DAVIS-BESSE NUCLEAR POWER STATION UNIT NO. 1

APPENDIX D

BTP-APCSB 9.5-1

APPENDIX A RESPONSE

Compliance Matrix to Appendix A

The following represents a line-by-line comparison between the NRC guidelines of Appendix A to BTP 9.5-1 and the design of the Unit. Methods of compliance and justification of deviation are also incorporated in the table.

Appendix D (Sheet 1)

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
1.	A.	Overall Requirements of Nuclear Plant Fire Protection Program	The Vice President - Nuclear, is responsible for managing the formulation, implementation, and assessment of the effectiveness of the fire protection program at the DBNPS site.
		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. The qualification requirements for the fire protection engineer or consultant who will assist in the design and selection of equipment, inspect and test the completed physical aspects of the system, develop the fire protection program, and assist in the fire-fighting training for the operating plant should be stated. Subsequently, the FHAR should discuss the training and the updating provisions such as fire drills provided for maintaining the competence of the station fire-fighting and operating crew, including personnel responsible for maintaining and inspecting the fire protection equipment.	The Director - Engineering is responsible for: • Ensuring that fire prevention and fire protection are considered in the design of plant facilities and systems. • Designing the plant's fire detection, fire containment, and fire suppression systems. The Director, Site Operations is responsible for formulating, administrating and implementing the fire protection program in the protected area and for the non-Nuclear Group building on the DBNPS site located outside the protected area as documented in the Fire Protection Plan. This includes implementing fire brigade training and drills. The Manager - Fleet Oversight is responsible for: • Assessing the effectiveness of the fire protection program through planned inspections and both scheduled and unscheduled audits, according to the FENOC Quality Assurance Program Manual (QAPM). • Providing a review of selected maintenance work packages to ensure that appropriate inspections, witness and hold points are included and that procedures and other reference documents are current and appropriate for the activity. This responsibility includes ensuring compliance of maintenance procedures, work packages and inspection activities with the FENOC Quality Assurance Program Manual, Sections B.10 and B.12 for equipment required by the FHAR.

Appendix D (Sheet 2)

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
1.	A1.	The fire protection staff should be responsible for: (a) Coordination of building layout and systems design with fire area requirements, including consideration of potential hazards associated with postulated design basis fires.	The Director - Site Performance Improvement is responsible for: • Developing and implementing a fire prevention training program. • Maintaining all fire protection training records, including plant fire brigade training records. Emergency Preparedness is responsible for planning, developing, and coordinating the plant's radiological emergency response capabilities in the event of a serious fire that could result in the degradation of a safety related system. This includes interfacing with offsite fire rescue departments. All site personnel, in order to minimize the probability of fire at the DBNPS, are responsible for: o Controlling the use of transient combustibles. o Maintaining good housekeeping practices according to plant procedures. o Reporting fires promptly to the Control Room.

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Compliance Matrix to Appendix A

Page	Appendix A Position Section	Davis-Besse Unit 1
2.	A1. (b) design and maintenance of fire detection, suppression, and extinguishing systems,	
2.	A1. (c) fire prevention activities,	
2.	A1. (d) training and manual fire-fighting activities of plant personnel and the fire brigade. (NOTE: NFPA 6 – Recommendations for Organization of Industrial Fire Loss Prevention, contains useful guidance for organization and operation of the entire fire loss prevention program.)	

Appendix D (Sheet 4)

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
2.	A2.	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 fires relative to maintaining ability to perform safety shutdown functions and minimize radioactive releases to the environment.	Comply – As discussed in Section 4, the fire protection program is based on an evaluation of potential fire hazards at Davis-Besse and the effects of postulated fires relative to maintaining the ability to perform safe shutdown functions and minimize radioactive releases to the environment.
2.	A3.	Backup	
		Total reliance should not be placed on a single automatic fire suppression system. Appropriate backup fire suppression capability should be provided.	Comply – As discussed throughout Section 4, total reliance is not placed on a single automatic fire suppression system, nor is total reliance placed on a single manual portable extinguisher or hose line. Where portable extinguishers or hose stations have been deemed appropriate for fire suppression, based on the hazard analysis, they have been provided so as to be readily accessible to required areas. If a situation was found where a portable extinguisher, or a hose station, was appropriate for fire suppression, but where one did not exist so as to be readily available, an additional one has been installed. Where, based on the hazards analysis, automatic suppression has been deemed required for fire suppression, such a system, has been installed.

Page	Appendix A Position Section	Davis-Besse Unit 1
2.	A4. 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 accident or the most severe natural phenomena.	Comply – Redundant pumps with independent water supply and controls are provided. The fire protection yard piping is a loop. Hence, each feed point can be supplied from 2 directions.
	The effect of lightning strikes should be included in the overall plant fire protection Program.	Comply – The results of the National Fire Protection Association NFPA 78, "Lightning Protection Code compliance review are documented in Toledo Edison Letter to the NRC dated July 31, 1989 (Serial No. 1685). Lightning protection is provided for the Auxiliary Building, Cooling Tower, Diesel Oil Storage Tank and Pump house, Emergency Diesel Generator Fuel Oil Storage Tank, Intake Structure, Miscellaneous Diesel Building, Shield Building and Turbine Building.

Page	Appendix A Position Section	Davis-Besse Unit 1
3.	A5. Fire Suppression System 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 System Piping Failures in Fluid System Outside Containment."	Deviate – The design of the Unit with respect to piping failures predated the issuance of APCSB 3-1. The design was based on the guidelines of the generic December 1972 letter from A. Giambusso. As documented in Toledo Edison letter to NRC dated November 22, 1989 (Serial No. 1735) the design approach is to demonstrate that at least one train of redundant Appendix R Safe Shutdown equipment will be maintained free of damage from the effects of inadvertent or fire induced suppression system actuation. The USAR Section 3.6.2.7.2 indicates that portions of Seismic Class II fluid systems located in the Auxiliary Building and the intake structure were seismically supported where necessary to prevent damage to safety-related systems from the effects of falling pipe, flooding, or the loss of the negative pressure area. USAR section 3.6.2.7.2.1 also indicates more specifically that approximately 75 percent of the Fire Water system has been seismically supported to prevent falling pipe or flooding from affecting safety related equipment. Protection for inadvertent actuation of sprinkler system is provided where the Section 4 of this document indicates that the component must be protected to ensure safe shutdown capability in the event of a fire and where review of the design documents indicates the component cannot survive the water spray. The results of the NFPA 92M, "Waterproofing Draining of Floors" compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The evaluation of drainage capabilities determined that there is adequate capability to remove the anticipated water from fire suppression activities to prevent immediate damage to equipment which could result in adverse consequences. Some rooms, such as Room 318 and 319, may require a door be opened to route water to an adjacent area.

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Compliance Matrix to Appendix A

Page	Appendix A Position Section	Davis-Besse Unit 1
3.	A6. Fuel Storage Areas	
	The fire protection program (plans, personnel and equipment) for buildings storing new reactor fuel and for adjacent fire zones which could affect the fuel storage zone should be fully operational before fuel is received at the site. Schedule for implementation of modification, if any, will be established on a case-by-case basis for plants under construction or operating as of 7/1/76.	Comply – The Davis-Besse Operating License and subsequent amendments provide the schedule to establish compliance with Appendix A.
4.	A7. Fuel Loading	
	The fire protection program for an entire reactor unit should be fully operational prior to initial fuel loading in that reactor unit. Schedule for implementation of modifications, if any, will be established on a case-by-case basis for plants under construction or operating as of 7/1/76.	Comply – The Davis-Besse Operating License and subsequent amendments provide the schedule to establish compliance with Appendix A.

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Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
4.	A8.	Multiple-Reactor Sites On multiple-reactor sites where there are operating reactors and construction of remaining units is being completed, the fire protection program should provide continuing evaluation and include additional fire barriers, fire protection capability, and administrative controls necessary to protect the operating units from construction fire hazards. The superintendent of the operating plant should have the lead responsibility for site fire protection.	Not Applicable – Davis-Besse is a single unit site.
4.	A9.	Simultaneous Fires Simultaneous fires in more than one reactor need not be postulated, where separation requirements are met. A fire involving more than one reactor unit need not be postulated except for facilities shared between units.	Not Applicable – Davis-Besse is a single unit site.
4.	B1.	Administrative Procedures, Controls and Fire Brigade Administrative procedures consistent with the need for maintaining the performance of the fire protection system and personnel in nuclear power plants should be provided.	Deviate – Guidance for the Davis-Besse Fire Protection Administrative Controls and Procedures was taken from the Vassallo letter, dated August 29, 1977.

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Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
4.	B1.	(Continued) Guidance is contained in the following publications: NFPA 4 – Organization for Fire Services NFPA 4A – Organization for Fire Department NFPA 6 – Industrial Fire Loss Prevention NFPA 7 – Management of Fire Emergencies NFPA 8 – Management Responsibility for Effects of Fire on Operations NFPA 27 – Private Fire Brigades	
5.	B2.	Effective administrative measures should be implemented to prohibit bulk storage of combustible materials inside or adjacent to safety related buildings or systems during operation or maintenance periods. Regulatory Guide 1.39, “Housekeeping Requirements for Water-Cooled Nuclear Power Plants”, provides guidance on housekeeping, includes the disposal of combustible materials.	Comply – Most of the storage of combustible materials is not in the Unit. Hydrogen gas is stored in a tank outside the Unit. Lubricating oil barrels are stored only in a locked and sprinklered room. A fire insurance waiver exists for a maximum of 7 additional 55-gallon barrels to be at different locations throughout the Unit but no such use is currently anticipated.

Page	Appendix A Position Section	Davis-Besse Unit 1
5.	B2. (Continued)	Resins are not stored in the Unit but in a separate structure. They are to be brought into the Unit when needed. Refer to item G2. Resins in bags are inside plastic drums. Condensate polishing and demineralizer resins are an exception in that they are stored in pails located in the Turbine Building. The fuel handling areas will not normally contain the diesel truck fuel. Since the space is limited and the fumes objectionable to personnel, the preferred method is to unhook the trailer and park the tractor outside. Oxygen and acetylene used for welding are to be stored in a sprinklered shop area when not in use. Refer to Item G1. Ammonia and hydrazine are stored in a separate building. Approximately one 5-gallon glass bottle in a styrofoam case and one 15-gallon drum, respectively, would be anticipated at each of the 2 mixing tank locations. The contents of the cabinets is not considered to be a fuel source readily available for consumption by a postulated fire in the room. Note that the results of the fire hazards analysis for Room 405 (Fire Area V) indicates that, given a fire in the room, the ability to achieve safe shutdown is not precluded. This is discussed in Section 4.V.

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Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
5.	B3.	Normal and abnormal conditions or other anticipated operations such as modifications (e.g., breaking fire stops, impairment of fire detection and suppression systems) and refueling activities should be reviewed by appropriate levels of management and appropriate special actions and procedures such as fire watches or temporary fire barriers implemented to assure adequate fire protection and reactor safety. In particular:	Comply – Such anticipated activities are evaluated in accordance with written procedures. Appropriate actions are performed for maintenance or other conditions resulting in impairment of passive or active fire protection systems, in accordance with those written procedures.
		(a) Work involving ignition sources such as welding and flame cutting should be done under closely controlled conditions. Procedures governing such work should be reviewed and approved by persons trained and experienced in fire protection. Persons performing and directly assisting in such work should be trained and equipped to prevent and combat fires. If this is not possible, a person qualified in fire protection should directly monitor the work and function as a fire watch.	Comply – Welding and cutting permits are required for welding and cutting activities in areas outside the Maintenance Shop. For further information refer to item G1. In cases where personnel assisting in the work are not trained in fire protection, qualified personnel will perform fire protection activities.
6.	B3.	(b) Leak testing, and similar procedures such as air flow determination, should use one of the commercially available aerosol techniques. Open flames or combustion generated smoke should not be permitted.	Comply – Commercially available aerosol techniques are utilized for testing. Open flames and combustion-generated smoke is not permitted.

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Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
6.	B3.	(c) Use of combustible material, e.g, HEPA and charcoal filters, dry ion exchange resins or other combustible supplies, in safety related areas should be controlled. Use of wood inside buildings containing safety related systems or equipment should be permitted only when suitable non-combustible substitutes are not available. If wood must be used, only fire retardant treated wood (scaffolding, lay down blocks) should be permitted. Such materials should be allowed into safety related areas only when they are to be used immediately. Their possible and probable use should be considered in the fire hazard analysis to determine the adequacy of the installed fire protection systems.	Comply – Use of combustible material is administratively controlled. Combustible material that would normally be expected in a room over a significant period of time is addressed in Section 4 of this report. Wood used inside buildings containing safety related systems or equipment would be treated with fire retardant materials.
6.	B4.	Nuclear power plants are frequently located in remote areas, at some distance from public fire departments. Also, first response fire departments are often volunteer. Public fire department response should be considered in the overall fire protection program. However, the plant should be designed to be self-sufficient with respect to fire fighting activities and rely on the public response only for supplemental or backup capability.	Comply – The Davis-Besse Fire Protection Program is designed to be self sufficient. The Carroll Township Fire Department is a backup means of fire protection support.

Page	Appendix A Position Section		Davis-Besse Unit 1
7.	B5.	The need for good organization, training and equipping of fire brigades at nuclear power plant sites requires effective measures be implemented to assure proper discharge of these functions. The guidance in Regulatory Guide 1.101, “Emergency Planning for Nuclear Power Plants”, should be followed as applicable.	Comply – Emergency plans exist for the Davis-Besse site. These emergency plans incorporate the guidance established in Regulatory Guide 1.101. Provisions have been made for the notification of appropriately trained offsite agencies. Hospital facilities, prepared for nuclear accidents, are available. Environmental monitoring is provided for the assessment of appropriate parameters.
7.	B5.	(a) Successful fire fighting requires testing and maintenance of the fire protection equipment, emergency lighting and communication, as well as practice as brigades for the people who must utilize the equipment. A test plan that lists the individual and their responsibilities in connection with routine tests and inspections of the fire detection and protection systems should be developed. The test plan should contain the types, frequency and detailed procedures for testing. Procedures should also contain instructions on maintaining fire protection during those periods when the fire protection system is impaired or during periods of plant maintenance, e.g., fire watches or temporary hose connections to water systems.	Comply – Procedures require definite test frequencies and provide detailed steps for the testing and restoration of systems following the completion of the test, for fire protection equipment, emergency lighting, and communication equipment. Communication systems that are used on a constant basis (e.g. radio, Gai-Tronics, telephones) do not have formal testing as any system failures would be readily apparent. Procedures are also provided for fire brigade drills, training and personnel qualifications.

Page	Appendix A Position Section		Davis-Besse Unit 1
8.	B5.	(b) Basic training is a necessary element in effective fire fighting operation. In order for a fire brigade to operate effectively, it must operate as a team. All members must be familiar with the layout of the plant and equipment location and operation in order to permit effective fire-fighting operations during times when a particular area is filled with smoke or is insufficiently lighted. Such training can only be accomplished by conducting drills several times a year (at least quarterly) so that all members of the fire brigade have had the opportunity to train as a team, testing itself in the major areas of the plant. The drills should include the simulated use of equipment in each area and should be preplanned and post-critiqued to establish the training objective of the drills and determine how well these objectives have been met. These drills should periodically (at least annually) include local fire department participation where possible. Such drills also permit supervising personnel to evaluate the effectiveness of communications within the fire brigade and with the on scene fire team leader, the reactor operator in the Control Room, and the offsite command post.	Comply – Fire drills are performed at least quarterly. The local offsite Fire Department is annually invited to participate in the drills. The scope of the basic fire brigade members provides a basic knowledge of fire protection systems. The fire drills simulate the use of equipment and are critiqued by management to ensure objectives are met.

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
8.	B5.	(c) To have proper coverage during all phases of operation, members of each shift crew should be trained in fire protection. Training of the plant fire brigade should be coordinated with the local fire department so that responsibilities and duties are delineated in advance. This coordination should be part of the training course and implemented into the training of the local fire department staff. Local fire departments should be educated in the operational precautions when fighting fires on nuclear plant sites. Local fire departments should be made aware of the need for radioactive protection of personnel and the special hazards associated with a nuclear power plant site.	Comply – Training sessions are scheduled annually for the appropriate offsite Fire Department. The offsite fire department and fire brigade responsibilities and duties are coordinated. Operational precautions and special hazards associated with a nuclear power plant are discussed during the annual training.
9.	B5.	(d) NFPA 27, “Private Fire Brigade” should be followed in organization, training, and fire drills. This standard also is applicable for the inspection and maintenance of fire fighting equipment. Among the standards referenced in this document, the following should be utilized: NFPA 194, “Standard for Screw Threads and Gaskets for Fire Hose Couplings,” NFPA 196, “Standard for Fire Hose,” NFPA 197, “Training Standard on Initial Fire Attacks,” NFPA 601, “Recommended Manual of Instructions and Duties for the Plant Watchman	Deviate – The existing fire brigade organization has established training programs and fire drills in accordance with NFPA 27 “Private Fire Brigades”. The results of the NFPA 27 compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 27 are documented as acceptable in the July 31, 1989 letter.

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9.	B5.	(d) (Continued) on Guard." NFPA booklets and pamphlets listed on page 27-11 of Volume 8, 1971-72 are also applicable for good training references. In addition, courses in fire prevention and fire suppression which are recognized and/or sponsored by the fire protection industry should be utilized.	
10.	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:	Comply – Davis-Besse's existing Nuclear Quality Assurance Program, which is under the management control of the independent QA organization, is implemented and includes the fire protection systems required to meet the intent of NRC Regulatory Guide 1.33. Applicable portions of the Nuclear Quality Assurance Program were further extended to include the fire protection system and provide the implemented procedures to assure the quality assurance program criteria outlined in Section C, Quality Assurance Program (including its subsections) of Appendix A to Branch Branch Technical Position APCSB 9.5-1 and the NRC (Vassallo) 8-29-77 QA supplemental guidance. It must be clearly recognized that the implementation of the Toledo Edison Nuclear Quality Assurance Program to the Davis-Besse Unit 1 fire protection system is limited to the requirements of Section C, Quality Assurance Program, of Appendix A to Branch Technical Position APCSB 9.5-1 and the NRC (Vassallo) 8-29-77 QA supplemental guidance. Also, this commitment in no way implies backfitting of quality assurance criteria to the design, procurement, construction, or preoperational testing of installed fire protection systems.

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Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
10.	C1.	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.	
10.	C2.	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.	
10.	C3.	Control of Purchased Material, Equipment and Services Measures should be established to assure that purchased material, equipment and services conform to the procurement documents.	

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
11.	C4.	Inspection A program for independent inspection of activities affecting fire protection should be established and executed by, or for, the organization performing the activity to verify conformance with documented installation drawings and test procedures for accomplishing the activities.	
11.	C5.	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.	
11.	C6.	Inspection, Test and Operating Status Measures should be established to provide for the identification of items that have satisfactorily passed required tests and inspections.	

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
11.	C7.	Non-Conforming Items Measures should be established to control items that do not conform to specified requirements to prevent inadvertent use of installation.	
11.	C8.	Corrective Action Measures should be established to assure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and non-conformances are promptly identified, reported and corrected.	
12.	C9.	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.	
12.	C10.	Audits Audits should be conducted and documented to verify compliance with the fire protection program including design and procurement documents; instructions; procedures and drawings; and inspection and test activities.	

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
12.	D.	General Guidelines for Plant Protection	
12.	D1.	Building Design	
		(a) Plant Layouts should be arranged to:	
12.	D1.	(a) (1) Isolate safety related systems from unacceptable fire hazards, and	Comply – Buildings are designed for isolation of safety-related systems from unacceptable fire hazards to as great a degree as feasible. (Note "unacceptable fire hazards" is not defined but assumed to mean hazards with potential for impairment of both redundant safety trains.)
12.	D1.	(2) 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.	Comply – A detailed fire hazard analysis has been made, as discussed in Section 4. Fire hazards have been identified throughout the plant. The effect of these fire hazards on systems utilized to achieve Safe Shutdown has been evaluated. Where redundant systems utilized to achieve Safe Shutdown could be subject to damage from a single fire, the consequences of the fire, the extent of the fire, and the ability to suppress the fire with the available systems have been considered. Backup systems/components capable of performing the same function as the affected system or component have been considered. The design features of the Unit, fire tests results, and appropriate administrative controls have been considered. Where the potentially affected system is deemed, based on this evaluation, to require additional protection, detection, or suppression, this has been provided. Refer to the evaluation of Section 4 for further details.

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
13.	D1.	(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.	Comply – A detailed fire hazards analysis has been performed in Section 4 of this section. The fire hazards analysis is updated periodically, as necessary.
		Additional fire hazards analysis should be done after any plant modification.	Comply – All plant modifications are evaluated for impact on the fire analyses by use of a screening first and then, if necessary, a more detailed evaluation.
13.	D1.	(c) Alternative guidance for constructed plants is shown in Section F3, “Cable Spreading Room.”	
13.	D1.	(d) Interior wall and structural components, thermal insulation materials and radiation shielding materials and sound-proofing should be non-combustible. Interior finishes should be non-combustible or listed by a nationally recognized testing laboratory, such as Factory Mutual or Underwriters’ Laboratory, Inc. for flame spread, smoke and fuel contribution of 25 or less in its use configuration (ASTM E-84 Test), “Surface Burning Characteristics of Building Materials”).	Deviate – Noncombustibles were used for wall, structural component, and radiation shielding. Noncombustible metal reflective thermal insulation is used inside Containment. In other areas regular pipe insulation is noncombustible calcium silicate. Neoprene antisweat pipe insulation was specified 25 flame, 50 smoke by the manufacturer. However, the 1975 UL Building Materials List, (p. 75) indicates the supplied insulation tested better (i.e., 25, 5, 35 for flame, fuel and smoke, respectively). Refrigeration piping is insulated with a material rated 25 flame, 225 smoke by the manufacturer’s literature and confirmed by correspondence. No “nationally recognized testing laboratory” was indicated as the source for the 25, 225 rating. Duct work is insulated by material rated as 25, 50 by UL (1975 Building Materials List P. 175). The Control Room carpet is tested for flammability and smoke generation. The carpet is subjected to a radiant panel flammability test in accordance with ASTM E-648, “Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source”. Test results must yield a

Page	Appendix A Position Section		Davis-Besse Unit 1
13.	D1.	(d) (Continued)	critical radiant flux (CRF) of greater than 0.45 watt/sq cm (equivalent to a Class I Interior Floor Finish). The smoke generating characteristics of the carpet are tested in accordance with NFPA 258, "Smoke Generation of Solid Materials". Test results must yield a corrected maximum specific optical density of 0-450. The fuel contribution of the carpet is accounted for by incorporating a conservative heat load factor into the Control Room combustible loading analysis. This carpeting is not expected to contribute significantly to the control room fire load. There is little risk involved with using this carpet. Even if a fire in the Control Room were to occur, the fire would be quickly extinguished, resulting in no adverse consequences, as discussed in Section 4.FF. The advantages of the carpet far outweigh the risk of fire. The carpeting enhances the Control Room environment, providing a more desirable place in which to work. The noise reduction characteristics and visual stimulation result in an enhanced ability to react, the subdued effect of the carpeting subtly reducing the monotony of the routine visual, audible, and physical actions of Control Room operation.
14.	D1.	(e) Metal deck roof construction should be noncombustible (see the building materials directory of the Underwriters Laboratory, Inc.) or listed as Class I by Factor Mutual System Approval Guide. Where combustible material is used in metal deck roofing design, acceptable alternatives are (i) replace combustibles and non-combustible materials, (ii) provide an automatic sprinkler system, or (iii) provide ability to cover roof exterior and interior with adequate water volume and pressure.	Comply – Metal deck roof construction is not used for the safety-related areas. There is noncombustible rigid fiber board insulation and asbestos roofing with noncombustible vapor barrier used over the metal deck roof on the Turbine, Office, and Water Treatment Building Plastic cement is used between the layers of builtup roofing.

Compliance Matrix to Appendix A

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14.	D1.	(f) Suspended ceilings and their supports should be of non-combustible construction. Concealed spaces should be devoid of combustibles. Adequate fire detection and suppression system should be provided where full implementation is not practicable.	Comply – The material used is UL classified and has a flame rate of 0 to 25 which is the lower NFPA classification range and includes a noncombustible to light severity materials. There are no combustibles in concealed spaces, except for the Control Room area which is discussed in item F2.
14.	D1.	(g) High voltage – high amperage transformers installed inside buildings containing safety related systems should be of the dry type or insulated and cooled with non-combustible liquid. Safety related systems that are exposed to flammable oil filled transformers should be protected from the effects of a fire by:	Comply – Only transformers with primary windings rated 600 volts and above were considered to be “high voltage-high amperage” transformers. All “high voltage-high amperage” transformers, installed inside buildings containing safety related systems, are dry type or contain a nonflammable coolant.
14.	D1.	(g) (i) replacing with dry transformers or transformers that are insulated and cooled with noncombustible liquid; or	
14.	D1.	(g) (ii) enclosing the transformer with a 3-hour fire barrier and installing automatic water spray protection.	

Compliance Matrix to Appendix A

Page	Appendix A Position Section		Davis-Besse Unit 1
14.	D1.	(h) buildings containing safety related systems, having openings in exterior walls closer than 50 feet to flammable oil filled transformers should be protected from the effects of a fire by:	Comply – There are a total of 5 oil-filled transformers located near openings of buildings containing safety related systems. Two of these transformers, main stepup and startup No. 1, are separated from the building by 3-hour fire barriers. The other 3 transformers, auxiliary and both bus tie transformers are less than 20 feet from the building. However, for these transformers, a water deluge system is utilized maintaining a water curtain between the transformers and the building. The transformer pit for Startup Transformer No. 1 Bus Tie Transformer BD1, and Bus Tie Transformer AC1 is located approximately 20 feet away from the north wall of the Auxiliary Building. There are 7 penetrations in the exposed Auxiliary Building wall. Two of the openings in the wall are emergency exit door openings. Each of these door openings is protected against a transformer related fire by a Class A-type, 3-hour fire rated door assembly. The remaining 5 openings in the wall are HVAC openings. Three of these openings are required for normal ventilation in the Low Voltage Switchgear Rooms and the other 2 openings are required for the vent fan exhaust in the Battery Rooms. In order to maintain the fire resistive integrity of the interfacing Auxiliary Building wall; 3-hour fire rated, curtain-type fire door dampers are installed in the 5 HVAC wall openings. These fire door dampers close automatically upon the operation of the fusible link and remain tightly closed.
14.	D1.	(h) (i) closing of the opening to have fire resistance equal to three hours,	
14.	D1.	(h) (ii) constructing a 3-hour fire barrier between the transformers and the wall openings; or	
14.	D1.	(h) (iii) closing the opening and providing the capability to maintain a water curtain in case of a fire.	
15.	D1.	(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 as such fire fighting water could	Comply – The results of the NFPA 92M, “Waterproofing Draining of Floors” compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The evaluation of drainage capabilities determined that there is adequate capability to remove the anticipated water from fire suppression activities to prevent immediate damage to equipment which could result in adverse consequences.

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15.	D1.	(i) (Continued) cause unacceptable damage to equipment in the area. Equipment should be installed on pedestals, or curbs should be provided as required to contain water direct it to floor drains. (See NFPA 92M, "Waterproofing and Draining of Floors.") Drains in areas containing combustible liquids should have provisions for preventing the spread of the fire throughout the drain system. Water drainage from areas which may contain radioactivity should be sampled and analyzed before discharge to the environment. 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.	
15.	D1.	(j) Floors, walls and ceilings enclosing separate fire areas should have minimum fire ratings of three hours. Penetrations in these fire barriers, including conduits and piping, should be sealed or closed to provide a fire resistance rating at least equal to that of the fire barrier itself. Door openings should	Deviate – The stairwells and elevator shafts are rated for 2-hours. This is acceptable according to Regulatory Guide 1.120, Revision 1. This is the traditional building code rating for these areas. Elevator doors available from the elevator manufacturer are not rated for more than 1-hour, therefore the maximum rating is limited. As a safety measure a small sight glass is used on selected stairwell doors. Such doors are not rated for more than 2-hours. Stairwell walls shared by 3-hour zones are rated for 3-hours and have

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15.	D1. (j) (Continued) 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.	3-hour doors. Walls between the Control Cabinet and Computer Rooms are rated for 1-hour. The computer is not safety related. The Computer Room is within the Control Room pressure boundary which is also a 3-hour fire wall. Other fire walls in nonsafety-related areas are rated for 2-hours, such as office building partitions. Construction is in compliance with the Ohio Building Code. Hollow metal fire doors provided in fire walls are equipped with latch and closing mechanisms, except access doors. Access doors provide equipment access and are not used for personnel passage. Strict administrative procedures are used to assure that the doors are not left open. However, during maintenance or other operational events, the fire doors may be intentionally propped open. The breach of a fire barrier would be compensated for by appropriate measures delineated by the plant procedures. Additionally, certain fire doors are maintained open with automatic hold-open and release mechanisms. These mechanisms would actuate in the event of a fire and close the associated door to establish the fire barrier. The Davis-Besse design incorporates extensive compartmentation to minimize occurrence of and spread of a fire to minimize any fire damage potential. The design also incorporates several negative pressure boundaries in the Auxiliary Building associated with ventilation systems and flood walls at lower elevations which act as barriers to isolate and localize any flooding conditions. The walls and floors associated with these compartments and boundaries contain blockouts or holes for penetration of

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15.	D1.	(j) (Continued)	items such as piping, conduits, and cable trays. After installation of the penetrating item through the blockout or hole, the area between the item and blockout or hole has been sealed to ensure the wall or floor will perform its function as a fire barrier, negative pressure boundary barrier and/or floor barrier. In accordance with the guidance of Generic Letter (GL) 86-10, non-rated penetrations have been evaluated as acceptable. Davis-Besse Unit No. 1 uses fire rated grout, ceramic fiber, silicone foam, boots and caulking details to perform this sealing function. The acceptance criteria used was established based on published industrial standards and direction available from governing agencies as applied to the anticipated use of silicone foam in the plant. In accordance with the guidance of GL 86-10, non-rated HVAC openings have been evaluated as acceptable.
16.	D2.	Control of Combustibles	
16.	D2.	(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	Comply – The safety related systems are each discussed area by area later in this table and the necessary exceptions concerning separation of combustibles are given special consideration in analysis and by protection systems. The fire hazards analyses are discussed in section 4 of this report.

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16.	D2.	(a) (Continued) 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	
16.	D2.	(b) Bulk gas storage (either compressed or cryogenic), should not be permitted inside structures housing safety-related equipment. Storage of flammable gas such as hydrogen, should be located outdoors or in separate detached buildings so that a fire or explosion will not adversely affect any safety related systems or equipment. (Refer to NFPA 50A, "Gaseous Hydrogen Systems"). 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	Deviate – There are no hydrogen gas cylinders located inside the Auxiliary Buildings. The Hydrogen Trailer Area is approximately 200 feet from the Power Block and the supply is permanently piped into the Turbine Building. The results of the NFPA 50A, "Gaseous Hydrogen Systems At Consumers Sites" compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 50A are documented as acceptable in the July 31, 1989 letter with completion of the identified corrective action. The hydrogen to the Makeup Tank is supplied from a bank of hydrogen cylinders located in the Nitrogen Storage Building. The Makeup Tank 1/2 inch hydrogen supply line from the Nitrogen Supply Building is routed through the BWST Trench into Clean Liquid Waste Monitor Tank Room (Room 200), through a portion of Corridor (Room 209) and into the Makeup

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16.	D2.	(b) (Continued) (especially flammable and fuel gases) inside buildings should be controlled. (Refer to NFPA 6, Industrial Fire Loss Prevention.")	Tank Room (Room 225). During normal plant operations the hydrogen supply line is isolated. Hydrogen in conjunction with the makeup tank is utilized to ensure that a pre-determined amount of dissolved hydrogen remains in the reactor coolant.
17.	D2.	(c) The use of plastic materials should be minimized. In particular, haloginated plastics such as polyvinyl chloride (PVC) and neoprene should be used only when substitute non-combustible materials are not available. All plastic materials, including flame and fire retardant materials, will burn with an intensity and BTU production in a range similar to that of ordinary hydrocarbons. When burning, they produce heavy smoke that obscures visibility and can plug air filters, especially charcoal and HEPA. The haloginated plastics also release free chlorine and hydrogen chloride when burning which are toxic to humans and corrosive to equipment.	Deviate – Cross-linked polyethylene, neoprene, or hypalon are used extensively throughout the Unit as a cable jacket (insulation is cross-linked polyethylene and EPR). Tests conducted on this cable, showing propagation of flame did not occur, have been submitted earlier under separate cover (April 28, 1976). PVC is used in minor amounts for the cables in trays in the Unit. PVC is used for the Polar Crane Bus Bar covers as no alternate materials were available. Some PVC is used for equipment such as the electronic cabinets, and the plant computer and has been considered in the analysis. See response to 13.D1 for a discussion on the use of neoprene anti-sweat insulation. Note: There is some PVC associated with the data acquisition and analysis system (DAAS) unit and associated cables installed in the Control Room cabinet area. It is being used to monitor the Integrated Control System (ICS).
17.	D2.	(d) Storage of flammable liquids should, as a minimum, comply with the requirements of NFPA 30, "Flammable and Combustible Liquids Code."	Deviate – The results of the NFPA 30, "Flammable and Combustible Liquids" compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 30 are documented as acceptable in the July 3, 1989 letter with the completion of the identified corrective action by the end of the eight refueling outage.

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18.	D3.	Electric Cable Construction, Cable Trays and Cable Penetrations	
18.	D3.	(a) Only non-combustible materials should be used for cable tray construction.	Comply – The cable trays are fabricated from hot-dipped galvanized steel. The trays are a combination ladder-solid bottom type. The ladder rungs, which are spaced on 18-inch centers are made from 1 inch O.D. steel tubing having a wall thickness of 0.049 inches. The cable bearing surface of the steel tube is flattened to eliminate “point” loads on the cable jacket. The rungs are cold swaged to the 6-inch high tray side rails. The side rails are constructed from 16-gauge steel. The outward bending lip of the side rail eliminates any possibility of cable damage due to rough edges. The tray bottom is made from No. 22-gauge sheet steel and is spot welded to the bottom of the tray side rails.
18.	D3.	(b) See Section D3 for fire protection guidelines for cable spreading rooms.	Section F3 of this table discusses the compliance and deviation bases for the Cable Spreading Room.
18.	D3.	(c) Automatic water sprinkler systems should be provided for cable trays outside the cable spreading room. Cables should be designed to allow wetting down with deluge water without electrical faulting. Manual hose stations and portable hand extinguishers should be provided as backup. Safety related equipment in the vicinity of such cable trays, that does not itself require water fire protection, but is subject to unacceptable damage from sprinkler water discharge, should be protected from sprinkler system operation of malfunction.	Deviate – As discussed in Section 4, the Unit has been evaluated to determine the affect of fires upon the ability to achieve Safe Shutdown. Where a fire could affect cabling in an area outside the Cable Spreading Room in such a manner that achieving Safe Shutdown could not be assured, modifications were performed. In some cases, the modification was an automatic water sprinkler system. Refer to Section 4. Cables are designed to allow wetting down with water. The equipment in the area was evaluated with respect to the sprinklers resulting in unacceptable damage.

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18.	D3.	(c) (Continued) 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.	The separation requirements of Regulatory Guide 1.75 are satisfied either by meeting the stated separation requirements or by an equivalent means. Kaowool is used on all trays in the Auxiliary Building except for the Fuel Pool Area and Containment. In addition, a thorough onsite inspection was made to determine whether the separation criteria as set forth in the FSAR was met and to determine whether the minimum separation of 1 inch between enclosed raceways containing redundant cables existed. In those instances where the separation distance was less than 1 inch, an analysis was made to insure that a Safe Shutdown could be achieved. The analysis was based on tests conducted at the Franklin Institute Research Lab (FIRL). The FIRL report was previously submitted to the NRC.
18.	D3.	(d) Cable and cable tray penetration of fire barriers (vertical and horizontal) should be sealed to give protection at least equivalent to that fire barrier. The design of fire barriers for horizontal and vertical cable trays should, as a minimum, meet the requirements of ASTM E-119, “Fire Test of Building Construction and Materials,” including the hose stream test. Where installed penetration seals are deficient with respect to fire resistance, these seals may be protected by covering both sides with an	Comply – ASTM E-119 was used for furnace temperature and hose stream testing. Test standard IEEE-634 and/or ASTM E-119 were used in evaluating cold side temperatures. In accordance with the guidance of Generic Letter 86-10 non-rated penetrations have been evaluated as acceptable.

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18.	D3.	(d) (Continued) approved fire retardant material. The adequacy of using such material should be demonstrated by suitable testing.	
18.	D3.	(e) Fire breaks should be provided as deemed necessary by the fire hazards analysis. Flame or flame retardant coatings may be used as a fire break for grouped electrical cables to limit spread of fire in cable ventings. (Possible cable derating owing to use of such coating materials must be considered during design.)	Comply – Fire breaks are provided at all fire walls and where redundant cables are adjacent. Solid-bottom cable trays are used in the Unit.
19.	D3.	(f) Electric cable construction 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.	Deviate – All Davis-Besse Unit 1 fire tests were conducted before the current IEEE No. 383 flame tests. The tests done are comparable to IEEE No. 383, and no additional coatings were planned. Arc proofing/fire retardant tape is installed on some nonqualified IEEE No. 383 cable located in conduit at switchgear, manholes, junction boxes, etc., as required. Note: There is some PVC associated with the data acquisition and analysis system (DAAS) unit and associated cables installed in the Control Room cabinet area. It is being used to monitor the Integrated Control System (ICS).
19.	D3.	(g) To the extent practical, cable construction that does not give off corrosive gases while burning should be used. Applicable to new cable installations.	Not applicable – Davis-Besse cable was procured prior to the issuance of Appendix A to BTP 9.5-1, and therefore is not a new application. PVC cable was avoided, to the extent practical, even though no such regulation existed at such time.

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19.	D3.	(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 the cable runs as determined by the fire hazards analysis.	Comply – Cable trays, raceways, conduit, and cable trenches are used only for cable. Culverts are not used for cable. Miscellaneous storage and piping for flammable or combustible liquids are not installed in these areas.
19.	D3.	(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.	Comply – Smoke removal is discussed in the pre-fire plans.
19.	D3.	(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.	Deviate – Cables entering the Control Room terminate there, and there are no floor trenches or culverts. This cable is routed in conduit, and therefore no Halon system is provided. For additional information and justification, refer to item F2.

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20.	D4.	Ventilation	
20.	D4.	(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.	Comply – The discussion of isolation and smoke venting for each fire area is discussed in pre-fire plans. When available, the installed ventilation systems will be used to evacuate smoke form a fire zone. Because of the design of these systems, this may not always be possible and portable ventilation equipment will be utilized to evacuate smoke and heat to the atmosphere or to an area where the installed ventilation system is still available. Fire dampers, which close when the heat associated with the fire is sufficient to melt a fusible link, and thermal and ionization detectors, which shut down selected fans, will at times preclude the use of installed systems. When power supplies and/or controls for a particular fire zone are in that fire zone, it will be necessary to use portable ventilation equipment as described in the pre-fire plans. Before being vented from the Unit, smoke that is suspected of containing airborne radioactive material would pass through a series of charcoal and HEPA filters and is monitored by installed radiation monitors throughout the plant and in the Unit stack vent prior to being released from the Unit.
20.	D4.	(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.	Comply – The specific evaluations of isolation and smoke venting for each fire area are discussed in the pre-fire plans. Smoke removal paths have been evaluated to ensure that inadvertent operation or failures as a result of a fire will not violate controlled areas of the Unit.

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20.	D4.	(c) The power supply and controls for mechanical ventilation systems should be run outside the fire area served by the system.	Deviate – To the extent practical, wiring is outside the area. Thermal controls are always located within the area served. Power cables are in conduit. Larger fans and units serving several areas may be controlled from outside the area. Where power supply and controls for installed ventilation systems are within a fire area, provisions to utilize portable ventilation equipment have been specified. Provisions are discussed in the pre-fire plans.
20.	D4.	(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."	Deviate – The Unit charcoal filters have been evaluated and designed to assure that the charcoal ignition temperature will not be reached due to radioisotopic deposition. The evaluation is summarized below: The following are the charcoal-filter-equipped systems: a. EVS (used following a LOCA or on high radiation in Fuel Handling Area, Radwaste Area and Containment) b. Control Room EVS (standby unit) c. Lab Hood Exhaust System (normal) d. Containment Purge Exhaust I. CHARCOAL FILTERS IN EMERGENCY VENTILATION SYSTEM (EVS) The Emergency Ventilation System (EVS) fans are fully redundant and are powered from separate essential buses. The EVS fans are connected on the

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20.	D4. (d) (Continued)	suction side by cross-tie ductwork which is provided with a parallel arrangement of electric motor-operated dampers. These dampers are normally closed and are opened automatically when the charcoal bed temperature reaches a preset level following a fan failure. The design of the EVS is such that it renders a loss of cooling air to the filters due to fan failure as incredible. The assumptions and results of the analysis to find out the minimum air flow required to prevent desorption of radionuclides are summarized as follows: a. Assumptions 1. All radioiodine and methyl iodide as a result of a LOCA are assumed to be absorbed in one EVS filter unit. Other sources of radioiodine and methyl iodide would be less severe. 2. The Containment Vessel leak rate is assumed to be 0.5 percent per day of the contained air weight. 3. The ambient air temperature is assumed to be 120° F. 4. Desorption of the radionuclides is assumed to begin at 302° F. 5. Heat transfer from the charcoal filters to the surroundings is neglected. b. Results 1. The peak heating rate of the charcoal filters is calculated to be 613 Btu/hr.

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20.	D4. (d) (Continued)	2. The minimum required air flow to maintain the charcoal filters below the desorption temperature is approximately 20 cfm. In addition to the conservative assumptions used in the computation, the air flow used for cooling is 150 cfm. Temperature switches are provided in the air space between the random charcoal elements to indicate excessive bed heating. Temperature switches are set to alarm in the Control Room at 200° F to provide sufficient time for remedial action. Thus, the low-flow air bleed system is designed to offset possible iodine desorption and absorbent auto ignition that may result from radioactivity induced heat in the absorbent and concomitant temperature rise. This is within acceptance criteria established by Regulatory Guide 1.52, Section 3, Paragraph K. II. CHARCOAL FILTERS IN AUXILIARY BUILDING Cooling of the adsorber section of the charcoal filters in the Control Room emergency Ventilation System and the lab hood exhaust of the Radwaste Area HVAC System is achieved by: a. Heat transfer via convection: since the surrounding air is at lower temperature than the adsorber section, occurrence of continuous heat transfer would occur.

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20.	D4. (d) (Continued)	b. Steady air heat transfer: steady air at room ambient temperature is sufficient to cool the peak heating rate of the charcoal filter. To protect filter against ignition, the heaters are not installed adjacent to or integral with the charcoal medium. Calculations indicate that heat load due to radioisotopes is insufficient to ignite charcoal. Temperature switches are provided in the air space between the random charcoal elements to indicate excessive bed heating. Temperature switches are set to alarm in the Control Room at 200° F to provide sufficient time for remedial action. Per our design analysis, the charcoal filters in these systems are not expected to experience significant radioactivity induced heat resulting in iodine desorption and adsorbent auto ignition as the heating rate of the charcoal is so low that the cooling of adsorbent section via convection and steady air heat transfer is sufficient to offset radioactive induced heat. Thus, the intent of Regulatory Guide 1.52, Section 3, Paragraph K is fulfilled. Cooling of the adsorber section of the charcoal filters in the Containment Purge System is achieved by: a. Heat transfer via convection: since the surrounding air is at a lower temperature than the adsorber section, occurrence of continuous heat transfer would occur.

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20.	D4.	(d) (Continued)	A temperature switch and a smoke detector, on the fan discharge, and a radiation monitoring system on the filter inlet are installed to isolate the Containment Purge System on indication of an abnormal condition (i.e., smoke, high temperature, radiation). The temperature switch (setpoint 135° F), smoke detector or radiation detection system will trip the fan and isolate the filters upon indication of an abnormal condition. The charcoal filters in the Containment Purge Exhaust System are not expected to experience significant radioactivity induced heat resulting in desorption and adsorbent auto ignition. The system isolation features and cooling via convection heat transfer is sufficient to meet the intent of Regulatory Guide 1.52, Section 3, Paragraph K.
20.	D4.	(e) The fresh air supply intakes to areas containing safety related equipment or systems should be located remote from the exhaust air outlets and smoke vents of other fire areas to minimize the possibility of contaminating the intake air with the products of combustion.	Comply – All plant intakes are sufficiently separated from all plant exhausts, both the exhaust from the same area and from all other plant areas, such that there is no possibility of contamination of the intake air with the products combustion from exhaust air or smoke vents as shown by the following evaluation: 1. COMPONENT COOLING WATER PUMP AREA VENT SYSTEM Two air intake louvers on the south wall at elevation 596-6”. There is no exhaust from the area as the air from the area is dumped into the Turbine Building. Thus, there is no possibility of contaminating the intake air with the products of combustion or exhaust.

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20.	D4. (e) (Continued)	2. CONTROL ROOM EQUIPMENT ROOM Louvered penthouse supplying air to the Control Room normal air conditioning unit is located on the roof, elevation 654'. Louvered penthouse supplying air to the Control Room Equipment Room is located on the roof, elevation 654'. Louvered penthouse supplying air to the Control Room emergency ventilation system is located on the roof, elevation 654'. Return from the Control Room normal air conditioning unit and Control Room emergency ventilation system is also located on the roof at elevation 654' but at least 30 feet away from the intakes listed above. Thus, there is no possibility of contaminating the intake air with the products of combustion, since the air intakes are remote from exhausts. 3. EMERGENCY DIESEL GENERATOR ROOM VENTILATION Two air intake louvered penthouses for the diesel generator rooms are located on the roof at elevation 603'. The exhaust from the diesel generator engine is located near the exhaust penthouses for the area, but engine air is exhausted at higher elevation via stack. The louvered penthouse exhaust for the room is located on the roof at elevation 610', however it is 60 feet away from the intake.

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20.	D4. (e) (Continued)	Thus, there is no possibility of contaminating the intake air with the products of combustion, since the air intakes are remote from exhausts. 4. LOW VOLTAGE SWITCHGEAR ROOM, ROOM 429 Two outside air louvers are located on the north wall at elevation 607'. There is no exhaust within the area. The exhaust fan for the room is located on the east wall at elevation 603', exhausting air into the Turbine Room. There is no possibility of contaminating the intake air with the products of combustion, since the air intakes are remote from exhaust. 5. LOW VOLTAGE SWITCHGEAR ROOM, ROOM 428 Outside air louver is located on the north wall at elevation 607'. The air from the room is exhausted via the exhaust fan and duct system, through Room 515 and out to atmosphere through louvers on the west wall at elevation 628'. Thus, there is no possibility of contaminating the intake air with the products of combustion or exhaust since the air intake is remote from exhausts.

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20.	D4. (e) (Continued)	6. FUEL HANDLING AREA HVAC The air intake for the Fuel Handling Area is located on the west wall at elevation 603'. There is no exhaust within the area. The air from the area is exhausted through HEPA filter to station vent. Thus, there is no possibility of contaminating the intake air with the products of combustion or room exhaust since the air intake is remote from exhaust. 7. RADWASTE AREA HVAC SYSTEM The air intake for the system is located on the west wall at elevation 623'. The air from the Radwaste Area is exhausted through independent HEPA filters to station vent. The air from the Lab Area within the radwaste are is exhausted through independent HEPA or charcoal filters to station vent. Thus, there is no possibility of contaminating the intake air with the products of combustion or room exhaust air.

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20.	D4. (e) (Continued)	8. INTAKE STRUCTURE AREA The air intakes for the Intake Structure Area are located on the roof. The air from the room is exhausted via 4 exhaust fans which are located on the west wall, about 20 feet away from the intake. Thus, there is no possibility of contaminating the intake air with the products of combustion or room exhaust air since the air intake is remote from exhausts. 9. NONSAFETY GRADE DIESEL FUEL OIL PUMPHOUSE The nonsafety grade Fuel Oil Pumphouse serves the diesel fire pump diesel engine and the auxiliary boiler. The air intake for the room is located on the east wall. The air from the room is exhausted out through an exhaust fan which is located on the west wall, 20 feet away from the intake. Thus, there is no possibility of contaminating the intake air with the products of combustion or room air since the air intake is remote from exhaust.

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20.	D4.	(e) (Continued)	10. CONTAINMENT PURGE SYSTEM The air intake for the Containment Purge is located in the Auxiliary Building at elevation 643' on the north wall. The air from Containment is exhausted through the HEPA filter to station vent. Thus, there is no possibility of contaminating the intake air with the products of combustion or room exhaust air. 11. NONRADWASTE HVAC SYSTEM The outside air supply intake for the area is located on the roof at elevation 643'. The exhaust is located on the roof also, but 32 feet away from the air intake. Thus, there is no possibility of contaminating the intake air with the products of combustion or room exhaust.
21.	D4.	(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 three hours and automatic fire doors at least equal to the enclosure construction, at each opening into the building Elevators should not be used during fire emergencies.	Deviate – See first part of discussion for Section B5 for training and D1(j) regarding construction.

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21.	D4.	(f) (Continued) Where stairwells or elevators cannot be enclosed in three-hour fire rated barrier with equivalent fire doors, escape and access routes should be established by pre-fire plan and practices in drills by operating and fire brigade personnel.	
21.	D4.	(g) Smoke and heat vents may be useful in specific areas such as cable spreading rooms and diesel fuel oil storage areas and switchgear rooms. When natural-convection ventilation is used, a minimum ratio of 1 sq. foot of venting area per 200 sq. feet of floor area should be provided. If forced-convection ventilation is used, 300 CFM should be provided for every 200 sq. feet of floor area. See NFPA No. 204 for additional guidance on smoke control.	Comply – Smoke venting is discussed in the pre-fire plans.
21.	D4.	(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	Comply – Self-contained breathing apparatuses are the NIOSH approved minimum 1/2-hour, full face, positive pressure type masks with extra air bottles available on site. The onsite charging system is an independent air compressor system located on site. Procedural controls ensure that the required self-contained breathing apparatus and the required spare air bottles are available onsite.

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21.	D4.	(h) (Continued) 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.	
22.	D4.	(i) Where total flooding gas extinguishing system 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 System”, and 12A, “Halon 1301 Systems.”)	Not applicable – No total flooding gas extinguishing systems are utilized at Davis-Besse.

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22.	D5.	Lighting and Communication	
		Lighting and two way voice communications 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:	Fixed and portable emergency lighting and communication devices are available within the Davis-Besse plant.
22.	D5.	(a) Fixed emergency lighting should consist of sealed beam units with individual 8-hour minimum battery power supplies.	Comply – In the event of loss of offsite power, emergency lighting is powered from the diesel generators. In the unlikely event that both diesel power trains were not available, emergency lighting has a 2-hour battery supply; however, it is through a conduit and not individual battery supplies. In the event of failure of emergency lighting, fixed self-contained emergency lighting units consisting of sealed-beamed lights with individual 8-hour minimum battery power packs are installed in areas utilized to achieve safe shutdown and in routes utilized for access and egress to those areas.
23.	D5.	(b) Suitable sealed beam battery powered portable hand lights should be provided for emergency use.	Comply – Sealed beam, battery-powered portable hand lights are available.
23.	D5.	(c) Fixed emergency communication should use voice powered head sets at pre-selected stations.	Comply – A voice-powered system is used for long-term communications following a Control Room/Cable Spreading Room fire as discussed in section 6.2.2 of the FHAR. This section also describes the page-party system and telephone system in the plant.

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23.	D5.	(d) Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage.	Comply with Intent – While the repeater itself has no special exposure protection, portable radio communication equipment is available for the fire fighting activities and safe shutdown activities. The radio communication system utilizes a single repeater located in Room 603 (Fire Area HH) with radiax and heliax cables spreading throughout the Auxiliary Building and Containment. The system has been evaluated ensure that the capability for any required communication remains available.
23.	E.	Fire Detection and Suppression	
23.	E1.	1. Fire Detection	
23.	E1.	(a) Fire detection system should as a minimum comply with NFPA 72D, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems." Deviation from the requirements of NFPA 72D should be identified and justified.	Deviate – The results of the NFPA 72-1990, "Standard for the Installation, Maintenance, and Use of Protective Signaling Systems" compliance review are documented.
23.	E1.	(b) Fire detection systems should give audible and visual alarm and annunciation in the control room. Local audible alarms should also sound at location of the fire.	Comply – Fire detection systems annunciate on the Fire Detection System/Radiation Monitor System Console in the Control Room and at the local fire alarm panels. The annunciations are both visual and audible. The general audible fire alarm which is sounded over the PA system functions as the local audible alarm.
23.	E1.	(c) Fire alarms should be distinctive and unique. They should not be capable of being confused with any other plant system alarms.	Comply – The general audible fire alarm which is sounded over the PA system in the event of a fire is distinctive and unique from all other general plant alarms.

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23.	E1.	(d) Fire detection and actuation systems should be connected to the plant emergency power supply.	Comply – The power supply to the fire detection system is fed off the uninterruptible power supply.
23.	E2.	Fire Protection Water Supply Systems	
23.	E2.	(a) An underground yard fire main loop should be installed to furnish anticipated fire water requirements. NFPA 24 – Standard for Outside Protection – gives necessary guidance for such installation. It references other design codes and standards developed by such organizations as the American National Standards Institute (ANSI) and the American Water Works Associations (AWWA). Lined steel or cast iron pipe should be used to reduce internal tuberculation. Such tuberculation deposits in an unlined pipe over a period of years can significantly reduce water flow through the combination of increased friction and reduced pipe diameter. Means for treating and flushing the systems should be provided. Approved visually indicating sectional control valves, such as Post Indicator Valves, should be provided to isolate portions of the main for maintenance for repair without shutting off the entire system.	Deviate – The Davis-Besse underground yard fire main loop was installed utilizing NFPA 24. The results of the NFPA 24, “Standard for Outside Protection” compliance review documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 24 are documented as acceptable in the July 31, 1989 letter. Approved visually indicating sectional control valves (post indicator valves) are provided to isolate portions of the fire main for maintenance or repair without shutting down the entire system. The fire main piping at Davis-Besse Unit 1 is separate from all other water service type piping. The fire main is designed for fire protection use only.

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23.	E2.	(a) (Continued) The fire main system piping should be separate from service or sanitary water system piping. Visible location marking signs for underground valves is acceptable. Alternative valve position indicators should also be provided. For operating plants, fire main system piping that can be isolated from service or sanitary water system piping is acceptable.	
24.	E2.	(b) A common yard fire main loop may service multi-unit nuclear power plant sites, if cross-connected between units. Sectional control valves should permit maintaining independence of the individual loop around each unit. For such installations, common water supplies may also be utilized. The water supply should be sized for the largest single expected flow. For multiple reactor sites with widely separated plants (approaching 1 mile or more), separate yard fire main loops should be used. Sectionalized systems are acceptable.	Not Applicable – Davis-Besse is a single unit site.

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25.	E2.	(c) If pumps are required to meet system pressure or flow requirements, a sufficient number of pumps should be provided so that 100% capacity will be available with one pump inactive (e.g., three 50% pumps or two 100% pumps). The connection to the yard fire main loop from each fire pump should be widely separated, preferably located on opposite sides of the plant. Each pump should have its own driver with independent power supplies and control. At least one pump (if not powered from the emergency diesel) should be driven by non-electrical means, preferably diesel engine. Pumps and drivers should be located in rooms separated from the remaining pumps and equipment by a minimum three-hour fire wall. Alarms indicating pump running, driver availability, or failure to start should be provided in the control room. Details of the fire pump installation should as a minimum conform to NFPA 20, “Standard for the Installation of Centrifugal Fire Pumps.”	Deviate – Two 100 percent 2500 gpm UL listed fire pumps supply water for fire protection needs. They are located in separate buildings and take water from different sources located on the same side of the unit. The installation of the fire pumps utilized NFPA 20. The results of the NFPA 20, “Standard for the Installation of Centrifugal Fire Pumps” compliance review are documented in Toledo Edison letter to the NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 20 are documented as acceptable in the July 31, 1989 letter with the completion of the identified corrective action by the end of the eighth refueling outage. The fire pumps are separated from each other and are located in 2 separate buildings. The 2 fire pumps are located on the same side of the Unit and their connections to yard main are spatially separated by 60 feet.
25.	E2.	(d) Two separate reliable water supplies should be provided. If tanks are used, two 100% (minimum of 300,000 gallons each) system	Deviate – Two separate reliable water supplies are provided. The electric fire pump is supplied by a 250,000 gallon water source which is stored in the above ground fire water storage tank. The diesel fire pump takes its water

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25.	E2.	(d) (Continued)	
		capacity tanks should be installed. They should be so interconnected that pumps can take suction from either or both. However, a leak in one tank or its piping should not cause both tanks to drain.	under a static head from Lake Erie. The 2 water supplies and pumps are not interconnected because of the reliability of the fire water sources.
		The main plant fire water supply capacity should be capable of refilling either tank in a minimum of eight hours.	Deviate - The fire water storage tank would take greater than 8 hours to refill, once manually initiated. This is acceptable since the diesel fire pump has an unlimited source of water.
		Common tanks are permitted for fire and sanitary or service water storage. When this is done, however, minimum fire water storage requirements should be dedicated by means of a vertical standpipe for other water services.	
26.	E2.	(e) The fire water supply (total capacity and flow rate) should be calculated on the basis of the largest expected flow rate for a period of two hours, but not less than 300,000 gallons. This flow rate should be based (conservatively) on 1,000 gpm for manual hose streams plus the greater of:	Deviate – The largest water spray system flow plus 1000 gpm was not considered when the tank was sized since this system is installed on the main transformer located outside and 54 feet away from the closest exposed (Turbine Building) structure.
		(1) all sprinkler heads opened and flowing in the largest designed fire area; or	The second fire water supply, Lake Erie, is considered an unlimited supply of water available to manual fire fighting and automatic water suppression systems; thus, the quantity of the available fire water is considered acceptable.
		(2) the largest open head deluge system(s) operating.	

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26.	E2.	(f) Lakes or fresh water ponds of sufficient size may qualify as sole source of water for fire protection, but require at least two intakes to the pump supply. When a common water supply is permitted for fire protection and the ultimate heat sink, the following conditions should also be satisfied: (1) The additional fire protection water requirements are designed into the total storage capacity; and (2) Failure of the fire protection system should not degrade the function of the ultimate heat sink.	Not applicable – Davis-Besse does not utilize a single fire water supply.
27.	E2.	(g) Outside manual hose installation should be sufficient to reach any location with an effective hose stream. To accomplish this hydrants should be installed approximately every 250 feet on the yard main system. The lateral to each hydrant from the yard main should be controlled by a visually indicating or key operated (curb) valve. A hose house, equipped with hose and combination nozzle, and other auxiliary equipment recommended in NFPA 24, “Outside Protection”, should be provided as needed but at least every 1,000 feet.	Deviate – The outside manual hose installations have been evaluated and are sufficient to reach any location within the protected area with an effective hose stream. The hydrants are installed on the yard main system approximately every 250 feet. The lateral piping to each hydrant is controlled by a valve. Every hydrant inside the protected area fence at Davis-Besse is equipped with a hose house and appropriate equipment with the exception of Hydrant 3 (located east of PSF). The threads for all fire hose connections on standpipes, hydrants, the fire department connection, and hose couplings are compatible with equipment used by the local fire departments. NFPA 24 was utilized in the design. The results of the NFPA 24, “Standard for Outside Protection” compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 24 are documented as acceptable in the July 31, 1989 letter.

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27.	E2.	(g) (Continued) Threads compatible with those used by local identified in the Fire Protection Program. fire departments should be provided on all hydrants, hose couplings and standpipe risers.	
27.	E3.	Water Sprinklers and Hose Standpipe Systems	
27.	E3.	(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.	Deviate – A 10 inch fire water distribution header loop is provided within the Turbine Building. The loop, which supplies fire water to fire hose stations located throughout the Turbine Building, is fed by 4 branch feeders from the underground fire main yard loop. Two of the branch feeders run through the Auxiliary Building and supply fire water to sprinkler system, hose stations, and fire department connections throughout the Auxiliary Building. The underground fire main yard loop, Turbine Building fire water distribution header loop, and the Auxiliary Building branch feeder lines are provided with isolation valves to allow isolation of any portion of the systems.
		Each sprinkler and standpipe system should be equipped with OS&Y (outside screw and yoke) gate valve, or other approved shut off valve, and water flow alarm. Safety related equipment that does not itself require sprinkler water fire protection, but is subject to unacceptable damage if wetted by sprinkler water discharge should be protected by water shields or baffles.	Each sprinkler system protecting the Turbine Building is supplied by its own header fed from the yard main system. Each sprinkler and standpipe system is equipped with an OS&Y gate valve and water flow indication, which alarms on the Fire Detection System/Radiation Monitor System Console.

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28.	E3.	(b) All valves in the fire water systems should be electrically supervised. The electrical supervision signal should indicate in the control room and other appropriate command locations in the plant (see NFPA 26, "Supervision of Valves.")	Deviate – Selected water based suppression system manual isolation valves are electronically supervised. The closure of these valves alarm on the Fire Detection System/Radiation Monitor System Console in the Control Room. The balance of the fire protection valves are maintained in their normal operating position.
		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.	Administrative control procedures provide for inspections of locked valves.
28.	E3.	(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".	Deviate – The results of the NFPA 13, "Standard for the Installation of Sprinkler Systems" compliance review are documented in Toledo Edison letters to the NRC dated May 23, 1988 (Serial No. 1497) and July 31, 1989 (Serial No. 1685). The deviations to NFPA 13 are documented as acceptable in the May 23, 1988 and July 31, 1989 letters with the completion of the identified corrective actions by the end of the seventh and eighth refueling outages. The results of the NFPA 15, "Standard for Water Spray Fixed Systems" compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 15 are documented as acceptable in the July 31, 1989 letter with the completion of the identified corrective actions.

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28.	E3.	(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 connection 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 (NEPIA). Hose stations should be located outside entrances to normally unoccupied areas and inside normally occupied areas. Standpipes serving hose stations in areas housing safety related equipment should have shut off valves and pressure reducing devices (if applicable) outside the area.	Deviate – The hose stations at Davis-Besse are comprised of hose cabinets, hose reels, and hose racks. The NFPA 14, "Standard for Standpipe and Hose System" requirement of a maximum of a nominal 100 feet of hose was used as a basis for the evaluation. The results of the NFPA 14 compliance review for acceptable hose lengths are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). Hose cabinets are provided throughout the Auxiliary Building. Each hose cabinet contains a nominal minimum 75 feet of 1-1/2 inch hose with a combination-type fog nozzle, and a separate 2-1/2 inch connection for local fire department use. Hose reel units are provided in the Turbine Building. Each reel is provided with a nominal minimum 75 feet of 1-1/2 inch rubber-lined fire hose and an adjustable fog-type nozzle. Adjacent to each hose reel is a separate 2-1/2 inch hose connection for local fire department use. Hose rack units are provided in the office building stairways. Each rack is provided with a nominal minimum 75 feet of 1-1/2 inch rubber-lined fire hose and a combination-type fog nozzle. The fire department hose connections in the stairways outside the Cable Spreading Room and Control Room are provided with a nominal minimum 75 feet of 1-1/2 inch fire hose on a pin-type hose rack. The 2-1/2 inch fire department hose connection valve outlet is reduced to 1-1/2 inches with a removable reducing coupling and the fire hose is preconnected to the fire department connection. Individual standpipes are at least 4 inch diameter for multiple hose connections and 2-1/2 inch pipe for single hose connections. The standpipe

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28.	E3.	(d) (Continued)	system is seismically supported in areas containing safety systems in the Auxiliary Building. The standpipes and hose station system in the Turbine Building and Auxiliary Building were designed in utilizing NFPA 14 for sizing, spacing, and pipe support. The results of the NFPA 14 compliance review are documented in Toledo Edison letter to NRC dated July 31, 1989 (Serial No. 1685). The deviations to NFPA 14 are documented as acceptable in the July 31, 1989 letter. There are no standpipes or hose stations inside Containment. (For fire suppression capabilities inside Containment during periods of normal operation and plant refueling, see Section 4.D).
30.	E3.	(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.	Deviate – Davis-Besse utilizes fog-type nozzles which are capable of producing complete shutoff, straight stream, or any degree of solid conical fog. Fire Brigade personnel adjust the nozzle as required for specific applications, since 1 hose station may serve areas with multiple types of fire potential.
30.	E3.	(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	Deviate – A Diesel Foam Suppression System was installed but has been determined as not being required based on existing fire protection features. The inoperability and potential removal of the system from service are discussed in the NFPA 26, “Recommended Practices for the Suppression of Valves Controlling Water Supplies for Fire Protection” compliance review as documented in the Toledo Edison letter to the NRC dated July 31, 1989 (Serial No. 1685).

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30.	E3.	(f) (Continued) expansion foam and the relatively new aqueous film forming foam (AFFF).	
31.	E4.	Halon Suppression System The use of Halon fire extinguishing agents should as a minimum comply with the requirements of NFPA 12A and 12B, "Halogenated Fire Extinguishing Agent Systems – Halon 1301 and Halon 1211." Only UL or FM approved agents should be used. 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.	Not Applicable – Halon suppression systems are not currently utilized at Davis-Besse.

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31.	E5. Carbon Dioxide Suppression Systems The use of carbon dioxide extinguishing systems should as a minimum comply with the requirements of NFPA 12, "Carbon Dioxide Extinguishing Systems." Particular consideration should also be given to: (a) minimum required CO_2 concentration and soak time; (b) toxicity of CO_2; (c) possibility of secondary thermal shock (cooling) damage; (d) offsetting requirements for venting during CO_2 injection to prevent overpressurization versus sealing to prevent loss of agent; (e) design requirements from overpressurization; and (f) possibility and probability of CO_2 systems being out-of-service because of personal safety consideration. CO_2 systems are disarmed whenever people are present in an area so protected. Areas entered	Not Applicable – Carbon Dioxide extinguishing system are not currently utilized at Davis-Besse.

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31.	E5.	(f) (Continued) frequently (even though duration time for any visit is short) have often been found with CO2 systems shut off.	
32.	E6.	Portable Extinguishers	
		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 given to cleanup problems after use and possible adverse effects on equipment installed in the area.	Deviate – Extinguishers are installed utilizing NFPA 10 "Portable Fire Extinguishers, Installation, Maintenance, and Use". Their inspection, maintenance, and use are administratively controlled. These administrative controls reflect the intent and use. The results of the NFPA 10 compliance review are documented in the Toledo Edison letter to the NRC dated July 31, 1989 (Serial No. 1685). The deviation to NFPA 10 are documented as acceptable in the July 31, 1989 letter.
32.	F.	Guidelines for Specific Plant Areas	
32.	F1.	Primary and Secondary Containment	
32.	F1.	(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:	Deviate – Each area of Containment has been evaluated to determine the effects of fire. The analyses can be found in Section 4.D. The major areas of concern are the areas within the secondary shield walls continuing the reactor coolant pumps, the Containment Vessel penetration areas, and those areas containing equipment and/or cables utilized to achieve safe shutdown. There are no charcoal filters within the Containment Vessel. Protection from

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32.	F1. (a) (Continued) o Lubricating oil or hydraulic fluid system for the primary coolant pumps o Cable tray arrangements and cable penetrations o Charcoal filters Fire suppression systems should be provided based on the fire hazards analysis. Fixed fire suppression capability should be provided for hazards that could jeopardize safe plant shutdown. Automatic sprinklers are preferred. An acceptable alternate is automatic gas (Halon or CO_2) for hazards identified as requiring suppression protection. Operation of the fire protection systems should not compromise integrity of the containment or the other safety related systems. Fire protection activities in the containment areas should function in conjunction with total containment requirements such as control of contaminated liquid and gaseous release and ventilation. An enclosure may be required to confine the agent if a gas system is used. Such enclosure	a fire at the Reactor Coolant Pumps due to oil leakage or spray is provided by a Reactor Coolant Pump Oil Collection System, adequately sized for proper oil containment and for proper oil containment and designed to withstand the effects of a pressurized oil line failure. Because this design provides the necessary fire protection from a reactor coolant pump fire, automatic or fixed fire suppression capability is not required. Protection from a fire at the penetration area is afforded by the cable and penetration design characteristics discussed in Section 4.D. The essential divisions enter at penetrations approximately 90 degrees or 120 feet apart, being routed separately. Additionally, the cabling does not propagate flame nor support combustion. Cable tray-to-tray flame propagation is therefore precluded. Both essential and nonessential cabling was evaluated to assure that any postulated fire would not preclude the ability to achieve Safe Shutdown. Equipment such as valving in systems utilized to achieve Safe Shutdown were evaluated to assure that, should they be affected in the most adverse manner by a fire, Safe Shutdown could be achieved. Based on these analyses, it is concluded that Safe Shutdown can be achieved and not automatic or fixed fire suppression is required. The portable extinguishers are sufficient fire suppression, based on the fire hazards evaluation. Since there are no automatic suppression systems nor hose stations within the Containment Vessel, the integrity of the Containment Vessel will not be compromised. There are three 2½” connections, with one usually available, on the Service Water lines in containment that could be used for fire fighting. While not designed to NFPA standards (e.g., lower pressure) it would allow attack of the fire without requiring the personnel hatch to be blocked open.

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32.	F1. (a) (Continued) should not adversely affect safe shutdown, or other operating equipment in containment. Fire detection systems should alarm and annunciate in the control room. The type of detection used and the location of the detectors should be most suitable to the particular type of fire that could be expected from the identified hazard. A primary containment general area fire detection capability should be provided as backup for the above described hazard detection. To accomplish this, suitable smoke detection (e.g., visual obscuration, light scattering and particle counting) should be installed in the air recirculation system ahead of any filters. Automatic fire suppression capability need not be provided in the primary containment atmospheres that are inerted during normal operation. However, special fire protection requirements during refueling and maintenance operations should be satisfied as provided below.	The Containment Fire Detection System is discussed in Section 4.D.

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34.	F1	(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. 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. Equivalent protection from portable systems should be provided if it is impractical to install standpipe with hose stations.	Deviate – Standpipes with hose stations are not provided within the Containment Vessel. There are hose connections on the Service Water lines inside containment that could be used for fire fighting. (See paragraph F1.(a) response above). Hazard areas accessible for manual fire fighting are provided adequate coverage by portable extinguishers. Hoses may also be used if necessary from hose stations outside the personnel hatch. The personnel hatch door interlocks may be overridden if the hose is required.

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34.	F1. (b) (Continued) Adequate self-contained breathing apparatus should be provided near the Containment entrances for fire fighting and damage control personnel. These units should should be independent of any breathing pendent of any breathing apparatus or air supply systems provided for general plant activities.	There are self-contained breathing apparatus units, available for manual fire fighting use and damage control personnel, distributed in various locations throughout the Unit. At the normal entrance ramp to the Auxiliary Building at the 603'-0" elevation, there are at least three self-contained breathing apparatus units mounted on the wall. See discussion for D.4 above for further information.
35.	F2. 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 ratings of three hours. 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.	Deviate – Refer to Section 4.FF for the fire hazard evaluation of the Control Room Area. The Control Room is separated from the Turbine Building, Cable Spreading Room below, and the Mechanical Equipment Room above by reinforced concrete walls, floors and ceiling which meet the required 3-hour fire rating. The Control Room is separated from the Auxiliary Building by 3-hour fire rated barriers, except where it adjoins the elevator and stairwell entrances in the Vestibule, Room 508. These walls are 2-hour rated. The elevator door and Door 513 into the stairwell are Class B assemblies which are 1-1/2 hour fire rated. The main part of the Control Room complex is separated from the 2-hour rated barriers by Door 509. This door was originally purchased as a special purpose, UL labeled, Class A (3-hr) fire door. Subsequent modifications to the door and an error by the manufacturer in affixing the UL label in the field raised questions regarding the validity of the 3-hour rating. Door 509, while not UL labeled, provides a substantial degree of fire protection. In conjunction with the 2-hour rated barriers, this configuration protects the Control Room against disabling fire damage.

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35.	F2. (Continued) Manual fire fighting capability should be provided for both hazards. Hose stations adjacent to the Control Room with portable extinguishers in the Control Room are acceptable.	Doors leading into the Control Room from the Turbine Building side are Class A rated for 3-hour fire resistance The door between the Control Room and The Auxiliary Building is a watertight metal door. This door is not fire rated. The body of the door is constructed of 5/8 inch thick steel plate. All parts of the door except the heat and oil treated neoprene gasket around the perimeter of the door are noncombustible. The gasket material on the perimeter of the door is required to provide a watertight seal. This door is made watertight to prevent steam and water flooding into the Control Room from the Auxiliary Building in the event of a pipe rupture. A 3-hour rated door was added in series with this watertight door to assure the required fire resistance rating of 3-hours. As discussed in Section 4.FF, the design of the Control Room is such that a fire in an essential cabinet should only affect the cabinet, not the cabinet housing the redundant essential component. Physical separation of redundant channels, barriers installed between cabinets, barriers installed between redundant essential channels within cabinets, and sealing to prevent the passage of fire and smoke, not only between essential cabinets, but between the Main Control Room and the Cable Spreading Room, are design features included in the Control Room to minimize the risk of a fire adversely affecting the ability to achieve Safe Shutdown. Portable extinguishers are provided inside the Control Room and hose stations adjacent to the Control Room are provided. Hose stations are located outside the Control Room to prevent pipe failure in the Control Room. Also, addition of an electrically controlled shutoff or manual shutoff with

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35.	F2. (Continued)	penetration seal and associated reducer is not required since the hose station is not inside the Control Room. Water nozzles are of the adjustable spray type. Any nozzle that applies water in the vicinity will cause equipment operation to be unreliable. If the reactor is in operation, hose station use is considered a step that follows after initiation of remote Safe Shutdown. As discussed in Section 4.FF, the Control/Cabinet Room Fire Detection System consists of 17 ionization detectors. Nine of the ionization detectors are installed in the main control boards (vertical panels) that extend from floor to ceiling and contain cables of 2 safety related trains. The remaining 8 ionization detectors are mounted at ceiling height within the confines of the Control/Cabinet Room. A thermal fire detector is a combined rate of rise and fixed temperature detector and is located in the kitchen area. In addition to the above there are 2 photoelectric smoke detectors and 2 temperature detectors in the return air ducts from the Control Room. In addition, fire alarms from any part of the Unit are annunciated in the Control Room. Smoke detectors are also provided in the main supply air duct of the Control Room normal air conditioning system. Smoke, if any, that enters the supply duct through the outside air intake will be detected by this smoke detector. Upon detection of smoke, it will automatically alarm and isolate the Control Room by closing the outside air intake and exhaust dampers and shutting down the air conditioning system to protect the operators by preventing smoke from entering the Control Room through the outside air intake. The Control Room and Cable Spreading Room are in communication via a supply air duct and a return air duct. Fire door type dampers rated for 3-hour fire resistance have been installed in these ducts at the floor and wall penetration to isolate the Control Room. Also, provisions exist for manual isolation of the Control Room from the Cable Spreading Room by closing the redundant

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35.	F2. (Continued)	isolation dampers in the supply and return ducts from the Control Room main panel. Manual venting of the Control Room is possible by operating the Control Room normal air conditioning system in 100 percent exhaust mode. Smoke removal is further discussed in the pre-fire plans. Self-contained breathing apparatus is available within the boundary of the Control Room for operators' use. All cable duct penetrations are sealed with silicone foam to act as a barrier and air seal. Air handling duct penetrations passing through fire partitions are provided with automatic closing, Class A (3-hour) rated fire door type dampers. The only electrical equipment located in the concealed ceiling space are 7 electric heaters mounted in the HVAC ducts, the lighting fixtures associated with the Control/Cabinet Room, and communications system loudspeakers. All cables routed in the concealed ceiling space are installed in steel conduit. Ionization-type smoke detectors, provided in the return air duct, will detect and alarm automatically if there is any smoke generated within the ceiling space, as the return air fan takes its suction from the ceiling space. Further, the BTP-recommended halon suppression system is not desirable for the following reasons: a. Self-ignition is improbable due to the low voltage and current. b. The cables are within conduit or other metallic enclosures and so ignition by exposure is improbable.

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35.	F2. (Continued) Nozzles that are compatible with the hazards and equipment in the control room should be provided for manual hose station. The nozzles chosen should satisfy actual fire fighting needs, satisfy electrical safety and minimize physical damage to electrical equipment from hose stream impingement. 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 alarms and annunciated in the control room. Breathing apparatus for control room operators should be readily available. Control room floors, ceiling, support structures, and walls, including penetrations and doors, should be designed to a minimum fire rating of three hours. All penetration seals should be air tight.	(c) A halon suppression system would be ineffective due to leakage through the ceiling and light fixtures. This leakage could be severely aggravated by dislodging the ceiling tiles and light fixtures due to the extremely high halon velocities on discharge.

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35.	F2. (Continued) 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. Cables should not be located in concealed floor and ceiling spaces. All spaces that enter the control room should terminate in the control room. That is, no cabinet 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.	

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37.	F3. 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 acceptable, provided it is of a type capable of being delivered by a sprinkler of deluge systems such as an Aqueous Film Forming Foam (AFFF).	Deviate – As discussed in Section 4.DD, the Cable Spreading Room design as well as the testing program backing up the design, in conjunction with the totality of the Davis-Besse administrative and security procedures, is such that a fire of either electrical origin or other than electrical origin is precluded. Further, since the Davis-Besse Cable Spreading Room contains no exposed junctions or open cabinets, (other than a small ventilated lighting transformer) any splash from manual hose is not a significant concern. Space between trays is provided to permit standing and hose positioning for upper tray extinguishment; however, the access in most upper cases is blocked by cross trays, thus restricting rapid movement from one point to another. For that reason, a third point of access is provided through a floor hatch from a stairwell below. The stairwell access to the hatch is by means of a ladder mounted behind the doorway. In some cases the specific numerical separation requirements of Regulatory Guide 1.75 are not met. However, a Kaowool blanket covers, trays, providing heat insulation, smoke reduction, and flame-resistant properties, yet permits both easy and quick access for manual hose application under the blanket and also permits water to penetrate the blanket. A hose is available at all access points. Portable extinguishers are located just outside the Cable Spreading Room. Fire-area-mounted ionization-type detectors are in the room, and additional detection is provided in the HVAC system. Cable trays in the Cable Spreading Room are also protected against an exposure fire by an automatic wet pipe sprinkler system. The sprinkler system is discussed in Section 4.DD.

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37.	F3. (a) (Continued) (2) Manual hoses and portable extinguishers should be provided as backup. (3) Each cable spreading room of each unit should have divisional cable separation, and be separated from the other and the rest of the plant by a minimum three-hour rated fire wall (refer to NFPA 251 or ASTM E-119 for fire test resistance rating). (4) At least two remote and separate entrances are provided to the room for access by fire brigade personnel; and (5) Aisle separation provided between tray stacks should be at least three feet wide and eight feet high.	
38.	F3. (b) For cable spreading rooms that do not provide divisional cable separation of a(3), in addition to meeting a(1), (2), (4), and (5) above, the following should also be provided:	

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38.	F3. (b) (Continued) (1) Divisional cable separation should meet the guidelines of Regulatory Guide 1.75, “Physical Independence of Electric Systems.” (2) All cabling should be covered with a suitable fire retardant coating. (3) 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. (4) Plants that cannot meet the guidelines of Regulatory Guide 1.75, in addition to meeting a(1), (2), (4), and (5) above, an auxiliary shutdown system with all cabling independent of the cable spreading room should be provided. (5) For multiple-reactor unit sites, cable spreading rooms should not be shared between reactors. Each cable spreading room of each unit should have divisional cable separation as stated above and be separated from	

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38.	F3.	(b) (Continued) the other and the rest of the plant by a wall with a minimum fire rating of three hours. (See NFPA 251, "Fire Tests, Building Construction and Materials", or ASTM E-119, "Fire Test of Building Construction and Materials", for fire test resistance rating.) The ventilation system to the cable spreading room should be designed to isolate the area upon actuation of any gas extinguishing system in the area. In addition, smoke venting of the cable spreading room may be desirable. Such smoke venting systems should be controlled automatically by the fire detection or suppression system as appropriate. Capability for remote manual control should also be provided.	
39.	F4.	Plant Computer Room Safety related computers should be separated from other areas of the plant by barriers having a minimum three-hour fire resistant rating. Automatic fire detection should be provided to alarm and annunciate in the control room and alarm locally. Manual hose stations and portable water and halon fire extinguishers should be provided.	Not applicable – The Davis-Besse computer is not safety related.

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40.	F5.	Switchgear Rooms Switchgear rooms should be separated from the remainder of the plant by minimum three-hour rated fire barriers to the extent practicable. Automatic fire detection should alarm and annunciate in the control room and alarm locally. Fire hose stations and portable extinguishers should be readily available. 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.	Deviate – Refer to Sections 4.Q, 4.S, 4.X and 4.Y for the fire hazards evaluation of these rooms. Three hour fire walls with appropriate sealed penetrations, automatic detection with appropriate alarms, and hose stations and portable extinguishers appropriately located are all provided. Power cables passing through, terminating, or originating in switchgear rooms are in conduit rather than trays; therefore, an automatic suppression system does not represent a very practical requirement. Instrument and control cables in trays are covered with Kaowool. Additionally, the analysis reported in the above sections indicates that, given a postulated fire in either switchgear room, the Unit can be brought to Safe Shutdown. Compliance with the intent to achieve Safe Shutdown can be attained with manual suppression. Detection is provided to ensure adequate coverage, as discussed in Sections 4.Q, 4.S, 4.X, and 4.Y.
40.	F6.	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 should be provided.	Comply – Detection with appropriate alarms, and portable extinguishers with manual hose stations are provided. Combustible materials are controlled as appropriate. The panels are located in a security area; therefore, unauthorized entry is controlled. A fire at the Auxiliary Shutdown Panel (ASP) or in the room housing the ASP (as well as the essential HPI/DHR flow panels) will not preclude the ability to achieve Safe Shutdown. The Containment Gas Analyzer Panel, C3801, located in Room 304, is a safety related panel utilized, not achieving Shutdown, but after a Loss of Coolant Accident (LOCA). It was not specifically analyzed as being a

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40.	F6.	(Continued)	component necessary to function, given a postulated fire, but is mentioned here for completeness.
41.	F7.	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 hose and portable extinguishers should be provided.	Comply – Battery rooms have a 3-hour wall with appropriate penetrations, the ventilation system is capable of maintaining hydrogen concentration below 2 percent volume, and portable extinguishers are provided. A Q-listed fan is provided for SSE conditions. Hydrogen generation does not occur except during the equalizing process and this process can be administratively controlled. A loss of Battery Room ventilation flow alarm was added in the Control Room. Refer to Section 4.X and 4.Y for the evaluation of the Battery Rooms.
		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 1-1/2 hours. OR	

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41.	F7. (Continued) (c) Provide a remote manual actuated sprinkler system in each room and provide the 1-1/2 hour fire barrier separation.	
41.	F8. 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.	Deviate – A 3-hour wall separates the oil storage area. The oil system includes piping in the main turbine area. The wall between the Turbine Building and the Auxiliary Building is not a blank wall at elevation 585' and contains, in addition to rated penetrations, the following unrated penetrations into areas with systems utilized for achieving Safe Shutdown. a. Feedwater blowout panels b. Access plates for tube removal of CCW Heat Exchangers. c. Stairwell and HVAC penetrations into Auxiliary Feedwater Pump Rooms. (These penetrations are curbed or raised to protect against a combustible fluid carrying a potential fire to the pump rooms below.) Where the fire hazard analyses indicate that systems utilized for achieving Safe Shutdown could be affected by a fire due to an unrated opening, such that safe shutdown capability could be jeopardized, modifications were performed as a result of the evaluation in Section 4.II. As discussed in Section 4.A, an automatic water curtain was installed at the Feedwater Blowout Panels between Rooms 314 and 326.

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41.	F8.	(Continued)	For the reasons discussed in Section 4.II, a fire in the Turbine Building area is not expected to affect the Auxiliary Feedwater Pump Rooms. This, coupled with the fact that a fire would have to both render the Main Feedwater System inoperable and also preclude the use of both Auxiliary Feedwater Pumps before it would jeopardize shutdown capability, leads to the conclusion that modifications for the stairwell and HVAC penetrations in the Auxiliary Feedwater Pump Rooms' roofs are not required.
42.	F9.	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.	Deviate – These areas are discussed in Sections 4.J, and 4.K Generator areas are separated by a 3-hour barrier from each other and all other areas or the unit except the yard. This exception is of no consequence. Automatic fire detection with Control Room alarm and adequate drainage for the sprinkler system and hose is provided. As discussed in Sections 4.J and 4.K, the fire suppression system is a preaction sprinkler system which provides increased assurance that a fire will be extinguished rapidly. The drainage capability is adequate. Smoke venting is discussed in pre-fire plans. The Day Tank is separated by the 3-hour walls with appropriate penetration ratings, ventilation, and automatic sprinklers. The tank capacity is 6,000 gallons for each of the 2 Day Tank Rooms. Although this is in excess of 1,100 gallons, the evaluation of Sections 4.J and 4.K show that Safe Shutdown can be achieved, given a postulated fire in the Day Tank Rooms present tank capacity is therefore acceptable.
		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	

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42.	F9. (Continued) control room and alarm locally. Drainage for fire fighting water and means for local manual venting of smoke should be provided. Day tanks with total capacity up to 1100 gallons are permitted in the diesel generator area under the following conditions: (a) The day tank is located in a separate enclosure, with a minimum fire resistance rating of three hours, including doors or penetrations. These enclosures should be capable of containing the entire contents of the day tanks. The enclosure should be ventilated to avoid accumulation of oil fumes. (b) The enclosure should be protected by automatic fire suppression systems such as AFFF or sprinklers. When day tanks cannot be separated from the diesel-generator one of the following should be provided for the diesel generator area: (a) Automatic open head deluge or open head spray nozzle system(s)	

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42.	F9.	(Continued) (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.	
42.	F10.	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 three hours. Buried tanks are considered as meeting the three hour fire resistance requirements. See NFPA 30, "Flammable and Combustible Liquid Code," for additional guidance.	Comply – The original Main Diesel Fuel Oil Tank is outside, more than 50 feet away. Separate buried tanks for each of the 2 emergency diesel generators have been provided. This new system is installed and functional. The original tank supplies only the Diesel Fire Pump and Auxiliary Boiler.

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42.	F10. (Continued) 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. In operating plants where tanks are located directly above or below the diesel generators and cannot reasonably be moved, separating floors and main structural members should, as a minimum, have fire resistance rating of three hours. Floors should be liquid tight to prevent leaking of possible oil spills from one level to another. Drains should be provided to remove possible oil spills and fire fighting water to a safe location. One of the following acceptable methods of fire protection should also be provided: (a) Automatic open head deluge or open head spray nozzle system(s) (b) Automatic closed head sprinklers; or	

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42.	F10. (Continued) (c) Automatic AFFF that is delivered by a sprinkler system or spray system	
44.	F11. 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.	Deviate – Early warning fire detection with control room alarm, extinguishers, and hose stations are provided for all essential pump rooms. The fire hazard evaluation of Section 4 considers the effects of fire on both essential and nonessential pumps utilized for achieving Safe Shutdown. The specific evaluation sections are as follows: a. For the Decay Heat Removal Pumps, refer to Sections 4.A and 4.AB b. For the CCW Pumps, refer to Section 4.T c. For the Makeup Pumps, refer to Section 4.AB d. For the Boric Acid Addition Pumps, refer to Section 4.G e. Deleted f. For the Main Feedwater Pumps, refer to Section 4.II. g. For the Auxiliary Feedwater Pumps which serve a backup function, refer to Section 4.E and 4.F h. For the Service Water Pumps, refer to 4.BF and 4.II.

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44.	F12.	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. The storage configuration of new fuel should always be so maintained as to preclude criticality for any water density that might occur during fire water application.	Comply – Refer to Section 4.V for a discussion of this area. Portable extinguishers within the area, a hose station within reach, automatic detection, Control Room alarm and annunciation, and a drainage system are provided. Combustibles are to be limited to a minimum. A fire retardant cover may be used over the closed pit for cleanliness. New fuel storage configuration is maintained to preclude criticality with unborated water.
45.	F13.	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 alarm and annunciate in the control room and to alarm locally.	Comply – Refer to Section 4.V for a discussion of this area. Local hose stations, portable extinguishers, and automatic fire detection with Control Room annunciation are provided as required.

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45.	F14.	Radwaste Building	
		The radwaste building should be separated from other areas of the plant by fire barriers have at least three-hour ratings. Automatic sprinklers should be used in all areas where combustible materials are located. Automatic fire detection should be provided to annunciate and alarm in the control room and alarm locally. During a fire, the ventilation systems in these areas should be capable of being isolated. Water should drain to liquid radwaste building sumps. 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 larger wheeled units.	Deviate – The Low Level Radwaste Building is separated from the Auxiliary Building by a 3-hour rated barrier. The existing radwaste functions are conducted in various locations throughout the plant. Three-hour rated fire barriers do not separate other plant areas from all areas in which radwaste activities are conducted. Refer to Section 4.V for the radwaste area hazards evaluation.
46.	F15.	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	Comply – No flammable liquids are utilized for decontamination in the Unit. Decontamination activities utilize detergents with water. A typical cleaning agent used in the unit is a cleaning gel adaptable, by dilution with water, to any degree of surface soilage. It has no flash point, is non-fuming, and contains no harmful acids, abrasives, or caustics. No flammable liquid storage removes the requirement for automatic sprinklers. Automatic detection, Control Room annunciation, ventilation shutdown, fire damper

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46.	F15. (Continued) portable extinguishers should be provided as backup to the sprinkler system.	isolation at fire walls, local hose stations, and portable extinguisher are provided.
46.	F16. Safety Related Water Tanks Storage tanks that supply water for safe shutdown should be protected from the effects of fire. Local hose stations and portable extinguishers should be provided. Portable extinguishers should be located in nearby hose houses. Combustible materials should not be stored next to outdoor tanks. A minimum of 50 feet of separation should be provided between outdoor tanks and combustible materials where feasible.	Deviate – One or more of the following tanks may be involved in achieving a safe shutdown of the Unit: (a) Borated Water Storage Tank (BWST) in the Yard (b) Boric Acid Addition Tank in the Auxiliary Building (c) Makeup Tank in the Auxiliary Building (d) Condensate Storage Tank in the Office Building The BWST is a safety related tank and can be utilized as the suction source for the High Pressure Injection (HPI) system, in conjunction with Letdown, as a backup to the normal boration path which utilized one of the boric acid addition tanks via the makeup system. The BWST can also be aligned as the suction source for the makeup pumps. The BWST is provided with a thermal insulation system applied to its exterior sides (excluding roof). The insulation system consists of a spray applied foam insulation over a protective base coat and is topcoated. The insulation has a flame spread rating of 25 per ASTM E-84. The topcoat can achieve a Class A coating system rating per UL 790. The Condensate

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46.	F16.	(Continued)	Storage Tank serves as the primary suction source for the Auxiliary Feedwater System. This system is only required when the Main Feedwater System is not available for removal of heat from the steam generators. The Auxiliary Feedwater System also has available a secondary source of water from the Service Water System which would automatically be aligned upon loss of the condensate storage tank source. The fire hazards evaluation discussed in Section 4 shows that loss of the supply from any one of the above tanks would not preclude achieving a Safe Shutdown. Hose stations are available for all of the above tanks. Portable extinguishers are available for all tanks, with the clarification that an extinguisher would have to be obtained from inside the building for the BWST. The Makeup Tank (c) is located in a pit for shielding from radioactivity with a 4 foot thick concrete hatch, and use of either the hose or extinguisher is highly unlikely. However, a fire in this pit is highly unlikely. Although a hydrogen line serves this tank, there is no ignition source present.
46.	F17.	Cooling Towers	
		Cooling towers should be of noncombustible construction or so located that a fire will not adversely affect any safety related systems or equipment. Cooling towers should be of noncombustible construction when the basins are not for the ultimate heat sink or for the fire protection water supply.	Comply – Concrete natural draft cooling towers are noncombustible and nonsafety related. They are not required for either an accident condition nor to achieve Safe Shutdown.

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46.	F17.	(Continued) Cooling towers of combustible construction, so located that a fire in them could adversely affect safety related systems or equipment should be protected with an open head deluge system installation with hydrants and hose houses strategically located.	
47.	F18.	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.	Comply – Record storage rooms, the auxiliary boiler room, shop areas, and warehouse are located with appropriate distance or barrier to protect against adverse fire effects, including smoke, to systems utilized for achieving Safe Shutdown. The fuel oil for the auxiliary boiler is provided with a dike. These areas have been considered in the fire hazards evaluations discussed in Section 4.
47.	G.	Special Protection Guidelines	
47.	G1.	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	Comply – Welding and cutting equipment is not stored within the Unit. Bottles for welding or cutting are stored in racks outside the Unit at the southeast corner of the plant and in Service Building No. 2 located west of the protected area.

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47.	G1.	(Continued) 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.)	Welding and cutting equipment and its use utilize NFPA 51 and 51B. An open flame, welding, or cutting permit is issued prior to performing work in any area other than designated areas such as the welding shops. Appropriate personnel will review and approve all permits.
47.	G2.	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.")	Comply – 1. Powdered Resins – Limited quantities are stored under the stairs and platform at the precoat and resin fill tanks on El 603 in the Turbine Building. This is in Fire Zone II-12 just outside the west wall of the upper part of the condensate storage tank area. This area is protected with an automatic sprinkler system. The remainder of the powdered resin is a stock item and thus handled by the storeroom. 2. Whole Bead Resin – Presently stored in a separate warehouse and not inside the plant.
48.	G3.	Hazardous Chemicals Hazardous chemicals should be stored and protected in accordance with the recommendations of NFPA 49, "Hazardous Chemicals Data." Chemicals storage areas should be well ventilated and protected against	Not applicable – Bulk Chemicals are stored in a separate buildings rather than in the Unit. Specifically, sulfuric acid storage tanks (2) are located just east of the Cooling Tower. An acid tank and a caustic tank are located north of the

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48.	G3.	(Continued)	
		flooding conditions since some chemicals may react with water to produce ignition.	Water Treatment Building. Water treatment chemicals are stored in the Water Treatment Building chemical storage room. Hydrazine and ammonia are stored either in the water treatment chemical storage room or in the building east of the Water Treatment Building.
48.	G4.	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.	Comply – Administrative procedures control handling and storage of combustible materials in the Fuel Handling and Radwaste shipping area.