISOLATION AND SMOKE REMOVAL - A description of the isolation of the fire and the method of smoke removal from the area.

SAFE SHUTDOWN EQUIPMENT - A reference to Table 9.5B-2 for a list of all electrically operated safe shutdown equipment located in the various rooms of the fire area. Table 9.5B-2 provides identification of those devices required for hot standby/hot shutdown and cold shutdown following a fire in the area and other fire areas.

ANALYSIS - A description of the fire suppression systems' (fixed and manual) use and effectiveness in extinguishing a fire and a description of the safe shutdown capability. The safe shutdown capability descriptions are based on the requirements of 10 CFR 50, Appendix R, Paragraph III.G.2 for fire barriers, and suppression and separation of redundant trains.

Adequacy of the design was proven if one shutdown train remained operable when required, or if alternative systems were available to bring the plant to safe shutdown. Changes in the plant design were made as required, based on the analysis results.

The following sections provide additional information on the details and assumptions utilized in the fire hazards analysis for each fire area.

9.5B.2 ASSUMPTIONS ON PLANT CONDITIONS

The following assumptions were made in accordance with 10 CFR 50, Appendix R to define the plant conditions for analysis purposes.

a. Only one fire is postulated to occur at any one time. Multiple fires are not postulated.

b. A design basis accident occurring simultaneously with a fire hazard is not assumed.

c. Extreme environmental phenomena, i.e., earthquake, flood, tornado, etc., occurring simultaneously with fire hazard are not assumed.

d. Failure of plant systems and components required for safe shutdown is not postulated unless that equipment is exposed to the fire. The separation fire barrier, and detection/suppression provisions of Section III.G.2 of Appendix R are assumed to be acceptable means to protect redundant safe shutdown equipment. Random single failures are not postulated in safe shutdown systems; only fire-related failures are evaluated. It should be noted that where automatic fire suppression systems are installed, the fire hazards analysis evaluates the effects of a failure of the automatic systems.

e. Loss of offsite power is assumed to occur simultaneously with the fire. Failure of any of the onsite vital power supplies is not assumed unless it is caused as a direct consequence of a fire.

9.5B.3 FIRE EFFECTS ON ELECTRICAL EQUIPMENT AND SAFE SHUTDOWN INFORMATION

The following discussions provide information on the SNUPPS plant design and nomenclature, the assumed effects of a fire, and the response of certain devices.

a. Redundant safe shutdown mechanical systems are referred to in the analysis as Train A and Train B. Train A is served by electrical separation groups 1 and 3. Train B is served by electrical separation groups 2 and 4. For a further discussion of electrical separation groups discussed in the fire hazards analysis, see FSAR Section 8.3.1.4.

b. The fire hazards analysis includes the effects of a postulated fire hazard on safe shutdown cables, exposed conduits, and instrumentation. Embedded conduits are not considered. Section 8.3.1.4 of the SNUPPS FSAR describes the basis and criteria for the independence of redundant systems.

c. If a fire is postulated to cause a short in a circuit and that circuit is protected by an individual overcurrent protection device, that device is assumed to function to clear the fault without further degradation of the power source.

d. Separation of the devices for nuclear safety-related controls and instrumentation is achieved by physical separation or barriers between separation groups for the same protective function, in accordance with Regulatory Guide 1.75.

9.5B.4 GENERAL INFORMATION ON DESIGN FEATURES

Redundant equipment and circuits required for safe shutdown are also protected against the effects of potential exposure fires. These protection features include fixed fire detection and suppression systems, fire barriers, control of combustibles, and physical separation. The design goal for safety-related areas outside of the containment was to provide the equivalent of a 3-hour-rated fire barrier between redundant trains, as described in 10 CFR 50, Appendix R, Paragraph III.G.2.a. Where this was not possible, credit was taken for the detection and suppression systems installed in the plant, and compliance to the provisions of Appendix R, Paragraphs III.G.2.b and c, was addressed.

In most fire areas, the boundaries are defined by walls, floors, and ceilings. In the reactor building, however, such natural boundaries do not completely enclose localized fire hazards. For the fire areas inside of the containment, the provisions of Appendix R, Paragraphs III.G.2.d, e, and f were addressed.

Where a fire barrier is indicated, penetration seals in the barrier are fire rated for the same or greater time period, unless otherwise indicated.

All areas of the plant protected with water suppression systems have sufficient drainage capacity. All drains throughout the plant drain to their respective building sumps. From there, sump pumps transfer the water to the radwaste system.

Smoke and heat are assumed to be removed from areas affected by a postulated fire by the plant HVAC systems until such time that the fire dampers are actuated. Flexible duct and portable fans would be used to remove the remaining smoke to allow access to the area, as required, for manual fire fighting. The smoke would be removed via the flexible duct to an operable plant exhaust.

Equipment need times used in the fire hazards analysis are not absolute requirements and are listed to demonstrate that adequate time is available for operator action.

Emergency lighting is provided for areas which must be manned for safe shutdown and for access and egress to fire areas. It consists of sealed beam units with individual 8-hour minimum battery power supplies.

9.5B.5 COMBUSTIBLE LOADINGS AND FLAME SPREAD

Combustible loadings were determined for each room in the fire area through a review of design drawings and plant walk-downs. Specific descriptions and quantity of fixed and expected transient combustibles are maintained in the Combustible Loading Information Program (CLIP) in accordance with plant procedure EDP-ZZ-04044. The combustible loading analysis in the Fire Hazards Analysis will be updated when changes are made to the plant which changes the combustible loading classifications for a room.

Although fire hazard effects on exposed conduits have been evaluated for safe shutdown, electric cable inside metal conduit has not been considered as contributing to the fire loading in the hazard areas.

Noncombustible materials are defined to meet one of the following criteria:

a. Material of which no part will burn.

b. Surface materials not over 1/16-inch thick with a flame spread rating of 50 or less as measured by ASTM E 84-1976.

c. Interior finishes which meet a. or are listed by an approved organization for surface flame spread of 25 or less per ASTM E 84-1976 and potential heat release of 3,500 Btu/lb or less per ASTM D 3286-1973.

The combustible loading classifications are based on the total floor area of each room. Unless indicated otherwise, the specific location of combustible material within a room is not a significant factor in the analysis.

A significant amount of the fixed combustibles in the plant is electric cable insulation. In most cases, the specific calorific value for each type and size of cable was used in calculating the maximum heat loading for each fire area.

All safety-related cable in the general plant area is qualified to IEEE 383-1974. All single conductors inside control panels meet the flame resistance requirements of IPCEA S-19-81 or S-61-402.

Lighting, fire protection, communication, and specialty cables which are flame retardant but not qualified to IEEE-383-1974, and other specialty cable such as cords and computer ribbon cable are limited in use by the following matter:

a. Covered with a flame-retardant coating per the requirements of (BTP) APCSB 9.5-1, Appendix A, or

b. Installed in a totally enclosed metal conduit system, or

c. Consist of short lengths of exposed cable between the end of a totally enclosed metal conduit system routed to a component and the connection to the component (e.g., at light fixtures, public-address devices and computer peripherals), or

d. Located in nonsafety-related areas which are separated from safety-related areas by fire-rated boundaries, or

e. Evaluated on a case-by-case basis for adverse impact on the fire protection program.

The quantities of transient combustibles allowed by plant procedures are accounted for in the Combustible Loading Classification. Transient Combustibles are controlled by plant procedure APA-ZZ-00741. This program assures that added combustible loading due to transient material does not exceed an amount that would affect the conclusion of the Fire Hazards Analysis which determines that safe shutdown capability is maintained.

9.5B.6 FIRE HAZARDS REVIEW METHODOLOGY

The SNUPPS fire hazards analysis, originally conducted in 1977, has been updated periodically as the design of the plant has been finalized. The most recent update reflects the as-built condition of the plant. The following descriptions provide details on the methodology utilized in the evaluations performed as required by 10 CFR 50, Appendix R, Paragraph III.G.2.

The safe shutdown design basis, for purposes of this analysis, is the cold shutdown operational mode. If a fire hazard within the plant necessitates the plant being placed in a safe condition, the reactor will first be taken to a hot shutdown condition. An extended

hot shutdown condition prior to achieving a cold shutdown in order to perform repairs or temporary routings, if required, is a stable, safe condition.

To maintain a hot shutdown condition, the following functions need to be accomplished:

a. Circulation of reactor coolant.

b. Removal of decay heat.

c. Boration approximately 24 hours after the start of shutdown.

To achieve cold shutdown conditions, the following functions need to be accomplished:

a. Circulation of reactor coolant.

b. Removal of decay heat and sensible heat.

c. Boration.

d. Depressurization.

The minimum systems required to perform these functions are shown in Table 9.5B-1. A detailed listing of each safe shutdown component is provided in Table 3.11(B)-3. Table 9.5B-2 provides a detailed listing of each safe shutdown component required for fire hazards analyses. This table identifies both hot and cold shutdown equipment, the associated electrical separation group, and the equipment location by room number and fire zone. Table 9.5B-2 also includes devices with circuits which are associated with safe shutdown. Any component with a connection to a circuit of equipment whose spurious operation could adversely affect safe shutdown (e.g., RHR/RCS isolation valves, pressurizer PORVs, steam generator atmospheric dump valves, instrumentation, etc.) is included on the list. These associated circuits were reviewed as if they were redundant safe shutdown items.

The spent fuel pool cooling system (SFPCS) components are listed as being required for safe shutdown for the fire hazards analysis of the fuel building; however, they are neither required for safe shutdown nor are they associated circuits as defined in III.G of Appendix R. They have been included to ensure that repairs are not required for fires in the fuel building. SFPCS component failures resulting from fires in the auxiliary and control buildings are not evaluated in the fire hazards analysis.

FSAR Section 5.4A describes in detail how safe shutdown can be performed with safety-related equipment, and provides a discussion of component redundancies and system diversity for achieving the safe shutdown functions. System and component redundancy for the various support and auxiliary systems is provided in the associated FSAR section.

The power block analysis applies only to the protection of the functions of the safe shutdown equipment and its auxiliary support systems, and includes equipment and systems in the reactor, auxiliary, control, fuel, and diesel buildings, and adjacent areas and buildings. The site-specific safe shutdown equipment is evaluated in the Site Addendum.

The list of safe shutdown components shown on Table 9.5B-2 was provided to electrical design engineers who located all associated circuits through the review of physical drawings and electrical schematics. Each circuit associated with these devices was then flagged as being safe shutdown related (following a fire) in the master electrical raceway routing program/ data base E0580. This program is utilized to route all scheduled cable in the SNUPPS plants. It ensures that train separation is maintained and provides the most direct/suitable routing for circuits.

After the E0580 data base was updated, a special program (Electrical Fire Hazards Analysis Program [EFHAP]) was run to produce a listing of safe shutdown circuits by fire area and room number, and by electrical separation group. This listing also included "from" and "to" information for each circuit. When a safe shutdown incompatibility was determined to exist, a failure modes analysis was performed on the circuit, the physical location(s) of the circuits were evaluated, the availability of an alternate (diverse) shutdown system was identified, and/or the need for a rated fire barrier wrap was evaluated.

The need for a fire wrap was determined based on the installed detection and suppression systems and the physical distance separating the incompatible circuits. A summary of the final evaluation for each area is provided in Section X.X.7.2 of each fire area described in Appendix 9.5B (where "X.X" identifies the fire area).

Since the SNUPPS safety-related circuits are all routed in the design office through the application of computer technology and the EFHAP listings were generated from the base E0580 program, it was been determined that the inclusion of listings of conduit and raceway numbers in the FSAR descriptions of each fire area is inappropriate. These listings would be of no benefit to any FSAR holder or reviewer. The listings would be voluminous and add several hundred pages to the fire hazards analyses.

The results of the evaluations show that safe shutdown of the plant can be accomplished and maintained and that cold shutdown can be achieved and maintained.

The fire hazards analysis summaries for each safety-related area of the plant comprise the remainder of this appendix.

Fire Area A-1 (Ref. Figure 9.5.1-2, Sheet 1)

A.1.1	Fire Area Description	Major Equipment
	Auxiliary building - El. 1974, 1988, general area Rooms 1101 - 1106, 1115, 1120 - 1125, 1128 - 1130, 1201 - 1207, 1329	Letdown heat exchanger and associated piping valves valves and instrumentation reactor makeup makeup water pumps, normal charging pump, CVCS chiller pumps, moderating heat exchanger, letdown reheat heat exchanger, letdown chiller heat exchanger, chiller surge tank, auxiliary building dry waste compactor, CVCS chiller unit, auxiliary steam deaerator feed pumps, auxiliary steam condensate recovery and storage tank, auxiliary building sump pumps, auxiliary feedwater pump room sump and sump pumps

A.1.2 Design Features

This area is separated from all adjacent power block buildings and fire areas by 3-hour fire barriers. The ceiling is a 3-hour-rated barrier. Automatic sprinkler protection is provided in areas of inaccessible cable concentrations as detailed in Table 9.5B-4. The system also provides a water curtain for the steel plate covered hatches in the north and south corridors of elevation 2000 (Fire Area A-8). All dumbwaiter doors are rated for 1-1/2 hours. For a fire to propagate between elevations, it would have to penetrate two doors.

Automatic wet-pipe sprinkler protection and a 20 foot combustible-free separation zone is provided for the auxiliary feedwater pipe chase area (Rooms 1206 and 1207). This sprinkler system is supplied from the Turbine Bldg main header and provides protection to meet the requirements of 10CFR50, Appendix R, for redundant safe shutdown equipment contained in the same fire area.

Three-hour-rated fire barriers separate area A1 from the following rooms containing safe shutdown equipment:

a. Rooms 1116 and 1117 (Fire Area A-3)

b. Rooms 1114 and 1111 (Fire Area A-2)

c. Rooms 1107 and 1109 (Fire Area A-4)

d. Room 1126 (Fire Area A-7)

Stairwells (Fire Areas A-5 and A-6) are separated from this area by 3-hour-rated barriers. All penetrations through fire-rated barriers are fitted with 3-hour penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers. The letdown heat exchanger (Room 1125) and the valve compartment (Room 1124) are enclosed by 18-inch-thick (minimum) concrete walls. Openings are located in these walls, near the ceiling, for venting these rooms in the event of a high-energy pipe break. The normal charging pump room (Room 1115) is enclosed by 2-foot-thick concrete walls and penetrations seals in the North and South walls.

A.1.3 Combustible Loading

Room	Combustible Loading Classification
1101	Low
1102	Low
1105	Low
1115	Low
1120	Low
1121	Low
1122	Low
1123	Low
1124	Low
1128	Low
1129	Low
1130	Low
1201	Low
1202	Low
1203	Low
1204	Low
1205	Low
1206	Low
1207	Low
1103	Low
1104	Low
1106	Low
1125	Low
1329	Low

A.1.4 Fire Protection

An automatic detection system consisting of ionization-type smoke detectors, that alarms locally and in the control room on detection, is installed in this area as detailed in Table 9.5B-3. The control room alarms are zoned for quick and easy identification of the specific trouble area. Manual-pull stations are located at exit doors of this floor.

An automatic preaction-type sprinkler system is installed over inaccessible cable tray concentrations in Rooms 1101, 1102, 1130, and 1122. The design density for the sprinkler system is 0.3 gpm/ft^2. The system flow rate and pressure are based on all nozzles open over the most remote 3,000 square feet of floor area. The system also provides protection for the north and south hatchways at the ceiling of this area (El. 2000'). Sprinklers are located to minimize obstructions with structural steel.

An automatic wet-pipe sprinkler system is installed in the auxiliary feedwater pipe chase area (Rooms 1206 and 1207). The design density for the sprinkler system is 0.2 gpm/ft^2. System flow rate and pressure are based on all upright sprinkler heads open over the most remote 1500 square foot floor area. A 20 foot combustible-free separation zone is also provided in conjunction with automatic detection in order to meet safe shutdown requirements for redundant auxiliary feedwater equipment and circuits within this area.

Hose stations and portable extinguishers are located throughout the area (See Figure 9.5.1-2, Sheet 1). Access to this area for manual fire fighting is available as follows:

a. Stairwell 4101 from the turbine building.

b. Stairwell 1119 at the south end from El. 2000'-0".

c. Stairwell 1127 at the north end from El. 2000'-0".

d. Additional access is available from the control building, if required.

The alarms associated with the fire protection system are shown below:

		Local	Remote (control room)
a.	Detection by ionization detectors	X	X
b.	Sprinkler deluge valve tripped, or Waterflow in sprinkler system (Aux Feed Pipe Chase)	X	X
c.	Sprinkler trouble alarms on loss of power or low air pressure		X

		Local	Remote (control room)
d.	Isolation valve on the supply line not fully open		X

One 4-inch drain per 1,000 square feet of floor area is provided throughout this fire area. The floor drains are piped to the auxiliary building sump. Sump pumps pump the drainage in the sump to a drain tank in the radwaste building.

A.1.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers until extinguished. Fire dampers will isolate the HVAC ducts from the other areas of the building.

Smoke can be removed by portable fans and flexible ducts to the turbine building or through the stairwell to the other areas of the auxiliary building, and then exhausted by the normal ventilation system in the adjoining areas.

A.1.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.1.7 Analysis

A.1.7.1 Fire Suppression

The automatic detection system will provide an early warning of a fire in this area. Hose stations or portable extinguishers can be used to suppress the fire. The automatic sprinkler system installed over the cable trays will actuate to control a fire below and to assist the fire brigade by keeping the environment cool. The wet-pipe sprinkler system installed in the Aux Feedwater Pipe Chase will control a fire in this area. The sprinkler actuation or a malfunction will be identified by the alarms described in A.1.4. In the event of a failure of the automatic system, the fire can be extinguished manually, using hose stations and/or portable extinguishers. Adequate floor drains are provided to remove the fire suppression system discharge.

A.1.7.2 Safe Shutdown Capability

Redundant safe shutdown circuits in Rooms 1101, 1120, 1121, and 1122 of this area are protected by preaction sprinkler systems. One train of centrifugal charging is assured for hot shutdown for a fire in the west corridor (Room 1101) due to at least 35 feet of separation, suppression, and detection. Local damage to the RHR system which is required for cold shutdown can be circumvented by manually realigning valves BN-HV-8812A, EJ-HV-8701A, and BB-PV-8702A. Similarly, for a fire in Room 1121, during RHR initiation for cold shutdown, valve EJ-HV-8701B may have to be manually opened.

Room 1128 contains circuits for both motor-driven auxiliary feedwater pumps; however, the turbine-driven auxiliary feedwater pump is not affected by a fire in this area and will be available to bring the plant to a safe shutdown. Additionally it is highly unlikely that both motor-driven pumps could be affected by the same fire, since the circuits are contained in Separation Group 1 and 4 trays which are routed vertically along the west wall. These are 9-inch trays, and the minimum horizontal separation between them is 19 feet. No other safe shutdown equipment, trays, or exposed conduits are located in this room. A sump with two sump pumps is located along the east wall of this room. Traffic to the other areas of the plant cannot pass through this zone. Rooms 1128 and 1129 are used as maintenance tool storage and contaminated spare parts storage areas with a very low combustible loading. There is no continuity of combustibles between the Group 1 and 4 trays.

An ionization-type smoke detector is installed over the Groups 1 and 4 trays in this room. The detector will alarm locally and in the control room in the event of a fire in the trays, in the tool storage fixed combustibles or a transient fire. The control room alarm is zoned for easy identification of the trouble area. A portable extinguisher is located within the room. Another portable extinguisher is located just outside the room. This room is within the reach of hose stations in Room 1122 (see Figure 9.5.1-2).

Also in Fire Area A-1 and located directly above Rooms 1128 and 1129 are Rooms 1206 and 1207, respectively, which may be accessed from 1129 by ladder. The floor opening is covered by a steel security hatch. Rooms 1206 and 1207 contain circuits associated with both motor-driven auxiliary feedwater pumps (AFWPs), the suction valves to all three AFWPs, and the condensate storage tank level transmitters which switch the suction source to ESW on low CST level.

A 20 foot combustible-free separation zone is provided between the turbine-driven AFWP suction valve AL-HV-32 (Train A ESW supply to TDAFP) and ESW supply to motor driven auxiliary feedwater pumps supply valves and associated circuits. Automatic wet-pipe sprinkler protection and fire detection are provided along with the 20 foot separation, and a 1-hour fire wrap exists on AL-HV-32 conduits in Room 1206 and the 20 foot separation zone, to ensure that one train of auxiliary feedwater, required to achieve and maintain hot shutdown per 10CFR50 Appendix R, is preserved in the event of a fire in this area.

Since Rooms 1206 and 1207 have a very low quantity of installed and transient combustibles and detection is provided, a damaging fire is highly unlikely. Failure of two of three CST pressure transmitters could cause a false low pressure signal and the closure of the three associated valves (AL-HV-34, 35, and 36). If a fire were to occur such that AL-HV-32 was also lost, the preventive measures described above would ensure that Train B MDAFP was preserved along with the Train A MDAFP ESW supply. Failure of all three CST supply pressure transmitters could occur such that a low CST suction pressure signal is not received upon a low CST level. In this case, the pressure transmitters at the suction of each auxiliary feedwater pump remain available to alarm in the Control Room and Train B MDAFP is available and supplied from Train B ESW supply. If a fire were to occur in the area such that all Train B ESW supplies were lost along with the Train A MDAFP ESW supply, Train A ESW supply to the TDAFP via AL-HV-32 would be preserved. In all cases, safe shutdown capability would be assured for a fire in this area.

Fire Area A-1 also includes the piping mezzanine area at elevation 1988 (Rooms 1203 and 1204). These rooms contain no hot standby circuits and are a high radiation zone (Zone E). As noted in Section 9.5.1.2.2.3, these rooms are well separated from the remainder of Fire Area A-1. These rooms contain encapsulated containment sumps isolation valves for RHR and containment spray. Due to the high radiation area and the very low quantity of combustibles, smoke detection is not provided. Fires originating in this area are not credibly postulated. However, should a damaging fire be considered, manual opening of valve BB-PV-8702A may be required to take suction from the RCS hot leg when going to cold shutdown. Circuit failures associated with the RHR and containment spray system sump isolation valves will not cause the valves to spuriously open. A fire in this area will not prevent safe shutdown.

In summary, a fire in any portion of Fire Area A-1 will not prevent safe shutdown of the plant.

Fire Area A-2 (Ref. Figure 9.5.1-2, Sheet 1)

A.2.1 Fire Area Description	Major Equipment
Auxiliary building safety-related pump area Rooms 1111, 1112, 1113, 1114	Centrifugal charging pump, safety-injection pump, RHR pump, containment spray pump, coolers for the above pump rooms, RHR room sump pumps, and auxiliary lube oil pump for the centrifugal charging pump

A.2.2 Design Features

The fire area is separated from all adjoining areas by 3-hour-rated barriers. All penetrations through fire-rated barriers are fitted with 3-hour fire-rated penetration seals. Ducts penetrating the fire barriers are provided with 3-hour fire dampers. The centrifugal charging pump room, Room 1114, is separated from the safety-injection pump room, Room 1113, by a 2-foot-thick concrete wall with a 3 foot 4 inch x 7 foot 2 inch accessway.

The RHR pump room, Room 1111, is separated from the other rooms by 2-foot-thick concrete walls. A 3-hour fire door is provided for access to this room from Room 1112.

A.2.3 Combustible Loading

A.2.3.1 Fixed Combustibles

Room	Combustible Loading Classification
1111	Low
1112	Low
1113	Low
1114	Low

A.2.4 Fire Protection

Ionization-type detectors are installed in each room. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Indicating lights installed outside the rooms in the adjoining corridor aid further in the location of the trouble area. Manual-pull fire alarm stations are located near the exit doorways for this elevation. The pull stations alarm locally and in the control room on actuation. Hose stations and portable extinguishers are located in Rooms 1101 and 1122 (corridors) (see Figure 9.5.1-2, Sheet 1). Access to Room 1112 is from Room 1121 (corridor) through a watertight door. Access to Room 1111 is from

Room 1112 through a 3-hour-rated fire door. Access to Rooms 1113 and 1114 is from Room 1101 through a watertight door.

Rooms 1113 and 1114 have two 4-inch floor drains per room. There is one 4-inch floor drain in Rooms 1111 and 1112. A sump with two sump pumps is located in Room 1111. The floor drains are piped to this sump. The pumps empty the sump to a drain tank in the radwaste building.

A.2.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to adjoining corridors or to the turbine building.

A.2.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.2.7 Analysis

A.2.7.1 Fire Suppression

This area is protected from a fire in adjacent areas by 3-hour barriers. A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. A fire in this area will be contained by the fire barriers, until extinguished manually. Adequate drainage is provided in each room to drain away the fire-fighting water. The watertight doors will protect the safe shutdown equipment from damage by water discharge from extinguishing systems in the adjacent areas.

A.2.7.2 Safe Shutdown Capability

This area contains only Train A hot standby and cold shutdown equipment. The redundant Train B equipment and circuits are separated from this area by 3-hour fire barriers. Hot standby capabilities are assured through the use of centrifugal charging Train B. For a fire in Room 1111 and subsequent cold shutdown using RHR Train B, manual closing of valve BN-HV-8812B and opening of EJ-HV-8701B may be required to provide a suction source from the RCS hot leg through valves BB-PV-8702B and EJ-HV-8701B. This is due to the potential failure of a Train A interlock from the position

switch associated with valve BN-HV-8812B which could prevent the remote opening of EJ-HV-8701B.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-3 (Ref. Figures 9.5.1-2, Sheets 1 and 3)

A.3.1	Fire Area Description	Major Equipment
	Boric acid tank rooms Rooms 1116, 1117, 1407	Boric acid tanks and transfer pumps, unit heaters, boric acid batching tank, boron injection makeup pump, and piping and valves. None are required for safe shutdown following a fire.

A.3.2 Design Features

This fire area is separated from all adjacent areas by 3-hour-rated fire barriers. The fire area extends from Elevation 1974 to the floor slab of Elevation 2047 feet - 6 inches. The ceiling is a 3-hour-rated barrier. Room 1116 houses the Separation Group 4 boric acid tank and transfer pump. The corresponding Separation Group 1 equipment is located in Room 1117. Rooms 1116 and 1117 are separated by a 6-foot-high, 12-inch-thick concrete barrier wall with no openings, which acts as a radiant heat shield. The redundant transfer pumps are located approximately 4 feet away from the barrier wall. A 6-foot-wide platform extending from the east to the west fire barrier is located at Elevation 2013. Steps are provided to Elevation 2026 from the platform with an intermediate landing at Elevation 2015 feet - 3 inches. The boric acid batching tank and the boron injection makeup pumps are located on steel grating above Elevation 2026.

A.3.3 Combustible Loading

Room	Combustible Loading Classification
1407	Low
1116	Low
1117	Low

A.3.4 Fire Protection

One ionization-type smoke detector is installed under the Elevation 2026 slab in Room 1116 and Room 1117. One infrared flame detector is installed on either side of the 6-foot-high barrier wall to provide early warning of a fire at the floor elevation. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. An indicating light is installed outside the rooms in Room 1101 to identify the trouble area. Manual-pull stations located at the exit doors on this floor can also provide warning in the event of a fire.

A hose station and one portable extinguisher are located in the corridor (Room 1101), outside Room 1116, and in Room 1122 (see Figure 9.5.1-2, Sheet 1). For fighting a fire from the platform or at Room 1407, the hose stations in Room 1408 can be used (see Figure 9.5.1-2, Sheet 3). Additional hose lengths can be added (if required) for manual

fire fighting above the boric acid tanks. Access for manual fire fighting at the floor elevation is from Room 1122 for Room 1117 and from Room 1101 for Room 1116. For access to Rooms 1101 and 1122, see Fire Area A-1. Access to Room 1407 and the platform is from Room 1408. For a description of access to Room 1408, see Fire Area A-16.

A 4-inch floor drain is provided in each room. The floor drains are located 10 feet away from the barrier wall. The floor drains discharge to a sump located in the corridor area. Two sump pumps are provided to pump the sump water to a drain tank in the radwaste building.

A.3.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. The barrier wall will protect one room from a floor fire in the other. Fire dampers will isolate the HVAC ducts penetrating the fire barriers. Portable fans and flexible ducting can be used to remove smoke to the turbine building or to the corridors outside this area.

A.3.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.3.7 Analysis

A.3.7.1 Fire Suppression

Due to the fire barrier separation, a fire in one of the adjacent areas cannot damage the equipment in this area. A fire in one of the rooms at Elevation 1974 will be detected and alarmed by the flame detectors and/or smoke detectors. The fire can be extinguished manually, using the hose stations and/or the portable extinguishers. A fire in this area will be contained by the fire barriers until extinguished. The combustible loading is very low. Since the floor on either side of the barrier slopes to drains in the middle of each room, any transient combustible spill (such as lube oil) will flow away from the barrier wall.

Since there is no equipment requiring maintenance in the vicinity of the platform, introduction of transient combustibles in such quantities as to cause fire damage at this elevation is unlikely. A fire in the cable tray will be detected and alarmed by the ionization detector located in this zone. The fire can be extinguished from the platform (or the steps leading to the platform) by manual hose stream brought in from Room 1408.

A fire in Room 1407 will be detected and alarmed by the detectors in the ceiling. The fire can be extinguished manually by hose stream brought in from Room 1408. The floor drains in Rooms 1116 and 1117 are adequate to drain the fire fighting water. The floor slopes away from the access doors and barrier walls to the floor drains in the corridor in these rooms. Therefore, an extinguishing system discharge in one of the adjacent areas will not damage the equipment within this fire area.

A.3.7.2 Safe Shutdown Capability

The equipment installed in this area is not required for safe shutdown following a fire. Although the boric acid tanks and transfer pumps could be used as a source of borated water for the centrifugal charging pumps and RHR pumps, the RWST source will be available for hot standby and cold shutdown following a fire.

Circuits routed through this area are associated with component cooling water and essential service water Train A. Circuits for Train B of these systems are not present in the fire area.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-4 (Ref. Figure 9.5.1-2, Sheet 1)

A.4.1 Fire Area Description	Major Equipment
Auxiliary building safety-related pump area Rooms 1107, 1108, 1109, 1110	Centrifugal charging pump, safety-injection pump, RHR pump, containment spray pump, coolers for the above pump rooms, RHR room sump pumps, auxiliary lube oil pump, valves, and piping for the centrifugal charging pump

A.4.2 Design Features

The fire area is separated from all adjoining areas by 3-hour-rated barriers. All penetrations through fire-rated barriers are fitted with 3-hour fire-rated penetration seals. Ducts penetrating the fire barriers are provided with 3-hour fire dampers. The centrifugal charging pump room, Room 1107, is separated from the safety-injection pump room, Room 1108, by a 2-foot-thick concrete wall with a 3 foot 4 inch x 7 foot 2 inch accessway. The RHR pump room, Room 1109, is separated from the other rooms by a 2-foot-thick concrete wall. A 3-hour fire door is provided for access to this room from Room 1110.

A.4.3 Combustible Loading

A.4.3.1 Fixed Combustibles

Room	Combustible Loading Classification
1107	Low
1108	Low
1109	Low
1110	Low

A.4.4 Fire Protection

Ionization-type detectors are installed in each room. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Indicating lights installed outside the rooms in the adjoining corridor provide further aid in locating the trouble area. Manual-pull fire alarm stations are located near the exit doorways for this elevation. The pull stations alarm locally and in the control room on actuation. Hose stations and portable extinguishers are located in Rooms 1120 and 1121 (corridors) (see Figure 9.5.1-2, Sheet 1). A hose station and a portable extinguisher are located in Room 1101. Access to Room 1110 is from Room 1121 (corridor) through a watertight door. Access to Room 1109 is from Room 1110

through a 3-hour fire-rated door. Access to Rooms 1107 and 1108 is from Room 1101 through a watertight door.

Rooms 1107 and 1108 have two 4-inch floor drains each. There is one 4-inch floor drain in Rooms 1110 and 1109. A sump with two sump pumps is located in Room 1109. The floor drains are piped to this sump. The pumps empty the sump to a drain tank in the radwaste building.

A.4.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to adjoining corridors or to the turbine building.

A.4.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.4.7 Analysis

A.4.7.1 Fire Suppression

This area is protected from the spread of fire from adjacent areas by 3-hour-rated fire barriers. A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. A fire in this area will be contained by the fire barriers until extinguished manually. Adequate drainage is provided in each room to remove the fire-fighting water. The watertight doors will protect the safe shutdown equipment from damage by water discharge from extinguishing systems in the adjacent areas.

A.4.7.2 Safe Shutdown Capability

This area contains only Train B (Separation Group 4) hot standby and cold shutdown equipment. The redundant Train A equipment and circuits are separated by 3-hour-rated fire barriers.

For a fire in Room 1108 and subsequent cold shutdown using RHR Train A, manual closing of valve BN-HV-8812A and opening of BB-PV-8702A may be required to provide a suction source from the RCS hot leg through valves BB-PV-8702A and EJ-HV-8701A. This is due to the potential failure of a Train B interlock from the position switch

associated with valve BN-HV-8812A which could prevent the remote opening of BB-PV-8702A.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-5 (Ref. Figures 9.5.1-2, Sheets 1-4)

A.5.1 Fire Area Description

Auxiliary building stairway and elevator (south)
Room 1119

Major Equipment

Electric cable

A.5.2 Design Features

The stairway is enclosed by 3-hour-rated fire barriers.

All of the stairway doors are also fire rated for 3 hours. The elevator is isolated from the rest of the plant by 2-hour-rated fire barriers. Each elevator door is rated for 1-1/2 hours, in accordance with the industry standard.

A.5.3 Combustible Loading

Room	Combustible Loading Classification
1119	Low
1601	Low

A.5.4 Fire Protection

An ionization-type detector is installed at the ceiling of the stairwell. Smoke detectors are installed at the elevator lobby on each floor. The detectors alarm locally and in the control room. Manual-pull stations are located near the exit doors on each floor. Hose stations and portable extinguishers are located outside the stairway on each floor.

A.5.5 Isolation and Smoke Removal

A fire in the stairway or elevator will be confined by the fire barriers. Smoke can be removed by portable fans and flexible ducting to outside the auxiliary building.

A.5.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.5.7 Analysis

A.5.7.1 Fire Suppression

The stairwell and elevator will be protected from a fire in the adjoining areas by the fire-rated barriers. A fire in the stairway will be detected and alarmed by the ionization detector. The fire will be contained by the fire-rated barrier until extinguished manually, using the hose stations and/or portable extinguishers. There is no equipment susceptible to water damage in this area.

A.5.7.2 Safe Shutdown Capability

Circuits for valves BB-HV-8157A and B are located in this area. If both of these valves were to fail in the closed position, letdown through the excess letdown path to the PRT would be unavailable. However, if letdown were required to allow for addition of borated water from the RWST to maintain extended hot standby or to borate to cold shutdown concentrations, the alternate path of letdown to the PRT through the pressurizer PORVs is available.

A fire in this area will not prevent a safe shutdown of the plant.

Fire Area A-6 (Ref. Figures 9.5.1-2, Sheets 1 Through 4)

A.6.1 Fire Area Description

Auxiliary building stairway (north)
Room 1127

Major Equipment

Electric cable

A.6.2 Design Features

The stairway is separated from the rest of the plant by 3-hour-rated fire barriers.

A.6.3 Combustible Loading

Room	Combustible Loading Classification
1127	Low

A.6.4 Fire Protection

An ionization-type smoke detector is installed at the ceiling of the stairway tower. The automatic detection system will alarm locally and in the control room. Hose stations and portable extinguishers are located outside the stairwell on each floor.

A.6.5 Isolation and Smoke Removal

A fire in the stairway will be contained by the fire barriers until extinguished. Smoke can be vented to the turbine building or to outside the building by portable fans and flexible ducting.

A.6.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.6.7 Analysis

A.6.7.1 Fire Suppression

The fire barriers will protect the stairwell from a fire in the adjacent areas. A fire in the stairway will be detected and alarmed by the ionization detector. The fire can be extinguished manually, using the hose stations and portable extinguishers located at

each floor. A fire within the stairway will be contained by the fire barriers until extinguished.

A.6.7.2 Safe Shutdown Capability

Circuits associated with all three auxiliary feedwater pumps (AFWPs) are routed through this stairwell. Therefore, to ensure the operability of the Train A motor-driven AFWP with a CST suction source, two cable trays have been wrapped with a 3-hour barrier.

Steam generators B and C will remain available for decay heat removal.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-7 (Ref. Figure 9.5.1-2, Sheet 1)

A.7.1 Fire Area Description

Boron injection room

Major Equipment

Boron injection piping and valves

A.7.2 Design Features

This fire area is separated from all adjoining areas by 3-hour fire-rated barriers.

All penetrations through the fire barriers are fitted with 3-hour fire penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

A.7.3 Combustible Loading

Room	Combustible Loading Classification
1126	Low

A.7.4 Fire Protection

An ionization-type smoke detector is installed at the ceiling of this area. The detector will alarm locally and in the control room. A manual-pull station is provided in the corridor adjacent to the watertight door. A hose station and two portable extinguishers are located in Room 1122 (corridor), adjacent to the access door. Access to this area is from Room 1122 through a watertight door. For access to Room 1122, see Fire Area A-1. One 4-inch floor drain with a sealed cover (to prevent back flooding) is located in this area. The drain is piped to the auxiliary building floor drain sump; however, it would not be available during a fire. Fire-fighting water would drain from the room through the open door and into the auxiliary building sump. Pumps installed in the sump drain the water to a drain tank in the radwaste building.

A.7.5 Isolation and Smoke Removal

The fire barriers will contain a fire within the area until extinguished. The HVAC ducts will be isolated by the fire dampers. Smoke can be vented either to the turbine building or to adjacent areas of the auxiliary building by portable fans and flexible ducting. The turbine building or auxiliary building normal ventilating system can be used to exhaust the smoke.

A.7.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.7.7 Analysis

A.7.7.1 Fire Suppression

The fire barriers protect the components within the area from a fire in the adjacent areas. A fire in this area will be detected and alarmed by the ionization detector. The fire can be extinguished manually, using the hose station and/or portable extinguishers located outside the area. The watertight door will protect the equipment in this area against damage from a fire suppression system discharge in the adjacent area.

A.7.7.2 Safe Shutdown Capability

The redundant safe shutdown equipment and circuits in this area are associated with the secondary boration flow path. A diverse, redundant means of boration from the RWST and charging pumps through the normal charging path or through the RCP seals is located outside of this area and would be available for safe shutdown.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-8 (Ref. Figure 9.5.1-2, Sheet 2)

A.8.1	Fire Area Description	Major Equipment
	Auxiliary building - El. 2000, general area Rooms 1301, 1302, 1306, 1307, 1308, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321	Volume control tank and associated piping and valves, seal water heat exchanger and associated piping and valves, containment spray additive tank, reactor coolant filter, seal water return filter, seal water injection filters (2), and boric acid filters, boron thermal regeneration demineralizers (5), cation bed demineralizer and mixed bed demineralizers (2), resin charging tank, ground floor fan coil unit, auxiliary building sampling panel, and load center

A.8.2 Design Features

This area is separated from all adjacent power block buildings by 3-hour-rated fire barriers. There are three missile doors, as discussed in Section 9.5.1.2.2.3, in this fire area. They separate this fire area from the 1) outside environment, 2) laundry decontamination facility, and 3) turbine building. The floor and ceiling are 3-hour-rated fire barriers. There are two equipment hatchways (north and south ends) with steel plate covers. An automatic sprinkler system is installed around these hatchways to provide a water curtain. At the center of this area there are two adjacent hatchways provided above the RHR and containment spray valve encapsulation tanks located on elevation 1988'-0". These two hatchways are covered with steel checker plate. The major portion of the cover will only be removed when repair/maintenance work is performed on the encapsulated valves.

Small vent valves are located in the curbed area surrounding the hatchways.

These hatch covers are only provided for separation of Fire Zones A-1 and A-8 from a fire in Zone A-8. Fires are not postulated in Rooms 1203 and 1204 because there are a very low quantity of combustibles and the rooms are well separated from the remainder of Fire Area A-1. Three-hour-rated fire barriers separate this area from the following rooms containing safe shutdown equipment:

a.	Room 1309	(Fire Area A-9)
b.	Room 1310	(Fire Area A-10)
c.	Room 1322	(Fire Area A-25)
d.	Room 1323	(Fire Area A-24)

e. Rooms 1116 and 1117 (Fire Area A-3)

The stairwells (Fire Areas A-5 and A-6) are separated from this area by 3-hour-rated barriers. All penetrations through fire-rated barriers are fitted wth 3-hour-rated penetration seals. Three-hour-rated fire dampers are installed in all HVAC ducting penetrating the fire barriers. The volume control tank room is separated from adjacent rooms by heavy concrete walls and a 3-hour-rated floor and ceiling. Personnel access to the room is through a labyrinth opening with no door. The seal water heat exchanger in Room 1317 is enclosed by heavy concrete walls. The floor and ceiling are 3-hour-rated fire barriers. Access to this room is through Room 1316.

Access to the volume control tank room is from Room 1320 through a door in Room 1318 and a labyrinth opening (Refer to Figure 9.5.1-2, Sheet 2). The volume control tank room, Room 1313, has the tank, piping, and two exposed conduits routed east-west 18 feet above the floor. The adjoining valve compartment, Room 1318, has two motor-operated valves, piping, manual valves, and five exposed conduits. Since access from Room 1320 (corridor) is limited to these two rooms, the transient combustibles introduced into these rooms will be those required for maintenance of equipment located in these rooms. Any cutting or welding operation will be administratively controlled. The low quantity of transient combustibles introduced into these rooms will not likely produce enough heat, in the event of a fire, to damage the tank, piping, and valves.

The seal water heat exchanger in Room 1317 is separated by heavy concrete walls and a 3-hour-rated ceiling and floor.

Access to the seal water heat exchanger room is from Room 1315 (corridor) through a 3-hour door in Room 1316. Room 1317 is separated by a heavy concrete partition wall from Room 1316 (See Figure 9.5.1-2, Sheet 2). Room 1317 has seal water heat exchanger and piping while Room 1316 has piping and manual valves. The fixed combustible loading is, therefore very low. Since access from the corridor is limited to these rooms only, the transient combustibles introduced into these rooms will likely be limited to those required for maintenance of equipment in these rooms. Consequently, a fire in these rooms will not burn with enough severity to damage the seal water heat exchanger.

The seal water heat exchanger is in the secondary letdown path. The primary letdown through the letdown heat exchanger is totally removed from these rooms. The letdown path is not required for safe shutdown of the plant.

All dumbwaiter doors are rated for 1-1/2 hours. For a fire to propagate between elevations, it would have to penetrate two doors.

A.8.3 Combustible Loading

Room	Combustible Loading Classification
1301	Moderate
1302	Low
1306	Low
1307A	Low
1307B	Low
1308	Low
1311	Low
1312	Low
1313	Low
1314	Low
1315	Low
1316	Low
1317	Low
1318	Low
1319	Low
1320	Low
1321	Low

A.8.4 Fire Protection

An automatic detection system, consisting of ionization-type smoke detectors that alarm locally and in the control room on detection, is installed in areas of high combustible loading as described in Table 9.5B-3. The control room alarms are zoned for quick and easy identification of the specific trouble area. Manual-pull stations are located at the exit doors of this floor.

An automatic preaction sprinkler system is installed over cable tray concentrations in Rooms 1301, 1314, and 1320 as described in Table 9.5B-4. In the west corridor (Room 1301), additional sprinkler heads are provided below the cable tray elevation between columns A-2 and A-4. These additional sprinkler heads are provided to protect the cable trays from a fire located on the floor. This area contains three racks of cable trays and other obstructions which may reduce the effectiveness of the ceiling-mounted sprinklers in controlling a floor level fire. The design density for the sprinkler system is 0.3 gpm/ft^2. The system flow rate and pressure is based on a single level nozzle open over the most remote 3,000 square feet of floor area. The system also provides protection for the hatchways at the ceiling of this area located at the north and south ends of the building. The hatches at the center of the building are protected as detailed in Section 9.5.1.2.2.3. Hose stations and portable extinguishers are located throughout the area (See

Figure 9.5.1-2, Sheet 2). Access to this area for manual fire fighting is available as follows:

a. Stairwell 4101 from the turbine building.

b. Stairwell 1119 (at the south end) from outside and other buildings.

c. Stairwell 1127 (at the north end) from other elevations of the auxiliary building.

d. Doors (at the south end) of Room 1301 from outside.

e. Access to Room 1313 (volume control tank room) is through Room 1318 and Room 1320 (corridor).

f. Access to Room 1317 is from Room 1315 and Room 1316.

The alarms associated with the fire protection system are shown below:

		Local	Remote (control room)
a.	Detection by ionization detectors	X	X
b.	Sprinkler deluge valve tripped		X
c.	Sprinkler trouble alarms on loss of power or low air pressure		X
d.	Isolation valve on the supply line not fully open		X

One 4-inch drain per 1,000 square feet of floor area is provided throughout this fire area. Rooms 1313, 1318, 1317, 1316, 1311, and 1312 have one 4-inch floor drain per room. The floor drains are piped to the auxiliary building sump located in El. 1974. Sump pumps pump the drainage in the sump to a drain tank in the radwaste building.

A.8.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers until extinguished. The fire dampers will isolate the HVAC ducts from this area. Smoke can be vented to the outside by portable fans and flexible ducting. Smoke can also be vented to the turbine building from where it will be exhausted by the normal turbine building ventilation system.

A.8.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.8.7 Analysis

A.8.7.1 Fire Suppression

The ionization detection system installed in areas of high combustible loading will provide early warning of a fire. Due to negligible combustible loading, detectors are not installed in the rooms where the CVCS demineralizers, filters, volume control tank, and seal water heat exchanger are located. Hose stations and/or portable extinguishers can be used to extinguish a fire in these areas. The preaction sprinkler system installed over the cable tray concentration will actuate to control a fire below and keep the area cool for fire brigade entry. The sprinkler actuation or malfunction will be identified by the alarms described in A.8.4. In the event of a failure of the automatic system, the fire can be extinguished manually using hose stations. Adequate floor drains are provided to remove the fire suppression system discharge. There is no safe shutdown equipment susceptible to water damage in this area.

The volume control tank in Room 1313 is enclosed by concrete walls of adequate thickness to prevent damage from a fire in the adjacent areas. A water inventory is maintained within the tank at all times. The combustible loading in this area is low. Therefore, a fire in this room will not damage the tank.

The seal water heat exchanger is enclosed by concrete walls of adequate thickness to preclude any damage from a fire in the adjacent areas. The combustible loading is low. Therefore, a fire in this room will not damage the heat exchanger. The seal water heat exchanger is not required for safe shutdown of the plant.

The new resin for the demineralizers in Room 1319 will be brought in through the south end of the corridor and transported up to El. 2026 by the elevator in the south end. The new resin will be in a hydrated form and, therefore, does not ignite or sustain combustion easily. The demineralizers will be charged with new resin from the resin hopper in Room 1307 above Room 1319. The resin hopper is filled through a penetration in the floor above on El. 2026, Room 1405. The demineralizers are ASME pressure vessels filled with water. Spent resin in the demineralizers is sluiced and piped to a spent resin storage tank located in the radwaste building. Consequently, the resin in the demineralizers do not pose a fire hazard.

The spent cartridges in the CVCS filters in Room 1302 will be transferred to a 55-gallon drum, sealed, and when full transported to the Radwaste Building for storage/ processing. Administrative controls will ensure that only new cartridges in quantities required for immediate use will be brought into this area and the containers hauled away as soon as they are emptied. The demineralizers and filters are not required for a safe shutdown of the plant. These rooms are within reach of hose stations located in Rooms 1301 and 1314. Portable extinguishers are also available in these rooms for manual fire suppression.

A.8.7.2 Safe Shutdown Capability

Redundant safe shutdown circuits in Rooms 1301, 1314, and 1320 are protected by the preaction sprinkler system. Train B systems are protected in this area and would be used for safe shutdown.

For cold shutdown using RHR Train B, manual opening of EJHV8701B and BBPV8702B (or electric operation from MCC NG02B) may be required to provide a suction source from the RCS hot leg through valves BBPV8702B and EJHV8701B. This is due to the postulated failure of various Train B position switch interlocks associated with valve BBPV8702B which could prevent the remote opening of BBPV8702B and postulated failure of control or power cables for EJHV8701B which would prevent remote opening of EJHV8701B.

Additionally, manual opening of EJFCV611 (RHR Pump B Miniflow Valve) may be required due to postulated failure of EJFIS611 cables which causes EJFCV611 to fail closed.

The charging pump isolation valves (BG-LCV-112B and C) from the VCT are normally open, motor-operated valves. These valves fail as-is, which would be the likely case if a fire in this area disabled the associated circuits. This condition would not prevent a normal shutdown of the plant. Furthermore, the isolation valve for the charging pump B supply from the RWST (BN-LCV-112E) is in another fire area and would be available to provide a backup source of RCS makeup water.

The west corridor (Room 1301) contains circuits for the pressurizer PORV and the block valve on the same line: both are Train A valves (BB-PCV-455A and BB-HV-8000A). However, should the PORV fail open and should the block valve fail as-is in the open position, the RCS would blow down to the PRT. In this case, the control room operator would place the PORV in manual and close the PORV from the control room.

The east corridor (Room 1320) contains both VCT level transmitters (LT-112 and LT-185). These transmitters close the VCT discharge valves 112B and C and open the RWST suction valves 112D and E. If these transmitters are adversely affected by the fire, one of the VCT valves may close; however, the RWST valve would open and supply a suction source for the charging pump.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-9 (Ref. Figures 9.5.1-2, Sheets 1-3)

A.9.1 Fire Area Description	Major Equipment
RHR heat exchanger room Room 1309	RHR heat exchangers (B) and associated piping and valves

A.9.2 Design Features

This fire area is separated from all adjoining areas by 3-hour-rated fire barriers. This fire area extends through two floor elevations. The ceiling forms the floor of the RAM Storage Building and serves as a 3-hour rated fire barrier. A hatch with a removable concrete cover is provided in the ceiling for pulling the tube bundle or the heat exchanger. All penetrations through fire-rated barriers are fitted with 3-hour penetration seals. HVAC ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers. A 1-foot-6-inch-thick, 8-foot-0-inch-high concrete partition wall is located within the fire area between the heat exchanger and the valve compartment.

A.9.3 Combustible Loading

Room	Combustible Loading Classification
1309	Low

A.9.4 Fire Protection

Due to the very low combustible loading in this area and the separation of redundant equipment by 3-hour fire barriers, detectors are not installed in this area. In the event of a fire in this area, plant notification can be made by the activation of a manual-pull station in the corridor.

Hose stations are located in Room 1301 outside the fire area. Two portable extinguishers are located in Room 1301. Access to this area is from Room 1301 through a door. For access to Room 1301, see Fire Area A-8. Two 4-inch floor drains - one on either side of the partition wall - are provided. The drains are piped to the sump located at Elevation 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

A.9.5 Isolation and Smoke Removal

A fire within the area will be contained by the fire barriers and the fire dampers in the HVAC ducting until extinguished. Smoke can be removed to outside (if required) by portable fans and flexible ducting.

A.9.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.9.7 Analysis

A.9.7.1 Fire Suppression

The 3-hour-rated barriers protect the safe shutdown equipment from a fire in adjacent areas. Hose stations or portable extinguishers are available to manually extinguish a fire. A fire in this area will be contained by the 3-hour barriers. Adequate drainage is provided to remove any fire-fighting water. Since the floor in adjoining corridor Room 1301 slopes away from the door to a floor drain, a fire suppression system discharge in the adjacent area cannot damage the equipment in this area.

A.9.7.2 Safe Shutdown Capability

In the event of exposure fire damage to equipment in this area, the plant can be safely shut down, using the redundant Train A equipment located in a separate fire area.

Fire Area A-10 (Ref. Figures 9.5.1-2, Sheets 2 and 3)

A.10.1 Fire Area Description

RHR heat exchanger room
Room 1310

Major Equipment

RHR heat exchanger and associated piping and valves

A.10.2 Design Features

This fire area is separated from all adjoining areas by 3-hour-rated fire barriers. This fire area extends through two floor elevations. The ceiling forms the floor of the RAM Storage Building and serves as a 3-hour rated fire barrier. A hatch with a removable concrete cover is provided in the ceiling for pulling the tube bundle or the heat exchanger. All penetrations through the fire-rated barriers are fitted with 3-hour penetration seals. HVAC ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers. A 1-foot-6-inch-thick, 8-foot-0-inch-high concrete partition wall is located within the fire area between the heat exchanger and the valve compartment.

A.10.3 Combustible Loading

Room	Combustible Loading Classification
1310	Low

A.10.4 Fire Protection

Due to low combustible loading and redundant train separation, detectors are not installed in this area. A hose station is located in Room 1301 outside the fire area. Two portable extinguishers are located in Room 1301. Access to this area is from Room 1301 through a door. For access to Room 1301, see Fire Area A-8. Two 4-inch floor drains - one on either side of the partition wall - are provided. The drains are piped to the sump located at El. 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

A.10.5 Isolation and Smoke Removal

A fire within the area will be contained by the fire barriers and the fire dampers in the HVAC ducting until extinguished. Smoke can be removed to outside (if required) by portable fans and flexible ducting.

A.10.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.10.7 Analysis

A.10.7.1 Fire Suppression

The 3-hour fire barriers protect the safe shutdown equipment from a fire in adjacent areas. Hose stations or portable extinguishers can be used to manually suppress a fire. The fire will be contained by the 3-hour fire barriers. Adequate drainage is provided to remove the fire-fighting water. Since the floor in the adjoining corridor Room 1301 slopes away from the door to a floor drain, a fire suppression system discharge in the adjacent area cannot damage the equipment in this area.

A.10.7.2 Safe Shutdown Capability

In the event of fire damage to equipment in this area, the plant can be safely shut down using the redundant Train B equipment located in a separate fire area.

Fire Area A-11 (A-11 (Ref. Figure 9.5.1-2, Sheet 2)

A.11.1 Fire Area Description

Cable chase, auxiliary building - El. 2000 to 2026 Room 1335

Major Equipment

Electric cable only

A.11.2 Design Features

The area is separated from all adjoining areas by 3-hour-rated fire barriers. All penetrations through the fire barriers have 3-hour-rated fire penetration seals. A 3-hour-rated counter fire door is provided to enable access for manual fire fighting from Room 1323.

A.11.3 Combustible Loading

Room	Combustible Loading Classification
1335	High

A.11.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. Manual-pull fire alarm stations are located at normal exits from this floor area. These alarm locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
a.	Detection by ionization detectors	X	X
b.	Water flow in sprinkler valve system	X	X
c.	Interruption of power to sprinkler alarm		X
d.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Room 1320 (Fire Area A-8). Drainage in this area is by one 4-inch

floor drain. This is more than adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3 foot 6 inch by 4 foot 0 inch, 3-hour-rated fire door. The access door is within 25 feet of the hose station.

A.11.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant.

Smoke can be removed by portable fans and flexible ducting to the turbine building or to adjoining areas of the auxiliary building from where it can be exhausted by the normal building ventilation systems.

A.11.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.11.7 Analysis

A.11.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, hose streams can be directed through the access opening to extinguish the fire.

A.11.7.2 Safe Shutdown Capability

This cable chase contains circuits for pressurizer PORV BB-PCV-455A and the PORV block valve BB-HV-8000A which are both Train A valves; however, should the PORV fail to the open position and the block valve fail in the as-is open position, the RCS would blow down to the PRT. In this case, the control room operator would place the PORV in manual and close the PORV from the control room.

This area contains only Separation Group 1 circuits. The redundant Separation Group 4 circuits are separated by 3-hour-rated fire barriers. Therefore, a fire in this area would not prevent safe shutdown.

Fire Area A-12 (Ref. Figure 9.5.1-2, Sheet 2)

A.12.1 Fire Area Description

Cable chase, auxiliary building - El. 2000 to 2026 Room 1336

Major Equipment

Electric cable only

A.12.2 Design Features

The area is separated from all adjoining areas by 3-hour-rated barriers. All penetrations through the barriers have 3-hour-rated penetration seals.

A.12.3 Combustible Loading

Room	Combustible Loading Classification
1336	High

A.12.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. Manual-pull fire alarm stations are located at the normal exits from this floor area. These alarm locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed at the ceiling in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
a.	Detection by ionization detectors	X	X
b.	Water flow in sprinkler valve system	X	X
c.	Interruption of power to sprinkler alarm		X
d.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Room 1314 (Fire Area A-8). Drainage in this area is by one 4-inch floor drain. This is more than adequate to handle maximum sprinkler system discharge

or hose station discharge. Access to the chase is through a 3 foot 6 inch by 4 foot 3-hour-rated door. The access door is within 30 feet of the hose station.

A.12.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant.

Smoke can be removed by portable fans and flexible ducting through the doors in the south side of corridor 1314.

A.12.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.12.7 Analysis

A.12.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers until extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

A.12.7.2 Safe Shutdown Capability

This area contains only Separation Group 4 circuits. The redundant Separation Group 1 circuits are separated by 3-hour-rated fire barriers. Therefore, a fire in this area would not prevent safe shutdown.

Fire Area A-13 (Ref. Figure 9.5.1-2, Sheet 2)

A.13.1 Fire Area Description

Auxiliary feedwater pump room
Room 1325

Major Equipment

Motor-driven auxiliary feedwater pump B, pump room cooler

A.13.2 Design Features

This fire area is separated from all adjoining areas by 3-hour-rated fire barriers. All cable and piping penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. All HVAC duct penetrations are fitted with 3-hour-rated fire dampers. Watertight doors with 6-inch-high curb are located in the south and east fire barrier walls.

A.13.3 Combustible Loading

Room	Combustible Loading Classification
1325	Low

A.13.4 Fire Protection

Ionization-type detectors are installed in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. An indicating light installed outside the area in the adjoining corridor will aid further in locating the trouble area. A hose station and a portable extinguisher are located in the corridor (Room 1329) outside this fire area. All areas are within reach of this hose station. Access for manual fire fighting is through a watertight door from Room 1329. Access to Room 1329 is from the turbine building. Two 4-inch floor drains are provided in this area. The floor drain is piped to the auxiliary feedwater room sump located in Room 1128 (El. 1974). Sump pumps drain the sump to a drain tank located in the radwaste building.

A.13.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers in the HVAC ducts until extinguished. Portable fans and flexible ducting can be used to remove smoke to the turbine building to be exhausted by the normal turbine building ventilation system.

A.13.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.13.7 Analysis

A.13.7.1 Fire Suppression

This area is protected from a fire in the adjacent areas by 3-hour-rated fire barriers. A fire in the area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using the hose station and/or the portable extinguishers located in the adjoining corridor (Room 1329). A fire will be contained by the fire barriers until extinguished. Adequate drainage is provided to drain the fire-fighting water. The watertight doors will protect the safe shutdown equipment from damage by water discharged by extinguishing systems in the adjacent areas.

A.13.7.2 Safe Shutdown Capability

In the event of fire damage to the safe shutdown equipment in this area, the redundant Train A motor-driven auxiliary feedwater pump located in a different fire area can be used to shut down the plant safely using steam generators B and C.

The suction source to AFWP A will be from the CST unless the circuits for two of three CST level transmitters burn and cause a spurious switchover to the ESW source. The CST and ESW suction valves to AFWP A are not affected by a fire in this area and will operate properly.

The circuitry for the turbine stop/control valves located downstream of the MSIVs are not in the fire area and would be available to isolate the secondary side. The MSIVs (AB-HV-17 and 20) are therefore not required and may be assumed to fail open due to circuit failures associated with this fire area.

The four secondary side PORVs must remain operable or be closed to control the decay heat removal process. If the circuitry to any PORV is burned, the associated PORV will fail closed. If the pressure transmitter/controller circuitry is damaged, the PORV will be placed in manual and closed/manually positioned from the control room. PORVs AB-PV-1 and AB-PV-4 will be closed from the control room and AB-PV-2 will be manually positioned from the control room if possible. If AB-PV-2 cannot be controlled from the control room, it may be operated locally using a local pneumatic controller.

Therefore, a fire in this area will not prevent safe shutdown.

Fire Area A-14 (Ref. Figure 9.5.1-2, Sheet 2)

A.14.1 Fire Area Description

Auxiliary feedwater pump room
Room 1326

Major Equipment

Motor-driven auxiliary feedwater pump A and pump room cooler

A.14.2 Design Features

This fire area is separated from all adjoining areas by 3-hour-rated fire barriers. All cable and piping penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. All HVAC duct penetrations are provided with 3-hour-rated fire dampers. A watertight door with 6-inch-high curb is located in the east fire barrier walls.

A.14.3 Combustible Loading

Room	Combustible Loading Classification
1326	Low

A.14.4 Fire Protection

Ionization-type detectors are installed in this area. The detector system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. An indicating light installed outside the area in the adjoining corridor will aid further in locating the trouble area. A hose station and a portable extinguisher are located in the corridor (Room 1329) outside this fire area. All areas are within reach of this hose station.

Access for manual fire fighting is through a watertight door from Room 1329. Access to Room 1329 is from the turbine building.

Two 4-inch floor drains are provided in this area. The floor drain is piped to the auxiliary feedwater room sump located in Room 1128 (El. 1974). Sump pumps drain the sump to a drain tank located in the radwaste building.

A.14.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers on the HVAC ducts. Portable fans and flexible ducting can be used to remove smoke to the turbine building to be exhausted by the normal turbine building ventilation system.

A.14.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.14.7 Analysis

A.14.7.1 Fire Suppression

This area is protected from a fire in the adjacent areas by 3-hour-rated fire barriers. A fire in the area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using the hose station and/or the portable extinguishers located in the adjoining corridor (Room 1329). A fire will be contained by the fire barriers. Adequate drainage is provided to drain all fire-fighting water. The watertight doors will protect the safe shutdown equipment from damage by water discharge from extinguishing systems in the adjacent areas.

A.14.7.2 Safe Shutdown Capability

An exposure fire in this area could possibly disable the Train A motor-driven auxiliary feed pump (Separation Group 1). Safe shutdown of the plant could then be accomplished with the turbine-driven pump, which is separated by 3-hour-rated fire barriers.

The turbine-driven AFWP will supply water to steam generators B and C to accomplish safe shutdown with the CST as the suction source.

The circuitry for the turbine stop/control valves downstream of the MSIVs is not in the fire area and would be available to isolate the secondary side. The MSIVs are therefore not required and may be assumed to fail open due to circuit failures associated with this fire area.

The secondary side PORV AB-PV-1 must be closed to control the decay heat removal process due to the potential failure(s) of the MSIV(s). If pressure transmitter AB-PT-1 circuitry is damaged, PORV AB-PV-1 will be placed in manual and closed from the control room. The other PORVs are not affected by a fire in this area.

Therefore, a fire in this area will not prevent the safe shutdown of the plant.

Fire Area A-15 (Ref. Figure 9.5.1-2, Sheet 2)

A.15.1 Fire Area Description

Auxiliary feedwater pump room
Room 1331

Major Equipment

Turbine-driven auxiliary feedwater pump

A.15.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All cable and piping penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. All HVAC duct penetrations are fitted with 3-hour-rated fire dampers. A watertight, missile-protection door with 6-inch-high curb is located in the west fire barrier wall.

A.15.3 Combustible Loading

Room	Combustible Loading Classification
1331	Low

A.15.4 Fire Protection

Ionization smoke detection is provided in this area. Rate-compensated thermal detectors are also installed in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. An indicating light installed in the adjoining corridor outside the area will provide further aid in locating the trouble area. A hose station and a portable extinguisher are located in the corridor (Room 1329) outside this fire area. All areas are within reach of this hose station. In addition to the above, a manually charged fixed water spray system is installed to protect the turbine and pump lubricating oil lines and bearings. A manual system precludes any water damage to the turbine due to an inadvertent operation. The design density for the spray system is 0.3 gpm/ft^2. The manual valve to activate the system is located outside the fire area in Room 1329 and is electrically supervised. Access for manual fire fighting is through a watertight door from Room 1329. Access to Room 1329 is from the turbine building. Two 4-inch floor drains are provided in this area. The floor drain is piped to the auxiliary feedwater room sump located in Room 1128 (El. 1974). Sump pumps drain the sump to a drain tank located in the radwaste building.

A.15.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers on the HVAC ducts until extinguished. Portable fans and flexible ducting can be used to remove smoke to the turbine building to be exhausted by the normal turbine building ventilation system.

A.15.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.15.7 Analysis

A.15.7.1 Fire Suppression

This area is protected from a fire in the adjacent areas by 3-hour-rated fire barriers. A fire in the area will be detected and alarmed by the automatic detection system. The manual spray system can be actuated to extinguish the fire. In case of a malfunction of the spray system, the hose station and/or the portable extinguishers located in the adjoining corridor (Room 1329) will provide adequate backup for fire suppression. A fire will be contained by the fire barriers. Adequate drainage is provided to drain the fire-fighting water. The watertight doors will protect the safe shutdown equipment from damage by water discharged by extinguishing systems in the adjacent areas.

A.15.7.2 Safe Shutdown Capability

A postulated exposure fire in this area could possibly disable the turbine-driven auxiliary feedwater pump; however, motor-driven pump B would be available.

The suction source to AFWP B will be from the CST unless the circuits for two of three CST level transmitters burn and cause a spurious switchover to the ESW source. The CST and ESW suction valves to AFWP B are not affected by a fire in this area and will operate properly.

The circuitry for the turbine stop/control valves downstream of the MSIVs is not in this fire area and would be available to isolate the secondary side. The MSIVs are therefore not required and may be assumed to fail open due to circuit failures associated with this fire area.

The secondary side AB-PV-2 must remain operable and be closed, respectively, to control the decay heat removal process. If pressure controller AB-PV-2 circuitry is damaged, the PORV will be placed in manual and closed from the control room.

A fire in this area will not prevent safe shutdown.

Fire Area A-16 (Ref. Figure 9.5.1-2, Sheet 3)

A.16.1 Fire Area Description	Major Equipment
Auxiliary building El. 2026, general area Rooms 1401, 1402, 1406, 1408	CCW heat exchangers, pumps, pump room coolers, piping, and valves

A.16.2 Design Features

This fire area is separated from the adjoining buildings by 3-hour-rated fire barriers. This area has one missile door as described in Section 9.5.1.2.2.3. It separates this fire area from the turbine building. The floors and ceiling are 3-hour-rated fire barriers. There are two equipment hatchways with steel plate covers. An automatic sprinkler system is installed for cable concentrations and around the hatchways to provide a water curtain. Three-hour-rated fire barriers separated this area from the following adjacent areas containing safe shutdown equipment:

a.	1309 and 1310	(Fire Areas A-9 and A-10)
b.	1409	(Fire Area A-17)
c.	1410	(Fire Area A-18)
d.	1407	(Fire Area A-3)
e.	1413	(Fire Area A-28)

Three-hour-rated barriers are provided to separate Rooms 1405 and 1403 (Fire Areas A-26 and A-27) based on combustible loading. The stairwells are separated by 3-hour-rated fire barriers. The elevator shaft and door are 2-hour and 1-1/2-hour-rated, respectively. All cable and piping penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. Three-hour-rated fire dampers are installed in all HVAC ducting penetrating the fire barriers. Six-inch-high curbs are installed around Rooms 1401 and 1406 containing the redundant CCW system equipment. These rooms are separated horizontally by 75 feet (minimum). The fire barrier enclosure around Fire Areas A-9 and A-10 is located between these two rooms. A cable tray fire stop is provided immediately adjacent to the sprinkler area in Room 1408 near column A-8 to prevent fire propagation along the trays. The Buttress Hatch Covers, located between the Auxiliary Building floor at El. 2026' and the containment's tendon buttress, are fabricated from checker plate and sealed between the plate and supporting structure interface with fire resistant sealant. This configuration will prevent the propagation of fire between fire areas A-8 and A-16.

A.16.3 Combustible Loading

Room	Combustible Loading Classification
1401	Low

1402	Low
1406	Low
1408	Low

A.16.4 Fire Protection

An automatic detection system, consisting of ionization-type smoke detectors that alarm locally and in the control room on detection, is installed in this area. The control room alarms are zoned for quick and easy identification of the specific trouble area. Manual-pull stations are located at exit doors of this floor.

An automatic preaction-type sprinkler system is installed over cable tray concentrations in Rooms 1402 and 1408 as detailed in Table 9.5B-4. The design density for the sprinkler system is 0.3 gpm/ft^2. The system flow rate and pressure are based on all nozzles open over the most remote 3,000 square feet of floor area. The system also provides protection for the hatchways at the ceiling of this area. Hose stations and portable extinguishers are located throughout the area (see Figure 9.5.1-2, Sheet 3). Access to this area for manual fire fighting is available as follows:

a. Stairwell 4101 from the turbine building

b. Stairwell 1119 (at the south end) from other elevations of the auxiliary building

c. Stairwell 1127 (at the north end) from other elevations of the auxiliary building

The alarms associated with the fire protection system are shown below:

		Local	Remote (control room)
a.	Detection by ionization detectors	X	X
b.	Sprinkler deluge valve tripped		X
c.	Sprinkler trouble alarm on loss of power or low air pressure		X
d.	Isolation valve on the sprinkler supply line not fully open		X

In the east corridor (Room 1408), additional sprinkler heads are provided below the cable tray elevation between columns A-1 and A-4. These additional sprinkler heads are provided to protect the cable trays from a fire located at the floor. This area contains cable trays and other obstructions which may reduce the effectiveness of the ceiling-mounted sprinklers in controlling floor level fire.

The cable tray fire stop will prevent a fire from propagating along the cable trays.

One 4-inch drain per 1,000 square feet of floor area is provided in the corridor area (Rooms 1402 and 1408). Six 4-inch and two 4-inch drains are provided in Rooms 1401 and 1406, respectively. All the floor drains are piped to a sump located in El. 1974. Sump pumps are installed to drain the sump to a drain tank in the radwaste building.

A.16.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers in HVAC ducting until extinguished. The 6-inch-high curbing in Rooms 1401 and 1406 and the floor drains will prevent any transient combustible spill (such as lube oil) from spreading from one room to the other. The curb will also protect Rooms 1401 and 1406 against a spill in the corridor (Room 1408). Portable fans and flexible ducting can be used to vent smoke either to the turbine building or to other elevations of the auxiliary building where it may be exhausted by the normal ventilation systems.

A.16.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.16.7 Analysis

A.16.7.1 Fire Suppression

The 3-hour-rated fire barrier will contain a fire in this area and will also protect this area from a fire in any of the adjoining areas. The ionization detectors will provide an early warning of a fire in this area. The fire can be extinguished manually using the hose stations and/or the portable extinguishers. The automatic detection system will trip the sprinkler system deluge valve when a cable tray fire or floor level fire is detected. The automatic system will actuate to extinguish the fire. The sprinkler actuation or a malfunction can be identified by the alarms described in A.16.4. In the event of a failure of the automatic system, the fire can be extinguished manually using the hose stations. Adequate drainage is provided in each room to remove the fire-fighting water. The

6-inch-high curb installed around Rooms 1401 and 1406 will protect the safe shutdown equipment against damage from water discharged by the sprinkler system in Rooms 1402 and 1408.

A.16.7.2 Safe Shutdown Capability

The redundant safe shutdown components in this fire area are located in Rooms 1401 and 1406. These rooms are separated by at least 50 feet with fire areas A-9 and A10 intervening. These rooms are provided with ionization smoke detectors and have relatively light fixed combustibles loadings. Neither an insitu fire originating in the fixed combustibles nor an exposure fire from the transient combustibles could disable both trains of redundant equipment.

The cables in Room 1402 are protected by ionization smoke detectors and a preaction sprinkler system. Redundant circuits in these areas have greater than 20 feet physical separation. Handswitch BBHIS0456A for pressurizer PORV BB-PCV-456A is placed in the closed position to prevent the inadvertent opening of BB-PCV-0456A. Additionally, in order to initiate cold shutdown using RHR Train A, manual closing of valve BN-HV-8812A from its MCC and local manual opening of valve BB-PV-8702A from its MCC may be required to provide a suction source from the RCS hot leg.

For a fire affecting adjacent Rooms 1406 and 1408, AFWP A supplies water to steam generators B and C. Steam generator PORVs AB-PV-2 and 3 are placed in the manual mode and are positioned manually from the control room if possible to remove decay heat. Alternatively, if AB-PV-2 and 3 cannot be controlled from the control room, they can be positioned locally using local pneumatic controllers. Handswitch BBHIS0456A for pressurizer PORV BB-PCV-456A is placed in the closed position to prevent the inadvertent opening of BB-PCV-0456A due to possible trouble with pressurizer pressure loop BBPT0456A. PORV BB-PCV-455A is used for letdown for extended hot standby or cold shutdown. The 'RED' train of narrow range steam generator level for the 'B' and 'C' steam generators, the RCS wide range cold leg loop 'C' temperature, and the RCS wide range hot leg loop 'B' temperature will be functional to assist in bringing the plant to a 'cold shutdown' mode.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-17 (Ref. Figure 9.5.1-2, Sheet 3)

A.17.1 Fire Area Description	Major Equipment
Electrical penetration room (south) Room 1409	Motor control centers, load center, switchgear, room cooler, electric cable

A.17.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All cable and piping penetrations through fire-rated barriers are fitted with 3-hour-rated penetration seals or seals described in Section 9.5.1.2.2.3. Three-hour-rated fire dampers are installed in HVAC ducts penetrating the fire barriers.

A.17.3 Combustible Loading

Room	Combustible Loading Classification
1409	Low

A.17.4 Fire Protection

This area is provided with a cross-zoned ionization detection system. Detection by either zone will alarm locally and in the control room. Activation by both zones will initiate the discharge of the Halon 1301 suppression system installed in this area. If one detection zone is not available, detection by the remaining zone alone will activate the Halon system.

The Halon 1301 system serves the room with the exception of the electrical chase area and is capable of attaining a minimum 5-percent concentration. The system is designed to maintain at least a 5-percent concentration at the level of the highest combustible for a soak time of 10 minutes. An actuation station is provided to discharge the system manually. An automatic activation will sound a local alarm, close required ventilation dampers, shut off associated ventilation and/or air-conditioning fan motors, and discharge the system after an adequate time delay for evacuation.

The Halon cylinders and the control panel are located outside the fire area. The control panel has a keylock switch to disable system controls during maintenance to prevent any unwanted system actuation. A 100-percent reserve cylinder bank is provided for this system.

An automatic wet pipe sprinkler system, based on NFPA No. 13, serves the electrical chase area of Room 1409. The system is equipped with closed head spray nozzles rated for 165°F and a sprinkler head rated for 160°F. The design density of the sprinkler system is 0.5 gpm per square foot of total protected floor area.

The alarms associated with the fire protection systems in this area are shown below:

		Local	Remote (control room)
a.	First zone detection	X	X
b.	Detection by two zones	X	X
c.	Halon system discharge		X
d.	Halon system trouble	X (Visual)	X
e.	HVAC system isolation		X (Visual)
f.	Water flow in sprinkler valve system		X
g.	Interruption of power to sprinkler alarm		X
h.	Isolation valve on supply line not fully open		X

Two 4-inch floor drains are provided in this area. The drains are piped to a sump located at El. 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

A.17.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and isolated by the fire dampers in the HVAC ducts. Smoke can be removed by portable fans and flexible ducting to the turbine building or to the other areas of the auxiliary building. The normal building ventilating systems will then exhaust the smoke.

A.17.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.17.7 Analysis

A.17.7.1 Fire Suppression

The fire barriers enclosing this area will protect this area from a fire in the adjoining areas and will contain a fire within this area until extinguished. The fire will be detected,

alarmed, and suppressed by the Halon system or the wet pipe sprinkler system. The Halon system discharge or a malfunction will be identified by the alarms described in A.17.4. In the event of a malfunction of the automatic systems, the hose station in Room 1408 can be used to extinguish the fire. Adequate drainage is provided to drain the fire-fighting water.

A.17.7.2 Safe Shutdown Capability

This room contains circuits for pressurizer PORV BB-PCV-456A and the PORV block valve BB-HV-8000B which are both Train B valves; however, should the PORV fail to the open position and the block valve fail in the as-is open position, the RCS would blow down to the PRT. In this case, the control room operator would place the PORV in manual and close the PORV from the control room.

Circuits for valves BB-HV-8157A and B are located in this area. If both of these valves were to fail in the closed position, letdown through the excess letdown path to the PRT would be unavailable. However, if letdown were required to allow for addition of borated water from the RWST to maintain extended hot standby or to borate to cold shutdown concentrations, the alternate path of letdown to the PRT through the pressurizer PORV BB-PCV-455A is available.

Following a fire in this room, cold shutdown using RHR Train A, manual closing of valve BN-HV-8812A and opening of BB-PV-8702A may be required to provide a suction source from the RCS hot leg through valves BB-PV-8702A and EJ-HV-8701A. This is due to the potential failure of a Train B interlock from the position switch associated with valve BN-HV-8812A which could prevent the remote opening of BB-PV-8702A.

When going to cold shutdown, the RCS must be depressurized. Prior to depressurization, the accumulator tanks must be isolated or vented to preclude the release of the nitrogen cover gas into the RCS. The accumulator tanks are to be isolated/vented as follows due to potential fire damage to isolation/vent valves: Accumulator A close EP-HV-8808A; accumulator B, C, and D open vent valves EP-HV-8950B, D, and F, respectively.

A fire in this area will not prevent a safe shutdown of the plant.

Fire Area A-18 (Ref. Figure 9.5.1-2, Sheet 3)

A.18.1 Fire Area Description	Major Equipment
Electrical penetration room (north) Room 1410	Motor control centers, load center, switchgear, room cooler, electric cable

A.18.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All penetrations through fire-rated barriers are fitted with 3-hour-rated penetration seals or those described in 9.5.1.2.2.3. Three-hour-rated fire dampers are installed in HVAC ducts pene-trating the fire barriers.

Internal panel surfaces are finished with paint of low fire rating. All cable in these panels meets the vertical flame requirements of ICEA S-19-81 and/or IEEE 383 for flame resistance. The panels are provided with keylocks to control access to the panel interiors.

A.18.3 Combustible Loading

Room	Combustible Loading Classification
1410	Low

A.18.4 Fire Protection

This area is provided with a cross-zoned ionization detection system. Detection by either zone will alarm locally and in the control room. Activation by both zones will initiate the discharge of the Halon 1301 suppression system installed in this area. If one detection zone is not available, detection by the remaining zone alone will activate the Halon system.

The Halon 1301 system serves the room with the exception of the electrical chase area and is capable of attaining a minimum 5-percent concentration. The system is designed to maintain at least a 5-percent concentration at the level of the highest combustible for a soak time of 10 minutes. An actuation station is provided to discharge the system manually. An automatic activation will sound a local alarm, close required ventilation dampers, shut off associated ventilation and/or air-conditioning fan motors, and discharge the system after an adequate time delay for evacuation.

The Halon cylinders and the control panel are located outside the fire area. The control panel has a keylock switch to disable system controls during maintenance to prevent any unwanted system actuation. A 100-percent reserve cylinder bank is provided for this system.

An automatic wet pipe sprinkler system, based on NFPA No. 13, serves the electrical chase area of Room 1410. The system is equipped with closed head spray nozzles rated for 165°F and a sprinkler head rated for 160°F. The design density of the sprinkler system is 0.5 gpm per square foot of total protected floor area.

A hose station and portable extinguishers are located outside the area in Room 1408 (corridor). Access for manual fire fighting is through the two doors from Room 1408. For access to Room 1408, see Fire Area A-16. The alarms associated with the fire protection systems in this area are shown below:

		Local	Remote (control room)
a.	First zone detection	X	X
b.	Detection by two zones	X	X
c.	Halon system discharge		X
d.	Halon system trouble	X (Visual)	X
e.	HVAC system isolation		X (Visual)
f.	Water flow in sprinkler valve system		X
g.	Interruption of power to sprinkler alarm		X
h.	Isolation valve on supply line not fully open		X

Two 4-inch floor drains are provided in this area. The drains are piped to a sump located at El. 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

A.18.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and isolated by the fire dampers in the HVAC ducts. After a Halon system discharge, smoke can be removed by portable fans and flexible ducting to the turbine building or to the other areas of the auxiliary building. The normal building ventilating systems will then exhaust the smoke.

A.18.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.18.7 Analysis

A.18.7.1 Fire Suppression

The fire barriers enclosing this area will protect this area from a fire in the adjoining areas and will contain a fire within the area until extinguished. The fire will be detected, alarmed, and suppressed by the automatic Halon system or the wet pipe sprinkler system. The Halon system discharge or a malfunction will be identified by the alarms described in A.18.4. In the event of a malfunction of the automatic systems, the hose station in Room 1408 can be used to extinguish the fire. Adequate drainage is provided to drain the fire-fighting water. Should manual fire fighting be required, water damage to the electrical equipment in this room could result (with or without associated fire damage); however, the water damage would not adversely affect safe shutdown. The redundant equipment is located in another fire area. Since the floor in Room 1408 (corridor) slopes away from the doors to this room, water damage due to a sprinkler discharge in adjoining areas is not possible.

A.18.7.2 Safe Shutdown Capability

This area contains predominately Separation Group 1 circuits and equipment. With the exception of the B train auxiliary feedwater and steam generator PORV control cables discussed below, redundant Separation Group 4 circuits and equipment are located in the south electrical penetration room, which is in another fire area.

For a fire in fire zone A-18, it is assumed that secondary side heat removal is accomplished using motor-driven auxiliary feedwater pump B and steam generators A and D. However, control cables for the A steam generator atomospheric PORV (ABPV0001) and for the B motor-driven auxiliary feedwater pump discharge isolation valves (ALHV0005 and 7) route through this fire zone. The raceways associated with these cables are located greater than 20 feet from any opposite train auxiliary feedwater components or cables, with automatic detection and suppression. If the raceways associated with the B motor-driven auxiliary feedwater system are lost, the A motor-driven auxiliary components would still be available due to the 20 feet separation with detection and suppression. However, manual Operator action would be required to manipulate the B steam generator atmospheric PORV (ABPV0002) since its control cable could also be lost in the fire. Three narrow range level transmitters are available to monitor steam generator A level; therefore, wide range level transmitter LT-501 is allowed to fail.

This room contains circuits for pressurizer PORV BB-PCV-455A and the PORV block valve BB-HV-8000A which are both Train A valves; however, should the PORV fail to the open position and the block valve fails in the as-is open position, the RCS would blow

down to the PRT. In this case, the control room operator would place the PORV in manual and close the PORV from the control room.

Circuits for valves BG-HV-8157A and B are located in this area. If both of these valves were to fail in the closed position, letdown through the excess letdown path to the PRT would be unavailable. However, if letdown were required to allow for addition of borated water from the RWST to maintain extended hot standby or to borate to cold shutdown concentrations, the alternate path of letdown to the PRT through the pressurizer PORV BB-456A is available.

For cold shutdown using RHR Train B, manual closing of valve BN-HV-8812B and opening of EJ-HV-8701B may be required to provide a suction source from the RCS hot leg through valves BB-PV-8702B and EJ-HV-8701B. This is due to the postulated failure of a Train A interlock from the position switch associated with valve BN-HV-8812B which could prevent the remote opening of EJ-HV-8701B.

When going to cold shutdown, the RCS must be depressurized. Prior to depressurization, the accumulator tanks must be isolated or vented to preclude the release of the nitrogen cover gas into the RCS. The accumulator tanks are to be isolated/vented as follows due to potential fire damage to isolation/vent valves: accumulator A open vent valve EP-HV-8950A; accumulator B open vent valve EP-HV-8950B or close EP-HV-8808B; accumulator C open vent valve EP-HV-8950D or E; accumulator D open vent valve EP-HV-8950F or close valve EP-HV-8808D.

Therefore, a fire in this area will not prevent safe shutdown of the plant.

Fire Area A-19 (Ref. Figure 9.5.1-2, Sheet 4)

A.19.1 Fire Area Description	Major Equipment
Auxiliary building El. 2047'-6" general area Rooms 1504, 1506, 1513	Auxiliary/fuel building normal exhaust filter, adsorber and exhaust fans, containment purge filter adsorber unit, containment minipurge and shutdown purge exhaust fans, access control exhaust filter adsorber unit and exhaust fan, condenser air removal filtration system filter adsorber unit and fans, control building air supply unit, control building exhaust fans, electrical equipment room cooler, auxiliary building supply air unit, containment purge and minipurge supply units, main steam enclosure supply unit, main steam enclosure building exhaust fans, unit heaters

A.19.2 Design Features

This fire area is separated from adjoining areas and buildings by 3-hour-rated barriers. There are two missile doors, as discussed in Section 9.5.1.2.2.3, in this fire area. They separate this fire area from the RAM Storage Building and the turbine building. There is one equipment hatchway with a steel cover. An automatic sprinkler system is installed under the hatchway to provide a water curtain. The Buttress Hatch Covers, located between the Auxiliary Building floor at El. 2047.5' and the containment's tendon buttress, are fabricated from checker plate and sealed between the plate and supporting structure interface with fire resistant sealant. This configuration will prevent the propagation of fire between fire areas A-16 and A-19.

Three-hour-rated fire barriers separate this area from the following rooms containing safe shutdown equipment:

a. Rooms 1501 and 1512 (Fire Area A-21 & A-22)

b. Rooms 1502 and 1503 (Fire Area A-20)

c. Rooms 1508 and 1509 (Fire Area A-23)

No other adjoining areas contain safe shutdown equipment.

The stairway in the north end is separated by 3-hour-rated fire barriers. All penetrations through fire barriers are fitted with 3-hour-rated fire stops. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers except for the containment purge system containment penetration as described in Section 9.5.1.2.2.3. Room 1504, 1506 and 1513 contain the following quantities of flammable compressed gas: 146 ft^3, 73 ft^3 and 0.243 ft^3. Room 1504 and 1506 contain a 10% hydrogen calibration gas and Room 1513 contains carbon monoxide. The fire load from this quantity of gas is negligible.

A.19.3 Combustible Loading

Room	Combustible Loading Classification
1504	Low
1506	Low
1513	Low

A.19.4 Fire Protection

An automatic detection system consisting of ionization-type detectors is installed in this area. The detection system alarms locally and in the control room. The control room alarms are zoned for easy identification of the specific trouble area. Manual-pull stations are located near the exit doors of this floor. Hose stations and portable extinguishers are located throughout this area (see Figure 9.5.1-2, sheet 4).

Access to this area is as follows:

a. From turbine building stairway (Room 4101)

b. From control room a/c and filtration room (Room 1512)

c. From the north and south stairways (Rooms 1127 and 1119)

One 4-inch floor drain per 1,000 square feet of floor area is provided in this area. The drains are piped to a sump at El. 1974. Pumps are installed to empty the sump to a drain tank in the radwaste building.

A.19.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers in ducts until extinguished. Smoke can be removed to the turbine building or to the other areas of the auxiliary building by portable fans and flexible ducting. The normal ventilation systems for the turbine or auxiliary building can be used to exhaust the smoke.

A.19.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.19.7 Analysis

A.19.7.1 Fire Suppression

The fire barrier separation provided for this area will contain a fire until extinguished and will protect the area from a fire in any one of the adjoining areas. The automatic detection system will provide an early warning of a fire in this area. The fire can be extinguished manually, using the hose stations and/or portable extinguishers located throughout the area. Adequate drainage is provided to remove the fire-fighting water. There is no safe shutdown equipment susceptible to water damage in this area.

All the charcoal adsorber units, except the containment purge filter adsorber, operate during normal plant operation. Downstream of each charcoal bed is a thermistor-type continuous thermal detector which alarms in the control room at high air stream temperature. The bed temperature is therefore constantly monitored for the containment purge adsorber units and for the other units when not in use. The charcoal beds are equipped with a manual water spray system.

A.19.7.2 Safe Shutdown Capability

The RWST level transmitters are located in this area; however, their function is not required following a fire in this area. The water volume of the RWST (394,000 gallons) is more than sufficient to assure boration to cold shutdown conditions.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-20 Fire Area A-20 (Ref. Figure 9.5.1-2, Sheet 4)

A.20.1 Fire Area Description

Personnel hatch and CCW surge tank area
Rooms 1502, 1503, 1505, 1507

Major Equipment

CCW surge tanks, CCW chemical addition tank, piping and valves

A.20.2 Design Features

This area is separated from the adjoining areas and building by 3-hour-rated fire barriers. The floor is a 3-hour-rated fire barrier. There is an equipment hatch with a steel cover as described in Section 9.5.1.2.2.3. The cover is not fire rated since a fire-rated cover for this size of opening is not commercially available. The elevator and stairway are separated by 3-hour-rated fire barriers. The elevator door is 1-1/2-hour rated. A 12-inch-thick concrete barrier wall extending 15 feet from the west barrier separates the redundant CCW surge tanks. The tank outside diameter is 8 feet. All penetrations through fire-rated barriers are fitted with 3-hour penetration seals. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers except for the containment purge system containment penetration as described in Section 9.5.1.2.2.3. Room 1507 contains one 73 ft^3 cylinder of flammable compressed gas. The gas is a 10% hydrogen calibration gas and the fire load is negligible.

A.20.3 Combustible Loading

Room	Combustible Loading Classification
1502	Low
1503	Low
1505	Low
1507	Low

Room	Combustible Materials	Quantity
1505	Charcoal	500 lb
	Filter cartridges	5 lb
	Shipping containers	5 lb
	Protective clothing	1 lb
	Cleaning fluids	1 gal
	Rags, mops, etc.	1 lb
	Paper	5 lb

A.20.4 Fire Protection

Ionization-type detectors are installed in the elevator lobby and over the cable trays in Rooms 1505 and 1507. The automatic detection system alarms locally and in the control room. The control room alarms are zoned for quick identification of the trouble area. Manual-pull stations are installed at the exit door to the stairway. A hose station and one portable extinguisher are installed in the elevator lobby within the fire area. If access to these are blocked by a fire in the area, the hose station located in Room 1504 (approximately 50 feet from the fire area) and portable extinguisher outside the area will provide backup fire-fighting capability (see Figure 9.5.1-2, Sheet 4).

Access for manual fire fighting is as follows:

a. From Room 1504 (see Fire Area A-19 for access to Room 1504)

b. From stairway 1119

c. From fuel building (Room 6301)

Four-inch floor drains are provided in this area as follows:

Room	No. of Drains
1502	1
1503	1
Elevator lobby	1
1505	1
1507	1

The drains are piped to a sump in El. 1974. Sump pumps are provided to drain the sump to a drain tank in the radwaste building.

A.20.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers in the HVAC ducts until extinguished. Smoke can be removed to adjacent areas of the auxiliary building or to the fuel building by portable fans and flexible ducting, and eventually exhausted by the normal ventilation systems associated with these buildings.

A.20.6 Safe Shutdown Equipment

Refer to Table 9.5B for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.20.7 Analysis

A.20.7.1 Fire Suppression

The 3-hour-rated fire barrier separation provided will protect this area from a fire in adjacent areas and will also contain a fire within the area until extinguished. A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using the hose stations and/or portable extinguishers located inside the area or in the adjacent Room 1504. Adequate drainage is provided to remove the fire-fighting water. There is no safe shutdown equipment susceptible to water damage in this area.

A.20.7.2 Safe Shutdown Capability

The fixed combustibles in this area are insufficient to sustain an insitu fire that could disable redundant safe shutdown equipment.

An exposure fire from the postulated transient combustibles in this area would not disable both CCW surge tanks (these tanks are provided with over-pressure protection). Loss of redundant level transmitters EG LT-1 and LT-2 could disable the normal makeup supply to the CCW surge tanks; however, makeup to the CCW is not required during a fire.

The RWST level transmitters are located in this area; however, their function is not required following a fire in this area. The water volume of the RWST (394,000 gallons) is more than sufficient to assure boration to cold shutdown conditions.

A fire in this area will not prevent safe shutdown.

Fire Area A-21 (Ref. Figure 9.5.1-2, Sheet 4)

A.21.1 Fire Area Description

Control room ac and filtration units room Room 1501

Major Equipment

Control room ac unit (B), control room filtration system filter/ adsorber unit (B), control filtration fan (B), motor control center

A.21.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. All HVAC ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

A.21.3 Combustible Loading

Room	Combustible Loading Classification
1501	Low

A.21.4 Fire Protection

An automatic detection system consisting of ionization-type detectors is installed in this room. The detection system alarms locally and in the control room. The control room alarms are zoned for easy identification of the trouble area. Manual-pull stations are installed at the exit doors of this floor. A hose station is installed in this area. If access to this hose station is blocked by a fire, the hose station located in Room 1506 (corridor) can be used (see Figure 9.5.1-2, Sheet 4). This hose station is approximately 20 feet away from the access door to this area. Two portable extinguishers are located in Room 1506.

Access to this fire area is as follows:

a. From Room 1506 (see Fire Area A-19 for access to Room 1506)

b. From control building through the adjacent Fire Area A-22 (Room 1512)

Three 4-inch floor drains are provided in this area. The drains are piped to sump at El. 1974. Pumps installed in the sump drain the sump to a drain tank in the radwaste building.

A.21.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers in the HVAC ducts until extinguished. Portable fans and flexible ducting can be used to remove smoke to the turbine building which will then be exhausted by the normal turbine building ventilation system.

A.21.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.21.7 Analysis

A.21.7.1 Fire Suppression

The fire barrier separation provided for this area will contain a fire within the area until extinguished and will protect this area from a fire in adjacent areas. The automatic detection system will provide an early warning of a fire. The fire can be extinguished manually, using the hose stations and/or the portable extinguishers. Adequate drainage is provided to remove the fire-fighting water. As explained in A.21.7.2, water or fire damage to the safe shutdown equipment will not prevent the safe shutdown of the plant.

The charcoal/adsorber unit is in the control room filtration system. Downstream of each charcoal bed is a thermistor-type continuous detector which alarms in the control room at high airstream temperature. The charcoal filters are equipped with a manual spray system as detailed in Section 9.5.1.2.2.1, Suppression Systems/Capabilities.

A.21.7.2 Safe Shutdown Capability

Only Train B equipment and Separation Group 4 circuits and MCC are located in this fire area. In the event of fire damage and/or water damage to these, the plant can be shut down safely, using the redundant Train A equipment and Separation Group 1 circuits and MCC located in a separate fire area.

Fire Area A-22 (Ref. Figure 9.5.1-2, Sheet 4)

A.22.1 Fire Area Description

Control room ac and filtration units room
Room 1512

Major Equipment

Control room ac unit (A), control room filtration system filter/ adsorber unit (A), control filtration fan (A), motor control center

A.22.2 Design Features

This fire area is separated from adjoining areas and buildings by 3-hour-rated fire barriers. All penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. All HVAC ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

A.22.3 Combustible Loading

Room	Combustible Loading Classification
1512	Low

A.22.4 Fire Protection

An automatic detection system consisting of ionization-type detectors is installed in this room. The detection system alarms locally and in the control room. The control room alarms are zoned for easy identification of the trouble area. Manual-pull stations are installed at the exit doors of this floor. Two portable extinguishers are installed in room 1506.

Additional portable extinguishers and a hose station are located in Room 1513 (see Figure 9.5.1-2, Sheet 4).

Access to this fire area is as follows:

a. From Room 1506 (see Fire Area A-19 for access to Room 1506)

b. From turbine building through Room 1513

c. From control building

Two 4-inch floor drains are provided in this area. The drains are piped to sump at El. 1974. Pumps installed in the sump drain the sump to a drain tank in the radwaste building.

A.22.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers in the HVAC ducts until extinguished. Portable fans and flexible ducting can be used to remove smoke to the turbine building where it may be exhausted by the normal turbine building ventilation system.

A.22.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.22.7 Analysis

A.22.7.1 Fire Suppression

The fire barrier separation provided for this area will contain a fire within the area until extinguished and will protect this area from a fire in adjacent areas. The automatic detection system will provide an early warning of a fire.

The fire can be extinguished manually, using the hose stations and/or the portable extinguishers. Adequate drainage is provided to remove the fire-fighting water. As explained in A.22.7, water or fire damage to the safe shutdown equipment will not prevent the safe shutdown of the plant.

The charcoal/adsorber unit is in the control room filtration system. Downstream of each charcoal bed is a thermistor-type continuous detector which alarms in the control room at high airstream temperature. The charcoal filters are equipped with a manual spray system as detailed in Section 9.5.1.2.2.1, Suppression Systems/Capabilities.

A.22.7.2 Safe Shutdown Capability

In the event of fire and/or water damage to the Train A equipment and Separation Group 1 cable trays, conduits, and MCC, the plant can be shut down safely, using the redundant Train B equipment and Separation Group 4 circuits and MCC located in a different fire area.

Fire Area A-23 (Ref. Figure 9.5.1-2, Sheets 3 and 4)

A.23.1	Fire Area Description	Major Equipment
	Main steam and feedwater valve compartment Room 1508, 1509, 1411, 1412	Mainsteam piping and isolation valves, feedwater piping and isolation valves, main steam safety relief valves, main steam power-operated relief valves, steam generator blowdown isolation valves, auxiliary feedwater pump turbine steam supply valves, pressure transmitters, flow transmitters

A.23.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour rated fire barriers with the exception of the north wall. The north wall separates the auxiliary building from the turbine building. This wall contains nonrated configurations which include missile shields and torsion restraints. In addition the floor of this fire area is penetrated with two blowdown/drain lines which extend from fire area A-23 into the turbine building. The missile shield's function is to stop items which have become projectiles and is not a fire rated component. On the 2065' elevation, the missile shield separating fire area A-23 and T-2 will provide an equivalent level of protection from the largest expected fire event initiating in fire area T-2 to protect fire area A-23. Torsional restraints are installed for the main feedwater and main steam lines on the 2028' and 2039' elevations. The torsional restraints have a small air gap around the main steam and main feedwater lines. In addition, there is an access door from the Turbine Building into the torsional restraint area which is not fire rated. The configuration of the torsional restraints provide an equivalent level of protection from the largest expected fire event initiating in fire area T-2 to protect fire area A-23. The blowdown/drain lines extend for over 20 feet before exiting into the turbine building. This length of steel pipe contains no intervening combustible materials and provides an equivalent level of protection for fire area A-23 from the largest expected fire event initiating in fire area T-2. The fire area is divided into two compartments by a 2-foot-thick concrete wall. A 9-foot x 24-foot vent opening is located at the ceiling of each compartment. The barrier wall between the two compartments has a 27-foot wide x 23-foot high vent opening located approximately 34 feet above the floor. These vent openings are required to prevent overpressurization of the compartment in the event of a postulated break of main steam piping. Due to the existence of the vent opening, the barrier wall cannot be fire rated.

All penetrations through the fire barriers are fitted with 3-hour-rated penetration seals or those described in Section 9.5.1.2.2.3. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers.

A.23.3 Combustible Loading

Room	Combustible Loading Classification
1411 and 1508	Low
1422 and 1509	Low

A.23.4 Fire Protection

An automatic detection system consisting of ultraviolet flame detectors is installed in this fire area. The detection system alarms locally and in the control room. The control room alarms are zoned for easy identification of the trouble area. An indicating light installed outside the fire area will aid further in location of the specific trouble area. Manual-pull stations are installed in Room 1408.

Portable extinguishers are located in each compartment. A hose station and additional portable extinguishers are located in Room 1506. The hose station is approximately 25 feet from the access door into Room 1508. All areas of the two compartments are within reach of this hose station. Additional hose length, if required, can be added from adjacent hose racks in Room 1506. Access to this area is through an alarmed access door from stairway Room 1127. Access openings in the barrier wall and platforms installed at El. 2042 and 2030 provide access between compartments. An intermediate platform is installed at El. 2037 feet - 7 1/2 inches in each compartment; however, access between compartments at this elevation is not possible. An emergency escape hatch to the turbine building is located in the torsional restraint structure adjacent to this fire area. Access to this area is from the platform at El. 2030 in Room 1412.

A.23.5 Isolation and Smoke Removal

A fire in one of the compartments will be contained by the fire barriers and the concrete barrier wall until extinguished. The enclosure will also protect each section from a fire in adjoining areas. Smoke can be removed to the turbine building or to adjacent areas of the auxiliary building by portable fans and flexible ducting. The smoke entering these adjoining areas can be exhausted by the normal ventilation systems.

A.23.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.23.7 Analysis

A.23.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the detection system. The fire can be extinguished manually, using the portable extinguishers and/or the hose station in Room 1506. The safe shutdown instrumentation in this area has watertight enclosures.

The hydraulic fluid in the actuators of the main steam and feedwater isolation valves is contained in a totally enclosed system. The trade name for the fluid is Fyrquel 220. This is a synthetic phosphate ester fluid. The fluid does not easily sustain combustion (due to its self-extinguishing property). A prolonged exposure to an ignition source is required to initiate and maintain combustion. It is incredible to postulate such an ignition source in these rooms. All the safe shutdown equipment in these rooms is qualified to a steam environment and an ambient temperature of 320°F.

Since the access to this area is controlled and limited, the transient combustibles introduced into these rooms will be those associated with the maintenance of equipment located in these rooms. Any major maintenance work on the isolation valves or the power-operated relief valves will require a plant shutdown. (Maintenance on these valves will normally be done during refueling outage). Any postulated transient fire will not damage the 2-foot-thick concrete wall. Due to the low combustible loading and the strict control on access and transient combustibles, this area is judged to require a degree of fire protection equivalent to the reactor building. Therefore, the provisions of Appendix R, Section III.G.2.f are applied to this area.

A.23.7.2 Safe Shutdown Capability

Loops 1 and 4 main steam piping (steam generators A and D) and associated isolation valves, relief valves, power-operated relief valves, and pressure transmitters are located in Room 1508. The corresponding equipment for Loops 2 and 3 (steam generators B and C) are located in Room 1509. The feedwater piping and associated isolation and nonreturn valves for Loops 1 and 4 are installed in Room 1411 while Room 1412 has the equipment for Loops 2 and 3. In addition, Room 1412 has two valves on the steam supply from Loops 2 and 3 main steam piping to the auxiliary feedwater pump turbine. The steam generator blowdown isolation valves are installed in Rooms 1412 and 1411.

The failure modes on loss of power (or air if air operated) for the various valves in this area are given below:

	Valve	Normal Mode	Failure Mode
a.	Main steam isolation	Open	Open
b.	Main steam isolation valve bypass	Closed	Closed

	Valve	Normal Mode	Failure Mode
c.	Power-operated relief	Closed	Closed
d.	Feedwater isolation	Open	Closed
e.	Steam supply to auxiliary feedwater pump turbine	Closed	Open
f.	Bypass for item e	Open	Closed
g.	Steam generator blowdown isolation	Open	Closed

As discussed in A.23.7.1, a postulated fire in this area cannot damage the equipment in both of the two compartments. The criteria of Appendix R, Section III.G.2.f are met for this area. In the unlikely event of fire damage to equipment in one compartment, the reactor and turbine can be tripped, and the plant can be safely shutdown using the power-operated relief valves in the unaffected compartment and the auxiliary feedwater system.

The steam generator blowdown isolation valves fail closed on loss of power or air and, consequently, a fire damage will not prevent safe shutdown.

The valves on the steam supply to the auxiliary feedwater pump turbine in Room 1412 fail open on loss of power or air. However, the turbine throttle valve located in a separate fire area is normally closed. The motor-driven auxiliary feedwater pump B, located in a different fire area, is available to safely shut down the plant.

A fire in this area will not prevent safe shutdown of the plant.

Fire Area A-24 (Ref. Figure 9.5.1-2, Sheet 2)

A.24.1 Fire Area Description

Containment isolation valve room (north)
Room 1323

Major Equipment

Containment isolation valves and piping

A.24.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers.

All penetrations through the fire barriers are fitted with 3-hour penetration seals or those described in Section 9.5.1.2.2.3. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers.

A.24.3 Combustible Loading

Room	Combustible Loading Classification
1323	Low

A.24.4 Fire Protection

An ionization detection system is installed in this area. Manual-pull stations are located at the exit doors of this floor. A hose station and portable extinguishers are located outside the area in Room 1320. Access is from Room 1320 through a door. For access to Room 1320, see Fire Area A-8.

Three 4-inch floor drains are provided in this area. These drains are piped to sump at El. 1974. The sump is drained to a drain tank in the radwaste building by sump pumps.

A.24.5 Isolation and Smoke Removal

The fire barrier separation and the fire dampers in the HVAC ducting will contain a fire in this area until extinguished and will also protect this area from a fire in one of the adjoining areas. Smoke can be removed to the turbine building or to other areas of the auxiliary building by portable fans and flexible ducting, to be exhausted by the normal ventilation systems.

A.24.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.24.7 Analysis

A.24.7.1 Fire Suppression

Due to very low combustible loading, a fire in this area is highly unlikely. A fire will be detected by the ionization detection system and can be extinguished manually, using the portable extinguishers and/or the hose station in Room 1320. The 3-hour barriers protect the safe shutdown equipment from a fire in all adjacent areas. A fire occurring in this area will be contained by the fire barriers. Adequate drainage is provided to remove the fire-fighting water.

A.24.7.2 Safe Shutdown Capability

This area contain predominately Separation Group 1 circuits and equipment that are redundant to Separation Group 4 circuits and equipment located in the south containment isolation valve room (A-25).

For a fire in this area, motor-driven AFWP B will supply water to steam generators A and D. The CST will provide a suction source unless the circuits on two of three CST level transmitters burn and cause a spurious switchover to the ESW source. The CST and ESW suction valves are not affected by a fire in this area.

Circuits for AL-FT-1 and 7 have been provided with a 3-hour wrap to ensure that the AFWP B discharge valves AL-HV-7 and AL-HV-5 to steam generators A and D do not receive a spurious signal to close.

Therefore, in the event of damage to the equipment in this area due to an exposure fire, redundant or diverse components and systems will be available for safe shutdown.

Fire Area A-25 (Ref. Figure 9.5.1-2, Sheet 2)

A.25.1 Fire Area Description

Containment isolation valve room (south) Room 1322

Major Equipment

Containment isolation valves and piping

A.25.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All penetrations through the fire barriers are fitted with 3-hour penetration seals or those described in Section 9.5.1.2.2.3. Three-hour-rated fire dampers are installed in all HVAC ducting penetrating the fire barriers.

A.25.3 Combustible Loading

Room	Combustible Loading Classification
1322	Low

The combustible loading for this area is negligible.

A.25.4 Fire Protection

An ionization detection system is installed in this area. Manual pull stations are located at the exit doors of this floor. A hose station and two portable extinguishers are located outside the area in Room 1314. Access is from Room 1314 through a 3-hour-rated fire door. For access to Room 1314, see Fire Area A-8. Three 4-inch floor drains are provided in this area. These drains are piped to a sump at El. 1974. The sump is drained to a drain tank in the radwaste building by sump pumps.

A.25.5 Isolation and Smoke Removal

The fire barrier separation and the fire dampers in the HVAC ducting will contain a fire in this area and will also protect this area from a fire in the adjoining areas. Smoke can be removed to the outside or to other areas of the auxiliary building by portable fans and flexible ducting. If vented to other areas of the auxiliary building, the smoke can be exhausted by the auxiliary building normal ventilation system.

A.25.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.25.7 Analysis

A.25.7.1 Fire Suppression

Due to very low combustible loading, a fire in this area is highly unlikely. A fire will be detected by the ionization detection system and can be extinguished manually, using the portable extinguishers and/or hose stations in Room 1314. The 3-hour-rated barriers protect the safe shutdown equipment from a fire in all adjacent areas. A fire occurring within this area will be contained by the fire barriers. Adequate drainage is provided to remove any fire-fighting water.

A.25.7.2 Safe Shutdown Capability

This area contains only Separation Group 4 circuits. Redundant Separation Group 1 equipment is separated by 3-hour-rated fire barriers. Therefore, safe shutdown capability is ensured following a fire in this area.

Fire Area A-26 (Ref. Figure 9.5.1-2, Sheet 3)

A.26.1 Fire Area Description

Chemical storage area
Room 1405

Major Equipment

Decontamination area scrubbers

A.26.2 Design Features

This fire area is separated by 3-hour-rated fire barriers from all adjacent areas and buildings. All penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. Three-hour-rated fire dampers are installed in the HVAC ducting penetrating the fire barriers.

A.26.3 Combustible Loading

Room	Combustible Loading Classification
1405	Low

A.26.4 Fire Protection

An automatic detection system that alarms locally and in the control room is installed in this area. The control room alarms are zoned for quick identification of the specific trouble area. Manual-pull stations are located at the exit doors of this floor. Two hose stations located in Room 1408 are within reach of this area. Two portable extinguishers are located in Room 1408 outside the area.

Access to this area is from Room 1408 through two 3-hour fire doors. For access to Room 1408, see Fire Area A-16. Two 4-inch floor drains are provided in this area. These drains are piped to a sump at El. 1974. The sump is drained to a drain tank in the radwaste building by the sump pumps.

A.26.5 Isolation and Smoke Removal

A fire in this area will be confined by the fire barriers and the fire dampers in the HVAC ducts. Smoke can be removed to the fuel building or to other areas of the auxiliary building by portable fans and flexible ducting. The smoke can then be exhausted by the fuel building and auxiliary building normal ventilation system.

A.26.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.26.7 Analysis

A.26.7.1 Fire Suppression

The fire barrier separation provided for this area will contain a fire in this area and will protect this area from a fire in any of the adjoining areas. The detection system will provide an early warning of a fire. The fire can be extinguished manually, using the hose station and/or portable extinguishers located outside the fire area. Adequate drainage is provided to remove all fire-fighting water. There is no safe shutdown equipment susceptible to water damage in this area.

The resin loading chute for the demineralizers located in El. 2000 is located in this area. Resins are received in a hydrated form, and, therefore, they do not readily ignite or sustain combustion. Administrative controls will ensure that resins only in quantities required for immediate use in recharging the demineralizers will be brought into this area. In the event that the resins dehydrate and ignite, the 3-hour-rated barrier enclosing this area will contain the fire and prevent damage to equipment in adjacent areas. Refer to Section 9.5.1.2.2.5.

A.26.7.2 Safe Shutdown Capability

Only Separation Group 4 safe shutdown conduits are located in this area. In the event of fire damage to these conduits, redundant Separation Group 1 circuits will be available to achieve safe shutdown. Consequently, a fire in this area will not prevent safe shutdown of the plant.

Fire Area A-27 (Ref. Figure 9.5.1-2, Sheet 3)

A.27.1 Fire Area Description

Reactor trip switchgear room
Room 1403

Major Equipment

Reactor trip switchgear, MG sets, load centers, rod control and rod-drive power supply control cabinets, 125-V dc panel

A.27.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. There is one missile door, as described in Section 9.5.1.2.2.3, in this fire area. It separates this fire area from the turbine building. All penetrations through fire barriers are fitted with 3-hour-rated penetration seals. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers.

A.27.3 Combustible Loading

Room	Combustible Loading Classification
1403	Low

A.27.4 Fire Protection

This area is provided with a cross-zoned ionization detection system. Detection by either zone will alarm locally and in the control room. Activation by both zones will initiate the discharge of the Halon 1301 suppression system installed in this area. If one detection zone is not available, detection by the remaining zone alone will activate the Halon system.

The Halon 1301 system installed is capable of attaining a minimal 5 percent concentration. The system is designed to maintain at least a 5-percent concentration at the level of the highest combustible for a soak time of 10 minutes. An activation by any automatic method will sound a local alarm, close required ventilation dampers, shut off associated ventilation and/or air conditioning fan motors, and discharge the system after an adequate time delay for evacuation. The Halon cylinders and the control panel are located outside the fire area. The control panel has a keylock switch to disable system controls during maintenance to prevent any unwanted system actuation. A 100-percent reserve cylinder bank is provided for this system.

A hose station and three portable extinguishers are located within the area. If access to these are blocked by a fire, additional hose stations and portable extinguishers located outside the area in Rooms 1402 and 3503 (communications corridor) are available. Access for manual fire-fighting is from Rooms 1402 and 3503. For access to Rooms 1402 and 3503, see Fire Areas A-16 and CC-1, respectively.

The alarms associated with the fire protection system in this area are shown below:

		Local	Remote (control room)
a.	First zone detection	X	X
b.	Detection by two zones	X	X
c.	Halon system discharge		X
d.	Halon system trouble	X (Visual)	X
e.	HVAC system isolation		X (Visual)

Four 4-inch floor drains are provided in this area. The drains are piped to a sump located at El. 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

A.27.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and isolated by the fire dampers in the HVAC ducts. After a Halon system discharge, smoke can be removed by portable fans and flexible ducting to the communications corridor, turbine building or to the other areas of the auxiliary building. The normal building ventilating systems will then exhaust the smoke.

A.27.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.27.7 Analysis

A.27.7.1 Fire Suppression

The fire barriers enclosing this area will protect this area from a fire in the adjoining areas and will contain a fire within the area until extinguished. The fire will be detected, alarmed, and suppressed by the automatic Halon system. The Halon system discharge or a malfunction will be identified by the alarms described in A.27.4. In the event of a malfunction of the automatic system, the portable extinguishers and/or the hose stations can be used to extinguish the fire. Adequate drainage is provided to drain the fire-fighting water. Should manual fire fighting be required, water damage could result to the electrical equipment in this room (with or without fire damage); however, the water

damage would not prevent safe shutdown. Since the floor in Room 1402 (corridor) slopes away from the doors in this room, water damage due to a sprinkler discharge in adjoining areas is not possible.

A.27.7.2 Safe Shutdown Capability

The redundant Separation Groups 1 and 4 circuits in this area are separated by greater than 20 feet.

When going to cold shutdown, the RCS must be depressurized. Prior to depressurization, the accumulator tanks must be isolated or vented to preclude the release of the nitrogen cover gas into the RCS. The accumulator tanks B and D are to be vented by opening EP-HV-8950B and EP-HV-8950F, respectively.

This room contains circuits for pressurizer PORV BB-PCV-456A and the PORV block valve BB-HV-8000B which are both Train B valves; however, should the PORV fail to the open position and the block valve fail in the as-is open position, the RCS would blow down to the PRT. In this case, the control room operator would place the PORV in manual and close the PORV from the control room

Pressurizer PORV BB-PCV-455A could spuriously open which would require the block valve to be manually closed from the control room.

Pressurizer PORV BB-PCV-456A or 455A will be used to depressurize the RCS for initiation of cold shutdown due to the potential failure of valves in the excess letdown path.

Therefore, based on the fire suppression design features and the physical separation of redundant equipment in this area, a fire would not prevent a safe shutdown.

Fire Area A-28 (Ref. Figure 9.5.1-2, Sheet 3

A.28.1 Fire Area Description	Major Equipment
Auxiliary shutdown panel room Room 1413	Auxiliary shutdown and control panels

A.28.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers. In addition, within the room, the two auxiliary shutdown panels are separated by a 3-hour-rated fire barrier, which contains two normally closed 3-hour-rated doors. One door is located in front and one is located behind the panels.

A.28.3 Combustible Loading

Room	Combustible Loading Classification
1413	Low

A.28.4 Fire Protection

Ionization-type smoke detectors are installed at the ceiling of this fire area. The automatic detection system alarms locally and in the control room. The control room alarms are zoned for quick identification of a specific trouble area. An indicating light located outside the fire area will further aid in identification of the trouble zone. Manual-pull stations are installed adjacent to the exit doors of this floor. A hose station and one portable extinguisher are installed in Room 1408 (corridor) outside the area.

Access for manual fire fighting is from Room 1408 through an alarmed access door. For access to Room 1408, see Fire Area A-16.

A.28.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers and the fire dampers in the HVAC ducts until extinguished. Smoke can be removed either to the turbine building or to adjacent areas of the auxiliary building. The normal ventilation systems will then exhaust the smoke from the adjacent areas.

A.28.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.28.7 Analysis

A.28.7.1 Fire Suppression

The auxiliary shutdown panel is divided into two separate and distinct metal panels that are separated by a 3-hour-rated fire barrier. Each panel contains the controls and instrumentation for one safe shutdown train.

Cable to the panels enter from the top for Separation Group 4 and from below for the redundant Separation Group 1. The Separation Group 1 circuits to the auxiliary shutdown panel enter the panel bottom directly through a penetration seal at the floor. Therefore, no exposed Separation Group 1 raceways appear in the room. The doors to the panels have a locking mechanism to provide for controlled access to the panel interiors as needed. Access to the panel room is controlled and alarmed. The transient combustibles are negligible.

The 3-hour barriers around the room will protect the panels from a fire in one of the adjoining areas. The 3-hour barrier separation between the panels will protect either auxiliary shutdown panel from a fire postulated in the other. The smoke detectors will provide an early warning of a fire either in a cabinet or in the room. The fire can be extinguished manually, using the portable extinguisher.

Internal surfaces of the panels are finished with paint of low flame spread. All cables in these panels meet the vertical flame spread requirements of IPCEA S-19-81 and/or IEEE 383-1974.

A.28.7.2 Safe Shutdown Capability

If a fire were to occur in the auxiliary shutdown panel area, the fire could be in either panel but would be confined to only one panel. Based on the design features discussed above, a postulated fire is not considered capable of disabling both panels. Therefore, if a fire occurs in either auxiliary shutdown panel, there is assurance that the other panel will be protected. Furthermore, a fire in this area will not prevent safe shutdown of the plant.

Fire Area A-29 (Ref. Figure 9.5.1-2, Sheet 2)

A.29.1 Fire Area Description	Major Equipment
Feedwater pump valve compartment Rooms 1304, 1324, 1327	Auxiliary feedwater piping and valves, backup compressed gas accumulator tanks

A.29.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All penetrations through the fire barriers are fitted with 3-hour-rated fire penetration seals. Three-hour fire dampers are installed in all HVAC ducting penetrating the fire barriers.

A.29.3 Combustible Loading

Room	Combustible Loading Classification
1304	Low
1324	Low
1327	Low

A.29.4 Fire Protection

Due to very low combustible loading in this area, a detection system is not installed. Fire extinguishers are located in Rooms 1324 and 1329. A hose station is provided for this room in Room 1329. For specific locations, see Figure 9.5.1-2, Sheet 2. One 4-inch drain is provided in each room. The drains are piped to a sump at El. 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

A.29.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Smoke can be removed by portable fans and flexible ducting to the turbine building or to other areas of the auxiliary building. The normal building ventilation system will then remove the smoke.

A.29.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.29.7 Analysis

A.29.7.1 Fire Suppression

The fire barriers enclosing this area will protect this area from a fire in the adjoining areas and will contain a fire within the area until extinguished. Adequate drainage is provided to drain any fire-fighting water.

A.29.7.2 Safe Shutdown Capability

AFWP A provides water to steam generators B and C. Steam generator B and C PORVs AB-PV-2 and 3 can be manually positioned from the control room if possible. Alternatively, if AB-PV-2 and 3 cannot be controlled from the control room, they can be positioned locally using pneumatic controllers. A fire in this area will not prevent safe shutdown.

Fire Area A-30 (Ref. Figure 9.5.1-2, Sheet 2)

A.30.1 Fire Area Description	Major Equipment
Feedwater pump valve valve compartment Rooms 1305, 1328, 1330	Auxiliary feedwater piping and valves, backup compressed gas accumulator tanks

A.30.2 Design Features

This fire area is separated from all adjoining areas and buildings by 3-hour-rated fire barriers. All penetrations through the fire barriers are fitted with 3-hour-rated fire penetration seals. Three-hour fire dampers are installed in all HVAC ducting penetrating the fire barriers.

A.30.3 Combustible Loading

Room	Combustible Loading Classification
1305	Low
1328	Low
1330	Low

A.30.4 Fire Protection

Due to very low combustible loading in this area, a detection system is not required; however thermal detectors are installed in Rooms 1305 and 1328. Fire extinguishers are located in Rooms 1329 and 1330. A hose station is provided for this room in Room 1329. For specific locations, see Figure 9.5.1-2, Sheet 2. One 4-inch drain is provided in each room. The drains are piped to a sump at El. 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

A.30.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Smoke can be removed by portable fans and flexible tubing to the turbine building or to other areas of the auxiliary building. The normal building ventilation system will then remove the smoke.

A.30.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

A.30.7 Analysis

A.30.7.1 Fire Suppression

The fire barriers enclosing this area will protect this area from a fire in the adjoining areas and will contain a fire within the area until extinguished. Adequate drainage is provided to drain the fire-fighting water.

A.30.7.2 Safe Shutdown Capability

AFWP B provides water to steam generators A and D. The CST will be the source of water unless two of three CST level transmitters burn and spuriously switch the suction source to ESW. The ESW valve in the suction of AFWP B is not affected by a fire in this area. A fire in this area will not affect safe shutdown of the plant.

Fire Area A-31

This fire area has been deleted.

Fire Area A-32

This fire area has been deleted.

Fire Area C-1 (Ref. Figure 9.5.1-2, Sheet 1)

C.1.1 Fire Area Description

Pipe space and tank area control building, El. 1974 Room 3101, 3104

Major Equipment

ESW piping and motor-operated isolation valves, detergent drain tank and pumps, control building floor and equipment, drain sump pumps, chemical equipment, drains sump pumps, and washing machine hot water heater

C.1.2 Design Features

The area is separated from adjoining areas by 3-hour-rated ceiling and walls. Rooms 3101 and 3104 are separated by a qualified 2-hour-rated barrier. All cable and piping penetrations through the barriers have 3-hour-rated penetration seals. Ducts penetrating the barriers have 3-hour-rated fire dampers.

C.1.3 Combustible Loading

Room	Combustible Loading Classification
3101	Low
3104	Low

C.1.4 Fire Protection

This fire area is provided with ionization smoke detectors in the area of the ESW motor-operated isolation valves to provide early warning of a fire in this area as described in Table 9.5B-3.

Two manual hose stations are located within the area (Ref. Figure 9.5.1-2, Sheet 1).

An automatic wet pipe system is provided for Room 3101. The system is designed on an ordinary schedule for head quantities. Adequate floor drains are provided in the area to remove sprinkler discharge without appreciable accumulation.

Portable extinguishers are located within the area and in the corridor outside access doors between the control building and the auxiliary building (Room 1101).

C.1.5 Isolation and Smoke Removal

A fire in the area will be contained by the 3-hour-rated barriers and the fire dampers in the HVAC ducts. Smoke can be removed by portable fans and flexible ducting to the outdoors through the grade level doors in the north side of the communications corridor.

C.1.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.1.7 Analysis

C.1.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the ionization detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the wet pipe system. Should the automatic suppression system fail, manual hose streams and extinguishers can be used to extinguish the fire.

C.1.7.2 Safe Shutdown Capability

Room 3101 contains redundant ESW system isolation valves required to isolate the ESW system from the service water system. These valves have widely separated redundant counter-parts and are provided with automatic smoke detectors. In addition, the combustible loading for this area is very low.

These design features are supplemented by the addition of a fixed automatic water suppression system to satisfy the requirements of 10 CFR 50, Appendix R. Therefore, a fire in this area will not prevent safe shutdown of the plant.

Fire Area C-2 (Ref. Figure 9.5.1-2, Sheet 1)

C.2.1 Fire Area Description

North vertical cable chase, control building. El. 1974 to 1984.
Room 3106

Major Equipment

Electric cable only

C.2.2 Design Features

The area is separated from adjoining areas by 3-hour-rated ceiling and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.2.3 Combustible Loading

Room	Combustible Loading Classification
3106	Moderate

C.2.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the door will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3101 which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler systems is by portable extinguishers and manual hose stations located in Fire Area C-1. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 2 foot 8 inch by 4 foot 6 inch, 3-hour-rated fire door.

C.2.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level doors in the north side of the communications corridor.

C.2.6 Safe Shutdown Equipment

No safe shutdown equipment or cable is located in this fire area.

C.2.7 Analysis

C.2.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barrier and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.2.7.2 Safe Shutdown Capability

Since there are no safe shutdown equipment or circuits in this area, fire damage to this area will not prevent safe shutdown.

Fire Area C-3 (Ref. Figure 9.5.1-2, Sheet 1)

C.3.1 Fire Area Description

South vertical cable chase, control building. El. 1974 to 1984.
Room 3105

Major Equipment

Electric cable only

C.3.2 Design Features

The area is separated from all adjoining areas by 3-hour-rated ceiling and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.3.3 Combustible Loading

Room	Combustible Loading Classification
3105	High

C.3.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3101, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-1. Drainage in this area is by one 4-inch floor drain. This

is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 2 foot 8 inch by 4 foot 6 inch 3-hour-rated door.

C.3.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level doors in the north side of the communications corridor.

C.3.6 Safe Shutdown Equipment

No safe shutdown equipment or cable is located in this fire area.

C.3.7 Analysis

C.3.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.3.7.2 Safe Shutdown Capability

Since no safe shutdown equipment is located in this area, a fire in the area will not prevent safe shutdown.

Fire Area C-4

This fire area has been deleted. The area above the acoustical ceiling is now included in Fire Areas C-5 and C-6.

Fire Area C-5 (Ref. Figure 9.5.1-2, Sheet 1)

C.5.1 Fire Area Description

Access control area above and below suspended ceiling Rooms 3212 through 3224, 3233, 3236, 3237

Major Equipment

Electric cable, contamination monitoring equipment medical supplies, and office equipment

C.5.2 Design Features

This fire area is separated from adjacent areas by 3-hour-rated walls and ceiling. The safe shutdown cable is separated from the access control area below by a noncombustible suspended ceiling. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour fire dampers. A 3-hour-rated counter fire door is provided to separate this area from the dumbwaiter enclosure.

C.5.3 Combustible Loading

Room	Combustible Loading Classification
*AC	Low
3212	Low
3213	Low
3214	Low
3215	Moderate
3216	High
3217	Low
3218	Moderate
3219	Low
3220	Moderate
3221	Low
3222	Moderate
3223	Moderate
3224	Low
3233	Moderate
3236	High
3237	High

* AC = above ceiling.

C.5.4 Fire Protection

Ionization-type detectors are installed above and below the suspended ceiling as detailed in Table 9.5B-3. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from the access control area. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided in the corridors within the access control area, as indicated in Figure 9.5.1-2, Sheet 1.

An automatic wet pipe sprinkler system is provided in this area above and below the suspended ceiling as detailed in Table 9.5B-4. Water flow in the system is alarmed in the main control room. Adequate floor drains are provided to remove sprinkler discharge without appreciable accumulation. Any sprinkler discharge in the area above the suspended ceiling will drain through the suspended ceiling to the access control area below.

C.5.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.5.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.5.7 Analysis

C.5.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire occurs, the automatic suppression system will actuate and extinguish the fire. In the event of failure of the automatic system, the manual hose stations provide the capability of extinguishing the fire.

The majority of the cable trays in this area are no more than 12 feet above the floor elevation, and no trays are more than 14 feet above the floor. Consequently, a fire in these cable trays can be extinguished by manual hose stations (assuming failure of the automatic wet pipe sprinkler system above the trays) from the floor below.

C.5.7.2 Safe Shutdown Capability

Since this area contains only Separation Group 1 cable, fire damage to this area will not prevent safe shutdown since the redundant Separation Group 4 circuits, separated by 3-hour barriers, will be available.

Fire Area C-6 (Ref. Figure 9.5.1-2, Sheet 1)

C.6.1 Fire Area Description

Access control area above and below suspended ceiling Rooms 3201 through 3211, 3231, 3232, 3234, 3235

Major Equipment

Electric cable, laundry machinery, and office equipment

C.6.2 Design Features

This fire area is separated from adjacent areas by 3-hour-rated walls and ceiling, except the stairway enclosure which is 2-hour rated. The safe shutdown cable is separated from the access control area below by a noncombustible suspended ceiling. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.6.3 Combustible Loading

C.6.3.1 Fixed Combustibles

Room	Combustible Loading Classification
*AC-1	Low
3201	Low
3202	Moderate
3203	High
3204	Low
3205	Moderate
3206	High
3207	Moderate
3208	Moderate
3209	Low
3210	High
3211	Low
3231	Moderate
3232	Moderate
3234	Moderate
3235	Low

* AC-1 = above ceiling.

C.6.4 Fire Protection

Ionization-type detectors are installed above and below the suspended ceiling as detailed in Table 9.5B-3. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from the access control area. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided in the corridors within the access control area, as indicated in Figure 9.5.1-2, Sheet 1. An automatic wet pipe sprinkler system is provided for this area above and below the suspended ceiling as detailed in Table 9.5B-4. Water flow in the system is alarmed in the main control room. Adequate floor drains are provided in the area below this fire area to remove sprinkler discharge without appreciable accumulation. Sprinkler discharge in the area above the suspended ceiling will drain through the suspended ceiling to the access control area below.

C.6.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.6.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.6.7 Analysis

C.6.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire occurs, the automatic suppression system will actuate and extinguish the fire. In the event of the failure of the automatic system, the manual hose stations are capable of extinguishing the fire.

The majority of the cable trays in this area are no more than 12 feet above the floor elevation, and no trays are more than 14 feet above the floor. Consequently, a fire in these cable trays can be extinguished by manual hose stations (assuming failure of the automatic wet pipe sprinkler system above the trays) from the floor below.

C.6.7.2 Safe Shutdown Capability

Since this area contains only Separation Group 4 cable, fire damage will not prevent safe shutdown. Since the redundant Separation Group 1 circuits, separated by 3-hour-rated fire barriers, will be available.

Fire Area C-7 (Ref. Figure 9.5.1-2, Sheet 1)

C.7.1 Fire Area Description

North vertical cable chase, control building. El. 1984 to 2000.
Room 3230

Major Equipment

Electric cable only

C.7.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.7.3 Combustible Loading

Room	Combustible Loading Classification
3230	Very High

C.7.4 Fire Protection

Ionization smoke detectors are provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent area, which alarms locally and in the control room. An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system	X	X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler systems is by portable extinguishers and manual hose stations located in the access control area. Drainage in this area is by one 4-inch floor

drain. This is more than adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.7.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level doors in the north side of the communications corridor.

C.7.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.7.7 Analysis

C.7.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers until extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.7.7.2 Safe Shutdown Capability

Since there are no safe shutdown equipment or circuits in this area, fire damage to this area will not prevent safe shutdown.

Fire Area C-8 (Ref. Figure 9.5.1-2, Sheet 1)

C.8.1 Fire Area Description

South vertical cable chase, control building. El. 1984 to 2000.
Room 3229

Major Equipment

Electric cable only

C.8.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.8.3 Combustible Loading

Room	Combustible Loading Classification
3229	High

C.8.4 Fire Protection

Ionization smoke detectors are provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent area, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system	X	X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in the access control area. Drainage in this area is by one 4-inch floor drain. This is more than adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.8.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through grade level doors in the west side of the control building.

C.8.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.8.7 Analysis

C.8.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barrier and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.8.7.2 Safe Shutdown Capability

Since there are no safe shutdown equipment or circuits in this area, fire damage to this area will not prevent safe shutdown.

Fire Area C-9 (Ref. Figure 9.5.1-2, Sheet 2)

C.9.1 Fire Area Description

ESF switchgear room, north
Room 3301

Major Equipment

Electric cable, ESF switchgear, load center unit substations

C.9.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling. There is one missile door, as discussed in Section 9.5.1.2.2.3, in this fire area. It separates this fire area from the communications corridor. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetrations seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.9.3 Combustible Loading

Room	Combustible Loading Classification
3301	Low

C.9.4 Fire Protection

This area is provided with a cross-zoned ionization detection system. Detection by either zone will alarm locally and in the control room. Activation by both zones will initate the discharge of the Halon 1301 suppression system installed in this area. If one detection zone is not available, detection by the remaining zone alone will activate the Halon system.

The Halon 1301 system installed is capable of attaining a minimum 5-percent concentration. The system is designed to maintain at least a 5-percent concentration at the level of the highest combustible for a soak time of 10 minutes. An activation station is provided to discharge the system manually. An automatic activation will sound a local alarm, close required ventilation dampers, shut off associated ventilation and/or air-conditioning fan motors, and discharge the system after an adequate time delay for evacuation.

The Halon cylinders and the control panel are located outside the fire area. The control panel has a keylock switch to disable system controls during maintenance to prevent any unwanted system actuation. A 100-percent reserve cylinder bank is provided for this system.

Manual-pull fire alarm stations are located near the exit doorway from this area. The pull station alarms locally and in the control room.

Hose stations and portable extinguishers are provided in this fire area, as indicated in Figure 9.5.1-2, Sheet 2.

The alarms associated with the fire protection system in this area are shown below:

	Condition	Local	Remote (control room)
a.	First zone detection	X	X
b.	Detection by both zones	X	X
c.	Halon system discharge		X
d.	Halon system trouble	X (Visual)	X
e.	HVAC system isolation		X (Visual)

C.9.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other area of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.9.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.9.7 Analysis

C.9.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the detection system. Normally, since this is an unoccupied area, both zones of ionization detection would trip during a fire and the Halon system would discharge. In the event of the failure of the Halon system (identified by the alarms described in C.9.4) the fire can be extinguished manually with the portable extinguishers and/or hose stations after high-voltage equipment is de-energized. The area is accessible through two double doorways in the south wall and one double doorway in the north wall.

C.9.7.2 Safe Shutdown Capability

This fire area contains Separation Group 1 circuits and switchgear. The redundant Separation Group 4 circuits and equipment, with one exception, are in another area

separated by 3-hour-rated fire barriers, and would be available for safe shutdown in the event of a fire in this area.

The exception, Cable 24EFB01NJ, is routed into this area as part of the ESW pump control logic. This cable is separately fused with proper coordination. The downstream circuit is not required for safe shutdown.

Fire Area C-10 (Ref. Figure 9.5.1-2, Sheet 2)

C.10.1 Fire Area Description

ESF switchgear room, south
Room 3302

Major Equipment

Electric cable ESF switchgear, load center unit substations

C.10.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour penetrations seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.10.3 Combustible Loading

Room	Combustible Loading Classification
3302	Low

C.10.4 Fire Protection

Manual-pull fire alarm station is located near the exit doorways from this area. The pull station alarms locally and in the control room. Hose stations and portable extinguishers are provided in this fire area, as indicated in Figure 9.5.1-2, Sheet 2.

This area is provided with a cross-zone ionization detection system. Detection by either zone will alarm locally and in the control room. Activation by both zones will initiate the discharge of the Halon 1301 suppression system installed in this area. If one detection zone is not available, detection by the remaining zone alone will activate the Halon system.

The Halon 1301 system installed is capable of attaining a minimum 5-percent concentration with a nominal 10-second discharge time. The system is designed to maintain at least a 5-percent concentration at the level of the highest combustible for a soak time of 10 minutes. An activation station is provided to discharge the system manually. An automatic activation will alarm, close required ventilation dampers, shut off associated ventilation and/or air conditioning fan motors, and discharge the system after an adequate time delay for evacuation.

The Halon cylinders and the control panel are located outside the fire area. The control panel has a keylock switch to disable system controls during maintenance to prevent any unwanted system actuation. A 100-percent reserve cylinder bank is provided for this system.

The alarms associated with the fire protection system in this area are shown below.

	Condition	Local	Remote (control room)
a.	First zone detection	X	X
b.	Detection by both zones	X	X
c.	Halon system discharge		X
d.	Halon system trouble	X (Visual)	X
e.	HVAC system isolation		X (Visual)

C.10.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.10.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.10.7 Analysis

C.10.7.1 Fire Suppression

A fire in this area will be detected and alarmed by either zone of detection. Normally, since this is an unoccupied area, both zones of ionization detection would trip during the fire and the Halon system would discharge. In the event of a failure of the Halon system (identified by the alarms described in C.10.4) the fire can be extinguished manually with the portable extinguishers and/or hose stations after high-voltage equipment is de-energized. The area is accessible through two double doorways in the north wall.

C.10.7.2 Safe Shutdown Capability

This area contains mostly Separation Group 4 circuits and switchgear. The redundant Separation Group 1 circuits and equipment, with one exception, are in another area

separated by 3-hour-rated fire barriers, and would be available for safe shutdown in the event of a fire in this area.

The exception, cable 21EFB01NJ, is routed into this area as part of the ESW pump control logic. This cable is separately fused with proper coordination. The downstream circuit is not required for safe shutdown.

AFWP A provides water to steam generators B and C. Steam generator B and C PORVs AB-PV-2 and 3 can be manually positioned from the control room if possible (Note: S/G B PORV control cables are located in this fire zone and could be damaged by the fire). Alternatively, if AB-PV-2 and 3 cannot be controlled from the control room, they can be positioned locally using pneumatic controllers. A fire in this area will not prevent safe shutdown.

Fire Area C-11 (Ref. Figure 9.5.1-2, Sheet 2)

C.11.1 Fire Area Description

South vertical cable chase, control building. El. 2000 to 2016.
Room 3305

Major Equipment

Electric cable only

C.11.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.11.3 Combustible Loading

Room	Combustible Loading Classification
3305	Moderate

C.11.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent area (C-10), which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and the manual hose stations located in Fire Area C-10. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.11.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level doors in the north side of the communications corridor.

C.11.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.11.7 Analysis

C.11.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barrier and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.11.7.2 Safe Shutdown Capability

Since only Separation Group 4 cables are in this area, the redundant Separation Group 1 cables, separated by 3-hour-rated fire barriers, are available for safe shutdown.

Fire Area C-12 (Ref. Figure 9.5.1-2, Sheet 2)

C.12.1 Fire Area Description

North vertical cable chase, control building. El. 2000 to 2016.
Room 3306

Major Equipment

Electric cable only

C.12.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.12.3 Combustible Loading

Room	Combustible Loading Classification
3306	Moderate

C.12.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent area (C-9), which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-9. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.12.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.12.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.12.7 Analysis

C.12.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.12.7.2 Safe Shutdown Capability

Since only Separation Group 1 cables are in this area, the redundant Separation Group 4 cables, separated by 3-hour-rated fire barriers, will be available for safe shutdown.

Fire Area C-13 (Ref. Figure 9.5.1-2, Sheet 2)

C.13.1 Fire Area Description

Class IE air conditioning equipment room No. 1
Room 3415

Major Equipment

Class IE electrical equipment ac unit, control room pressurization fan, and control room pressurization system filter adsorber unit

C.13.2 Design Features

This fire area is separated from all adjoining areas by 3-hour-rated walls, floor, and ceiling. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour fire dampers.

C.13.3 Combustible Loading

Room	Combustible Loading Classification
3415	Low

C.13.4 Fire Protection

Ionization-type detectors are installed in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this elevation of the control building. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided in the corridors just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 2. The charcoal adsorber unit is provided with thermistor-type temperature detectors downstream of the charcoal bed, which alarm in the control room at high airstream temperature, and a manual water spray system as described in Appendix 9.5A.

C.13.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.13.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.13.7 Analysis

C.13.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system and extinguished by the manual spray system. In the event of system failure, the fire can be extinguished manually with the portable extinguishers and/or hose stations. The area is accessible through the door from the adjacent corridor.

C.13.7.2 Safe Shutdown Capability

Since only Separation Group 4 conduits and equipment are located in this area, the redundant Separation Group 1 equipment, separated by 3-hour-rated fire barriers, is available for safe shutdown.

Fire Area C-14 (Ref. Figure 9.5.1-2, Sheet 2)

C.14.1 Fire Area Description

Class IE air conditioning equipment room No. 2
Room 3416

Major Equipment

Class IE electrical equipment ac unit, control room pressurization fan, and control room pressurization system filter adsorber unit

C.14.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling. All cable and piping penetration through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour fire dampers.

C.14.3 Combustible Loading

Room	Combustible Loading Classification
3106	Low

C.14.4 Fire Protection

Ionization-type detectors are installed in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this elevation of the control building. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided in the corridors just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 2. The charcoal adsorber unit is provided with thermistor-type temperature detectors downstream of the charcoal bed, which alarm in the control room at high airstream temperature, and a manual spray system as described in Appendix 9.5A.

C.14.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.14.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.14.7 Analysis

C.14.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system and extinguished by the manual spray system. In the event of system failure, the fire can be extinguished manually with the portable extinguishers and/or hose stations. The area is accessible through the door from the adjacent corridor.

C.14.7.2 Safe Shutdown Capability

Since only Separation Group 1 conduits and equipment are located in this area, the redundant Separation Group 4 equipment, separated by 3-hour-rated fire barriers, is available for safe shutdown.

Fire Area C-15 (Ref. Figures 9.5.1-2, Sheet 2)

C.15.1 Fire Area Description

Battery and switchboard rooms (south), control building. El. 2016. Rooms 3403, 3404, 3405, 3410, 3411

Major Equipment

Switchgear, batteries, battery chargers, panels, inverters, transformers, and electric cable

C.15.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floors, and ceilings. The area includes five separate rooms divided by 3-hour-rated fire walls. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.15.3 Combustible Loading

Room	Combustible Loading Classification
3403	Low
3404	Low
3405	Low
3410	Low
3411	Low

C.15.4 Fire Protection

Each room in this fire area has at least one zone of ionization fire detectors. The detection system alarms locally and in the control room when a zone actuates. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this floor elevation. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided in the corridors just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 2. The hose stations can reach all rooms in this area.

C.15.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

The battery rooms in this fire area serving each of the safeguards equipment trains in the safe shutdown areas are served by two systems--the control building supply air system and the Class IE ac unit. Loss of either or both of these systems will be alarmed in the

control room via the plant computer. Each battery room is also provided with a hydrogen detector which will alarm in the control room whenever the hydrogen concentration exceeds 2 volume percent in any one of the battery rooms.

The control building supply air system supplies outside air to each of the four dc switchgear rooms. This air is exhausted from the switchgear rooms through the battery rooms by the control building exhaust system. The supply air system and the exhaust system provide approximately one air change per hour in each battery room.

Battery rooms 1, 3 and 2, 4 are each served by the Class IE ac system. Each battery room is supplied and exhausted separately. The Class IE ac systems each operate in a completely recirculating mode at all times. These systems also serve their respective ESF switchgear and dc switchgear rooms. It has been conservatively calculated that with no fresh air the system can operate for approximately 3 days before the hydrogen concentration reaches 3 volume percent.

All ductwork penetrations of the battery rooms are provided with 3-hour fire dampers.

C.15.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.15.7 Analysis

C.15.7.1 Fire Suppression

A fire in any of the rooms in this area will be detected and alarmed by the ionization detection system. The fire can be extinguished manually with the portable extinguishers and/or hose streams. This area is accessible through any of the four doors opening into the access corridor.

C.15.7.2 Safe Shutdown Capability

Since this area contains only Separation Groups 2 and 4 equipment and cable, fire damage to this area will not prevent safe shutdown of the plant. The redundant Separation Groups 1 and 3 equipment and cable, separated by 3-hour-rated fire barriers, will still be available.

FSAR Section 8.3.2 provides a discussion of the loads on each Class IE dc system separation group.

Fire Area C-16 (Ref. Figure 9.5.1-2, Sheet 2)

C.16.1 Fire Area Description

Battery and switchboard rooms (north), control building. El. 2016
Rooms 3408, 3409, 3407, 3413, 3414

Major Equipment

Switchgear, batteries, battery chargers, panels, inverters, transformers, and electric cable

C.16.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floors, and ceilings. The area includes five separate rooms divided by 3-hour-rated fire walls. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.16.3 Combustible Loading

Room	Combustible Loading Classification
3407	Low
3408	Low
3409	Low
3413	Low
3414	Low

C.16.4 Fire Protection

Each room in this fire area has at least one zone of ionization fire detectors. The detection system alarms locally and in the control room when either zone actuates. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this floor elevation. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided in the corridors just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 2. The hose stations can reach all the various rooms in this area.

C.16.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

The battery rooms in this fire area serving each of the safeguards equipment trains in the safe shutdown areas are served by two systems--the control building supply air system and the Class IE ac unit. Loss of either or both of these systems will be alarmed in the control room via the plant computer. Each battery room is also provided with a hydrogen detector which will alarm in the control room whenever the hydrogen concentration exceeds 2 volume percent in any one of the battery rooms.

The control building supply air system supplies outside air to each of the four dc switchgear rooms. This air is exhausted from the switchgear rooms through the battery rooms by the control building exhaust system. The supply air system and the exhaust system provide approximately 1 air change per hour in each battery room.

Battery rooms 1, 3 and 2, 4 are each served by the Class IE ac system. Each battery room is supplied and exhausted separately. The Class IE ac systems each operate in a completely recirculating mode at all times. These systems also serve their respective ESF switchgear and dc switchgear rooms. It has been conservatively calculated that with no fresh air the system can operate for approximately 3 days before the hydrogen concentration reaches 3 volume percent.

All ductwork penetrations of the battery rooms are provided with 3-hour fire dampers.

C.16.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.16.7 Analysis

C.16.7.1 Fire Suppression

A fire in any of the rooms in this area will be detected and alarmed by the ionization detection system.

The fire can be extinguished manually with the portable extinguishers and/or hose streams. This area is accessible through any of the four doors opening into the access corridor.

C.16.7.2 Safe Shutdown Capability

Since this area contains only Separation Groups 1 and 3 equipment and cable, fire damage to this area will not prevent safe shutdown of the plant. The redundant

Separation Groups 2 and 4 equipment and cable, separated by 3-hour-rated fire barriers, will still be available.

FSAR Section 8.3.2 provides a discussion of the loads on each Class 1E dc system separation group.

Fire Area C-17 (Ref. Figure 9.5.1-2, Sheet 2)

C.17.1 Fire Area Description

South vertical cable chase, control building. El. 2016 to 2032.
Room 3418

Major Equipment

Electric cable only

C.17.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.17.3 Combustible Loading

Room	Combustible Loading Classification
3418	Moderate

C.17.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from this floor elevation which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in the access corridor (3401) at this elevation. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system

discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.17.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.17.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.17.7 Analysis

C.17.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.17.7.2 Safe Shutdown Capability

Failure by fire of all circuits contained in this area will not prevent safe shutdown of the plant. Since only Separation Group 4 cables are located in this area, the redundant Separation Group 1 cables, separated by 3-hour-rated fire barriers, are available for safe shutdown.

Fire Area C-18 (Ref. Figure 9.5.1-2, Sheet 2)

C.18.1 Fire Area Description

North vertical cable chase, control building. El. 2016 to 2032
Room 3419

Major Equipment

Electric cable only

C.18.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.18.3 Combustible Loading

Room	Combustible Loading Classification
3419	Low

C.18.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from this floor elevation which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in the access corridor (3401) at this elevation. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.18.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.18.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.18.7 Analysis

C.18.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.18.7.2 Safe Shutdown Capability

Only Separation Group 1 circuits are located in this fire area. Those circuits redundant to this separation group are separated from this area by a qualified 3-hour-rated barrier. Therefore, loss of all circuits in this area will not prevent the safe shutdown of the plant.

Fire Area C-19 (Ref. Figure 9.5.1-2, Sheet 2)

C.19.1 Fire Area Description

Cable chase at column line C-3, control building El. 2016 to 2032

Major Equipment

Electric cable only

C.19.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.19.3 Combustible Loading

Room	Combustible Loading Classification
N/A	Very High

C.19.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from this floor elevation, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in the access corridor (3401) at this elevation. Drainage in this area is

by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.19.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.19.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.19.7 Analysis

C.19.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.19.7.2 Safe Shutdown Capability

Since this area has only Separation Group 3 circuits in it, a fire will not damage Separation Groups 1, 2, and 4 and, therefore, not prevent safe shutdown.

Fire Area C-20 (Ref. Figure 9.5.1-2, Sheet 2)

C.20.1 Fire Area Description

Cable chase at column line C-6, control building El. 2016 to 2032

Major Equipment

Electric cable only

C.20.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.20.3 Combustible Loading

Room	Combustible Loading Classification
N/A	High

C.20.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from this floor elevation, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in the access corridor (3401) at this elevation. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system

discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.20.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.20.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.20.7 Analysis

C.20.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.20.7.2 Safe Shutdown Capability

Since this area only has Separation Group 2 trays in it, a fire will not damage Separation Groups 1, 3, and 4 and therefore, not prevent safe shutdown.

Fire Area C-21 (Ref. Figure 9.5.1-2, Sheet 3)

C.21.1 Fire Area Description

Fire Area Description	Major Equipment
Lower cable spreading room Room 3501	Electric cable

C.21.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling. This area has one missile door as described in Section 9.5.1.2.2.3. It separates this fire area from the communications corridor. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetrations seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.21.3 Combustible Loading

Room	Combustible Loading Classification
3501	Low

C.21.4 Fire Protection

Ionization-type detectors are installed in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorway from this area. The pull station alarms locally and in the control room. Hose stations and portable extinguishers are provided in this fire area, as indicated in Figure 9.5.1-2, Sheet 3. This area is provided with an automatic preaction sprinkler system with closed head spray nozzles as detailed in Table 9.5B-4. The system is based on NFPA No. 13 with a design flow rate of 0.3 gpm per square foot. Total system flow is based on actuation of all heads over the most remote 3,000-square-foot floor area. Adequate floor drainage capacity is provided in this area to remove sprinkler system discharge without appreciable accumulation.

The alarms associated with the fire protection system in this area are shown below.

	Condition	Local	Remote (control room)
a.	Detection by ionization detectors	X	X
b.	Sprinkler deluge valve tripped		X
c.	Sprinkler trouble alarms (loss of power, low air pressure)		X
d.	Isolation valves on the supply line not fully open		X

C.21.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other area of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.21.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.21.7 Analysis

C.21.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. Detector actuation will also open the sprinkler system deluge valve, thus charging the system piping. In the event that a fire occurs, the automatic sprinkler system will discharge and extinguish the fire. Should the automatic system fail to operate (identified by the alarms described in C.21.4), the fire would be extinguished by the manual hose stations. This area is accessible from the stairway at the south end and the communications corridor at the north end of the area.

C.21.7.2 Safe Shutdown Capability

In the event of fire damage to the safe shutdown circuits in this area, the redundant circuits located in the upper cable spreading room will be available for safe shutdown of the plant.

Fire Area C-22 (Ref. Figure 9.5.1-2, Sheet 4)

C.22.1 Fire Area Description

Upper cable spreading room
Room 3801

Major Equipment

Electric cable

C.22.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling. This area has one missile door as described in Section 9.5.1.2.2.3. It separates this fire area from the communications corridor. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.22.3 Combustible Loading

Room	Combustible Loading Classification
3801	Low

C.22.4 Fire Protection

Ionization-type detectors are installed in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this area. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided in the corridors within this fire area, as indicated in Figure 9.5.1-2, Sheet 4.

This area is provided with an automatic preaction sprinkler system with closed head nozzles as detailed in Table 9.5B-4. The system is based on NFPA No. 13 with a design flow rate of 0.3 gpm per square foot. Total system flow is based on actuation of all heads over the most remote 3,000-square-foot floor area. Adequate floor drainage capacity is provided in this area to remove sprinkler system discharge without appreciable accumulation. Floor penetrations in this area are provided with raised sleeves or curbs, and all penetrations have watertight seals to prevent water damage in the control room below during fire-fighting operations in this area.

The alarms associated with the fire protection system in this area are shown below:

		Local	Remote (control room)
a.	Detection by ionization detectors	X	X
b.	Sprinkler deluge valve tripped		X

		Local	Remote (control room)
c.	Sprinkler trouble alarms (loss of power, low air pressure)		X
d.	Isolation valve on the supply line not fully open		X

C.22.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.22.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.22.7 Analysis

C.22.7.1 Fire Suppresion

A fire in this area will be detected and alarmed by the automatic detection system. Detector actuation will also open the sprinkler system deluge valve, thus charging the system piping.

In the event that a fire occurs, the automatic sprinkler system will discharge and extinguish the fire. Should the automatic system fail to operate (identified by the alarms described in C.22.4), the fire would be extinguished by the manual hose stations. This area is accessible from the stairway at the south end and the communications corridor at the north end of the area.

C.22.7.2 Safe Shutdown Capability

In the event of fire damage to the safe shutdown circuits in this area, the redundant circuits located in the lower cable spreading room will be available for safe shutdown of the plant.

Fire Area C-23 (Ref. Figure 9.5.1-2, Sheet 3)

C.23.1 Fire Area Description

South vertical cable chase, control building. El. 2032 to 2047-6.
Room 3505

Major Equipment

Electric cable only

C.23.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.23.3 Combustible Loading

Room	Combustible Loading Classification
N/A	High

C.23.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3501 which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-21. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.23.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.23.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.23.7 Analysis

C.23.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system.

In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.23.7.2 Safe Shutdown Capability

Since this area contains only Separation Group 4 circuits, a fire will not disable redundant cable or components. Therefore, a fire in this area will not prevent the safe shutdown of the plant.

Fire Area C-24 (Ref. Figure 9.5.1-2, Sheet 3)

C.24.1 Fire Area Description

Fire Area Description	Major Equipment
North vertical cable chase, control building. El. 2032 to 2047-6. Room 3504	Electric cable only

C.24.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.24.3 Combustible Loading

Room	Combustible Loading Classification
3504	High

C.24.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3501, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-21. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.24.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.24.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.24.7 Analysis

C.24.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system.

In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.24.7.2 Safe Shutdown Capability

Since this area contains only Separation Group 1 circuits, a fire will not disable redundant cable or components. Therefore, a fire in this area will not prevent the safe shutdown of the plant.

Fire Area C-25 (Ref. Figure 9.5.1-2, Sheet 3)

C.25.1 Fire Area Description

Cable chase at column line C-6, control building.
El. 2032 to 2047-6

Major Equipment

Electric cable only

C.25.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.25.3 Combustible Loading

Room	Combustible Loading Classification
N/A	Very High

C.25.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3501, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-21. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.25.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level doors in the west side of the control building.

C.25.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.25.7 Analysis

C.25.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.25.7.2 Safe Shutdown Capability

This fire area contains only Separation Group 2 trays and conduits. The redundant Separation Groups 1, 3, and 4 trays and conduits are separated by qualified 3-hour-rated barriers. Fire damage to this area will not prevent the safe shutdown of the plant.

Fire Area C-26 (Ref. Figure 9.5.1-2, Sheet 3)

C.26.1 Fire Area Description

Vertical cable chase at column line C-3, control building
El. 2032 to 2047-6

Major Equipment

Electric cable only

C.26.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.26.3 Combustible Loading

Room	Combustible Loading Classification
N/A	Very High

C.26.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3501, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-21. Drainage in this area is by one 4-inch floor drain. This is more than adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.26.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.26.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.26.7 Analysis

C.26.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.26.7.2 Safe Shutdown Capability

This fire area contains only Separation Group 3 trays. The redundant Separation Groups 1, 2, and 4 trays are separated by qualified 3-hour-rated fire barriers. Fire damage to this area will not prevent the safe shutdown of the plant.

Fire Area C-27 (Ref. Figure 9.5.1-2, Sheet 4)

C.27.1 Fire Area Description	Major Equipment
Control room area Rooms 3601, 3603-3606	Main control board equipment cabinets, electric cable

C.27.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling, with the exception of the stairway enclosure which is 2-hour rated. This area has one missile door as described in Section 9.5.1.2.2.3. It separates this fire area from the communications corridor. The following rooms at this elevation of the control building are not considered part of the control room and are separated from the control room by 3-hour barriers:

a.	3609	SAS room (See Fire Area C-29)
b.	3602	Pantry (See Fire Area C-28)
c.	3607	Toilet (See Fire Area C-28)
d.	3608	Janitor's closet (See Fire Area C-28)

All penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

Some electric cable is routed above the suspended ceiling over Room 3601; however, none of these circuits are required for a safe shutdown. The floor of Room 3601 contains nine cable trenches (3 inches deep), which continue up the height of the west wall in the control room. The trenches are covered by steel plates, and the vertical chases are faced with sheet rock (not rated). A 3-hour-rated barrier is provided between each vertical cable chase. Access panels are provided for each chase at several elevations within the control room, and the steel covers on the trenches are removable for manual fire-fighting access. All cables from one load group (Separation Groups 1, 3, and 5) feed into the control room equipment from below, while cables from the other load group (Separation Groups 2, 4, and 6) feed from above.

Internal surfaces of control panels are finished with paint of low flame spread. All cables in these panels meet the vertical flame requirements of ICEA S-19-81 and/or IEEE 383-1974 for flame resistance. Cable separation is in accordance with Regulatory Guide 1.75.

C.27.3 Combustible Loading

C.27.3.1 Fixed Combustibles

Room	Combustible Loading Classification
3603	Moderate
3604	Low
3605	Low
3606	Very High

C.27.4 Fire Protection

Ionization-type detectors are installed in each room except the control room foyer. Ionization-type detectors are also installed in panels which contain both trains of redundant safety-related conduit, cable, or wire required for safe shutdown as described in Table 9.5B-3. Manual-pull fire alarm stations are located near the exit doorways from this area. The pull stations alarm locally. Hose stations and portable extinguishers are provided within this fire area, as indicated in Figure 9.5.1-2, Sheet 4.

Peripheral Rooms 3602, 3607, 3608, and 3609 in the control room complex have automatic smoke or heat detection and are separated from the control room by a 3-hour barrier. Rooms 3603, 3604, 3605, and 3606 in the control room complex are not considered as peripheral rooms, but are considered part of the control room.

An automatic Halon 1301 extinguishing system is provided for the nine cable trench/wall chase combinations in the floor and west wall of Room 3601.

Automatic smoke detection is provided for the outside air intakes to the control room ventilation system. This detection is alarmed in the control room, and the control room ventilation system can be manually isolated.

The HVAC return air ducts located in the back cabinet rooms have ionization-type detectors installed. These detectors will function as low level smoke detectors because the HVAC exhaust inlets are near floor level. The detection system alarms in the control room.

C.27.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building. The normal ventilation system for this area can be used to remove smoke at air temperatures up to 160°F. Air packs are provided for operating personnel to permit them to remain in the control room when smoke is present.

C.27.6 Safe Shutdown Equipment

See Section C.27.7.3, Safe Shutdown

C.27.7 Analysis

C.27.7.1 Fire Potential

Electrical cables of redundant safety-related equipment trains are physically separated within the control room. Redundant safety-related circuits enter the control room from the upper and lower cable spreading rooms. Circuits from the lower cable spreading room, which are in separation groups 1 and 3, enter the control panels and cabinets directly. Circuits from the upper cable spreading room, which are in separation groups 2 and 4, are routed to the control panels and cabinets through conduit, vertical wall trays, and underfloor cable trenches.

Separate process and protection system cabinets are provided for redundant safety-related circuits. Within the control panels, safety-related wiring is separated from redundant circuits and protected in accordance with the guidelines of Regulatory Guide 1.75.

This physical separation prevents an electrically-initiated fire from propagating to the point that it could adversely affect redundant trains. This is based on the limited energy density associated with an electrical fire, the minimum separation distances within any control panel, the physical barriers provided within the panel, and the fire detection and suppression systems provided. Further, since there are no power cables in safety-related control panels, the probability of an electrical fire is low.

Personnel access to the control room is limited to necessary personnel, and strict administrative controls exist to limit transient combustibles within the control room. For these reasons, it is highly improbable that any fire more severe than an electrical fire within a control panel or cabinet could occur. Nevertheless, exposure fires sufficiently large to destroy any single control panel, before being extinguished, have been postulated. The ability to take the plant to a safe shutdown condition under such a circumstance is described in C.27.7.3.

C.27.7.2 Fire Suppression

The vertical wall trays and the underfloor trenches containing cable from the upper cable spreading room to the control panels are provided with an automatically-actuated Halon 1301 fire protection system. The drop ceiling area of the control room proper contains 4 fire detectors mounted in the drop ceiling, and the area behind the control room proper contains 14 fire detectors that alarm in the control room proper. In addition, ionization duct detection is provided in the return air duct from the rear area of the control room to augment the capabilities of the ceiling mounted detectors.

All panels which contain redundant safe shutdown circuits are provided with internally mounted smoke detectors that can detect smoke and products of combustion and alarm in the control room. Detection is provided in each of the following panels: RL001/2, RL003/4, RL005/6, RL011/12/13/14, RL015/16, RL017/18, RL019/20, RL021/22, RL023/24, RL025/26/27/28, RP068, NF039A/B/C.

Portable fire extinguishers in the control room and in the area behind the main control panel and hose stations in the stairwells provide means of extinguishing any fire that may occur.

C.27.7.3 Safe Shutdown

In the event that the control room is made uninhabitable by smoke, as a consequence of a fire, and there is no damage to safety-related circuits within the control room, the plant can be taken to and controlled in a safe hot standby condition from the auxiliary shutdown panel in the auxiliary building, at the switchgear, at motor control centers, and other local stations. The plant can be taken to a cold shutdown condition from outside the control room using the auxiliary shutdown panel and local controls at equipment locations and cabinets containing safety related equipment as described in Section 7.4.3.

If, as a consequence of a fire, there is the potential for damage affecting safety-related circuits within control room panels, there are switches and contacts on the train B auxiliary shutdown panel (RP118B) that would be used to isolate control room circuits. With control at RP118B and following completion of specific actions at other locations outside the control room, the plant can be taken to and maintained at a safe hot standby condition and maintained there until the control room can be reentered and the damage repaired. Refer to Table 7.4-1 for the list of selected instrumentation and controls on RP118B that have the isolation feature.

With the plant in a safe hot standby condition, controls and instrumentation for systems required to take the plant to cold shutdown can be evaluated for operability and cold shutdown activities may be performed from the auxiliary shutdown panels, and locally, as required.

Specific actions taken by operators in the event of a Control Room Fire are contained within plant procedure OTO-ZZ-00001. Actions taken in the first phase (approximately five minutes) include:

- Trip Reactor
- Close MSIV's
- Trip the Reactor Coolant Pumps
- Close the PORVs

- Trip Offsite Power to 4160 Vac Train B Bus and start the Emergency Diesel Generator
- Establish ESW
- Trip off the major pumps
- Assume control at Auxiliary Shutdown Panel

Establish auxiliary feedwater supply to Steam Generators B&D.

Actions taken in the second phase (approximately ten minutes) include:

- Establish Safety Related Room Cooling
- Isolate RWST

Actions taken in third phase (approximately twenty minutes) include:

- Establish CCW

Actions taken in fourth phase (approximately thirty minutes) include:

- Establish charging.

Actions taken in fifth phase (approximately one hour) include:

- Long term Hot Standby.

Actions taken within 7 hours include the very long term actions.

Fire Area C-28 (Ref. Figure 9.5.1-2, Sheet 4)

C.28.1 Fire Area Description

Service area by control room
Rooms 3602, 3607, 3608

Major Equipment

None

C.28.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.28.3 Combustible Loading

Room	Combustible Loading Classification
3602	Moderate
3607	Low
3608	Moderate

C.28.4 Fire Protection

Ionization-type or heat detectors are installed in each zone containing any appreciable fixed combustibles as described in Table 9.5B-3. The detection system alarms locally in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from the adjacent area. The pull stations alarm locally. Hose stations and portable extinguishers are provided in the foyers of Fire Area C-27 as indicated in Figure 9.5.1-2, Sheet 4.

C.28.5 Isolation and Smoke Removal

A fire in this area will be contained by fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building. The normal ventilation system for this area can be used to remove smoke at air temperatures up to 160°F.

C.28.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment or circuits.

C.28.7 Analysis

C.28.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually with the portable extinguishers and/or hose station located in the adjacent area. Continuous occupancy of the adjacent control room ensures a rapid response to a fire in this area.

C.28.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment and is separated from adjacent areas by 3-hour-rated barriers, a fire in this area will not prevent safe shutdown.

Fire Area C-29 (Ref. Figure 9.5.1-2, Sheet 4)

C.29.1 Fire Area Description

SAS room
Room 3609

Major Equipment

SAS panel

C.29.2 Design Features

This fire area is separated from adjoining areas by 3-hour-rated walls, floor, and ceiling. All cable penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

C.29.3 Combustible Loading

Room	Combustible Loading Classification
3609	Moderate

C.29.4 Fire Protection

Ionization-type detectors are installed in this area. The detection system alarms locally in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from the adjacent area. The pull stations alarm locally. Hose stations and portable extinguishers are provided in the foyers of Fire Area C-27, as indicated in Figure 9.5.1-2, Sheet 4.

C.29.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the west side of the control building.

C.29.6 Safe Shutdown Equipment

There are no safe shutdown equipment or circuits in this area.

C.29.7 Analysis

C.29.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually with the portable extinguishers and/or hose station located in the adjacent area. Continuous occupancy of the adjacent control room ensures a rapid response to a fire in this area.

C.29.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment and is separated from adjacent areas by 3-hour-rated barriers, a fire in this area will not prevent safe shutdown.

Fire Area C-30 (Ref. Figure 9.5.1-2, Sheet 4)

C.30.1 Fire Area Description

South vertical cable chase, control building. El. 2047-6 to 2073-6.
Room 3617

Major Equipment

Electric cable only

C.30.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.30.3 Combustible Loading

Room	Combustible Loading Classification
3617	Very High

C.30.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent area (C-27), which alarms in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles rated for 165°F. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarm conditions associated with the chase fire protection are as follows and are annunciated in the adjacent control room:

1. Detection by ionization detector
2. Water flow in sprinkler system
3. Interruption of power to sprinkler alarm
4. Isolation valve on supply line not fully open

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-27. Drainage in this area is by one 4-inch floor drain. This is more than adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.30.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.30.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.30.7 Analysis

C.30.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.30.7.2 Safe Shutdown Capability

Since this area contains Separation Group 4 trays only and the redundant Separation Group 1 trays are separated by qualified 3-hour-rated fire barriers, fire damage to this area will not prevent safe shutdown on the plant.

Fire Area C-31 (Ref. Figure 9.5.1-2, Sheet 4)

C.31.1 Fire Area Description

North vertical cable chase, control building. El. 2047-6 to 2073-6.
Room 3618

Major Equipment

Electric cable only

C.31.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.31.3 Combustible Loading

Room	Combustible Loading Classification
3618	Low

C.31.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent area (C-27), which alarms in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarm conditions associated with the chase fire protection are as follows and are annunciated in the adjacent control room:

1. Detection by ionization detector
2. Water flow in sprinkler system
3. Interruption of power to sprinkler alarm
4. Isolation valve on supply line not fully open

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-27. Drainage in this area is by one 4-inch floor drain. This is more than adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.31.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.31.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.31.7 Analysis

C.31.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.31.7.2 Safe Shutdown Capability

Only Separation Group 1 trays are located in the fire area. Those trays redundant to this separation group are separated by qualified 3-hour-rated barriers. Therefore, loss of all trays in this area due to a fire will not prevent safe shutdown.

Fire Area C-32 (Ref. Figure 9.5.1-2, Sheet 4)

C.32.1 Fire Area Description

Vertical cable chase at column line C-6 control building
El. 2047-6 to 2073-6

Major Equipment

Electric cable only

C.32.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.32.3 Combustible Loading

Room	Combustible Loading Classification
N/A	Very High

C.32.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent area (C-27), which alarms in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarm conditions associated with the chase fire protection are as follows and are annunciated in the adjacent control room:

1. Detection by ionization detector
2. Water flow in sprinkler system
3. Interruption of power to sprinkler alarm
4. Isolation valve on supply line not fully open

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-27. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.32.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.32.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.32.7 Analysis

C.32.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barrier and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.32.7.2 Safe Shutdown Capability

Only Separation Group 2 trays are located in the fire area. Those trays redundant to this separation group are separated by qualified 3-hour-rated fire barriers. Therefore, loss of all trays in this area due to a fire will not prevent safe shutdown.

Fire Area C-33 (Ref. Figure 9.5.1-2, Sheet 4)

C.33.1 Fire Area Description

South vertical cable chase, control building. El. 2073-6.
Room 3804

Major Equipment

Electric cable only

C.33.2 Design Features

The area is separated from adjoining areas by 3-hour-rated barriers. All penetrations through the barriers have 3-hour-rated penetration seals.

C.33.3 Combustible Loading

Room	Combustible Loading Classification
3804	High

C.33.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3801, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarm conditions associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-22. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.33.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.33.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.33.7 Analysis

C.33.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.33.7.2 Safe Shutdown Capability

Only Separation Group 4 trays are located in this area. Those trays redundant to this separation group are separated from this area by qualified 3-hour-rated fire barriers. Therefore, fire damage to the trays in this area will not prevent safe shutdown.

Fire Area C-34 (Ref. Figure 9.5.1-2, Sheet 4)

C.34.1 Fire Area Description

Vertical cable chase at column line C-6, control building
El. 2073-6

Major Equipment

Electric cable only

C.34.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor and walls. Since this is the highest elevation, the ceiling is not rated. All penetrations through the barriers have 3-hour-rated penetration seals.

C.34.3 Combustible Loading

Room	Combustible Loading Classification
N/A	Very High

C.34.4 Fire Protection

Ionization smoke detection is provided in this area. The detection system alarms locally and in the control room. A remote light located just outside the chase will indicate detector actuation inside the chase. A manual-pull fire alarm station is located at the normal exit from the adjacent Room 3801, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarm conditions associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Detection by ionization detector	X	X
2.	Water flow in sprinkler system		X
3.	Interruption of power to sprinkler alarm		X
4.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and manual hose stations located in Fire Area C-22. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.34.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.34.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.34.7 Analysis

C.34.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.34.7.2 Safe Shutdown Capability

Only Separation Group 2 trays are located in this area. Those trays redundant to this separation group are separated from this area by qualified 3-hour fire barriers. Therefore, fire damage to the trays in this area will not prevent safe shutdown.

Fire Area C-35 (Ref. Figure 9.5.1-2, Sheet 2)

C.35.1 Fire Area Description

Control building corridor, El. 2016
Rooms 3401, 3406, 3412

Major Equipment

None

C.35.2 Design Features

This fire area is separated from adjoining areas and buildings by 3-hour-rated fire barriers. There is one missile door, as discussed in Section 9.5.1.2.2.3, in this area. It separates this fire area from the communications corridor. All penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers.

C.35.3 Combustible Loading

Room	Combustible Loading Classification
3401	Low
3406	Low
3412	Low

C.35.3.1 Transient Combustibles

Room	Combustible Materials	Quantity
All	Solvent	1 gal
	Rags	1 lb

C.35.4 Fire Protection

Due to low combustible loading in this area, a detection system is not installed. Fire extinguishers and hose stations are located in numerous locations in this area. For specific locations, see Figure 9.5.1-2, Sheet 2. There are five 4-inch drains located in this area. The drains are piped to a sump at El. 1974. Pumps are provided to drain the sump to a drain tank in the radwaste building.

C.35.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Smoke can be removed by portable fans and flexible ducting to the turbine building through the communications corridor. The normal ventilation system can then remove the smoke.

C.35.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.35.7 Analysis

C.35.7.1 Fire Suppression

The fire barriers enclosing this area will protect this area from a fire in the adjoining areas and will contain a fire within this area until extinguished. Adequate drainage is provided to drain any fire-fighting water. A fire in this area could be extinguished manually using the hose stations and extinguishers shown in Figure 9.5.1-2, Sheet 2.

C.35.7.2 Safe Shutdown Capability

One conduit associated with Train A Class IE electrical equipment room A/C unit (SGK05A) has been provided with a 3-hour fire barrier wrap. This wrap was required to meet Appendix R requirements due to the lack of fixed suppression and detection.

Fire Area C-36 (Ref. Figure 9.5.1-2, Sheet 2)

C.36.1 Fire Area Description

Cable chase at column line C-6, control building
El. 2000 to 2016

Major Equipment

Electric cable only

C.36.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.36.3 Combustible Loading

Room	Combustible Loading Classification
N/A	Very High

C.36.4 Fire Protection

A manual-pull fire alarm station is located at the normal exit from this floor elevation, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Water flow in sprinkler system		X
2.	Interruption of power to sprinkler alarm		X
3.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and a manual hose station located in the ESF switchgear room (3302) at this elevation. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated fire door.

C.36.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.36.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.36.7 Analysis

C.36.7.1 Fire Suppression

In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.36.7.2 Safe Shutdown Capability

Since this area only has Separation Group 2 trays in it, a fire will not damage Separation Groups 1, 3, and 4 and therefore, not prevent safe shutdown.

Fire Area C-37 (Ref. Figure 9.5.1-2, Sheet 2)

C.37.1 Fire Area Description

Cable chase at column line C-3, control building El. 2000 to 2016

Major Equipment

Electric cable only

C.37.2 Design Features

The area is separated from adjoining areas by 3-hour-rated floor, ceiling, and walls. All penetrations through the barriers have 3-hour-rated penetration seals.

C.37.3 Combustible Loading

Room	Combustible Loading Classification
N/A	Very High

C.37.4 Fire Protection

A manual-pull fire alarm station is located at the normal exit from this floor elevation, which alarms locally and in the control room.

An automatic wet pipe sprinkler system, based on NFPA No. 13, is installed in this area. The system is equipped with closed head spray nozzles. The design density of the sprinkler system is 0.5 gpm per square foot of total floor area per level. The alarms associated with the chase fire protection are as follows:

	Condition	Local	Remote
1.	Water flow in sprinkler system		X
2.	Interruption of power to sprinkler alarm		X
3.	Isolation valve on supply line not fully open		X

Backup to the automatic sprinkler system is by portable extinguishers and a manual hose station located in the ESF switchgear room (3301) at this elevation. Drainage in this area is by one 4-inch floor drain. This is adequate to handle maximum sprinkler system discharge and hose station discharge. Access to the chase is through a 3-hour-rated door.

C.37.5 Isolation and Smoke Removal

No ventilation ductwork penetrates the barrier of this fire area. Other than the floor drain opening, the area is isolated from the rest of the plant. Smoke can be removed by portable fans and flexible ducting through the grade level door in the west side of the control building.

C.37.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

C.37.7 Analysis

C.37.7.1 Fire Suppression

In the event that a fire develops, it will be contained by the fire barriers and extinguished by the automatic suppression system. Should the automatic suppression system fail, manual hose streams can be directed through the access opening to extinguish the fire.

C.37.7.2 Safe Shutdown Capability

Since this area has only Separation Group 3 circuits in it, a fire will not damage Separation Groups 1, 2, and 4 and, therefore, not prevent safe shutdown.

Fire Area F-1 (Ref. Figure 9.5.1-2, Sheets 2 through 4)

F.1.1 Fire Area Description

Fuel building, general area all elevations
Rooms 6101, 6102, 6103, 6201, 6204, 6205, 6210, 6301, 6302

Major Equipment

Spent fuel pool bridge crane and cask handling crane

F.1.2 Design Features

This fire area is separated from adjoining fire areas by 3-hour-rated walls. The bottom floor of this area is on soil and, consequently, is not rated. As shown on Figure 3.8-48, the fuel transfer tube connects the reactor and fuel buildings. A double o-ring flange is located in the reactor building, and a manual gate valve is located in the fuel transfer canal. Either barrier provides equivalent protection to a 3-hour barrier. In addition, the fuel transfer canal contains no installed combustibles. The structural steel of the fuel building is not structurally tied into the auxiliary building.

All penetrations through the rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers. A 20' non-combustible zone exists between Fire Area F-1, and Fire Areas F-2 and F-3.

F.1.3 Combustible Loading

Room	Combustible Loading Classification
6101	Low
6102	Low
6103	Low
6201	Low
6204	Low
6205	Low
6210	Low
6301	Low
6302	Low

F.1.4 Fire Protection

Detectors are installed to protect the refueling floor, El. 2047 feet 6 inches. The detection system alarms locally and in the control room. The control room annunication is zoned for quick identification of the trouble area. Manual-pull fire alarm stations are located near the exit doorways from this area. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided throughout this fire area, as indicated in Figures 9.5.1-2, Sheets 2 through 4. An automatic preaction

sprinkler system is provided for Room 6102, railroad bay/laydown area. The system is designed on an ordinary hazard schedule for head quantities. Adequate floor drains are provided in the area to remove sprinkler discharge without appreciable accumulation.

F.1.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers isolate the HVAC ducts from the other areas of the building, and radiation shielding doors can be closed to mitigate smoke dispersion into Fire Areas F-2 and F-3. Smoke can be removed by portable fans and flexible ducting to the grade level door in the east side of the building. The normal ventilation system for this area can be used to remove smoke at air temperatures up to 160°F.

F.1.6 Safe Shutdown Equipment

There are no safe shutdown equipment or circuits in this area.

F.1.7 Analysis

F.1.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. The preaction sprinkler system in Room 6102 does not protect safe shutdown equipment. Consequently, failure of this system to operate will not prevent safe shutdown. This area is accessible through two personnel doors and one railroad door from the exterior and through a personnel door at each floor elevation at the northwest corner of the building from the auxiliary building.

F.1.7.2 Safe Shutdown Capability

A fire in this area cannot prevent a safe shutdown of the plant. No fire could cause structural damage to the spent fuel storage racks in the spent fuel pool. A fire during fuel handling operations could cause damage to either of the fuel handling cranes; however, both cranes are designed to fail safe. A fire will not damage spent fuel cooling equipment located in Fire Areas F-2 and F-3 due to the 20’ non-combustible zone design feature between fire areas F-1, F-2, and F-3.

Fire Area F-2 (Ref. Figure 9.5.1-2, Sheet 2)

F.2.1 Fire Area Description

Fire Area Description	Major Equipment
Fuel pool cooling heat exchange room (west) Room 6104	Fuel pool cooling heat exchanger B, fuel pool cooling pump B, room cooler, and fuel pool cleanup pumps

F.2.2 Design Features

This fire area is separated from adjoining fire areas by 3-hour-rated walls, ceilings, and a 20' non-combustible zone. The floor of this area is on grade with the exception of a small pipe trench which opens into this room and connects with the radwaste tunnel. The trench opening in this room is closed by a heavy steel cover plate approximately 4 feet x 8 feet. All penetrations through the rated barriers, with the exception of the pipe trench opening, are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

F.2.3 Combustible Loading

Room	Combustible Loading Classification
6104	Low

F.2.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from the fuel building. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 2.

Adequate drainage is provided by floor drains within this area to remove fire-extinguishing water.

F.2.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building, and the radiation shielding door can be closed to mitigate smoke dispersion into Fire Area F-1. Smoke can be removed by portable fans and flexible ducting to the grade level door in the east side of the fuel building.

F.2.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

F.2.7 Analysis

F.2.7.1 Fire Suppression

A fire in the area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. Although the pipe trench in this area is not covered with a rated barrier, a fire could not damage the equipment located in the radwaste tunnel more than 50 feet away with no intervening combustibles. This area is accessible through a door at the south end of the room and a door at the northwest corner.

F.2.7.2 Safe Shutdown Capability

The RWST level transmitters are located in this area; however, their function is not required following a fire in this area. The water volume of the RWST (394,000 gallons) is more than sufficient to assure boration to cold shutdown conditions.

Otherwise, only Separation Group 4 conduits and equipment are located in this area. Those conduits and equipment redundant to this separation group are separated from this area by qualified 3-hour-rated fire barriers. Therefore, fire damage to this area will not prevent safe shutdown. A fire will not damage spent fuel cooling equipment located in Fire Area F-3 due to the 20’ non-combustible zone design feature between fire areas F-1, F-2, and F-3.

Fire Area F-3 (Ref. Figure 9.5.1-2, Sheet 2)

F.3.1 Fire Area Description

Fuel pool cooling heat exchanger room (east) Room 6105

Major Equipment

Fuel pool cooling heat exchanger A, fuel pool cooling pump A, and room cooler

F.3.2 Design Features

This fire area is separated from all adjoining fire areas by 3-hour-rated walls, ceilings, and a 20' non-combustible zone. All penetrations through the rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

F.3.3 Combustible Loading

Room	Combustible Loading Classification
6105	Low

F.3.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from the fuel building. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 2. Adequate drainage is provided by floor drains in this area to remove fire-extinguishing water.

F.3.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building, and the radiation shielding door can be closed to mitigate smoke dispersion into Fire Area F-1. Smoke can be removed by portable fans and flexible ducting to the grade level door in the east side of the fuel building.

F.3.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

F.3.7 Analysis

F.3.7.1 Fire Suppression

A fire in the area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. This area is accessible through a door at the south end of the room.

F.3.7.2 Safe Shutdown Capability

Separation Group 4 spent fuel pool level switch LSLL-58 is located in this area and may provide a false low-low level signal and stop spent fuel pool cooling pump B. Should this occur, the pump may be manually restarted to reestablish cooling of the pool.

Otherwise, only Separation Group 1 conduit and equipment are located in this area. The conduit and equipment redundant to this separation group are separated from this area by qualified 3-hour-rated fire barriers. Therefore, fire damage to this area will not prevent safe shutdown. A fire will not damage spent fuel cooling equipment located in Fire Area F-2 due to the 20’ non-combustible zone design feature between fire areas F-1, F-2, and F-3.

Fire Area F-4 (Ref. Figure 9.5.1-2, Sheet 3)

F.4.1 Fire Area Description

Air handling equipment room,
El. 2026
Room 6203

Major Equipment

Fuel building supply air units, fuel build ing heating coil unit, fuel handling area cooling coil

F.4.2 Design Features

This fire area is separated from all adjoining areas by 3-hour-rated wall, floor, and ceiling. All cable and piping penetrations through the rated barriers are fitted with 3-hour-rated penetrations seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

F.4.3 Combustible Loading

Room	Combustible Loading Classification
6203	Low

F.4.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorway from the fuel building. The pull stations alarm locally and in the control room. Adequate drainage is provided by floor drains in this area to remove fire-extinguishing water. Portable extinguishers are provided within this fire area. If access to these is blocked by a fire within the area, the hose stations and portable extinguishers in Room 1408 of the auxiliary building can be used.

F.4.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the east side of the fuel building. The normal ventilation system for this area can be used to remove smoke at air temperatures up to 160°F.

F.4.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

F.4.7 Analysis

F.4.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. This area is accessible through doors from the adjacent room and from the auxiliary building (Room 1408).

F.4.7.2 Safe Shutdown

Failure by fire of all Separation Group 4 circuits in this area will not prevent safe shutdown of the plant, since the redundant Separation Group 1 circuits, located in a separate fire area, will be available.

Fire Area F-5 (Ref. Figure 9.5.1-2, Sheet 3)

F.5.1 Fire Area Description

Electrical equipment room,
El. 2026
Room 6202

Major Equipment

Load centers and motor control centers

F.5.2 Design Features

This fire area is separated from adjoining fire areas by 3-hour-rated walls, floor, and ceiling. All cable and piping penetrations through the rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

F.5.3 Combustible Loading

Room	Combustible Loading Classification
6202	Low

F.5.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from the fuel building. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided inside this fire area.

F.5.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the east side of the fuel building.

F.5.6 Safe Shutdown Equipment

This fire area contains no safe shutdown equipment or circuits other than the RWST level transmitters.

F.5.7 Analysis

F.5.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. The area is accessible through double doors in the north and south walls of the area.

F.5.7.2 Safe Shutdown Capability

The RWST level transmitters are located in this area; however, their function is not required following a fire in this area. The water volume of the RWST (394,000 gallons) is more than sufficient to assure boration to cold shutdown conditions.

Since this area contains no other safe shutdown equipment and is separated from adjacent areas by a 3-hour-rated barrier, a fire in this area will not prevent safe shutdown.

Fire Area F-6 (Ref. Figure 9.5.1-2, Sheet 4)

F.6.1 Fire Area Description

Emergency exhaust equipment room, east, El. 2047-6
Room 6304

Major Equipment

Emergency exhaust filter/ adsorber unit and emergency exhaust fan

F.6.2 Design Features

This fire area is separated from adjoining fire areas by 3-hour-rated walls and floor. All cable and piping penetrations through the rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

F.6.3 Combustible Loading

Room	Combustible Loading Classification
6304	Moderate

F.6.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this building. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 4. Adequate drainage is provided by floor drains in this area to remove fire-extinguishing water.

F.6.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the east side of the fuel building.

F.6.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment or circuits.

F.6.7 Analysis

F.6.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. Access to this area is through a door at the south end of the room.

The emergency exhaust filter adsorber unit does not normally operate. Downstream of the charcoal bed is a thermistor-type continuous thermal detector, which alarms in the control room at high air stream temperature. This unit is equipped with a manual spray system as described in Appendix 9.5A.

F.6.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment or conduit, a fire in this area would not prevent safe shutdown.

Fire Area F-7 (Ref. Figure 9.5.1-2, Sheet 4)

F.7.1 Fire Area Description

Emergency exhaust equipment room, west, El. 2047-6
Room 6303

Major Equipment

Emergency exhaust filter/ adsorber unit and emergency exhaust fan

F.7.2 Design Features

This fire area is separated from adjoining fire areas by 3-hour-rated walls and floor. All cable and piping penetrations through the rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

F.7.3 Combustible Loading

Room	Combustible Loading Classification
6303	Moderate

F.7.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this building. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided just outside this fire area, as indicated in Figure 9.5.1-2, Sheet 4. Adequate drainage is provided by floor drains in this area to remove fire-extinguishing water.

F.7.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the building. Smoke can be removed by portable fans and flexible ducting to the grade level door in the east side of the fuel building. The normal ventilation system for this area can be used to remove smoke at air temperatures up to 160°F.

F.7.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible

(redundant train) components, the results of the analysis are described in the Analysis section immediately following.

F.7.7 Analysis

F.7.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. Access to this area is through a door at the south end of the room.

The emergency exhaust filter adsorber unit does not normally operate. Downstream of the charcoal bed is a thermistor-type continuous thermal detector, which alarms in the control room at the high air stream termperature. This unit is provided with a manual spray system as described in Appendix 9.5A.

F.7.7.2 Safe Shutdown Capability

The RWST level transmitters are located in this area; however, their function is not required following a fire in this area. The water volume of the RWST (394,000 gallons) is more than sufficient to assure boration to cold shutdown conditions.

Otherwise, only Separation Group 1 conduits and equipment are located in this area. Those conduits and equipment redundant to this separation group are separated from this area by qualified 3-hour-rated fire barriers. Therefore, fire damage to this area will not prevent safe shutdown.

Fire Area RB (Ref. Figure 9.5.1-2, Sheets 1 through 4)

RB.1	Fire Area Description	Major Equipment
	Reactor building	Reactor coolant pumps, steam generators, reactor, pressurizer, regenerative heat exchanger, reactor coolant drain tank and pumps, pressurizer relief tank, accumulator tanks, excess letdown heat exchanger, cavity cooling fans, rod positioning indicator cabinets, incore instrumentation drive units, hydrogen recombiners, CRDM cooling fans, hydrogen mixing fans, dry waste compactor, polar crane, RCP lube oil drain tanks, containment coolers

RB.2 Design Features

The 4-foot-thick reactor building walls separate the reactor building from adjacent buildings and serve as a 3-hour fire barrier. Containment penetrations are as described in Section 9.5.1.2.2.3. There are no physical boundaries enclosing localized fire hazards within the reactor building. However, for purposes of this analysis, the reactor building is divided in the following zones (see Figure 9.5.1-2, Sheets 1 through 4)

Zone No.	Area
RB-1	Area within the secondary shield wall
RB-2	Area outside the secondary shield wall - El. 2000
RB-3	North electrical penetration area - El. 2026
RB-4	South electrical penetration area - El. 2026
RB-5	Cable tray area - El. 2047'-6"
RB-6	Reactor building - El. 2068'-8"
RB-7	West area - El. 2026
RB-8	East area - El. 2026
RB-9	Tendon access gallery area
RB-10	Reactor building - El. 2047'-6" areas, except cable tray area
RB-11	Area within primary shield wall

RB.3 Combustible Loading

Room	Combustible Loading Classification
RB-1	Low
RB-2	Low
RB-3	Low
RB-4	Low
RB-5	Low
RB-6	Low
RB-7	Low
RB-8	Low
RB-9	Low
RB-10	Low
RB-11	Low

RB.4 Fire Protection

An automatic detector is installed above each reactor coolant pump. Detectors are also installed in all areas where cable trays are concentrated and in containment cooler ducts. The automatic detection system alarms locally and in the control room. The control room alarms are zoned for quick identification of the specific trouble area.

Portable extinguishers and manual hose stations are required to be permanently installed inside the containment as shown in Figure 9.5.1-2, Sheets 1 through 4 during refueling and maintenance outages. During normal operation, extinguishers and/or hose for hose stations may be located just outside the containment personnel hatch. The hose stations are spaced at no more than 100-foot intervals. The hose station locations are such that all accessible areas of the reactor building are adequately covered by at least one hose stream. A fire at any hose station may be extinguished by using an adjacent hose station. An extra length of hose can be added, if required, to the adjacent hose station.

The fire protection supply piping to the reactor building is protected from the effects of a single active failure. The inside containment isolation valve is a check valve which is highly reliable by design and considered exempt from active failures due to the lack of any external electrical signals which may be disabled due to a fire inside the containment. Refer to Section 3.1.1 for a discussion of the single failure criteria. Even though a fire inside the containment would not disable the outside isolation valve, a random failure of the outside valve may be postulated with a fire inside the containment. In this case, the accessibility of the outside isolation valve is not impaired, and the valve may be operated manually.

Access to the containment is via the personnel hatch at El. 2047 feet 6 inches. This hatch opens to Room 1507 of the auxiliary building. For access to Room 1507, see Fire Area A-20. An emergency personnel hatch for evacuation purposes is located at El. 2013 feet 5 inches. The hatch opens to a stairway leading to the outside grade elevation. The tendon access gallery can be reached from a hatch at the outside grade at El. 2000 leading to the tendon gallery access shaft. Stairways and one elevator are located at Zone RB-2, as shown in Figure 9.5.1-2, Sheet 2, and provide access to all elevations up to 2068 feet 8 inches.

A fixed, manually charged, closed head sprinkler system is provided over the cable trays in Zones RB-3 and RB-4. The design density for the system is 0.3 gpm/square feet of floor area. The pressure and flow rate are based on all heads open in the most remote 1,000 square feet. A manual system is installed to prevent an inadvertent actuation of the sprinklers during normal plant operation.

To protect the chloride sensitive piping and equipment from fire protection system leakage, the standpipes inside the reactor building are normally dry. Control room operator action is required to charge the standpipes. The probability of a fire occurrence is greater during refueling and maintenance operations. Personnel will, therefore, be available during these operations to take the necessary action in the event of a fire.

An electric pull station is located at each hose station. Actuation of the pushbutton alarms in the control room.

All the isolation valves associated with the standpipe and sprinkler system are electrically supervised.

A system is provided to collect and contain lubricating oil for each reactor coolant pump. High pressure portions of the lube oil system are totally enclosed with low point drip connections. Remote lube oil fill lines for the upper and lower bearing reservoirs on each reactor coolant pump motor are not protected by drip pans. Due to the design of the fill lines, no lube oil leakage is postulated. Low pressure portions of the system are provided with drip pans with low point connections. Low point connections from each of two reactor coolant pumps are piped to a lube oil collection tank in the reactor building. Each of the oil collection tanks has the capacity of 300 gallons, compared to 265 gallons of oil in the lube oil system of each pump. The tank vent is equipped with a flame arrester. The tanks have level indication and level alarm annunciation in the control room. Refer to Figure 9.5.1-3, Sheets 1 and 2 for isometric and general arrangement of the oil collection system.

The oil collection tanks, piping, and devices on the RCPs are designed to maintain their integrity following a safe shutdown earthquake.

The oil collection tanks were sized to accommodate any reasonable amount of leakage that might result from an SSE. Should the leakage be uncontrollable and the tank capacity exceeded prior to remedial action by the operators, the tank overflow would go

to the containment normal sumps via the drainage trenches. This oil would not come into contact with hot surfaces and create a fire hazard.

RB.5 Isolation and Smoke Removal

A fire within the reactor building will be contained by the fire barriers until extinguished. Smoke may be removed by the containment purge system.

RB.6 Safe Shutdown Equipment

Refer to Table 9.5B-2 for a complete listing of all electrically powered safe shutdown components located in the room(s) of this fire area.

Refer to Section 9.5B.6 for a description of the electrical circuit identification and analysis methodology. If special safe shutdown capability analysis was required for incompatible (redundant train) components, the results of the analysis are described in the Analysis section immediately following.

RB.7 Analysis

RB.7.1 Fire Suppression

The automatic detection system installed over areas of high combustible loading and in the containment cooling system ducts will alarm in the control room upon detection of a fire. The standpipes can be charged from the control room. The fire can be extinguished manually, using the portable extinguishers and/or the hose stations. The sprinkler system can be actuated, if required, from local hand pull stations to suppress a fire in the cable trays at Zones RB-3 and RB-4. The reactor coolant pumps are approximately 50 feet apart and a totally enclosed system to collect and contain the lube oil is provided for each pump. An oil fire is not postulated since this would require a failure in the pump lube oil system and another failure in the lube oil collection system in combination with the presence of an ignition source. Any major maintenance work on the pumps will require a plant shutdown. Therefore, introduction of transient combustibles into this zone during normal plant operation is not postulated. The reactor coolant pumps are not required for a safe shutdown. For these reasons, an automatic suppression system is not provided to extinguish an oil fire in this zone.

During refueling or maintenance operations when significant transient combustibles could be in the reactor building, the area would be occupied, and any potential fire would be quickly detected. Fire fighting could be performed manually using the hose stations and extinguishers shown in Figure 9.5.1-2, Sheets 1 through 4.

Adequate drainage capability exists in the reactor building to prevent the accumulation of fire-fighting water.

RB.7.2 Safe Shutdown Capability

As discussed in RB.7.1, an RCP oil fire in Zone RB-1 is not postulated due to the oil collection system.

The redundant RHR shutdown suction isolation valves, BB-PV-8702A and B and EJ-HV-8701A and B, could be affected by a fire on the 2000 elevation. Any power or control failure in the valves' circuitry will cause them to fail in the as is closed position. Only one train of RHR is required to obtain cold shutdown. The RHR valves are not required to open for a minimum of 30 hours following initiation of shutdown. At this time one train of the valves can be manually opened.

Circuits for excess letdown isolation valves BB-HV-8153A, B; 8154A, B; and 8157A, B could fail closed, leaving the excess letdown path to the PRT unavailable for a fire on the 2000 elevation. However, if letdown was required to allow for addition of borated water from the RWST to maintain extended hot standby or to borate to cold shutdown concentration, the alternate path of letdown to the PRT through the pressurizer PORVs is available. The pressurizer PORVs and their associated circuitry are unaffected by a fire on the 2000 elevation due to greater than 20 feet of separation from the excess letdown valves and their circuitry.

Two out of four containment coolers, SGN01A, B, C, and D, will be intact for a fire in any area of the reactor building due to greater than 20 feet between the redundant trains and their associated raceways.

Steam generator level instrumentation and RCS wide range temperature elements are intact on at least two steam generators and the corresponding hot leg or cold leg in the RCS for a fire in any area due to greater than 20 feet of separation between raceways and instruments in all cases.

At least one RCS pressure indicator will be intact for a fire in any area due to greater than 20 feet of separation between instruments and raceways.

At least one pressurizer level transmitter will be intact for a fire in any area due to an approved Appendix R fire barrier wrap.

When going to cold shutdown, the RCS must be depressurized. Prior to depressurization, the accumulator tanks must be isolated or vented to preclude the release of nitrogen cover gas into the RCS. Depending on the location of the fire, one or more accumulator tanks may have to be manually vented or isolated locally.

The pressurizer PORVs and block valves BB-PCV-455A and 456A and BB-HV-8000A and B could be affected by a single exposure fire in the vicinity of the valves. A fire in this area will cause the block valves to fail open and the PORVs to fail closed.

The excess letdown path to the PRT is available to permit boration through the charging pumps due to greater than 20 feet of separation from a fire in this area.

A single exposure fire could damage the pressurizer pressure transmitters, PT-455, 456, 457, and 458, which control the pressurizer PORVs. If the failure of the pressure transmitters caused the PORVs to open, they can be remote manually reclosed from the control room. A fire which affects the pressure transmitters will not affect the excess letdown path due to greater than 20 feet of separation.

Therefore, no postulated fire from fixed or transient combustibles in the reactor building will prevent safe shutdown of the plant.

Fire Area RW-1 (Ref. Figure 9.5.1-2, Sheet 1)

RW.1.1 Fire Area Description

Radwaste pipe tunnel and cable chase to auxiliary building (below grade)
Rooms 7133, 7134

Major Equipment

Electric cable

RW.1.2 Design Features

This area is separated from the auxiliary building by a 3-hour-rated wall. The ceiling, floor, and side walls of this area are against soil. All cable and piping penetrations through the fire-rated barrier are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barrier are fitted with 3-hour-rated fire dampers. The fire area is divided into two rooms by a 2-foot-thick concrete wall. Room 7133 is the personnel access, while Room 7134 contains radioactive piping.

RW.1.3 Combustible Loading

Room	Combustible Loading Classification
7133	Low
7134	Low

RW.1.4 Fire Protection

Ionization detectors are installed in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Remote lights installed at the entrance to the tunnel in the auxiliary and radwaste buildings will further aid in locating the trouble area.

Manual-pull fire alarm stations are located near the exit doorways from adjacent areas. The pull stations alarm locally and in the control room. A hose station is located just outside each end of the tunnel. The hose length is such that each hose will cover at least half of the tunnel. Portable extinguishers are provided inside and outside of the tunnel.

Refer to Figure 9.5.1-2, Sheet 1 for hose stations and extinguisher locations. A sump is located in Room 7133, midway between the auxiliary and radwaste buildings. A trench located along the wall empties into this sump.

Hose stations are not located inside the tunnel since a fire in the tunnel may render them inaccessible. Hose stations located approximately 30 feet away from either end of the tunnel in the auxiliary building and radwaste building are available for manual fire fighting. Each hose rack has 75 feet of hose, and the tunnel is approximately 140 feet along. Therefore, all areas of the pipe tunnel are within reach of these hose stations.

A 4 foot x 4 foot x 4 foot sump with two 50 gpm submersible pumps is located in the nonradioactive tunnel midway between the auxiliary and radwaste buildings. The sump pumps discharge to the floor drain tank located in the radwaste building. The radioactive pipe tunnel has a 3 foot x 3 foot x 3 foot sump, which is connected to the nonradioactive tunnel sump by a 4-inch embedded pipe.

Ventilation air for the tunnel is provided by transferring air from the radwaste and auxiliary buildings by means of transfer fans. The tunnel is exhausted by radwaste and auxiliary buildings exhaust systems. More air is exhausted than supplied to prevent exfiltration from the tunnel. Air is supplied to the nonradioactive portion of the tunnel and exhausted from the radioactive side of the tunnel.

RW.1.5 Isolation and Smoke Removal

A fire in this area is isolated from adjacent safe shutdown areas by 3-hour-rated fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the plant. Smoke can be removed by portable fans and flexible ducting to the exterior door on the north side of the radwaste building.

RW.1.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment or circuits.

RW.1.7 Analysis

RW.1.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers. Access to this area is through doors from either end of the tunnel.

RW.1.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment or circuits and is separated from the auxiliary building by a 3-hour fire-rated barrier, a fire in this area cannot prevent safe shutdown.

Fire Area LDF-1 (Ref. Figure 9.5.1-2, Sheet 2)

LDF.1.1 Fire Area Description

Laundry Decontamination Facility
Rooms 1332, 1333, 1334, and 1337

Major Equipment

Decontamination equipment, laboratory equipment, washer- extractors and dryers

LDF.1.2 Design Features

This area is separated from adjoining areas by 3-hour-rated walls. The ceiling of this area is the building roof, and the building floor is on grade. Consequently, only the walls are rated. The structural steel of the laundry decontamination facility is not structurally tied into the auxiliary building. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers. Flammable liquids storage cabinets, in accordance with NFPA 30, are provided for the storage of most transient flammable liquids in the laundry decontamination facility.

LDF.1.3 Combustible Loading

Room	Combustible Loading Classification
1332	Moderate
1333	Moderate
1334	Low
1337	Low

LDF.1.4 Fire Protection

A wet-pipe sprinkler system and detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from this area. The pull stations alarm locally and in the control room. A hose station and portable extinguishers are provided within this fire area, as indicated in Figure 9.5.1-2, Sheet 2.

The laundry decontamination facility is not a safety-related area and is separated from adjacent safety-related areas by a 3-hour fire barrier.

LDF.1.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas. Smoke can be removed by portable fans and flexible ducting to the door in the west side of the building.

LDF.1.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment, or circuits.

LDF.1.7 Analysis

LDF.1.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detector system. The fire can be extinguished by the sprinkler system or manually, using hose stations and/or portable extinguishers. Access to this area is through the exterior door in the west wall or through the interior doors at the north wall.

LDF.1.7.2 Safe Shutdown Capability

Since the area contains no safe shutdown equipment or circuits and is separated from adjoining areas by a 3-hour-rated barrier, a fire in this area cannot prevent safe shutdown.

Fire Area AB-1 (Ref. Figure 9.5.1-2, Sheets 2 and 3)

AB.1.1 Fire Area Description

Auxiliary boiler room
Room 4315

Major Equipment

Auxiliary boiler

AB.1.2 Design Features

This area is separated from adjoining areas by 3-hour-rated walls, except the stairway enclosure which is 2-hour rated. The ceiling of this area is the building roof, and the floor is on grade. Consequently, only the walls are rated. All penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers.

AB.1.3 Combustible Loading

Room	Combustible Loading Classification
4315	Low

AB.1.4 Fire Protection

Infrared flame detectors are provided in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. A manual-pull fire alarm station is located near the exit doorway from this area. The pull station alarms locally and in the control room. Hose stations and portable extinguishers are provided just outside this area in the turbine building. In addition, a portable extinguisher is provided inside the area, near the exterior door. An automatic wet-pipe sprinkler system is provided to protect the entire area. Operation of the system is alarmed locally and in the control room.

AB.1.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Fire dampers will isolate the HVAC ducts from the other areas of the plant.

AB.1.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment or circuits.

AB.1.7 Analysis

AB.1.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the event of the failure of the automatic system, the fire will be contained by the 3-hour-rated barrier walls until extinguished manually, using a fire extinguisher and/or hose station.

AB.1.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment and is separated from adjoining safe shutdown areas by a 3-hour-rated barrier, a fire in this area cannot prevent safe shutdown.

Fire Area T-1 Fire Area T-1 (Ref. Figure 9.5.1-2, Sheets 1 through 4)

T.1.1 Fire Area Description

Turbine building stairway
Room 4101

Major Equipment

Electric cable

T.1.2 Design Features

This area is separated from the auxiliary building by 3-hour-rated walls and all other adjoining areas by 2-hour-rated-walls, except that the missile-resistant doors to the auxiliary building have no rating. The construction of these doors is described in Appendix 9.5A. All penetrations through the fire-rated barrier are fitted with 3-hour-rated penetration seals.

T.1.3 Combustible Loading

Room	Combustible Loading Classification
4104	Low

T.1.4 Fire Protection

Ionization-type detection is provided in this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located just outside the doorway at each floor elevation. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided just outside this fire area at each floor elevation.

T.1.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Smoke can be removed by portable fans and flexible ducting to the exterior door at grade in the turbine building.

T.1.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment or circuits.

T.1.7 Analysis

T.1.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. The fire can be extinguished manually, using hose stations and/or portable extinguishers.

T.1.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment and is separated from adjacent areas containing safe shutdown equipment by 3-hour-rated fire barriers and from all other adjacent areas by a 2-hour-rated fire barrier, a fire in this area will not prevent safe shutdown.

Fire Area T-2 (Ref. Figure 9.5.1-2, Sheets 2 through 4)

T.2.1 Fire Area Description

Turbine building - 50 feet north of auxiliary building wall, general area.

Major Equipment

Condenser vacuum pumps, air compressors, feedwater heaters, turbine building supply air units, S.G. blowdown flash tank, S.G. blowdown nonregenerative heat exchanger, load centers, and motor control centers

T.2.2 Design Features

Fire Area T-2 only includes the south 50 feet of the turbine building. However, this section of the fire hazards analysis does include discussion of the entire turbine building. This information is included because there are no fire barriers between Fire Area T-2 and the other open areas of the turbine building.

This area is separated from the adjacent auxiliary building by a 3-hour-rated fire barrier wall, except that the missile-resistant doors, missile shields, and feedwater and mainstream torsional restraints have no rating. In addition, two blowdown/drain lines extend from fire area A-23 into fire area T-2. The missile doors, missile shields, torsional restraints and the blowdown/drain lines provide a level of protection that prevents the largest postulated fire from propagating from fire area T-2 to fire area A-23. The communication corridor (Fire Area CC-1) is open to this area but separated from the adjacent control building by a 3-hour-rated wall (except missile doors). The turbine lube oil area located approximately 38 feet north of the auxiliary building wall consists of two rooms, one above the other, which are both enclosed by 3-hour-rated fire barriers. This area is a separate fire area, not part of Fire Area T-2. The doorway of the room containing the lube oil storage tanks has an 8-inch curb to contain oil spillage in the room. A pipe trench extends from the auxiliary building wall to the condenser pit area. The trench is sloped away from the auxiliary building.

T.2.3 Combustible Materials

Room	Combustible Loading Classification
El. 2000	Low
El. 2015-4	Low
El. 2033	Low
E1.2065	Low

T.2.4 Fire Protection

All areas below the turbine operating floor (El. 2065) are protected by an automatic detection system, using rate compensated thermal detectors. The detection system alarms locally and in the control room and also charges the preaction sprinkler system in the area. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the emergency exit doorways from this area. The pull stations alarm locally and in the control room. Hose stations and portable extinguishers are provided throughout this area. Adjacent hose stations are separated by no more than 100 feet.

Automatic preaction sprinkler systems are provided to protect all turbine building areas (excluding room enclosures and the condenser pit area) below the operating floor, El. 2065. Each system is charged by actuation of any one of the thermal detectors located in the area protected by that system. Each floor elevation is protected by two independent sprinkler systems with each system serving approximately one-half of the floor area. The area under the condenser in the condenser pit is protected by an automatic wet pipe sprinkler system. The two rooms containing turbine lube oil storage and conditioning equipment are each protected by an automatic wet pipe sprinkler system. The steam generator feedwater pump turbines and the main turbine bearings are each protected by a manually actuated water spray system. Detection is by thermal detectors which alarm locally and in the control room. A manual system is installed to prevent damage due to inadvertent operation. The hydrogen seal oil unit is protected by an automatic water spray system actuated by thermal detectors, which alarm locally and in the main control room.

Collapse of the turbine building roof or even a turbine building roof truss is not credible and is not postulated because of the fire protection provided, low fire loadings above the operating deck of the turbine building, and the construction of the roof which meets FM Class I UL Class A requirements. Even though the roof trusses will not collapse, it has been verified that a free-falling roof truss has less energy than tornado missiles considered in the design of safety-related buildings.

Fires on or above the operating deck would be extinguished manually. Since there is no significant quality of combustibles above the operating floor and administrative controls will limit the introduction and storage of transient combustibles on the operating floor, fires starting on or above the operating floor will not damage the roof or roof trusses. The resultant heat and smoke will be vented through the roof vents.

Fire starting below the operating deck in an open area will be automatically detected and extinguished by an automatic preaction sprinkler system. A fire originating in the turbine oil reservoir room or lube oil storage tank room will be extinguished by the automatic wet pipe sprinkler systems in the rooms. These rooms are separated from each other and the remainder of the turbine building by 3-hour fire barrier walls, floors, and ceilings. These rooms are located approximately 40 feet from the auxiliary building. Should an automatic fire extinguishing system fail to operate, manual fire fighting could still be

accomplished to extinguish the fire. The resultant heat and smoke would be vented through the roof vents. Therefore, fires below the operating deck will not damage the roof or the roof trusses. Failure of the automatic extinguishing system will be alarmed in the control room.

T.2.5 Isolation and Smoke Removal

T.2.5.1 A fire in this area is isolated from adjacent safe shutdown areas by the 3-hour-rated fire barriers. HVAC ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers. The roof of the turbine building is fitted with spring loaded vents which are held closed by fusible links. In the event of a fire in the turbine building, these vents will open to relieve smoke and heat. The vents are sized to provide 1 square foot of vent area for each 150 square feet of floor area.

T.2.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment or circuits.

T.2.7 Analysis

T.2.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In areas where automatic suppression systems are installed, the design is such that the system will discharge shortly after the automatic alarm signal occurs. In the event of failure of the automatic suppression system or a delay in discharge, the fire can be manually extinguished, using the portable extinguishers, manual hose stations, and/or the manual water spray systems, where provided.

The entire area is readily accessible through several interior and exterior doors and fire-rated stairways.

T.2.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment or circuits, a fire in this area cannot prevent safe shutdown.

Fire Area D-1 (Ref. Figure 9.5.1-2, Sheet 2)

D.1.1 Fire Area Description

Diesel generator room (east)
Room 5203

Major Equipment

Standby diesel generator package, associated auxiliaries, and fuel oil day tank

D.1.2 Design Features

This area is separated from all adjoining areas by 3-hour-rated walls. The roof is also 3-hour rated, with the exception of the ventilation openings, to minimize property damage, and consists of an 18-inch-thick concrete slab. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. A curb is provided at the interconnecting door between this area and the ESF switchgear room (Fire Area C-10) to prevent the sprinkler system discharge from passing into Fire Area C-10.

The common trench between the two diesel generator rooms is fire-stopped with a 3-hour-rated barrier. The drainage in each of the rooms is collected in a sump in the same room from which the drainage is collected. The sump pump discharge lines from the two diesel generator room sumps are connected outside of the diesel generator building. It is not possible for a flame to spread through the pumps, valves, and piping from one sump to another.

The diesel fuel oil day tank has a nominal capacity of 550 gallons. The dike around the base of the tank will hold at least 110 percent of the tank contents. The dike area is drained by gravity to a 900-gallon, covered sump in the same diesel generator room. The oil can be pumped outdoors to a truck connection for removal from the building.

Each diesel fuel oil tank is provided with protection features to preclude the uncontrolled leakage of diesel fuel. The design features provided for the day tank were reviewed and accepted by the NRC at the Wolf Creek Fire Protection Audit of February 6 to 9, 1984.

D.1.3 D.1.3 Combustible Loading

Room	Combustible Loading Classification
5203	High

D.1.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Actuation of the detection system also charges the sprinkler system. Manual-pull fire alarm stations are located near the exit doorways from this area. The pull stations alarm locally and in the control room. A hose station and portable

extinguishers are provided just outside this fire area, and portable extinguishers are located within the area, as indicated in Figure 9.5.1-2, Sheet 2. The hose station is equipped with 100 feet of hose for effective coverage of this fire area.

An automatic preaction sprinkler system is provided for this area. The system is charged automatically by detector actuation. Adequate floor drains are provided in the area to remove sprinkler discharge without appreciable accumulation.

The alarms associated with the fire protection system in this area are shown below:

	Condition	Local	Remote (control room)
a.	Detection by infrared detectors	X	X
b.	Sprinkler deluge valve tripped		X

D.1.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Heat and smoke venting for each diesel generator room is provided by utilizing the exhaust air flow path. The free area of the exhaust air flow path provides at least 1.0 square feet of venting area for each 200 square feet of floor area. Smoke exhaust fans per se are not employed. Normal ventilation exhaust systems are utilized throughout for smoke removal.

D.1.6 Safe Shutdown Equipment

All of the safe shutdown equipment in this area is associated with the diesel generator package. Only equipment associated with one of the two redundant diesel generators is contained in each diesel generator room - there is no sharing of equipment between engines. The fuel oil storage tanks for the diesels are buried out in the yard.

D.1.7 Analysis

D.1.7.1 Fire Suppression

Early warning fire detection will be by infrared detectors which will readily detect the type of fire caused by the burning of fuel and lube oils. Depending upon the quantity of oil involved in the fire at this point, manual extinguishment with portable extinguishers and/or the hose station may be possible. If additional hose streams are required, the room is accessible from the yard hose hydrant system. In the event of a large fire, thermal detectors will automatically stop fuel oil transfer pump located in the fuel oil storage tank. However, diesel actuation will override the fire detection signal and the fuel oil transfer pumps will continue to run to provide fuel for the running diesel. The actuated thermal detectors will also charge the sprinkler system and the fusible link heads will open to extinguish the fire. In the event the automatic system fails (identified by the alarms described in D.1.4), the hose streams available will control the fire. The 3-hour-rated

barrier around this area will contain the fire. There is no safe shutdown equipment susceptible to water damage.

D.1.7.2 Safe Shutdown Capability

Since this area contains safe shutdown equipment and circuits from one separation group only and since the area is separated from adjoining areas by a 3-hour-rated barrier, a fire in this area will not prevent safe shutdown.

Fire Area D-2 (Ref. Figure 9.5.1-2, Sheet 2)

D.2.1 Fire Area Description

Diesel generator room (west)
Room 5201

Major Equipment

Standby diesel generator package, associated auxiliaries, and fuel oil day tank

D.2.2 Design Features

This area is separated from adjoining areas by 3-hour-rated walls. The roof is also 3-hour rated, with the exception of the ventilation openings, to minimize property damage, and consists of 18-inch-thick concrete slab. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. A dike is provided at the base of the fuel oil day tank in this area. The dike is sized to contain the entire contents of the tank. A curb is provided at the interconnecting door between this area and the ESF switchgear room (Fire Area C-10) to prevent the sprinkler system discharge from passing into Fire Area C-10.

The common trench between the two diesel generator rooms is fire-stopped with a 3-hour-rated barrier. The drainage in each of the rooms is collected in a sump in the same room from which the drainage is collected. The sump pump discharge lines from the two diesel generator room sumps are connected outside of the diesel generator building. It is not possible for a flame to spread through the pumps, valves, and piping from one sump to another.

The diesel fuel oil day tank has a nominal capacity of 550 gallons. The dike around the base of the tank will hold at least 110 percent of the tank contents. The dike area is drained by gravity to a 900-gallon, covered sump in the same diesel generator room. The oil can be pumped outdoors to a truck connection for removal from the building. Each diesel fuel oil tank is provided with protection features to preclude the uncontrolled leakage of diesel fuel. The design features provided for the day tank were reviewed and accepted by the NRC at the Wolf Creek Fire Protection Audit of February 6 to 9, 1984.

D.2.3 Combustible Loading

D.2.3.1 Fixed Combustibles

Room	Combustible Loading Classification
5201	High

D.2.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification for the specific trouble area. Actuation of the detection system also charges the sprinkler

system. Manual-pull fire alarm stations are located near the exit doorways from this area. The pull stations alarm locally and in the control room. A hose station and portable extinguishers are provided just outside this fire area, and portable extinguishers are located within the area, as indicated in Figure 9.5.1-2, Sheet 2. The hose station is equipped with 100 feet of hose for effective coverage of this fire area. An automatic preaction sprinkler system is provided for this area. Adequate floor drains are provided in the area to remove sprinkler discharge without appreciable accumulation.

The alarms associated with the fire protection system in this area are shown below:

	Condition	Local	Remote (control room)
a.	Detection by infrared detectors	X	X
b.	Sprinkler deluge valve tripped		X
c.	Sprinkler trouble alarms (loss of power, low air (pressure)		X

D.2.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers. Heat and smoke venting for each diesel generator room is provided by utilizing the exhaust air flow path. The free area of the exhaust air flow path provides at least 1.0 square feet of venting area for each 200 square feet of floor area. Smoke exhaust fans per se are not employed. Normal ventilation exhaust systems are utilized throughout for smoke removal.

D.2.6 Safe Shutdown Equipment

All of the safe shutdown equipment in this area is associated with the diesel generator package. Only equipment associated with one of the two redundant diesel generators is contained in each diesel generator room - there is no sharing of equipment between engines. The fuel oil storage tanks for the diesels are buried out in the yard.

D.2.7 Analysis

D.2.7.1 Fire Suppression

Early warning fire detection will be by infrared detectors, which will readily detect the type of fire caused by the burning of fuel and lube oils. Depending upon the quantity of oil involved in the fire at this point, manual extinguishment with portable extinguishers and/or the hose station may be possible. If additional hose streams are required, the room is accessible from the yard hose hydrant system. In the event of a large fire, thermal detectors will automatically stop the fuel oil transfer pump located in the fuel oil storage tank. However, diesel actuation will override the fire detection signal and the fuel oil transfer pumps will continue to run to provide fuel for the running diesel. The actuated

thermal detectors will also charge the sprinkler system, and the fusible link heads will open to extinguish the fire. In the event the automatic system fails (identified by the alarms described in D.2.4), the hose streams available will control the fire. The 3-hour-rated barrier around this area will contain the fire. There is no safe shutdown equipment susceptible to water damage.

D.2.7.2 Safe Shutdown Capability

Since this area contains safe shutdown equipment and circuits from one separation group only and since the area is separated from the adjoining areas by a 3-hour-rated barrier, a fire in this area will not prevent safe shutdown.

Fire Area CC-1 Fire Area CC-1 (Ref. Figure 9.5.1-2, Sheets 1 through 4)

CC.1.1 Fire Area Description

Communications corridor (all elevations)
Rooms 3102, 3103, 3225, 3226 3227, 3228, 3303, 3304, 3307, 3402, 3502, 3503, 3611,3612, 3613,3614, 3619, 3620, 3621,3701 thru 3706, 3802,3803

Major Equipment

Plant computer, central chilled and hot water package, and HVAC equipment

CC.1.2 Design Features

This area is separated from the adjacent safety-related areas (control and auxiliary building) by 3-hour-rated barriers, except that the missile-resistant doors are not rated. The construction of these doors is described in Section 9.5.1. The ceiling of this area is the building roof, and the bottom floor is on soil. At floor El. 2000 feet and above, this area is open to the turbine building. All cable and piping penetrations through the fire-rated barriers are fitted with 3-hour-rated penetration seals. Ducts penetrating the fire barriers are fitted with 3-hour-rated fire dampers. A dedicated combustible liquid storage room is located on El. 2000. This room features 3-hour-rated walls and ceiling and is built on a concrete slab.

CC.1.3 Combustible Loading

Room	Combustible Loading Classification
3102	Low
3103	Low
3225	Low
3226	Low
3227	Moderate
3228	Low
3303	Low
3304	Low
3307	Very High
3402	Low
3502	Low
3503	Low
3611	Low
3612	Moderate
3613,3613A,B	Low

Room	Combustible Loading Classification
3614	Moderate
3619	Low
3620	High
3621	Moderate
3701	Low
3702	Moderate
3703	Low
3704	Low
3705	Moderate
3706	Low
3802	Low
3803	Low

CC.1.4 Fire Protection

Ionization detectors, heat detectors or photoelectric detectors are installed in all areas which contain appreciable quantities of combustibles. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. Manual-pull fire alarm stations are located near the exit doorways from each elevation of this area. The pull stations alarm locally and in the control room.

Rooms 3613, 3613A, and 3613B are provided with an automatic preaction sprinkler system. This system is based on NFPA No. 13 pipe schedule for ordinary hazard occupancy.

At the floor elevations below the turbine operating floor where the communications corridor opens into the turbine building, an automatic sprinkler system is provided to protect this area from a fire in the turbine building. Room 3307 is a combustible liquid storage room and is constructed on a concrete slab with 3-hour-rated walls and ceiling. This room is protected by both an ionization detector and a wet pipe sprinkler system based on the extra hazard requirements of NFPA 13.

CC.1.5 Isolation and Smoke Removal

A fire in this area will be isolated from safety-related areas of the plant by 3-hour-rated barriers. Fire dampers will isolate the HVAC ducts from the safety-related areas of the plant. Smoke can be removed by portable fans and flexible ducting to the door in the north wall at grade.

CC.1.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment or circuits.

CC.1.7 Analysis

CC.1.7.1 Fire Suppression

A fire in this area will be detected and alarmed by the automatic detection system. In the computer room, the conference room and the adjoining E.O. room, the automatic pre-action sprinkler system will actuate when ceiling detectors alarm. In the other hazard areas and in the event the pre-action system fails, the fire can be extinguished, using hose stations and/or portable extinguishers. Access to this area is from the control building through double doors at each elevation, from the turbine building, and from outside through doors in the north wall of the building.

CC.1.7.2 Safe Shutdown Capability

Since this area contains no safe shutdown equipment and is separated from adjoining safe shutdown areas by a 3-hour-rated barrier, a fire in this area cannot prevent safe shutdown.

Fire Area RSB-1 (Ref. Figure 9.5.1-2, Sheet 4)

RSB.1.1 Fire Area Description

RAM Storage Building Room 8501

Major Equipment

Storage area for equipment and materials used for plant maintenance (some with contamination)

RSB.1.2 Design Features

This area is separated from adjoining areas and buildings by 3-hour-rated barriers. Room 1504 in Fire Area A-19 is separated from this area by a three hour rated wall and a missile door. The ceiling of this area is the building roof. The floor of this area serves as a 3-hour rated fire barrier. Portions of the floor serves as the roof of RHR Heat Exchanger rooms 1309 and 1310 which are Fire Areas A-9 and A-10. Hatches with removable concrete covers are provided in the floor for access to each heat exchanger room. There are also hatches in the ceiling directly above the floor hatches designed for removal of the tube bundles or the RHR heat exchangers.

RSB.1.3 Combustible Loading

Room	Combustible Loading Classification
8501	High

RSB.1.4 Fire Protection

Detectors are installed to protect this area. The detection system alarms locally and in the control room. The control room annunciation is zoned for quick identification of the specific trouble area. A hose station and portable fire extinguishers are provided for this fire area. This entire area is protected by an automatic wet pipe sprinkler system.

RSB.1.5 Isolation and Smoke Removal

A fire in this area will be contained by the fire barriers until extinguished. Smoke can be vented to the outside by portable fans.

RSB.1.6 Safe Shutdown Equipment

This area contains no safe shutdown equipment, or circuits.

RSB.1.7 Analysis

RSB.1.7.1 Fire Suppression

The fire barriers enclosing this area will protect this area from a fire in adjoining areas and will contain a fire within this area until extinguished. The fire in this area will be detected and alarmed by the detection system and will be extinguished by the automatic wet pipe sprinkler system. A hose station is provided for a back-up suppression system. Adequate drainage is provided to remove any fire-fighting water.

RSB.1.7.2 Safe Shutdown Capability

Since this area contains on safe shutdown equipment and is separated from adjoining safe shutdown areas by a 3-hour rated barrier, a fire in this area cannot prevent safe shutdown.

TABLE 9.5B-1 MINIMUM EQUIPMENT REQUIRED FOR SAFE SHUTDOWN

Function	Equipment
1. Circulation of reactor coolant	
a. Hot standby	a. Natural circulation is sufficient.
b. Cold shutdown	b. (1) One residual heat removal system and its necessary supporting auxiliaries and one train component cooling water
2. Removal of decay heat and sensible heat	
a. Hot standby	a. (1) Two intact steam generators and associated power-operated relief valves (2) One of three auxiliary feedwater systems and its necessary supporting auxiliary systems
b. Cold shutdown	b. (1) One residual heat removal system and its necessary supporting auxiliaries including the associated train of component cooling water
3. Boration	Boration when at hot standby is not required until approximately 24 hours after shutdown.
a. Hot standby	a. Refueling water storage tank providing a suction source to a centrifugal charging pump discharging to the RCS through the boron injection path or through the seal injection path
b. Cold shutdown	b. Additional boration from the RWST is required during first stages of cold shutdown procedure

TABLE 9.5B-1 (Sheet 2)

	Function	Equipment
4.	Depressurization	a. One pressurizer power-operated relief valve OR CVCS safety-related letdown to the PRT

TABLE 9.5B-2 EQUIPMENT REQUIRED FOR SHUTDOWN FOLLOWING A FIRE

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
JE-PJE01A	Emergency Fuel Oil Transfer Pump (Sub in Tank)	(50)	N/A	X	X	1
JE-PJE01B	Emergency Fuel Oil Transfer Pump (Sub in Tank)	(50)	N/A	X	X	4
EF-PEF01A	ESW Pump A	U104	UNPH	X	X	1
EF-FEF02A	Self-Cleaning Strainer A	U104	UNPH	X	X	1
EF-HV-0097	ESW Pump A Vent Valve	U104	UNPH	X	X	1
EF-PDEF01A	ESW Pump A	U104	UNPH	X	X	1
EF-PDI-0019	ESW Self-Cln Str 02A Dp	U104	UNPH	X	X	1
EF-PDT-0019	EDW Self-Cln Str 02A Dp	U104	UNPH	X	X	1
EF-PDV-0019	Strainer A Trash Valve	U104	UNPH	X	X	1
EF-PT-0001	ESW Pump 1A Disch Press	U104	UNPH	X	X	1
EF155	ESW Control Pnl, Unit 2	U104	UNPH	X	X	1
EF169	ESW Control Pnl, Unit 2	U104	UNPH	X	X	1
GD-CGD01A	ESW Pump Room Supply Fan	U104	UNPH	X	X	1
GD-HIS-0001B	ESW Pump Room Supply Fan 1A & Inlet Damper Switch	U104	UNPH	X	X	1
GD-TE-0001	ESW Pmp Rm Temp 1A Damper	U104	UNPH	X	X	1
GD-TZ-0001A	Flow Control Damper Actuator - ESW Pumphouses	U104	UNPH	X	X	1
GD-TZ-0001B	Flow Control Damper Actuator - ESW Pumphouses	U104	UNPH	X	X	1
GD-TZ-0001C	Flow Control Damper Actuator - ESW Pumphouses	U104	UNPH	X	X	1
NG-XNG05	ESW MCC Transformer	U104	UNPH	X	X	1
NG05E	MCC	U104	UNPH	X	X	1
RP315	125 VDC Panel	U104	UNPH	X	X	1
EF-DPEF01B	ESW Pump B	U105	USPH	X	X	4
EF-FEF02B	Self-Cleaning Strainer B	U105	USPH	X	X	4
EF-HV-0098	ESW Pump B Vent Valve	U105	USPH	X	X	4
EF-PDI-0020	ESW Self-Cln Str 02B Dp	U105	USPH	X	X	4
EF-PDT-0020	ESW Self-Cln Str 02B Dp	U105	USPH	X	X	4

TABLE 9.5B-2 (Sheet 2)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
EF-PDV-0020	Strainer B Trash Valve	U105	USPH	X	X	4
EF-PT-0002	ESW Pmp 1B Disch Press	U105	USPH	X	X	4
EF156	ESW Control Pnl, Unit 2	U105	USPH	X	X	4
EF170	ESW Control Pnl, Unit 2	U105	USPH	X	X	4
GD-CGD01B	ESW Pump Room Supply Fan	U105	USPH	X	X	4
GD-HIS-0011B	EDW Pump Room Supply Fan 1B & Inlet Damper Switch	U105	USPH	X	X	4
GD-TE-0011	ESW Pmp Rm Temp 1B Damper	U105	USPH	X	X	4
GD-TZ-0011A	Flow Control Damper Actuator - ESW Pumphouses	U105	USPH	X	X	4
GD-TZ-0011B	Flow Control Damper Actuators - ESW Pumphouses	U105	USPH	X	X	4
GD-TZ-0011C	Flow Control Damper Actuator - ESW Pumphouses	U105	USPH	X	X	4
NG-XNG06	ESW MCC Transformer	U105	USPH	X	X	4
NG06E	MCC	U105	USPH	X	X	4
RP316	125 VDC Panel	U105	USPH	X	X	4
GD-TE-0051	Cooling Twr Elect Rm Sup Fan	U301	UNCT	X	X	1
GD-TZ-0051C	Flow Control Damper Actuator - ESW Pumphouses	U301	UNCT	X	X	1
NG-XNG07	LC Transformer	U301	UNCT	X	X	1
NG07	Load Center	U301	UNCT	X	X	1
NG07F	MCC	U301	UNCT	X	X	1
NG07S	MCC	U301	UNCT	X	X	1
RP317	125 VDC Panel	U301	UCNT	X	X	1
EF-HV-0065	UHS Cooling Tower Bypass	U302	UNCT	X	X	1
GD-CGD02A	Cooling Tower Elect. Rm. Supply Fan	U302	UNCT	X	X	1
GD-HIS-0051B	Local Control Station	U302	UNCT	X	X	1
GD-TZ-0051A	Flow Control Damper Actuator - ESW Pumphouses	U302	UNCT	X	X	1
GD-TZ-0051B	Flow Control Damper Actuator - ESW Pumphouses	U302	UNCT	X	X	1
GD-TE-0061	Cooling Twr Elect Rm Sup Fan	U304	USCT	X	X	4

TABLE 9.5B-2 (Sheet 3)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
GD-TZ-0061C	Flow Control Damper	U304	USCT	X	X	4
NG-XNG08	LC Transformer	U304	USCT	X	X	4
NG08	Load Center	U304	USCT	X	X	4
NG08F	MCC	U304	USCT	X	X	4
NG08S	MCC	U304	USCT	X	X	4
RP318	125 VDC Panel	U304	USCT	X	X	4
EF-HV-0066	UHS Cooling Tower Bypass	U305	USCT	X	X	4
GD-CGD02B	Cooling Tower Elect. Rm. Supply Fan	U305	USCT	X	X	4
GD-HIS-0061B	Local Control Station	U305	USCT	X	X	4
GD-TZ-0061A	Flow Control Damper Actuator - ESW Pumphouses	U305	USCT	X	X	4
GD-TZ-0061B	Flow Control Damper Actuator - ESW Pumphouses	U305	USCT	X	X	4
EF-CEF01A	Cooling Tower Fan A	U306	UNCT	X	X	1
EF-CEF01C	Cooling Tower Fan C	U306	UNCT	X	X	1
EF-CEF01B	Cooling Tower Fan B	U307	USCT	X	X	4
EF-CEF01D	Cooling Tower Fan D	U307	USCT	X	X	4
BG-HV-8111	CCP B Miniflow Isolation Valve	1107	A-4	X	X	4
BG-HV-8357B	CCP B Discharge to RCP Seals	1107	A-4	X	X	4
BG-PBG05B	Centrifugal Charging Pump B	1107	A-4	X	X	4
BN-LCV-0112E	Charging Pump RWST Suction Valve	1107	A-4	X	X	4
GL-SGL12B	Cent. Charging Pump Room Cooler	1107	A-4	X	X	4
BN-HV-8812B	RHR Pump RWST Suction Valve	1109	A-4		X	4
BN-ZS-8812BA	RHR Pump RWST Suction Valve Limit Switch	1109	A-4		X	1
EJ-FCV-0611	RHR Mini Flow Isolation Valve Loop B	1109	A-4		X	4
EJ-PEJ01B	RHR Pump B	1109	A-4		X	4
GL-SGL10B	RHR Pump Room Cooler	1109	A-4		X	4
BN-HV-8812A	RHR Pump RWST Suction Valve	1111	A-2		X	1

TABLE 9.5B-2 (Sheet 4)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
BN-ZS-8812AA	RHR Pump RWST Suction Valve Limit Switch	1111	A-2		X	4
EJ-FCV-0610	RHR Mini Flow Isolation Valve Loop A	1111	A-2		X	1
EJ-PEJ01A	RHR Pump A	1111	A-2		X	1
GL-SGL10A	RHR Pump Room Cooler	1111	A-2		X	1
BG-HV-8110	CCP A Miniflow Isolation Valve	1114	A-2	X	X	1
BG-HV-8357A	CCP A Discharge to RCP Seals	1114	A-2	X	X	1
BG-PBG05A	Centrifugal Charging Pump A	1114	A-2	X	X	1
BN-LCV-0112D	Charging Pump RWST Suction Valve	1114	A-2	X	X	1
GL-SGL12A	Cent. Charging Pump Room Cooler	1114	A-2	X	X	1
EM-FT-0917A	Charging Pump to Boron Injection Flow Transmitter	1126	A-7	X	X	1
EM-FT-0917B	Charging Pump to Boron Injection Flow Transmitter	1126	A-7	X	X	4
EM-HV-8803A	Charging Pump Discharge Valve To Boron Injection	1126	A-7	X	X	1
EM-HV-8803B	Charging Pump Discharge Valve to Boron Injection	1126	A-7	X	X	4
EG-FT-0062	RCP Thermal Barrier (Total) Outlet Flow	1127	A-6	X	X	4
EJ-HV-8811B	Cont Recirc Sump Isolation Valve (Encapsulated)	1203	A-1		X	4
EJ-ZS-8811B	Cont Recirc Sump Isolation Valve Limit Switch	1203	A-1		X	4
ZNE-297	Electrical Penetration Assemblies	1203	A-1	X	X	1
ZNI-297	Valve Terminal Box	1203	A-1	X	X	1
ZSE-216	Electrical Penetration Assemblies	1203	A-1	X	X	4
ZSI-216	Valve Terminal Box	1203	A-1	X	X	4
EJ-HV-8811A	Cont Recirc Sump Isolation Valve (Encapsulated)	1204	A-1		X	1
EJ-ZS-8811A	Cont Recirc Sump Isolation Valve Limit Switch	1204	A-1		X	1
ZNE-296	Electrical Penetration Assemblies	1204	A-1	X	X	1
ZNI-296	Valve Terminal Box	1204	A-1	X	X	1
ZSE-215	Electrical Penetration Assemblies	1204	A-1	X	X	4
ZSI-215	Valve Terminal Box	1204	A-1	X	X	4

TABLE 9.5B-2 (Sheet 5)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
AL-HV-0030	ESW To Aux. Feed Pump B	1206	A-1	X		4
AL-HV-0031	ESW to Aux. Feed Pump A	1206	A-1	X		1
AL-HV-0034	CST To Aux. Feed Pump B	1206	A-1	X		4
AL-HV-0035	CST to Aux. Feed Pump A	1206	A-1	X		1
AL-HV-0032	Turbine AF Pump Suction From ESW A	1207	A-1	X		1
AL-HV-0033	Turbine AF Pump Suction From ESW B	1207	A-1	X		4
AL-HV-0036	Turbine AF Pump Suction From CST	1207	A-1	X		1
AL-PT-0037	ESFAS Low Suction Press	1207	A-1	X		1
AL-PT-0038	ESFAS Low Suction Press	1207	A-1	X		2
AL-PT-0039	ESFAS Low Suction Press	1207	A-1	X		4
EJ-FIS-0610	RHR Pump A Min. Flow Indicating Switch	1301	A-8		X	1
EJ-FIS-0611	RHR Pump B Min. Flow Indicating Switch	1301	A-8		X	4
AB-PT-0001	Stm Gen A Steamline Pressure	1304	A-29	X	X	1
AB-PT-0004	Stm Gen D Steamline Pressure	1304	A-29	X	X	4
AL-FT-0001	AFW to Stm Gen D Flow Transmitter	1304	A-29	X		4
AB-PT-0002	Stm Gen B Steamline Pressure	1305	A-30	X	X	2
AB-PT-0003	Stm Gen C Steamline Pressure	1305	A-30	X	X	3
BB-PT-0405	Reactor Coolant System Pres Wide Range (Hot Leg)	1320	A-8	X	X	1
BG-LT-0112	VCT Level Transmitter	1320	A-8	X	X	1
BG-LT-0185	VCT Level Transmitter	1320	A-8	X	X	4
RP209	Aux Relay Rack	1320	A-8	X	X	1
RP330	Reverse Isol Relay Rack	1320	A-8	X	X	1
RP332	Aux. Relay Rack	1320	A-8	X	X	1
BB-HV-8351A	RCP Seal Injection Containment Isolation Valve	1322	A-25	X	X	4
BB-HV-8351B	RCP Seal Injection Containment Isolation Valve	1322	A-25	X	X	4
BB-HV-8351C	RCP Seal Injection Containment Isolation Valve	1322	A-25	X	X	4

TABLE 9.5B-2 (Sheet 6)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
BB-HV-8351D	RCP Seal Injection Containment Isolation Valve	1322	A-25	X	X	4
BB-PT-0406	Reactor Coolant System Pres Wide Range (Hot Leg)	1202	A-25	X	X	4
EF-HV-0032	Containment Cooler Isolation Valve	1322	A-25	X	X	4
EF-HV-0048	Containment Cooler Isolation Valve	1322	A-25	X	X	4
EF-HV-0050	Containment Cooler Isolation Valve	1322	A-25	X	X	4
EJ-HV-8809B	RHR Isolation Valve to Cold Leg RCS Loops 3 and 4	1322	A-25		X	4
EJ-ZS-8809BA	RHR Isol Vlv to Cold Leg RCS Loops 3&4 Limit Sw	1322	A-25		X	1
EF-HV-0031	Containment Cooler Isolation Valve	1323	A-24	X	X	1
EF-HV-0047	Containment Cooler Isolation Valve	1323	A-24	X	X	1
EF-HV-0049	Containment Cooler Isolation Valve	1323	A-24	X	X	1
EG-HV-0058	RC Pump CCW Supply Cont Iso	1323	A-24	X	X	1
EG-HV-0059	RC Pump CCW Return Cont Iso	1323	A-24	X	X	1
EG-HV-0061	Cont Iso Vlv CCW Rtn From RC Pmp Ther Barr	1323	A-24	X	X	1
EG-HV-0071	Iso Valve CCW Supply to RC Pump	1323	A-24	X	X	4
EG-HV-0126	EG-HV-71 Bypass Valve	1323	A-24	X	X	1
EG-HV-0127	EG-HV-58 Bypass Valve	1323	A-24	X	X	4
EG-HV-0131	EG-HV-59 Bypass Valve	1323	A-24	X	X	4
EG-HV-0133	EG-HV-61 Bypass Valve	1323	A-24	X	X	4
EJ-HV-8809A	RHR Isolation Valve To Cold Leg RCS Loops 1 and 2	1323	A-24		X	1
EJ-ZS-8809AA	RHR Isol Vlv To Cold Leg RCS Loops 1&2 Limit Sw	1323	A-24		X	4
EM-HV-8801A	Boron Injection Discharge Valve to RCS	1323	A-24	X	X	1
EM-HV-8801B	Boron Injection Discharge Valve to RCS	1323	A-24	X	X	4
AL-FT-0007	Aux Fdw Flo to SG A	1304	A-29	X		4
AL-HV-0005	Mot Aux Fdwtr Pmp 2 Disch Iso	1324	A-29	X		4
AL-HV-0007	Mot Aux Fdwtr Pmp 2 Disch Iso	1324	A-29	X		4
AL-DPAL01B	Aux Feedwater Pump B Motor	1325	A-13	X		4

TABLE 9.5B-2 (Sheet 6)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
BB-HV-8351D	RCP Seal Injection Containment Isolation Valve	1322	A-25	X	X	4
BB-PT-0406	Reactor Coolant System Pres Wide Range (Hot Leg)	1202	A-25	X	X	4
EF-HV-0032	Containment Cooler Isolation Valve	1322	A-25	X	X	4
EF-HV-0048	Containment Cooler Isolation Valve	1322	A-25	X	X	4
EF-HV-0050	Containment Cooler Isolation Valve	1322	A-25	X	X	4
EJ-HV-8809B	RHR Isolation Valve to Cold Leg RCS Loops 3 and 4	1322	A-25		X	4
EJ-ZS-8809BA	RHR Isol Vlv to Cold Leg RCS Loops 3&4 Limit Sw	1322	A-25		X	1
EF-HV-0031	Containment Cooler Isolation Valve	1323	A-24	X	X	1
EF-HV-0047	Containment Cooler Isolation Valve	1323	A-24	X	X	1
EF-HV-0049	Containment Cooler Isolation Valve	1323	A-24	X	X	1
EG-HV-0058	RC Pump CCW Supply Cont Iso	1323	A-24	X	X	1
EG-HV-0059	RC Pump CCW Return Cont Iso	1323	A-24	X	X	1
EG-HV-0061	Cont Iso Vlv CCW Rtn From RC Pmp Ther Barr	1323	A-24	X	X	1
EG-HV-0071	Iso Valve CCW Supply to RC Pump	1323	A-24	X	X	4
EG-HV-0126	EG-HV-71 Bypass Valve	1323	A-24	X	X	1
EG-HV-0127	EG-HV-58 Bypass Valve	1323	A-24	X	X	4
EG-HV-0131	EG-HV-59 Bypass Valve	1323	A-24	X	X	4
EG-HV-0133	EG-HV-61 Bypass Valve	1323	A-24	X	X	4
EJ-HV-8809A	RHR Isolation Valve To Cold Leg RCS Loops 1 and 2	1323	A-24		X	1
EJ-ZS-8809AA	RHR Isol Vlv To Cold Leg RCS Loops 1&2 Limit Sw	1323	A-24		X	4
EM-HV-8801A	Boron Injection Discharge Valve to RCS	1323	A-24	X	X	1
EM-HV-8801B	Boron Injection Discharge Valve to RCS	1323	A-24	X	X	4
AL-FT-0007	Aux Fdw Flo to SG A	1304	A-29	X		4
AL-HV-0005	Mot Aux Fdwtr Pmp 2 Disch Iso	1324	A-29	X		4
AL-HV-0007	Mot Aux Fdwtr Pmp 2 Disch Iso	1324	A-29	X		4
AL-DPAL01B	Aux Feedwater Pump B Motor	1325	A-13	X		4

TABLE 9.5B-2 (Sheet 7)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
AL-PT-0024	Mot Aux Feedwater Pmp 2 Suct	1325	A-13	X		4
GF-HIS-0016	Local Control Station	1325	A-13	X		4
GF-SGF02B	Auxiliary Feed Pump Room Cooler	1325	A-13	X		4
AL-DPAL01A	Aux Feedwater Pump A Motor	1326	A-14	X		1
AL-PT-0025	Cst To Mot Aux Fdw Pmp 1 Suct	1326	A-14	X		1
GF-HIS-0015	Local Control Station	1326	A-14	X		1
GF-SGF02A	Auxiliary Feed Pump Room Cooler	1326	A-14	X		1
AL-HV-0006	Valve Terminal Box	1327	A-29	X		1
AL-HV-0006	Turb Afp Disch To Steam Gen D	1327	A-29	X		1
AL-HV-0008	Valve Terminal Box	1327	A-29	X		1
AL-HV-0008	Turb Afp Disch to Steam Gen A	1327	A-29	X		1
AL-FT-0009	Aux Fdw Flo To SG B	1305	A-30	X		1
AL-FT-0011	Aux Fdw Flo To SG C	1305	A-30	X		1
AL-HV-0009	Mot Aux Fdwtr Pmp 1 Disch Iso	1328	A-30	X		1
AL-HV-0011	Mot Aux Fdwtr Pmp 1 Disch Iso	1328	A-30	X		1
AL-HV-0010	Valve Terminal Box	1330	A-30	X		4
AL-HV-0010	Turb AFP Disch to Steam Gen B	1330	A-30	X		4
AL-HV-0012	Valve Terminal Box	1330	A-30	X		4
AL-HV-0012	Turb AFP Disch to Steam Gen C	1330	A-30	X		4
AL-PT-0026	Turb AFP Suction Pressure Transmitter	1331	A-15	X		2
FC-FV-0310	Valve Terminal Box	1207	A-15	X	X	4
FC-FV-0313	Turbine Speed-Governing Valve	1331	A-15	X	X	2
FC-FY-0310	Aux Fdwtr Pmp Stm Trap Isol	1207	A-15	X	X	4
FC-HV-0312	Turbine Manual Trip and Throttle Valve	1331	A-15	X	X	2
FC-KFC02	Aux Feed Pump Turbine	1331	A-15	X	X	2
FC-PFC04	Turbine L.O. Pump	1331	A-15	X	X	2

TABLE 9.5B-2 (Sheet 8)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
FC-219	AFP Turbine Gauge and Control Panel	1331	A-15	X	X	2
EF-HV-0052	CCW Isolation Valve	1401	A-16	X	X	4
EF-HV-0060	CCW Isolation Valve	1401	A-16	X	X	4
EG-DPEG01B	CCW Pump B Motor Train B	1401	A-16	X	X	4
EG-DPEG01D	CCW Pump D Motor Train B	1401	A-16	X	X	4
EG-HV-0054	Train B CCW to Common Header	1401	A-16	X	X	4
EG-PT-0078	CCW Pmps B&D Disch Press	1401	A-16	X	X	4
EG-TE-0032	CCW Hx B Outlet Temp	1401	A-16	X	X	4
EG-TV-0030	Valve Terminal Box	1401	A-16	X	X	4
EG-TV-0030	CCW Hx B Bypass Iso	1401	A-16	X	X	4
GL-HIS-0023	Local Control Station	1401	A-16	X	X	4
GL-SGL11B	CCW Pump Room Cooler	1401	A-16	X	X	4
EG-HV-0015	CCW Common Header Return Iso Train A	1402	A-16	X	X	1
EG-HV-0016	CCW Common Header Return Iso Train B	1402	A-16	X	X	4
EG-HV-0053	Train A CCW to Common Header	1402	A-16	X	X	1
EG-HV-0101	RHR A Inlet CCW Isolation Valve	1408	A-16	X	X	1
EG-HV-0102	RHR B Inlet CCW Isolation Valve	1402	A-16	X	X	4
RP210	Aux Relay Rack	1402	A-16	X	X	4
SB102A	Cab W Reactor Trip Swgr Train A	1403	A-27	X	X	1
SB102B	Cab W Reactor Trip Swgr Train B	1403	A-27	X	X	4
EF-HV-0051	CCW Isolation Valve	1406	A-16	X	X	1
EF-HV-0059	CCW Isolation Valve	1406	A-16	X	X	1
EG-DPEG01A	CCW Pump A Motor Train A	1406	A-16	X	X	1
EG-DPEG01C	CCW Pump C Motor Train A	1406	A-16	X	X	1
EG-PT-0077	CCW Pmps A&C Disch Press	1406	A-16	X	X	1
EG-TE-0031	CCW Hx A Outlet Temp	1406	A-16	X	X	1

TABLE 9.5B-2 (Sheet 9)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
EG-TV-0029	Valve Terminal Box	1406	A-16	X	X	1
EG-TV-0029	CCW Hx A Bypass Iso	1406	A-16	X	X	1
GL-HIS-0002	Local Control Station	1406	A-16	X	X	1
GL-HZ-0080	Auxiliary Bldg Isolation Damper	1406	A-16	X	X	1
GL-HZ-0081	Auxiliary Bldg Isolation Damper	1406	A-16	X	X	1
GL-SGL11A	CCW Pump Room Cooler	1406	A-16	X	X	1
RP266	Aux Relay Rack	1408	A-16	X	X	2
RP331	Reverse Isol Relay Rack	1408	A-16	X	X	4
RP333	Aux. Relay Rack	1408	A-16	X	X	4
GL-SGL15B	Penetration Room Cooler	1409	A-17	X	X	4
NG02B	MCC	1409	A-17	X	X	4
NG02T	MCC	1409	A-17	X	X	4
NG04T	MCC	1409	A-17	X	X	4
PA05	PT Cub. For RCP Motor DPBB01C	1409	A-17	X	X	2
PA06	PT Cub. For RCP Motor DPBB01D	1409	A-17	X	X	4
ZSE/ZSI	Electrical Penetration Assemblies	1409/2000	A-17/ RB-4	X	X	4
GL-SGL15A	Penetration Room Cooler	1410	A-18	X	X	1
NG01B	MCC	1410	A-18	X	X	1
NG01T	MCC	1410	A-18	X	X	1
NG03T	MCC	1410	A-18	X	X	1
PA03	PT Cub. For RCP Motor DPBB01A	1410	A-18	X	X	1
PA04	PT Cub. For RCP Motor DPBB01B	1410	A-18	X	X	3
ZNE/ZNI	Electrical Penetration Assemblies	1410/2000	A-18/ RB-3	X	X	1
AB-PT-0514	Main Steam Pressure Loop 1	1411	A-23	X	X	1
AB-PT-0515	Main Steam Pressure Loop 1	1411	A-23	X	X	2

TABLE 9.5B-2 (Sheet 10)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
AB-PT-0516	Main Steam Pressure Loop 1	1411	A-23	X	X	4
AB-PT-0544	Main Steam Pressure Loop 4	1411	A-23	X	X	1
AB-PT-0545	Main Steam Pressure Loop 4	1411	A-23	X	X	2
AB-PT-0546	Main Steam Pressure Loop 4	1411	A-23	X	X	4
AE-FV-0039	Feedwater Isolation Valve Loop 1	1411	A-23	X	X	1/4
AE-FV-0042	Feedwater Isolation Valve Loop 4	1411	A-23	X	X	1/4
BM-HV-0001	Valve Terminal Box	1411	A-23	X	X	1/4
BM-HV-0001	SG A To SG Bldn Flash Tk Vlv	1411	A-23	X	X	1/4
BM-HV-0004	Valve Terminal Box (AE-FV-0046)	1411	A-23	X	X	1/4
BM-HV-0004	SG D To SG Bldn Flash Tk Vlv	1411	A-23	X	X	1/4
BM-HY-0001B	Valve Terminal Box (AE-FV-0043, BM-ZS-0001B)	1411	A-23	X	X	1
BM-HY-0004B	Valve Terminal Box (BM-ZS-0004B)	1411	A-23	X	X	1
AB-HV-0005	Valve Terminal Box	1412	A-23	X	X	2
AB-HV-0005	Lp 2 Stm Sply To Aux FW Turb	1412	A-23	X	X	2
AB-HV-0006	Valve Terminal Box	1412	A-23	X	X	2
AB-HV-0006	Lp 3 Stm Sply To Aux FW Turb	1412	A-23	X	X	2
AB-HV-0048	Valve Terminal Box	1412	A-23	X	X	1
AB-HV-0049	Valve Terminal Box	1412	A-23	X	X	1
AB-PT-0524	Main Steam Pressure Loop 2	1412	A-23	X	X	1
AB-PT-0525	Main Steam Pressure Loop 2	1412	A-23	X	X	2
AB-PT-0526	Main Steam Pressure Loop 2	1412	A-23	X	X	3
AB-PT-0534	Main Steam Pressure Loop 3	1412	A-23	X	X	1
AB-PT-0535	Main Steam Pressure Loop 3	1412	A-23	X	X	2
AB-PT-0536	Main Steam Pressure Loop 3	1412	A-23	X	X	3
AE-FV-0040	Feedwater Isolation Valve Loop 2	1412	A-23	X	X	1/4
AE-FV-0041	Feedwater Isolation Valve Loop 3	1412	A-23	X	X	1/4

TABLE 9.5B-2 (Sheet 11)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
BM-HV-0002	Valve Terminal Box (AE-FV-0044)	1412	A-23	X	X	1/4
BM-HV-0002	SG B To SG Bldn Flash Tk Vlv	1412	A-23	X	X	1/4
BM-HV-0003	Valve Terminal Box	1412	A-23	X	X	1/4
BM-HV-0003	SG C To SG Bldn Flash Tk Vlv	1412	A-23	X	X	1/4
BM-HY-0002B	Valve Terminal Box (BM-ZS-0002B)	1412	A-23	X	X	1
BM-HY-0003B	Valve Terminal Box (AE-FV-0045, BM-ZS-0003B)	1412	A-23	X	X	1
AB-PIC-0001B	Stm Gen A Atm Steam Dump	1413	A-28	X	X	1
AB-PIC-0002B	Stm Gen B Atm Steam Dump	1413	A-28	X	X	2
AB-PIC-0003B	Stm Gen C Atm Steam Dump	1413	A-28	X	X	3
AB-PIC-0004B	Stm Gen D Atm Steam Dump	1413	A-28	X	X	4
AE-LI-0517X	Steam Generator Water Level	1413	A-28	X	X	4
AE-LI-0528X	Steam Generator Water Level	1413	A-28	X	X	3
AE-LI-0537X	Steam Generator Water Level	1413	A-28	X	X	4
AE-LI-0548X	Steam Generator Water Level	1413	A-28	X	X	3
AL-HK-0005B	Mot Aux Fw Pmp B Disch To Stm Gen D	1413	A-28	X	X	4
AL-HK-0006B	Turb AFP Disch To Steam Gen D	1413	A-28	X	X	1
AL-HK-0007B	Mot Aux Fw Pmp B Disch To Stm Gen A	1413	A-28	X	X	4
AL-HK-0008B	Turb Afp Disch To Steam Gen A	1413	A-28	X	X	1
AL-HK-0009B	Mot Aux Fw Pmp A Disch To Stm Gen B	1413	A-28	X	X	1
Al-HK-0010B	Turb AFP Disch To Steam Gen B	1413	A-28	X	X	4
AL-HK-0011B	Mot Aux Fw Pmp A Disch To Stm Gen C	1413	A-28	X	X	1
AL-HK-0012B	Turb AFP Disch To Steam Gen C	1413	A-28	X	X	4
BB-PI-0406X	Reactor Coolant Pressure Indicator	1413	A-28	X	X	4
FC-SI-0313B	Aux Fdwtr Pmp Speed Governor	1413	A-28	X	X	2
FC-HIS-0313B	Aux Fdwtr Pmp Speed Governor	1413	A-28	X	X	2
RP118A	Aux Shutdown Pnl	1413	A-28	X	X	1/3

TABLE 9.5B-2 (Sheet 12)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
RP118B	Aux Shutdown Pnl	1413	A-28	X	X	2/4
GK-HS-0040	Local Control Station	1501	A-21	X	X	4
GK-HS-0103	Local Control Station	1501	A-21	X	X	4
GK-HZ-0040A	A/C Unit Isolation Damper	1501	A-21	X	X	4
GK-HZ-0040B	Control Room Isolation Damper	1501	A-21	X	X	4
GK-SGK04B	Control Room A/C Unit	1501	A-21	X	X	4
NG04C	MCC	1501	A-21	X	X	4
RP290	125 VDC Panel	1501	A-21	X	X	4
AB-HV-0011	Main Steam Isol Valve Loop 4	1508	A-23	X	X	1/4
AB-HV-0012	Mn Stm Iso Byp Vlv Lp4	1508	A-23	X	X	1/4
AB-HV-0014	Main Steam Isol Valve Loop 1	1508	A-23	X	X	1/4
AB-HV-0015	Mn Stm Iso Byp Vlv Lpl	1508	A-23	X	X	1/4
AB-HY-0012A	Valve Terminal Box (AB-ZS-0012B)	1508	A-23	X	X	1
AB-HY-0012B	Valve Terminal Box (AB-ZS-0012A)	1508	A-23	X	X	4
AB-HY-0015A	Valve Terminal Box (AB-ZS-0015A)	1508	A-23	X	X	1
AB-HY-0015B	Valve Terminal Box (AB-ZS-0015B)	1508	A-23	X	X	4
AB-PV-0001	Valve Terminal Box	1508	A-23	X	X	1
AB-PV-0001	Stm Gen A Atm Relief Vlv	1508	A-23	X	X	1
AB-PV-0004	Valve Terminal Box	1508	A-23	X	X	4
AB-PV-0004	Stm Gen D Atm Relief Vlv	1508	A-23	X	X	4
AB-HV-0017	Main Steam Iso Valve Loop 2	1509	A-23	X	X	1/4
AB-HV-0018	Mn Stm Iso Byp Vlv Lp2	1509	A-23	X	X	1/4
AB-HV-0020	Main Steam Iso Valve Loop 3	1509	A-23	X	X	1/4
AB-HV-0021	Mn Stm Iso Byp Vlv Lp3	1509	A-23	X	X	1/4
AB-HV-0048	Lp 2 Stm Sply To Aux FW Turb Byp	1509	A-23	X	X	1
AB-HV-0049	Lp 3 Stm Sply To Aux FW Turb Byp	1509	A-23	X	X	1

TABLE 9.5B-2 (Sheet 13)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
AB-HY-0018A	Valve Terminal Box (AB-ZS-0018A)	1509	A-23	X	X	1
AB-HY-0018B	Valve Terminal Box (AB-ZS-0018B)	1509	A-23	X	X	1
AB-HY-0021A	Valve Terminal Box (AB-ZS-0021A)	1509	A-23	X	X	1
AB-HY-0021B	Valve Terminal Box (AB-ZS-0021B)	1509	A-23	X	X	4
AB-PV-0002	Valve Terminal Box	1509	A-23	X	X	2
AB-PV-0002	Stm Gen B Atm Relief Vlv	1509	A-23	X	X	2
AB-PV-0003	Valve Terminal Box	1509	A-23	X	X	3
AB-PV-0003	Stm Gen C Atm Relief Vlv	1509	A-23	X	X	3
GK-HZ-0029A	A/C System Isolation Damper	1512	A-22	X	X	1
GK-HZ-0029B	A/C System Isolation Damper	1512	A-22	X	X	1
GK-SGK04A	Control Room A/C Unit	1512	A-22	X	X	1
NG03C	MCC	1512	A-22	X	X	1
RP289	125 VDC Panel	1513	A-19	X	X	1
BB-FT-0017	RCP 1A Thrm Barr Clg	2000	RB-3	X	X	1
BB-FT-0018	RCP 1B Thrm Barr Clg	2000	RB-2	X	X	1
BB-FT-0019	RCP 1C Thrm Barr Clg	2000	RB-8	X	X	1
BB-FT-0020	RCP 1D Thrm Barr Clg	2000	RB-4	X	X	1
BB-HV-0013	RCP Thermal Barrier Cooler Isolation Valve	2000	RB-3	X	X	1
BB-HV-0014	RCP Thermal Barrier Cooler Isolation Valve	2000	RB-2	X	X	1
BB-HV-0015	RCP Thermal Barrier Cooler Isolation Valve	2000	RB-8	X	X	1
BB-HV-0016	RCP Thermal Barrier Cooler Isolation Valve	2000	RB-4	X	X	1
BB-HV-8157A	Excess Letdown Path to PRT Isolation	2000	RB-2	X	X	1
BB-HV-8157B	Excess Letdown Path to PRT Isolation	2000	RB-2	X	X	4
BB-PV-8702A	RHR Pump Suction Isolation Valve	2000	RB-1	X	X	4
BB-PV-8702B	RHR Pump Suction Isolation Valve	2000	RB-1	X	X	4
BB-ZS-8702AB	RHR Pump Suction Isolation Valve Limit Switch	2000	RB-1	X	X	1

TABLE 9.5B-2 (Sheet 14)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
BB-ZS-8702AA	Valve Terminal Box	2000	RB-1	X	X	1
BG-HV-8153A	Excess Letdown/RCS Isolation Valves	2000	RB-1	X	X	1
BG-HV-8153B	Excess Letdown/RCS Isolation Valves	2000	RB-1	X	X	4
BG-HV-8154A	Excess Letdown/RCS Isolation Valve	2000	RB-1	X	X	1
BG-HV-8154B	Excess Letdown/RCS Isolation Valves	2000	RB-1	X	X	4
EF-HV-0033	Containment Cooler Isolation Valve	2000	RB-2	X	X	1
EF-HV-0034	Containment Cooler Isolation Valve	2000	RB-2	X	X	4
EF-HV-0045	Containment Cooler Isolation Valve	2000	RB-2	X	X	1
EF-HV-0046	Containment Cooler Isolation Valve	2000	RB-2	X	X	4
EG-HV-0060	RC Pump CCW Return Cont Iso	2000	RB-2	X	X	4
EG-HV-0062	Cont Iso Vlv CCW Rtn From RC Pmp Ther Barr	2000	RB-2	X	X	4
EG-HV-0130	EG-HV-60 Bypass Valve	2000	RB-2	X	X	1
EG-HV-0132	EG-HV-62 Bypass Valve	2000	RB-2	X	X	1
EJ-HCV-8890A	Valve Terminal Box	2000	RB-2		X	1
EJ-HCV-8890B	Valve Terminal Box	2000	RB-2		X	4
EJ-HV-8701A	RHR Shutdown Suction Line Isolation Valve Loop A	2000	RB-2	X	X	1
EJ-HV-8701B	RHR Shutdown Suction Line Isolation Valve Loop B	2000	RB-2	X	X	4
EJ-HY-8890A	Test Line Isolation Valve Cold Leg Inj Line Sol	2000	RB-2		X	1
EJ-HY-8890B	Test Line Isolation Valve Cold Leg Inj Line Sol	2000	RB-2		X	4
EJ-ZS-8701BA	Valve Terminal Box	2000	RB-2	X	X	4
EJ-ZS-8701BB	RHR Shutdown Suct Line Isol Vlv Loop B Lmt Switch	2000	RB-2	X	X	4
EJ-ZS-8890A	Test Line Isol Vlv Cold Leg Inj Line Limit Sw	2000	RB-2		X	1
EJ-ZS-8890B	Test Line Isol Vlv Cold Leg inj Line Limit Sw	2000	RB-2		X	4
EM-HV-8843	Valve Terminal Box	2000	RB-2	X	X	4
EM-HY-8843	Boron Injection Testline and Containment Isolation Valve	2000	RB-2	X	X	4
EM-ZS-8843	Boron Injection Testline and Containment Isol Vlv Limit Switch	2000	RB-2	X	X	4

TABLE 9.5B-2 (Sheet 15)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
EP-HV-8808A	Accumulator Tank A Isolation Valve	2000	RB-2		X	1
EP-HV-8808B	Accumulator Tank B Isolation Valve	2000	RB-2		X	4
EP-HV-8808C	Accumulator Tank C Isolation Valve	2000	RB-2		X	1
EP-HV-8808D	Accumulator Tank D Isolation Valve	2000	RB-2		X	4
EP-HV-8950A	Accumulator Tank A Vent Valve	2000	RB-7		X	4
EP-HV-8950B	Accumulator Tank B Vent Valve	2000	RB-8		X	1
EP-HV-8950C	Accumulator Tank B Vent Valve	2000	RB-8		X	4
EP-HV-8950D	Accumulator Tank C Vent Valve	2000	RB-8		X	1
EP-HV-8950E	Accumulator Tank C Vent Valve	2000	RB-8		X	4
EP-HV-8950F	Accumulator Tank D Vent Valve	2000	RB-7		X	1
EP-ZS-8808AB	Accumulator Tank A ISO Valve Position Switch	2000	RB-2		X	4
EP-ZS-8808BB	Accumulator Tank B ISO Valve Position Switch	2000	RB-2		X	1
EP-ZS-8808CB	Accumulator Tank C ISO Valve Position Switch	2000	RB-2		X	4
EP-ZS-8808DB	Accumulator Tank D ISO Valve Position Switch	2000	RB-2		X	1
GN-SGN01A	Containment Cooler	2000	RB-5	X	X	1
GN-SGN01B	Containment Cooler	2000	RB-10	X	X	4
GN-SGN01C	Containment Cooler	2000	RB-5	X	X	1
GN-SGN01D	Containment Cooler	2000	RB-10	X	X	4
AE-LT-0501	SG Level Wide Range Loop 1	2201	RB-2	X	X	1
AE-LT-0502	SG Level Wide Range Loop 2	2201	RB-2	X	X	2
AE-LT-0503	SG Level Wide Range Loop 3	2201	RB-2	X	X	3
AE-LT-0504	SG Level Wide Range Loop 4	2201	RB-2	X	X	4
AE-LT-0517	S.G. Level Narrow Range Loop 1	2201	RB-7	X	X	4
AE-LT-0518	S.G. Level Narrow Range Loop 1	2201	RB-3	X	X	3
AE-LT-0519	SG Level Narrow Range Loop 1	2201	RB-3	X	X	1
AE-LT-0527	SG Level Narrow Range Loop 2	2201	RB-8	X	X	4

TABLE 9.5B-2 (Sheet 16)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
AE-LT-0528	SG Level Narrow Range Loop 2	2201	RB-8	X	X	3
AE-LT-0529	SG Level Narrow Range Loop 2	2201	RB-8	X	X	1
AE-LT-0537	SG Level Narrow Range Loop 3	2201	RB-2	X	X	4
AE-LT-0538	SG Level Narrow Range Loop 3	2201	RB-8	X	X	3
AE-LT-0539	SG Level Narrow Range Loop 3	2201	RB-8	X	X	1
AE-LT-0547	SG Level Narrow Range Loop 4	2201	RB-2	X	X	4
AE-LT-0548	SG Level Narrow Range Loop 4	2201	RB-7	X	X	3
AE-LT-0549	SG Level Narrow Range Loop 4	2201	RB-4	X	X	2
AE-LT-0551	SG Level Narrow Range Loop 1	2201	RB-7	X	X	1
AE-LT-0552	SG Level Narrow Range Loop 2	2201	RB-8	X	X	2
AE-LT-0553	SG Level Narrow Range Loop 3	2201	RB-8	X	X	2
AE-LT-0554	SG Level Narrow Range Loop 4	2201	RB-8	X	X	1
BB-LT-0459	Pressurizer Level Transmitter	2201	RB-4	X	X	1
BB-LT-0460	Pressurizer Level Transmitter	2201	RB-4	X	X	2
BB-LT-0461	Pressurizer Level Transmitter	2201	RB-4	X	X	3
BB-PT-0403	Reactor Coolant Sys Pres Wide Range (Hot Leg)	1202	RB-2	X	X	2
BB-PT-0455	Pressurizer Pressure Transmitter	2201	RB-4	X	X	1
BB-PT-0456	Pressurizer Pressure Transmitter	2201	RB-4	X	X	2
BB-PT-0457	Pressurizer Pressure Transmitter	2201	RB-10	X	X	3
BB-PT-0458	Pressurizer Pressure Transmitter	2201	RB-10	X	X	4
BB-TE-0411A1	RCS Loop 1 Hot Leg RTD 1 Temp Element	2201	RB-1	X	X	1
BB-TE-0411A2	RCS Loop 1 Hot Leg RTD 2 Temp Element	2201	RB-1	X	X	1
BB-TE-0411A3	RCS Loop 1 Hot Leg RTD 3 Temp Element	2201	RB-1	X	X	1
BB-TE-0411B	RCS Cold-Leg RTD Manifold Temp Element Loop 1	2201	RB-1	X	X	1
BB-TE-0413A	RCS Hot-Leg Temperature Element (WR) Loop 1	2201	RB-1	X	X	1
BB-TE-0413B	RCS Cold Leg Temp Element (WR) Loop 1	2201	RB-1	X	X	2

TABLE 9.5B-2 (Sheet 17)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
BB-TE-0421A1	RCS Loop 2 Hot Leg RTD 1 Temp Element	2201	RB-1	X	X	2
BB-TE-0421A2	RCS Loop 2 Hot Leg RTD 2 Temp Element	2201	RB-1	X	X	2
BB-TE-0421A3	RCS Loop 2 Hot Leg RTD 3 Temp Element	2201	RB-1	X	X	2
BB-TE-0421B	RCS Cold Leg RTD Mainfold Temp Element Loop 2	2201	RB-1	X	X	2
BB-TE-0423A	RCS Hot Leg Temp Element (WR) Loop 2	2201	RB-1	X	X	1
BB-TE-0423B	RCS Cold Leg Temp Element (WR) Loop 2	2201	RB-1	X	X	2
BB-TE-0431A1	RCS Loop 3 Hot Leg RTD 1 Temp Element	2201	RB-1	X	X	3
BB-TE-0431A2	RCS Loop 3 Hot Leg RTD 2 Temp Element	2201	RB-1	X	X	3
BB-TE-0431A3	RCS Loop 3 Hot Leg RTD 3 Temp Element	2201	RB-1	X	X	3
BB-TE-0431B	RCS Cold Leg RTD Manifold Temp Element Loop 3	2201	RB-1	X	X	3
BB-TE-0433A	RCS Hot Leg Temperature Element (WR) Loop 3	2201	RB-1	X	X	2
BB-TE-0433B	RCS Cold Leg Temperature Element (WR) Loop 3	2201	RB-1	X	X	2
BB-TE-0441A1	RCS Loop 4 Hot Leg RTD 1 Temp Element	2201	RB-1	X	X	4
BB-TE-0441A2	RCS Loop 4 Hot Leg RTD 2 Temp Element	2201	RB-1	X	X	4
BB-TE-0441A3	RCS Loop 4 Hot Leg RTD 3 Temp Element	2201	RB-1	X	X	4
BB-TE-0441B	RCS Cold Leg RTD Manifold Temp Element Loop 4	2201	RB-1	X	X	4
BB-TE-0443A	RCS Hot Leg Temperature Element (WR) Loop 4	2201	RB-1	X	X	2
BB-TE-0443B	RCS Cold Leg Temperature Element (WR) Loop 4	2201	RB-1	X	X	1
BB-HV-8000A	Pressurizer PORV Isolation Valve	2601	RB-10	X	X	1
BB-HV-8000B	Pressurizer PORV Isolation Valve	2601	RB-10	X	X	4
BB-PCV-0455A	Valve Terminal Box	2601	RB-10	X	X	1
BB-PCV-0455A	Pressurizer Power-Operated Relief Valve	2601	RB-10	X	X	1
BB-PCV-0456A	Valve Terminal Box	2601	RB-10	X	X	4
BB-PCV-0456A	Pressurizer Power-Operated Relief Valve	2601	RB-10	X	X	4
BB-ZS-0455A	Pressurizer PORV Limit Switch	2601	RB-10	X	X	1
BB-ZS-0456A	Pressurizer PORV Limit Switch	2601	RB-10	X	X	4

TABLE 9.5B-2 (Sheet 18)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
EF-FT-0053	ESW A Flo To Power Block	3101	C-1	X	X	1
EF-FT-0054	ESW B Flo To Power Block	3101	C-1	X	X	4
EF-HV-0023	Service Water Isolation Valve	3101	C-1	X	X	1
EF-HV-0024	Service Water Isolation Valve	3101	C-1	X	X	1
EF-HV-0025	Service Water Isolation Valve	3101	C-1	X	X	4
EF-HV-0026	Service Water Isolation Valve	3101	C-1	X	X	4
EF-HV-0037	Ultimate Heat Sink Isolation Valve	3101	C-1	X	X	1
EF-HV-0038	Ultimate Heat Sink Isolation Valve	3101	C-1	X	X	4
EF-HV-0039	Service Water Isolation Valve	3101	C-1	X	X	4
EF-HV-0040	Service Water Isolation Valve	3101	C-1	X	X	4
EF-HV-0041	Service Water Isolation Valve	3101	C-1	X	X	1
EF-HV-0042	Service Water Isolation Valve	3101	C-1	X	X	1
EF-TE-0067A	Ultimate Ht Sink Clg Twr 1A&C Temp	3101	C-1	X	X	1
EF-TE-0068A	Ultimate Ht Sink Clg Twr 1B&D Temp	3101	C-1	X	X	4
NB01	4.16 kV Switchgear	3301	C-9	X	X	1
NG-XNG01	LC Transformer	3301	C-9	X	X	1
NG-XNG03	LC Transformer	3301	C-9	X	X	1
NG01	Load Center	3301	C-9	X	X	1
NG01A	MCC	3301	C-9	X	X	1
NG03	Load Center	3301	C-9	X	X	1
RP139	Aux Relay Rack	3301	C-9	X	X	1
NK25	125 Vdc Swing Battery Charger Load Group 1	3301	C-9	X	X	1
NK77	NK25 AC Transfer Switch NG01/PG19	3301	C-9	X	X	1
NK75	NK25 DC Output Transfer Switch NK01/NK03	3301	C-9	X	X	1/3
NKHS0109	NG0109 Breaker Control Hand Switch	3301	C-9	X	X	1
NKHS1910	PG1910 Breaker Control Hand Switch	3301	C-9	X	X	5

TABLE 9.5B-2 (Sheet 19)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
NKHS0025	NK71 Transfer Switch Control Hand Switch	3301	C-9	X	X	1
GD-HS-0011	Local Control Station	3302	C-10	X	X	4
GD-HS-0061	Local Control Station	3302	C-10	X	X	4
NB02	4.16 kV Switchgear	3302	C-10	X	X	4
NG-XNG02	LC Transformer	3302	C-10	X	X	4
NG-XNG04	LC Transformer	3302	C-10	X	X	4
NG02	Load Center	3302	C-10	X	X	4
NG02A	MCC	3302	C-10	X	X	4
NG04	Load Center	3302	C-10	X	X	4
NK26	125 VDC Swing Battery Charger Load Group 2	3302	C-10	X	X	4
NK78	NK26 AC Transfer Switch NG01/PG19	3302	C-10	X	X	4
NK76	NK26 DC Output Transfer Switch NK02/NK04	3302	C-10	X	X	2/4
NKHS0411	NG0411 Breaker Control Hand Switch	3302	C-10	X	X	4
NKHS2010	PG2010 Breaker Control Hand Switch	3302	C-10	X	X	6
NKHS0026	NK75 Transfer Switch Control Hand Switch	3302	C-10	X	X	4
RP140	Aux Relay Rack	3302	C-10	X	X	4
RP147A	Instr Rack	3302	C-10	X	X	2
RP147B	Instr Rack	3302	C-10	X	X	4
RP334	Lockout Relay Rack	3302	C-10	X	X	2
RP335	Lockout Relay Rack	3302	C-10	X	X	4
SB148A	Cab W Contr Rm Isol	3302	C-10	X	X	2/4
SB148B	Cab W Contr Rm Isol	3302	C-10	X	X	4
NK04	125 Vdc Switchboard	3404	C-15	X	X	4
NK24	Charger	3404	C-15	X	X	4
NK44	125 Vdc Switchboard	3404	C-15	X	X	4
NK54	125 Vdc Switchboard	3404	C-15	X	X	4

TABLE 9.5B-2 (Sheet 20)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
NK74	NK04 Swing Transfer Switch NK24/NK26	3404	C-15	X	X	4
NKHS0014	NK78 Transfer Switch Control Hand Switch	3404	C-15	X	X	4
NKHS0264	NK76 Transfer Switch Control Hand Switch	3404	C-15	X	X	4
NN-XNN06	Xfmr	3404	C-15	X	X	4
NN04	Vital AC Inst Dist Panel	3404	C-15	X	X	4
NN14	Inverter	3404	C-15	X	X	4
NK14	Battery	3405	C-15	X	X	4
NK11	Battery	3407	C-16	X	X	1
NK01	125 Vdc Switchboard	3408	C-16	X	X	1
NK21	Charger	3408	C-16	X	X	1
NK41	125 Vdc Switchboard	3408	C-16	X	X	1
NK51	125 Vdc Switchboard	3408	C-16	X	X	1
NK71	NK01 Swing Transfer Switch NK21/NK25	3408	C-16	X	X	1
NKHS0251	NK72 Transfer Switch Control Hand Switch	3408	C-16	X	X	1
NKHS0011	NK73 Transfer Switch Control Hand Switch	3408	C-16	X	X	1
NK51A	Lighting Panel	3408	C-16	X	X	1
NN-XNN05	Xfmr	3408	C-16	X	X	1
NN01	Vital AC Inst Dist Panel	3408	C-16	X	X	1
NN11	Inverter	3408	C-16	X	X	1
NK25	Sapre Charger	3301	C-16	X	X	1
NK02	125 Vdc Switchboard	3410	C-15	X	X	2
NK22	Charger	3410	C-15	X	X	2
NK42	125 VDC Switchboard	3410	C-15	X	X	2
NK72	NK02 Swing Transfer Switch NK22/NK26	3410	C-15	X	X	2
NKHS0262	NK76 Transfer Switch Control Hand Switch	3410	C-15	X	X	4
NKHS0012	NK77 Transfer Switch Control Hand Switch	3410	C-15	X	X	4

TABLE 9.5B-2 (Sheet 21)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
NN02	Vital AC Inst Dist Panel	3410	C-15	X	X	2
NN12	Inverter	3410	C-15	X	X	2
NK12	Battery	3411	C-15	X	X	2
NK03	125 Vdc Switchboard	3414	C-16	X	X	3
NK13	Battery	3413	C-16	X	X	3
NK23	Charger	3414	C-16	X	X	3
NK43	125 VDC Switchboard	3414	C-16	X	X	3
NK73	NK03 Swing Transfer Switch NK23/NK25	3414	C-16	X	X	3
NKHS0253	NK72 Transfer Switch Control Hand Switch	3414	C-16	X	X	1
NKHS0013	NK74 Transfer Switch Control Hand Switch	3414	C-16	X	X	1
NN03	Vital AC Inst Dist Panel	3414	C-16	X	X	3
NN13	Inverter	3414	C-16	X	X	3
GK-SGK05B	Class IE Elec. Equip. A/C Unit	3415	C-13	X	X	4
GK-SGK05A	Class IE Elec. Equip. A/C Unit	3416	C-14	X	X	1
GM-CGM01B	Diesel Gen. Vent. Supply Fan	5201	D-2	X	X	4
GM-HS-0011B	Local Control Station	5201	D-2	X	X	4
GM-HS-0019B	Local Control Station	5201	D-2	X	X	4
GM-HZ-0019	Diesel Generator Room Isolation Damper	5201	D-2	X	X	4
GM-TE-0011	Diesel Gen Vent Supply Fan 1B	5201	D-2	X	X	4
GM-TZ-0011A	Flow Control Damper	5201	D-2	X	X	4
GM-TZ-0011B	Flow Control Damper	5201	D-2	X	X	4
JE-LT-0021	Emer Fuel Oil Day Tk B Lev	5201	D-2	X	X	4
JE-LT-0032	Emer Fuel Oil Day Tk B Lev	5201	D-2	X	X	4
KJ-PKJ01B	Mot Dr. Jacket Water Pump	5201	D-2	X	X	4
KJ-PKJ02B	Mot Dr. Rocker Prelube Pump	5201	D-2	X	X	4
KJ-PKJ03B	Mot Dr. Auxiliary Oil Pump	5201	D-2	X	X	4

TABLE 9.5B-2 (Sheet 22)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
KJ-PS-0162	Jacket Water Backup to Elect Speed Switch	5201	D-2	X	X	4
KJ-PSH-0123A	High Crankcase Press	5201	D-2	X	X	4
KJ-PSH-0123B	High Crankcase Press	5201	D-2	X	X	4
KJ-PSH-0123C	High Crankcase Press	5201	D-2	X	X	4
KJ-PSH-0123D	High Crankcase Press	5201	D-2	X	X	4
KJ-PSHL-0102A	Air Compr. A Start/Stop Press. Switch	5201	D-2	X	X	4
KJ-PSHL-0102B	Air Compr. B Start/Stop Press. Switch	5201	D-2	X	X	4
KJ-PSL-0126A	Low Lube Oil Press	5201	D-2	X	X	4
KJ-PSL-0126B	Low Lube Oil Press	5201	D-2	X	X	4
KJ-PSL-0126C	Low Lube Oil Press	5201	D-2	X	X	4
KJ-PSL-0126D	Low Lube Oil Press	5201	D-2	X	X	4
KJ-PV-0101A	Air Start Sol Vlv 1	5201	D-2	X	X	4
KJ-PV-0101B	Air Start Sol Vlv 2	5201	D-2	X	X	4
KJ-PV-0108	Shutdown Air Sol Vlv	5201	D-2	X	X	4
KJ-TCV-0134	Lube Oil Cooler Temp Ctrl Vlv	5201	D-2	X	X	4
KJ-TCV-0156	Intercooler Heat Exchanger Temp Ctrl Vlv	5201	D-2	X	X	4
KJ-TCV-0160	Jacket Water heat Exchanger Temp Ctrl Vlv	5201	D-2	X	X	4
KJ-TSH-0159A	High Jacket Water Temp	5201	D-2	X	X	4
KJ-TSH-0159B	High Jacket Water Temp	5201	D-2	X	X	4
KJ-TSH-0159C	High Jacket Water Temp	5201	D-2	X	X	4
KJ-TSH-0159D	High Jacket Water Temp	5201	D-2	X	X	4
KJ122	Diesel Gauge and Control Panel	5201	D-2	X	X	4
NE02	Diesel Generator	5201	D-2	X	X	4
NE106	Control & Relay Panel	5201	D-2	X	X	4
NG04D	MCC	5201	D-2	X	X	4
GM-CGM01A	Diesel Gen. Vent. Supply Fan	5203	D-1	X	X	1

TABLE 9.5B-2 (Sheet 23)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
GM-HZ-0009	Diesel Generator Room Isolation Damper	5203	D-1	X	X	1
GM-TE-0001	Diesel Gen Vent Supply Fan 1A	5203	D-1	X	X	1
GM-TZ-0001A	Flow Control Damper	5203	D-1	X	X	1
GM-TZ-0001B	Flow Control Damper	5203	D-1	X	X	1
JE-LT-0001	Emer Fuel Oil Day Tk A Lev	5203	D-1	X	X	1
JE-LT-0012	Emer Fuel Oil Day Tk A Lev	5203	D-1	X	X	1
KJ-PKJ01A	Mot Dr. Jacket Water Pump	5203	D-1	X	X	1
KJ-PKJ02A	Mot Dr. Rocker Prelube Pump	5203	D-1	X	X	1
KJ-PKJ03A	Mot Dr. Auxiliary Oil Pump	5203	D-1	X	X	1
KJ-PS-0062	Jacket Water Backup to Elect Speed Switch	5203	D-1	X	X	1
KJ-PSH-0023A	High Crankcase Pressure	5203	D-1	X	X	1
KJ-PSH-0023B	High Crankcase Pressure	5203	D-1	X	X	1
KJ-PSH-0023C	High Crankcase Pressure	5203	D-1	X	X	1
KJ-PSH-0023D	High Crankcase Pressure	5203	D-1	X	X	1
KJ-PSHL-0002A	Air Compr. A Start/Stop Press. Switch	5203	D-1	X	X	1
KJ-PSHL-0002B	Air Compr. B Start/Stop Press. Switch	5203	D-1	X	X	1
KJ-PSL-0026A	Low Lube Oil Press	5203	D-1	X	X	1
KJ-PSL-0026B	Low Lube Oil Press	5203	D-1	X	X	1
KJ-PSL-0026C	Low Lube Oil Press	5203	D-1	X	X	1
KJ-PSL-0026D	Low Lube Oil Press	5203	D-1	X	X	1
KJ-PV-0001A	Air Start Sol Vlv 1	5203	D-1	X	X	1
KJ-PV-0001B	Air Start Sol Vlv 2	5203	D-1	X	X	1
KJ-PV-0008	Shutdown Air Sol Vlv	5203	D-1	X	X	1
KJ-TCV-0034	Lube Oil Cooler Temp Ctrl Vlv	5203	D-1	X	X	1
KJ-TCV-0056	Intercooler Heat Exchanger Temp Ctrl Vlv	5203	D-1	X	X	1
KJ-TCV-0060	Jacket Water Heat Exchanger Temp Ctrl Vlv	5203	D-1	X	X	1

TABLE 9.5B-2 (Sheet 24)

COMPONENT NUMBER	DESCRIPTION	LOCATION ROOM NUMBER	FIRE ZONE	HOT SHUTDOWN	COLD SHUTDOWN	SEPARATION GROUP
KJ-TSH-0059A	High Jacket Water Temp	5203	D-1	X	X	1
KJ-TSH-0059B	High Jacket Water Temp	5203	D-1	X	X	1
KJ-TSH-0059C	High Jacket Water Temp	5203	D-1	X	X	1
KJ-TSH-0059D	High Jacket Water Temp	5203	D-1	X	X	1
KJ121	Diesel Gauge and Control Panel	5203	D-1	X	X	1
NE01	Diesel Generator	5203	D-1	X	X	1
NE107	Control & Relay Panel	5203	D-1	X	X	1
NG03D	MCC	5203	D-1	X	X	1
EC-HV-0012	F.P.C.H. Ex. CCW Isolation Valve Loop B	6104	F-3	X	X	4
EC-HV-0011	F.P.C.H. Ex. CCW Isolation Valve Loop A	6105	F-2	X	X	1
EC-PEC01A	Spent Fuel Pool Cooling Pump A	6105	F-2	X	X	1
GG-SGG04A	SFP Pump Room Cooler	6105	F-2	X	X	1
EC-PEC01B	Spent Fuel Pool Cooling Pump B	6104	F-3	X	X	4
GG-SGG04B	SFP Pump Room Cooler	6104	F-3	X	X	4
EC-LSL-0057	Fuel Pool Level Switch	6106	F-1	X	X	1
EC-LSL-0058	Fuel Pool Level Switch	6106	F-1	X	X	4
BN-LT-0930	RWST Level Transmitter	9102	N/A	X	X	1
BN-LT-0931	RWST Level Transmitter	9102	N/A	X	X	2
BN-LT-0932	RWST Level Transmitter	9102	N/A	X	X	3
BN-LT-0933	RWST Level Transmitter	9102	N/A	X	X	4

TABLE 9.5B-3 SAFETY-RELATED FIRE ZONES CONTAINING ROOMS WITHOUT DETECTION PROVISIONS

Fire Area	Rooms with No Detection	Safe Shutdown Circuits		Remarks
		No	Yes	
A-1	1103-1106	X		
A-1	1123-1125	X		
A-1	1129	X		
A-1	1202	X		
A-1	1203-1204		X	Cold shutdown only
C-6	3201	X		
C-6	3206	X		
C-6	3210	X		
C-5	3213	X		
C-5	3214	X		Detection in area
C-5	3217	X		
C-5	3221		X	Detection in area
C-5	3224	X		
C-5	3236	X		
CC-1	3227	X		
C-1	3104		X	See Note 5
A-8	1302	X		Detection in area
A-9	1304		X	See Note 1
A-30	1305		X	See Note 1
A-8	1306	X		
A-8	1307	X		
A-8	1308	X		
A-9	1309	X		See Note 2
A-10	1310		X	See Note 2
A-8	1313	X		
A-8	1318		X	
A-8	1319	X		
A-29	1324		X	See Note 1
A-29	1327		X	See Note 1
A-30	1328		X	See Note 1
A-1	1329	X		
A-30	1330		X	See Note 1
C-35	3401	X		See Note 3
C-35	3412	X		See Note 3

TABLE 9.5B-3 (Sheet 2)

Fire Area	Rooms with No Detection	Safe Shutdown Circuits No	Yes	Remarks
F-1	6101	X		
F-1	6201	X		
F-1	6210	X		
A-20	1502-1503	X		
A-20	1601	X		
C-27	3604	X		
C-28	3607	X		
C-36	NA		X	See Note 4
C-37	NA		X	See Note 4

NOTES:

1. Fire Areas A-29 contain no fire detectors. Fire Area A-30 contains fire detectors but none are required. These areas contain negligible installed combustibles and insignificant transient combustibles. Each area consists of three small rooms.

2. Fire Areas A-9 and A-10 consist of one room each and are high radiation zones which contain no fixed combustibles or transient combustibles. Only mechanical equipment and piping are present.

3. Fire Area C-35 has no detection. Minimal installed combustibles are present.

4. Fire Areas C-36 and C-37 are small electrical chases containing Channel 2 and Channel 3 circuits, respectively. A wetpipe sprinkler system is installed. Insignificant transient combustibles are expected.

5. This room is a stairwell with very low installed combustibles and no transient combustible loading.

TABLE 9.5B-4 SAFETY-RELATED FIRE ZONES OUTSIDE CONTAINMENT WITH AREA SUPPRESSION COVERAGE

Fire Zone	Coverage Total	Coverage Partial	Rooms Within Fire Zone with Partial or No Suppression	SSD Circuits in These Rooms Yes	SSD Circuits in These Rooms No
A-1		X	1101	X	
			1102		X
			1103		X
			1104		X
			1105		X
			1106		X
			1115		X
			1120	X	
			1121	X	
			1122	X	
			1123		X
			1124		X
			1125		X
			1128	X	
			1129		X
			1130		X
			1201		X
			1202		X
			1203	X	
			1204	X	
			1205		X
			1329		X
A-8		X	1301	X	
			1302		X
			1306		X
			1307		X
			1308		X
			1311		X
			1312 (1)	X	
			1313	X	
			1314	X	
			1315		X
			1316 (1)		X

TABLE 9.5B-4 (Sheet 2)

Fire Zone	Coverage Total	Coverage Partial	Rooms Within Fire Zone with Partial or No Suppression	SSD Circuits in These Rooms Yes	SSD Circuits in These Rooms No
			1317 (1)		X
			1318	X	
			1319		X
			1320	X	
			1321		X
A-11	X		N/A		
A-12	X		N/A		
A-15		X	1331	X	
A-16		X	1401	X	
			1402	X	
			1406	X	
			1408	X	
A-17	X		N/A		
A-18	X		N/A		
A-27	X		N/A		
C-1		X	3104	X	
C-2	X		N/A		
C-3	X		N/A		
C-5		X	3213 (1)		X
			3217 (1)		X
			3219 (1)		X
			3220 (1)		X
			3224 (1)	X	
			3237 (1)	X	
C-6		X	3201		X
			3202 (2)		X
			3205 (3)	X	
			3206 (1)		X
			3210 (1)		X
			3234 (2)	X	

TABLE 9.5B-4 (Sheet 3)

Fire Zone	Coverage Total	Coverage Partial	Rooms Within Fire Zone with Partial or No Suppression	SSD Circuits in These Rooms Yes	SSD Circuits in These Rooms No
C-7	X		N/A		
C-8	X		N/A		
C-9	X		N/A		
C-10	X		N/A		
C-11	X		N/A		
C-12	X		N/A		
C-17	X		N/A		
C-18	X		N/A		
C-19	X		N/A		
C-20	X		N/A		
C-21		X	3501	X	
C-22		X	3801	X	
C-23	X		N/A		
C-24	X		N/A		
C-25	X		N/A		
C-26	X		N/A		
C-30	X		N/A		
C-31	X		N/A		
C-32	X		N/A		
C-33	X		N/A		
C-34	X		N/A		
C-36	X		N/A		
C-37	X		N/A		
D-1	X		N/A		
D-2	X		N/A		
F-1		X	6101		X
			6102		X
			6103		X
			6106	X	
			6201		X
			6204		X
			6205		X
			6210		X
			6301	X	
			6302		X

TABLE 9.5B-4 (Sheet 4)

NOTES:

1. Total coverage above ceiling - none below
2. Total coverage below ceiling - none above
3. Total coverage above ceiling - partial below
4. Partial coverage above ceiling - none below
5. Partial coverage above ceiling - total below