A. NEI 04-02 Table B-1
Transition of Fundamental Fire Protection Program & Design Elements

116 Pages Attached

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.1 General	This chapter contains the fundamental elements of the fire protection program and specifies the minimum design requirements for fire protection systems and features. These fire protection program elements and minimum design requirements shall not be subject to the performance-based methods permitted elsewhere in this standard. Previously approved alternatives from the fundamental protection program attributes of this chapter by the AHJ take precedence over the requirements contained herein.	N/A	N/A – General statement; No technical requirements	N/A
3.2 Fire Protection Plan	N/A	N/A	N/A – General statement; No technical requirements	N/A
3.2.1 Intent	A site-wide fire protection plan shall be established. This plan shall document management policy and program direction and shall define the responsibilities of those individuals responsible for the plan’s implementation. This section establishes the criteria for an integrated combination of components, procedures, and personnel to implement all fire protection program activities.	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / All

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3.2.2 Management Policy Direction and Responsibility	A policy document shall be prepared that defines management authority and responsibilities and establishes the general policy for the site fire protection program.	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / All
3.2.2.1	The policy document shall designate the senior management position with immediate authority and responsibility for the fire protection program.	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / Section 2.1
3.2.2.2	The policy document shall designate a position responsible for the daily administration and coordination of the fire protection program and its implementation.	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / Section 3
3.2.2.3	The policy document shall define the fire protection interfaces with other organizations and assign responsibilities for the coordination of activities. In addition, this policy document shall identify the various plant positions having the authority for implementing the various areas of the fire protection program.	Complies, with Required Action	See implementation item identified below.	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All

IMPLEMENTATION ITEMS:

07-805-001 Procedure APA-ZZ-00700, "Fire Protection Program," will be revised to clearly define the fire protection interfaces with other organizations using the guidelines of Appendix A of NFPA 805.

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3.2.2.4	The policy document shall identify the appropriate AHJ for the various areas of the fire protection program.	Complies, with Required Action	See implementation item identified below.	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
	IMPLEMENTATION ITEMS:			
	07-805-002 The AHJ (i.e., NRC, NEIL) will be identified in procedure APA-ZZ-00700, "Fire Protection Program," using the guidelines of Appendix A of NFPA 805.			
3.2.3 Procedures	Procedures shall be established for implementation of the fire protection program. In addition to procedures that could be required by other sections of the standard, the procedures to accomplish the following shall be established:	N/A	N/A – General statement; No technical requirements	N/A

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.2.3(1)	Inspection, testing, and maintenance for fire protection systems and features credited by the fire protection program	Complies, with Required Action	See implementation items identified below.	Procedure APA-ZZ-00703, "Fire Protection Operability Criteria and Surveillance Requirements," Rev. 20 / All Calculation KC-162, "Performance Based Fire Protection Surveillance Frequency Program," Rev. 0 Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
	IMPLEMENTATION ITEMS: 11-805-048 Procedures APA-ZZ-00700 and APA-ZZ-00703 will be revised to include inspection, testing, and maintenance requirements for all fire protection systems and features credited by the fire protection program. 11-805-069 During the implementation of the NFPA 805 license basis, performance-based surveillance frequencies will be established as described in Electric Power Research Institute (EPRI) Technical Report TR-1006756, "Fire Protection Surveillance Optimization and Maintenance Guide for Fire Protection Systems and Features" and evaluated in Callaway Plant Calculation KC-162, "Performance Based Fire Protection Surveillance Frequency Program."			
3.2.3(2)	Compensatory actions implemented when fire protection systems and other systems credited by the fire protection program and this standard cannot perform their intended function and limits on impairment duration	Complies	No Additional Clarification	Procedure APA-ZZ-00703, "Fire Protection Operability Criteria and Surveillance Requirements," Rev. 20 / Attachments 1–8

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.2.3(3)	Reviews of fire protection program — related performance and trends	Complies	No Additional Clarification	Procedure EDP-ZZ-01131, "Plant Health and Performance Monitoring Program," Rev. 20 / Appendix J
3.2.3(4)	Reviews of physical plant modifications and procedure changes for impact on the fire protection program	Complies	No Additional Clarification	Procedure EDP-ZZ-04044, "Fire Protection Reviews," Rev. 9 / All
3.2.3(5)	Long-term maintenance and configuration of the fire protection program	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / All
3.2.3(6)	Emergency response procedures for the plant industrial fire brigade	Complies	No Additional Clarification	Procedure EIP-ZZ-00226, "Fire Response Procedure for Callaway Plant," Rev. 14 / All Callaway Fire Preplan Manual, Rev. 34 / All
3.3 Prevention	A fire prevention program with the goal of preventing a fire from starting shall be established, documented, and implemented as part of the fire protection program. The two basic components of the fire prevention program shall consist of both of the following:	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3(1) Prevention	Prevention of fires and fire spread by controls on operational activities	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / Section 3.6 and Appendix 2
3.3(2) Prevention	Design controls that restrict the use of combustible materials. The design control requirements listed in the remainder of this section shall be provided as described.	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / Section 3.6 and Appendix 2
3.3.1 Fire Prevention for Operational Activities	The fire prevention program activities shall consist of the necessary elements to address the control of ignition sources and the use of transient combustible materials during all aspects of plant operations. The fire prevention program shall focus on the human and programmatic elements necessary to prevent fires from starting or, should a fire start, to keep the fire as small as possible.	Complies	No Additional Clarification	Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / All Procedure APA-ZZ-00742, "Control of Ignition Sources," Rev. 20 / All
3.3.1.1 General Fire Prevention Activities	The fire prevention activities shall include but not be limited to the following program elements:	N/A	No additional fire prevention measures are credited at Callaway Plant other than those required by this section, as discussed below:	N/A

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.1.1(1)	Training on fire safety information for all employees and contractors including, as a minimum, familiarization with plant fire prevention procedures, fire reporting, and plant emergency alarms	Complies	No Additional Clarification	Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / Section 3.9.1 T68.003G, "General Employee Training CBT" / All
3.3.1.1(2)	Documented plant inspections including provisions for corrective actions for conditions where unanalyzed fire hazards are identified	Complies	No Additional Clarification	Procedure FPP-ZZ-00100, "Site Wide Fire Protection Inspection Procedure," Rev. 9 / All
3.3.1.1(3)	Administrative controls addressing the review of plant modifications and maintenance to ensure that both fire hazards and the impact on plant fire protection systems and features are minimized	Complies	No Additional Clarification	Procedure APA-ZZ-00322, "Integrated Work Management Process Description," Rev. 8 / Section 4.7.3 Procedure APA-ZZ-00600, "Design Change Control," Rev. 40 / All Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / Section 3.6.3 Procedure EDP-ZZ-04044, "Fire Protection Reviews," Rev. 9 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.1.2 Control of Combustible Materials	Procedures for the control of general housekeeping practices and the control of transient combustibles shall be developed and implemented. These procedures shall include but not be limited to the following program elements:	N/A	No additional general housekeeping and transient controls are credited at Callaway Plant other than those required by this section, as discussed below:	N/A
3.3.1.2(1)	Wood used within the power block shall be listed pressure-impregnated or coated with a listed fire-retardant application. Exception: Cribbing timbers 6 in. by 6 in. (15.2 cm by 15.2 cm) or larger shall not be required to be fire-retardant treated.	Complies, with Required Action	See implementation item identified below.	Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / Section 4.1.5.b CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All

IMPLEMENTATION ITEMS:

11-805-049	Section 4.1.5.b of APA-ZZ-00741 will be revised to address that cribbing timbers 6 in. by 6 in. or larger are not required to be fire-retardant treated.

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.1.2(2)	Plastic sheeting materials used in the power block shall be fire-retardant types that have passed NFPA 701, Standard Methods of Fire Tests for Flame Propagation of Textiles and Films, large-scale tests, or equivalent.	Complies, with Required Action	See implementation item identified below.	Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / All CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All NFPA 701, "Standard Methods of Fire Tests for flame Propagation of Textiles and Films," 1999 Edition / All
	IMPLEMENTATION ITEMS: 07-805-004 Procedure APA-ZZ-00741, "Control of Combustible Materials," will be revised to include a requirement for plastic sheeting used in the power block to have passed NFPA 701.			
3.3.1.2(3)	Waste, debris, scrap, packing materials, or other combustibles shall be removed from an area immediately following the completion of work or at the end of the shift, whichever comes first.	Complies, with Required Action	See implementation item identified below.	Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / Sections 4.1.5.c and 4.1.5.e CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
	IMPLEMENTATION ITEMS: 07-805-005 Sections 4.1.5.c and 4.1.5.e of procedure APA-ZZ-00741, "Control of Combustible Materials," will be revised to include the removal of all waste, debris, scrap, and combustible packing materials from all areas, not only safety-related buildings and adjacent areas.			
3.3.1.2(4)	Combustible storage or staging areas shall be designated, and limits shall be established on the types and quantities of stored materials.	Complies	No Additional Clarification	Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.1.2(5)	Controls on use and storage of flammable and combustible liquids shall be in accordance with NFPA 30, Flammable and Combustible Liquids Code, or other applicable NFPA standards.	Complies with Clarification	No NFPA standards, other than those listed, are applicable to controls on use and storage of flammable and combustible liquids at Callaway Plant, based on the guidance in Section K.1 of Nuclear Energy Institute (NEI) 04-02.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 30 NFPA 30, "Flammable and Combustible Liquids Code," 1973 Edition / All NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," Rev. 2 / Section K.1
3.3.1.2(6)	Controls on use and storage of flammable gases shall be in accordance with applicable NFPA standards.	Complies with Clarification	No NFPA standards, other than those listed, are applicable to controls on use and storage of flammable gases at Callaway Plant, based on the guidance in Section K.1 of NEI 04-02.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 50A NFPA 50A, "Standard for Gaseous Hydrogen Systems at Consumer Sites," 1973 Edition / All NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," Rev. 2 / Section K.1

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies, with Required Action	See implementation items identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
	IMPLEMENTATION ITEMS: 07-050A-001 Procedures will be revised to ensure that the hydrogen supply system is inspected annually and maintained by Ameren Missouri. 07-050A-002 Dry vegetation and combustible material within 15 feet of the hydrogen supply area will be removed. Additionally, procedures will be revised to ensure that the area within 15 feet of the hydrogen supply area is kept free of dry vegetation and combustible materials.			
3.3.1.3 Control of Ignition Sources	N/A	N/A	N/A – General statement; No technical requirements	N/A
3.3.1.3.1	A hot work safety procedure shall be developed, implemented, and periodically updated as necessary in accordance with NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, and NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Sections 51B and 241 NFPA 51B, "Standard for Fire Prevention during Welding, Cutting, and other Hot Work," 1999 Edition / All NFPA 241, "Standard for Safeguarding Construction, Alteration, and Demolition Operations," 2000 Edition / All Procedure APA-ZZ-00742, "Control of Ignition Sources," Rev. 20 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.1.3.2	Smoking and other possible sources of ignition shall be restricted to properly designated and supervised safe areas of the plant.	Complies	No Additional Clarification	Policy POL0035, "Smoking Policy," Rev. 2 / All Procedure APA-ZZ-00742, "Control of Ignition Sources," Rev. 20 / Section 4.13
3.3.1.3.3	Open flames or combustion-generated smoke shall not be permitted for leak or air flow testing.	Complies	No Additional Clarification	Procedure APA-ZZ-00742, "Control of Ignition Sources," Rev. 20 / Section 4.12
3.3.1.3.4	Plant administrative procedure shall control the use of portable electrical heaters in the plant. Portable fuel-fired heaters shall not be permitted in plant areas containing equipment important to nuclear safety or where there is a potential for radiological releases resulting from a fire.	Complies, with Required Action	See implementation item identified below.	Procedure APA-ZZ-00742, "Control of Ignition Sources," Rev. 20 / All CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All

IMPLEMENTATION ITEMS:

07-805-006 Procedure APA-ZZ-00742, "Control of Ignition Sources," will be revised to include requirements for not allowing portable electric or fuel-fired heaters in plant areas containing equipment important to nuclear safety or where there is a potential for radiological releases resulting from a fire.

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.2 Structural	Walls, floors, and components required to maintain structural integrity shall be of noncombustible construction, as defined in NFPA 220, Standard on Types of Building Construction.	Complies	No Additional Clarification	Specification 10466-A-000, "Architectural Design Criteria for the Standardized Nuclear Unit Power Plant System (SNUPPS)" / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.3 Interior Finishes	Interior wall or ceiling finish classification shall be in accordance with NFPA 101®, Life Safety Code®, requirements for Class A materials. Interior floor finishes shall be in accordance with NFPA 101 requirements for Class I interior floor finishes.	Complies	No Additional Clarification	CAR 200305040, "Eval OE16523 Test Report for Epoxy Floor Coatings" / All Final Safety Analysis Report (FSAR) Standard Plant (SP), Rev. OL-14f / Section 9.5.1.2, Page 9.5-3, Paragraph 7; Section 9.5.1.2.2.5, Paragraph 3 Procedure ETP-ZZ-03010, "Field Coatings," Rev. 10 / Attachments 2 through 15 Specification 10466-A-112, "Technical Specification for Subcontract for Drywall Construction for the Standardized Nuclear Unit Power Plant System," Rev. 4 / Section 5.3.1 Specification A-120, "Technical Specification for Resilient Flooring," Rev. 2 / Section 5.2.a Specification 10466-A-196, "Technical Specification for Contract for Carpets for the Standardized Nuclear Unit Power Plant System," Rev. 2 / Section 4.1.5 Specification 10466-A-200, "Technical Specification for Access Flooring for the Standardized Nuclear Unit Power Plant System," Rev. 4 / Section 5.3 NFPA 101, "Life Safety Code," 2000 Edition / Sections 10.2.3.2 and 10.2.7.2

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.4 Insulation Materials	Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.	Complies	No Additional Clarification	FSAR SP, Rev. OL-14f / Section 9.5.1.2, Page 9.5-3, Paragraph 7; Section 9.5.1.2.2.5, Paragraphs 3 and 4 Specification 10466-M-160, "Specification for Thermal Insulation for Piping and Equipment Located Inside the Reactor Containment and Outside Containment Requiring ISI Examination for the Standardized Nuclear Unit Power Plant System," Rev. 19 / Section 5.5
3.3.5 Electrical	N/A	N/A	N/A – General statement; No technical requirements	N/A

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.5.1	Wiring above suspended ceiling shall be kept to a minimum. Where installed, electrical wiring shall be listed for plenum use, routed in armored cable, routed in metallic conduit, or routed in cable trays with solid metal top and bottom covers.	Complies by Previous NRC Approval	Wiring exists above the ceilings in the Control Room, Control Room Foyer, and Shift Manager's Office (Fire Area C-27); and above the ceilings in all zones in Fire Areas C-5 and C-6. The fire protection for the area above the ceilings in these areas was approved in NUREG-0830 as identified below. This fire protection was considered acceptable considering the hazards in the area. Per Page 28 of NUREG-0830, "The automatic sprinkler systems (wet pipe sprinkler systems, pre-action sprinkler systems, and water spray systems) will be designed to meet the recommendations of NFPA Standards 13, 'Standard for the Installation of Sprinkler Systems,' and No. 15, 'Standard for Water Spray Fixed Systems.' "The areas that are equipped with automatic water suppression systems include the following: "Cable area above access control area… "…the staff concludes that the sprinkler and standpipe systems are adequate, meet the guidelines of Appendix A, Sections C.3.a and C.3.d, and are, therefore acceptable." Per Page 31 of NUREG-0830,	Letter ULNRC-00189 from Bryan (UE) to Rusche (NRC) dated April 15, 1977 / Section 9.5.1.1 NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Pages 28 and 31

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			"Automatic smoke detectors are provided in the ceiling of the control room… "…the staff concludes, that the fire protection-for the control room meets the guidelines of Appendix A to BTP ASB 9.5-1 and is, therefore, acceptable." The configuration of these areas, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	

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		Complies, with Required Action	See implementation item identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All FAQ 06-0022, "Acceptable Electrical Cable Construction Tests," Rev. 3 / All NRC Memorandum from Klein to AFPB File, "Close-Out of National Fire Protection Association Standard 805 Frequently Asked Question 06-0222 Electrical Cable Flame Propagation Tests," dated May 5, 2009 Drawing E-2R8900, "Raceway Notes, Symbols and Details," Rev. 99 / All Procedure EDP-ZZ-04044, "Fire Protection Reviews," Rev. 9 / All

IMPLEMENTATION ITEMS:

11-805-050 Drawing E-2R8900 and procedure EDP-ZZ-04044 will be revised to require that, where wiring must be installed above a suspended ceiling, it shall be of a type approved in FAQ 06-0022.

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		Submit for NRC Approval	Wiring exists above the suspended ceilings in the following locations: Fire Area RW-1: Fire Zone 7209 - Radwaste Control Room Fire Zone 7211 - Radwaste Lab Fire Area TB-1: Fire Zone 3225 - Access Corridor Fire Zones 3226, 3227, 3228 - Hot Lab Areas Fire Zone 3611 - Access Corridor Fire Zone 3612 - Operations Field Office Fire Zones 3613. 3613A, 3613B - Operations Misc Areas Fire Zone 3614 - Access Corridor Fire Zones 4317, 4323 - Chemistry Cold Lab Fire Zone 4505 - Turbine Deck Offices Approval of this wiring is being requested in Attachment L.	RFR 201103242, "NFPA 805 Evaluate Cable Above Suspended Ceilings/ 3.3.5.1" / All

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3.3.5.2	Only metal tray and metal conduits shall be used for electrical raceways. Thin wall metallic tubing shall not be used for power, instrumentation, or control cables. Flexible metallic conduits shall only be used in short lengths to connect components.	Complies	No Additional Clarification	Specification 10466-E-034, "Technical Specifications for Purchase of Electrical Cable Trays for the Standardized Nuclear Unit Power Plant System (SNUPPS)," Rev. 3 / Sections 8.2, 9.0 Drawing E-2R8900, "Raceway Notes, Symbols and Details," Sheet 8, Rev. 99 / All FSAR SP, Rev. OL-14b / Section 9.5B.5, Paragraph 7

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3.3.5.3	Electric cable construction shall comply with a flame propagation test as acceptable to the AHJ.	Complies with Clarification	Per Section 9.5B.5 of FSAR SP, Paragraph 7, "Lightning, fire protection, communication, and specialty cables which are flame retardant but not qualified to IEEE-383-1974, and other specialty cable such as cords and computer ribbon cable are limited in use by the following matter: a. Covered with a flame-retardant coating per the requirements of (BTP) APCSB 9.5-1, Appendix A, or b. Installed in a totally enclosed metal conduit system, or c. Consist of short lengths of exposed cable between the end of a totally enclosed metal conduit system routed to a component and the connection to the component (e.g., at light fixtures, public-address devices and computer peripherals), or d. Located in nonsafety-related areas which are separated from safety-related areas by fire-rated boundaries, or e. Evaluated on a case-by-case basis for adverse impact on the fire protection program." These cables are bounded by the requirements outlined in FAQ 06-0022 and are therefore acceptable.	FAQ 06-0022, "Acceptable Electrical Cable Construction Tests," Rev. 3 / All FSAR SP, Rev. OL-14b / Section 9.5B.5, Paragraph 7 NRC Memorandum from A. Klein to AFPB File, "Close-Out of National Fire Protection Association Standard 805 Frequently Asked Question 06-0022 Electrical Cable Flame Propagation Tests," dated May 5, 2009 / All Specification 10466-E-057, "Technical Specification for 600 Volt Copper Control Cable for the Standardized Nuclear Unit Power Plant System (SNUPPS)," Rev. 9 / Section 8.3.3 Specification 10466-E-058, "Technical Specification for 600 Volt Single and multiple Conductor Copper Power Cable for the Standardized Nuclear Unit Power Plant System (SNUPPS)," Rev. 12 / Section 8.2.3 Specification 10466-E-062, "Technical Specification for 600-Volt Shielded Instrumentation Cable for the Standardized Nuclear Unit Power Plant System (SNUPPS)," Rev. 7 / Section 8.2.3

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3.3.6 Roofs	Metal roof deck construction shall be designed and installed so the roofing system will not sustain a self-propagating fire on the underside of the deck when the deck is heated by a fire inside the building. Roof coverings shall be Class A as determined by tests described in NFPA 256, Standard Methods of Fire Tests of Roof Coverings.	Complies with Clarification	Roofs comply with the requirements of this section except as identified below.	CAR 200504809, "NEIL Request - Qualification of Class A Roofs" / All Drawing A-2901, "General Roof Details," Rev. 2 / All Drawing A-2902, "General Roof Details," Rev. 1 / All NFPA 256, "Standard Methods of Fire Tests of Roof Coverings," 1998 Edition /All Specification 4645-23A, "Technical Specification for Fire Protection System," Rev. 19 / Division 7, Section 7A, Section 2.4

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Per Page 9-7 of NUREG-0830 Supplement 3, "No fireproofing is provided on the underside on the fuel building roof. The roof is missile proof, of 2-foot-thick reinforced concrete. "Because of the low fuel loading in the area is low, the staff finds the level of fire protection acceptable." The Fuel Building roof, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	Letter SLNRC 84-0042 from Petrick (SNUPPS) to Denton (NRC) dated March 14, 1984 / Attachment, Section 9.5.2.1.1.3.c NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1", Supplement 3, dated May 1984 / Page 9-7
3.3.7 Bulk Flammable Gas Storage	Bulk compressed or cryogenic flammable gas storage shall not be permitted inside structures housing systems, equipment, or components important to nuclear safety.	Complies	No Additional Clarification	Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / Section 4.5.1.d

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.7.1	Storage of flammable gas shall be located outdoors, or in separate detached buildings, so that a fire or explosion will not adversely impact systems, equipment, or components important to nuclear safety. NFPA 50A, Standard for Gaseous Hydrogen Systems at Consumer Sites, shall be followed for hydrogen storage.	Complies with Clarification	Bulk hydrogen complies with the requirements of NFPA 50A–1973 Edition. Exceptions requiring further action are identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 50A NFPA 50A, "Standard for Gaseous Hydrogen Systems at Consumer Sites," 1973 Edition / All
		Complies, with Required Action	See implementation items identified below.	CAR 201101832, "Track Implementation Items for NFPA 805-Project" / All
	IMPLEMENTATION ITEMS: 07-050A-001 Procedures will be revised to ensure that the hydrogen supply system is inspected annually and maintained by Ameren Missouri. 07-050A-002 Dry vegetation and combustible material within 15 feet of the hydrogen supply area will be removed. Additionally, procedures will be revised to ensure that the area within 15 feet of the hydrogen supply area is kept free of dry vegetation and combustible materials.			
3.3.7.2	Outdoor high-pressure flammable gas storage containers shall be located so that the long axis is not pointed at buildings.	Complies	No Additional Clarification	FSAR Site Addendum (SA), Rev. OL-15 / Section 2.2.2.1.2.1
3.3.7.3	Flammable gas storage cylinders not required for normal operation shall be isolated from the system.	Complies	No Additional Clarification	Safe Work Practices Manual, Rev. 18 / "Compressed Gases" Section

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.8 Bulk Storage of Flammable and Combustible Liquids	Bulk storage of flammable and combustible liquids shall not be permitted inside structures containing systems, equipment, or components important to nuclear safety. As a minimum, storage and use shall comply with NFPA 30, Flammable and Combustible Liquids Code.	Complies with Clarification	Bulk flammable and combustible liquid storage complies with NFPA 30–1973 Edition.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 30 NFPA 30, "Flammable and Combustible Liquids Code," 1973 Edition / All

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Per Page 9-5 of NUREG-0830 Supplement 3, "The diesel fuel oil day tanks are located in each diesel generator room. The SER states that a containment dike would be provided beneath each day tank to contain 100% of the fuel oil, however, during its visit, the staff noted that the top of the dike is beneath the tank. The staff was concerned that not all leaks would be contained by this configuration and that the applicant should modify the dike to provide a more positive collection ability (such as by completely surrounding the day tank) in accordance with Section C.7.i of BTP CMEB 9.5-1. "By letter dated February 1, 1984, the applicant indicated that the existing fuel tank and all piping are seismic Category I. The fuel oil system is gravity-feed-type system, therefore, no pressurized sprays will occur as a result of a leak. The floor area adjacent to the dike has floor drains. The day tank is provided with level indication that alarms in the control room if there are more than 3 gallons of leakage. "The applicant considers that the current design of the tank is adequate and, on the basis of the information provided, the staff agrees. If any leaks should occur, they would be promptly detected,	Letter SLNRC 84-0014 from Petrick (SNUPPS) to Denton (NRC) dated February 1, 1984 / Enclosure 3 NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Page 9-5

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			and the floor drains would collect the majority of the leakage. "On the basis of its review, the staff concludes that the diesel fuel day tank and dike assembly meets the guidelines in Section C.7.i of BTP CMEB 9.5-1, and is, therefore, acceptable." The diesel fuel day tanks and dikes, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	
3.3.9 Transformers	Where provided, transformer oil collection basins and drain paths shall be periodically inspected to ensure that they are free of debris and capable of performing their design function.	Complies	No Additional Clarification	Procedure ODP-ZZ-0016E APPENDIX 01, "OT General Inspection Guide," Rev. 8 / Attachment 1

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.10 Hot Pipes and Surfaces	Combustible liquids, including high flashpoint lubricating oils, shall be kept from coming in contact with hot pipes and surfaces, including insulated pipes and surfaces. Administrative controls shall require the prompt cleanup of oil on insulation.	Complies, with Required Action	See implementation item identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / Section 4.1.5 MDP-ZZ-LM001, "Fluid Leak Management Program," Rev. 10
	IMPLEMENTATION ITEMS:			
	07-805-009 Procedures APA-ZZ-00741, "Control of Combustible Materials," and MDP-ZZ-LM001, "Fluid Leak Management Program," will be revised to include a requirement for the prompt cleanup of combustible liquids discovered on insulation, including high flashpoint lubricating oils (instead of only performing an assessment of the potential for fire and the recording of appropriate recommendation in APA-ZZ-00741), and to keep such fluids from coming in contact with hot pipes and surfaces, including insulated pipes and surfaces.			
3.3.11 Electrical Equipment	Adequate clearance, free of combustible material, shall be maintained around energized electrical equipment.	Complies, with Required Action	See implementation item identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All Procedure APA-ZZ-00741, "Control of Combustible Materials," Rev. 22 / All
	IMPLEMENTATION ITEMS:			
	07-805-017 Procedure APA-ZZ-00741, "Control of Combustible Materials," will be revised to include requirements for maintaining adequate clearance, free of combustible material, around energized electrical equipment.			

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.12 Reactor Coolant Pumps	For facilities with non-inerted containments, reactor coolant pumps with an external lubrication system shall be provided with an oil collection system. The oil collection system shall be designed and installed such that leakage from the oil system is safely contained for off normal conditions such as accident conditions or earthquakes. All of the following shall apply.	Complies by Previous NRC Approval	Per Pages 9-5 and 9-6 of NRC SER NUREG-0830 Supplement 3, "The reactor coolant pump (RCP) system is designed to collect and contain lubricating oil for each RCP. The collection systems are piped to two collection tanks. Each tank serves two RCPs, and each collection tank has a capacity of approximately 300 gallons. Each RCP motor contains approximately 265 gallons of oil. The collection tanks are provided with level indication and high level alarm in the control room. "Should leakage exceed the collection tank capacity before corrective actions are completed, the tank would overflow into the containment sumps. This oil would not come into contact with hot surfaces and would not pose a significant fire hazard. "The tanks are constructed to the requirements of ASME Code Section VIII and have flame arrestors on the vents. The drain piping meets American National Standards Institute (ANSI) Standard B 31.1. The tanks and piping are seismically supported in accordance with the requirements of Paragraph C.2 of RG 1.29. "By letter dated March 14, 1984, the applicant described how the oil collection system had been seismically analyzed and qualified	NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Pages 9-5 and 9-6 Letter SLNRC 84-0041 from Petrick (SNUPPS) to Denton (NRC) dated March 14, 1984 / All Letter SLNRC 84-0042 from Petrick (SNUPPS) to Denton (NRC) dated March 14, 1984 / Attachment, Pages 9.5E-11 and 9.5E-12

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			to remain functional after the safe shutdown earthquake. On this basis, the staff concludes that the protection provided for the reactor coolant pumps meets the guidelines of Section C.7.a of BTP CMEB 9.5-1 and is, therefore, acceptable." The reactor coolant pump lube oil collection system, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	
3.3.12(1)	The oil collection system for each reactor coolant pump shall be capable of collecting lubricating oil from all potential pressurized and nonpressurized leakage sites in each reactor coolant pump oil system.	Complies by Previous NRC Approval	See Section 3.3.12 Above	N/A
3.3.12(2)	Leakage shall be collected and drained to a vented closed container that can hold the inventory of the reactor coolant pump lubricating oil system.	Complies by Previous NRC Approval	See Section 3.3.12 Above	N/A

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.12(3)	A flame arrestor is required in the vent if the flash point characteristics of the oil present the hazard of a fire flashback.	Complies by Previous NRC Approval	See Section 3.3.12 Above	N/A
3.3.12(4)	Leakage points on a reactor coolant pump motor to be protected shall include but not be limited to the lift pump and piping, overflow lines, oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines, and the oil reservoirs, where such features exist on the reactor coolant pumps.	Complies by Previous NRC Approval	See Section 3.3.12 Above	N/A
3.3.12(5)	The collection basin drain line to the collection tank shall be large enough to accommodate the largest potential oil leak such that oil leakage does not overflow the basin.	Complies by Previous NRC Approval	See Section 3.3.12 Above	N/A
3.4 Industrial Fire Brigade	N/A	N/A	N/A – General statement; No technical requirements	N/A
3.4.1 On-Site Fire-Fighting Capability	All of the following requirements shall apply.	N/A	N/A – General statement; No technical requirements	N/A

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.1(a)	A fully staffed, trained, and equipped fire-fighting force shall be available at all times to control and extinguish all fires on site. This force shall have a minimum complement of five persons on duty and shall conform with the following NFPA standards as applicable:	Complies with Clarification	The Callaway Plant fire brigade complies with NFPA 600 for interior fire fighting operations as discussed in Section 3.4.1(a)(1). As required, and in accordance with the guidance of Section K.6 of NEI 04-02, the Callaway Plant fire brigade has the ability to control and extinguish exterior fires similarly to interior fires, through the development, review, and maintenance of associated fire emergency plans and fire attack plans; regular training and education; the use of appropriate protective clothing and equipment; and brigade member medical and physical performance requirements; as addressed through compliance with Section 3.4.1(a)(1).	Procedure APA-ZZ-00743, "Fire Team Organization and Duties," Rev. 23 / Sections 4.1.3(a), 4.1.3(b), and 4.1.3(c) NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," Rev. 2 / Section K.6
3.4.1(a)(1)	NFPA 600, Standard on Industrial Fire Brigades (interior structural fire fighting)	Complies with Clarification	The industrial fire brigade complies with NFPA 600–2000 Edition. Exceptions requiring further action are identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 600 NFPA 600, "Standard on Industrial Fire Brigades," 2000 Edition / All

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies, with Required Action	See implementation items identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All

IMPLEMENTATION ITEMS:

07-600-001 A safety and health policy will be documented for the Callaway Plant Fire Brigade. The policy will satisfy the requirements of NFPA 600, Sections 2-1.4 and 2-2.4.

07-600-002 Fire brigade policy documents and procedures will be updated to include a requirement for a standard system to identify and account for each industrial fire brigade member present at the scene of the emergency, in accordance with NFPA 600, Section 2-2.1.4.

The requirement will also meet NFPA 600, section 2-4.5, and will specify that industrial fire brigade members be issued identification for the following purposes:
(1) Assistance in reaching the incident in an emergency
(2) Identification by security personnel
(3) Establishing authority

07-600-003 A risk management policy will be written for emergency response. The risk management policy shall be routinely reviewed with industrial fire brigade members and shall be based on the following recognized principles:
(1) Some risk to the safety of industrial fire brigade members is acceptable where saving human lives is possible.
(2) Minimal risk to the safety of the industrial fire brigade members, and only in a calculated manner, is acceptable where saving endangered property is possible.
(3) No risk to the safety of industrial fire brigade members is acceptable where saving lives or property is not possible.

07-600-004 The Callaway Plant Fire Brigade training program will be updated to include a periodic review of NFPA 600.

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.1(a)(2)	NFPA 1500, Standard on Fire Department Occupational Safety and Health Program	N/A	NFPA 1500 is not applicable to Callaway Plant per Section K.6 of NEI 04-02 which states, "The NFPA standards divide fire brigades into two types, based on organization and duties: "Industrial fire Brigades" and "Industrial Fire Departments." Practically this means that a fire fighting organization at a nuclear power plant must comply with either NFPA 600 (for an Industrial Fire Brigade) or both NFPA 1500 and NFPA 1582 (for an Industrial Fire Department)."	NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," Rev. 2 / Section K.6
3.4.1(a)(3)	NFPA 1582, Standard on Medical Requirements for Fire Fighters and Information for Fire Department Physicians	N/A	NFPA 1582 is not applicable to Callaway Plant per Section K.6 of NEI 04-02 which states, "The NFPA standards divide fire brigades into two types, based on organization and duties: "Industrial fire Brigades" and "Industrial Fire Departments." Practically this means that a fire fighting organization at a nuclear power plant must comply with either NFPA 600 (for an Industrial Fire Brigade) or both NFPA 1500 and NFPA 1582 (for an Industrial Fire Department)."	NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," Rev. 2 / Section K.6

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.1(b)	Industrial fire brigade members shall have no other assigned normal plant duties that would prevent immediate response to a fire or other emergency as required.	Complies, with Required Action	See implementation item identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All Procedure APA-ZZ-00743, "Fire Team Organization and Duties," Rev. 23 / Section 4.1.3(c)
	IMPLEMENTATION ITEMS: 11-805-051 Section 4.1.3(c) of procedure APA-ZZ-00743, "Fire Team Organization and Duties," will be revised to include the requirement that industrial fire brigade members shall have no other assigned normal plant duties that would prevent immediate response to a fire or other emergency as required.			
3.4.1(c)	During every shift, the brigade leader and at least two brigade members shall have sufficient training and knowledge of nuclear safety systems to understand the effects of fire and fire suppressants on nuclear safety performance criteria. Exception: Sufficient training and knowledge shall be permitted to be provided by an operations advisor dedicated to industrial fire brigade support.	Complies	No Additional Clarification	Procedure ODP-ZZ-00001, "Operations Department - Code of Conduct," Rev. 61 / Sections 3.11.7 and 3.11.8
3.4.1(d)	The industrial fire brigade shall be notified immediately upon verification of a fire.	Complies	No Additional Clarification	Procedure EIP-ZZ-00226, "Fire Response Procedure for Callaway Plant," Rev. 14 / Section 5.2 Procedure OTO-KC-00001, "Fire Response," Rev. 8 / Step 7

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.1(e)	Each industrial fire brigade member shall pass an annual physical examination to determine that he or she can perform the strenuous activity required during manual firefighting operations. The physical examination shall determine the ability of each member to use respiratory protection equipment.	Complies	No Additional Clarification	Procedure APA-ZZ-00912, "Callaway Plant Medical Physical Program," Rev. 16 / Section 4.3 Procedure APA-ZZ-01000, "Callaway Radiation Protection Program" (CTSN 4111), Rev. 33 / Section 4.18
3.4.2 Pre-Fire Plans	Current and detailed pre-fire plans shall be available to the industrial fire brigade for all areas in which a fire could jeopardize the ability to meet the performance criteria described in Section 1.5.	Complies	No Additional Clarification	Callaway Plant Fire Preplan Manual, Rev. 34 / All

IMPLEMENTATION ITEMS:

11-805-076 The Fire Pre-Plan Manual will be revised as follows:

- The fire pre-plan attachments will be revised where the radiation release criteria are applicable for gaseous and liquid effluent as described in Table E-1/E-2 to include effluent controls and monitoring.
- New Pre-Fire Plans will be added for C-36 and C-37.
- Two new Attachments will be added, for Temporary Structures Inside the PA and for Temporary Structures Outside the PA, and existing Fire Attack Guidelines will be combined into each attachment.

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.2.1	The plans shall detail the fire area configuration and fire hazards to be encountered in the fire area, along with any nuclear safety components and fire protection systems and features that are present.	Complies with Clarification	The Callaway pre-fire plans which are used by the fire brigade are available for all fire areas and contain the following information as applicable to the fire area. —Fire area description / location —Major fire hazards —Fire Protection Information for systems and features -Fixed detection and suppression systems -Fire barriers and specific FP features -Locations for fire hose stations and extinguishers —Radiation Hazards and Toxic hazards if present -Primary and when available secondary access paths -Locked doors -Suggested command post location —Communications available —Guidelines for fire attack The fire response procedures (FPP-ZZ- series) which are fire area specific and used by the Main Control Room contain the following —Ventilation information —Nuclear Safety Components	Callaway Plant Fire Preplan Manual, Rev. 34 / All Procedure FPP-ZZ-00001, "Auxiliary Building Prefire Strategies," Rev. 22 / All Procedure FPP-ZZ-00002, "Fuel Building Prefire Strategies," Rev. 7 / All Procedure FPP-ZZ-00003, "Reactor Building Prefire Strategies," Rev. 8 / All Procedure FPP-ZZ-00004, "Control Building and Communications Corridor Prefire Strategies," Rev. 16 / All Procedure FPP-ZZ-00005, "Radwaste Building and Tunnel Prefire Strategies," Rev. 6 / All Procedure FPP-ZZ-00006, "Turbine Building Prefire Strategies," Rev. 10 / All Procedure FPP-ZZ-00007, "Miscellaneous Buildings Inside Protected Area Prefire Strategies," Rev. 12 / All Procedure FPP-ZZ-00008, "Miscellaneous Buildings Outside Protected Area Prefire Strategies," Rev. 11 / All

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.2.2	Pre-fire plans shall be reviewed and updated as necessary.	Complies	No Additional Clarification	Procedure APA-ZZ-00700, “Fire Protection Program,” Rev. 18 / Section 3.4.8
3.4.2.3	Pre-fire plans shall be available in the control room and made available to the plant industrial fire brigade.	Complies, with Required Action	See implementation item identified below.	Procedure APA-ZZ-00700, “Fire Protection Program,” Rev. 18 / Section 3.4.8 CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
3.4.2.4	Pre-fire plans shall address coordination with other plant groups during fire emergencies.	Complies	No Additional Clarification	Procedure OTO-KC-00001, "Fire Response," Rev. 8 / Step 15 Procedure EIP-ZZ-00226, "Fire Response Procedure for Callaway Plant," Rev. 14 / Section 5.2
		Complies, with Required Action	See implementation item identified below.	Callaway Plant Fire Preplan Manual, Rev. 34 / All CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.3 Training and Drills	Industrial fire brigade members and other plant personnel who would respond to a fire in conjunction with the brigade shall be provided with training commensurate with their emergency responsibilities.	N/A	N/A – General statement; No technical requirements	N/A
3.4.3(a)(1)	Plant industrial fire brigade members shall receive training consistent with the requirements contained in NFPA 600, Standard on Industrial Fire Brigades, or NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, as appropriate.	Complies with Clarification	The industrial fire brigade complies with NFPA 600–2000 Edition. Exceptions requiring further action are identified below. NFPA 1500 is not applicable to Callaway Plant per Section K.6 of NEI 04-02 which states, "The NFPA standards divide fire brigades into two types, based on organization and duties: "Industrial fire Brigades" and "Industrial Fire Departments." Practically this means that a fire fighting organization at a nuclear power plant must comply with either NFPA 600 (for an Industrial Fire Brigade) or both NFPA 1500 and NFPA 1582 (for an Industrial Fire Department)."	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 600 NFPA 600, "Standard on Industrial Fire Brigades," 2000 Edition / All NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," Rev. 2 / Section K.6

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies, with Required Action	See implementation items identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
	IMPLEMENTATION ITEMS: 07-600-004 The Callaway Plant Fire Brigade training program will be updated to include a periodic review of NFPA 600.			
3.4.3(a)(2)	Industrial fire brigade members shall be given quarterly training and practice in fire fighting, including radioactivity and health physics considerations, to ensure that each member is thoroughly familiar with the steps to be taken in the event of a fire.	Complies	No Additional Clarification	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 / Sections 4.2 and 4.4.1.b Procedure FPP-ZZ-00009 APPENDIX 1, "Initial Training Course Agenda," Rev. 7 / All Procedure FPP-ZZ-00009 APPENDIX 2, "Retraining Courses and Activities," Rev. 11 / All
3.4.3(a)(3)	A written program shall detail the industrial fire brigade training program.	Complies	No Additional Clarification	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.3(a)(4)	Written records that include but are not limited to initial industrial fire brigade classroom and hands-on training, refresher training, special training schools attended, drill attendance records, and leadership training for industrial fire brigades shall be maintained for each industrial fire brigade member.	Complies	No Additional Clarification	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 / Section 6.0
3.4.3(b)	Plant personnel who respond with the industrial fire brigade shall be trained as to their responsibilities, potential hazards to be encountered, and interfacing with the industrial fire brigade.	Complies, with Required Action	See implementation item identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All Procedure APA-ZZ-00700, “Fire Protection Program,” Rev. 18 / All
	IMPLEMENTATION ITEMS: 11-805-052 Procedure APA-ZZ-00700 will be revised to identify that plant personnel who respond with the industrial fire brigade are trained as to their responsibilities, potential hazards to be encountered, and interfacing with the industrial fire brigade.			
3.4.3(c)(1)	Drills shall be conducted quarterly for each shift to test the response capability of the industrial fire brigade.	Complies	No Additional Clarification	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 / Section 4.4.1.b

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.3(c)(2)	Industrial fire brigade drills shall be developed to test and challenge industrial fire brigade response, including brigade performance as a team, proper use of equipment, effective use of pre-fire plans, and coordination with other groups. These drills shall evaluate the industrial fire brigade's abilities to react, respond, and demonstrate proper fire-fighting techniques to control and extinguish the fire and smoke conditions being simulated by the drill scenario.	Complies, with Required Action	See implementation item identified below.	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 / All CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
	IMPLEMENTATION ITEMS:			
	07-805-013 Procedure FPP-ZZ-00009 will be revised to include an assessment of the proper use of pre-fire plans and coordination with other groups during fire brigade drills, using the guidelines of Appendix A of NFPA 805.			
3.4.3(c)(3)	Industrial fire brigade drills shall be conducted in various plant areas, especially in those areas identified to be essential to plant operation and to contain significant fire hazards.	Complies, with Required Action	See implementation item identified below.	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All
	IMPLEMENTATION ITEMS:			
	07-805-014 Procedure FPP-ZZ-00009, "Fire Protection Training Program," will be updated to provide requirements for drills to be conducted in various plant areas, especially in those areas identified to be essential to plant operation and to contain significant fire hazards, as required by NFPA 805.			

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.3(c)(4)	Drill records shall be maintained detailing the drill scenario, industrial fire brigade member response, and ability of the industrial fire brigade to perform as a team.	Complies	No Additional Clarification	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 / Section 6.0
3.4.3(c)(5)	A critique shall be held and documented after each drill.	Complies	No Additional Clarification	Procedure FPP-ZZ-00009, "Fire Protection Training Program," Rev. 25 / Section 4.4.3

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.4 Fire-Fighting Equipment	Protective clothing, respiratory protective equipment, radiation monitoring equipment, personal dosimeters, and fire suppression equipment such as hoses, nozzles, fire extinguishers, and other needed equipment shall be provided for the industrial fire brigade. This equipment shall conform with the applicable NFPA standards.	Complies with Clarification	Equipment is provided for the fire brigade as required. Per visual inspection of equipment, it is in accordance with applicable NFPA codes, as documented in CAR 200902315.	Procedure APA-ZZ-00743, "Fire Team Organization and Duties," Rev. 23 / Section 4.1.3.e Procedure HTP-ZZ-05006, "Fire Involving Radioactive Material or Entry into the Radiologically Controlled Area," Rev. 9 / Section 6.1.2 HDP-ZZ-08000, "Respiratory Protection Program," Rev. 21 / Section 3.9.2 Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 600 Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / All CAR 200902315, "NFPA 805 Transition - Site Organizations Support Tracking CAR" / All
		Complies, with Required Action	See implementation item identified below.	CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All Procedure APA-ZZ-00700, "Fire Protection Program," Rev. 18 / All

IMPLEMENTATION ITEMS:

07-805-015 A requirement that specifies that fire brigade protective clothing and respiratory protective equipment shall conform to the applicable NFPA standard will be documented in APA-ZZ-00700.

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.4.5 Off-Site Fire Department Interface	N/A	N/A	N/A – General statement; No technical requirements	N/A
3.4.5.1 Mutual Aid Agreement	Off-site fire authorities shall be offered a plan for their interface during fires and related emergencies on site.	Complies	No Additional Clarification	Procedure FPP-ZZ-00012, "Fire Pre-Plan Off Site Support Organizations," Rev. 5 / Section 1
3.4.5.2 Site-Specific Training	Fire fighters from the off-site fire authorities who are expected to respond to a fire at the plant shall be offered site-specific training and shall be invited to participate in a drill at least annually.	Complies	No Additional Clarification	Procedure FPP-ZZ-00012, "Fire Pre-Plan Off Site Support Organizations," Rev. 5 / Section 4.2
3.4.5.3 Security and Radiation Protection	Plant security and radiation protection plans shall address off-site fire authority response.	Complies	No Additional Clarification	Procedure FPP-ZZ-00012, "Fire Pre-Plan Off Site Support Organizations," Rev. 5 / Section 4.1.3 Procedure HTP-ZZ-01203, "Radiological Area Access Control," Rev. 44 / Section 6.8.3
3.4.6 Communications	An effective emergency communications capability shall be provided for the industrial fire brigade.	Complies	No Additional Clarification	FSAR SP, Section 9.5.2, Rev. OL-14f / All RFR 200800301, "Emergency Communications Capability During a Fire" / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5 Water Supply	N/A	N/A	N/A – General statement; No technical requirements	N/A
3.5.1	A fire protection water supply of adequate reliability, quantity, and duration shall be provided by one of the two following methods.	N/A	N/A – General statement; No technical requirements	N/A
3.5.1(a)	Provide a fire protection water supply of not less than two separate 300,000-gal (1,135,500-L) supplies.	Complies	No Additional Clarification	Drawing 8600-X-88305, "Piping Plan Storage Tank Area Fire Protection Sys.," Rev. 13 / All
3.5.1(b)	Calculate the fire flow rate for 2 hours. This fire flow rate shall be based on 500 gpm (1892.5 L/min) for manual hose streams plus the largest design demand of any sprinkler or fixed water spray system(s) in the power block as determined in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, or NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection. The fire water supply shall be capable of delivering this design demand with the hydraulically least demanding portion of fire main loop out of service.	N/A	Callaway Plant complies with subsection (a) to this requirement; therefore, compliance with subsection (b) is not required.	N/A

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.2	The tanks shall be interconnected such that fire pumps can take suction from either or both. A failure in one tank or its piping shall not allow both tanks to drain. The tanks shall be designed in accordance with NFPA 22, Standard for Water Tanks for Private Fire Protection. Exception No. 1: Water storage tanks shall not be required when fire pumps are able to take suction from a large body of water (such as a lake), provided each fire pump has its own suction and both suctions and pumps are adequately separated. Exception No. 2: Cooling tower basins shall be an acceptable water source for fire pumps when the volume is sufficient for both purposes and water quality is consistent with the demands of the fire service.	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 22 NFPA 22, "Standard for Water Tanks for Private Fire Protection," 1974 Edition / All
3.5.3	Fire pumps, designed and installed in accordance with NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection, shall be provided to ensure that 100 percent of the required flow rate and pressure are available assuming failure of the largest pump or pump power source.	Complies with Clarification	Fire pumps comply with NFPA 20–1974 Edition except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 20 NFPA 20, "Standard for the Installation of Centrifugal Fire Pumps," 1974 Edition / All

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Per Section 8-6.1 of NFPA 20–1974 Edition, engines shall be started not less than once a week and run for not less than 30 minutes. Per Section 4.7.10.1.1.a of NUREG-1058, "The Fire Suppression Water System shall be demonstrated OPERABLE at least once per 31 days on a STAGGERED TEST BASIS by starting the electric motor-driven pump and operating it for at least 15 minutes on recirculation flow." Per Section 4.7.10.1.2.a, "Each fire pump diesel engine shall be demonstrated OPERABLE at least once per 31 days by verifying: 1) The fuel oil day tank level contains at least 175 gallons of fuel, and 2) The diesel starts from ambient conditions and operates for at least 30 minutes on recirculation flow." Per Section 8-6.2 of NFPA 20–1974 Edition, engines shall be kept clean, dry, and well lubricated. The proper oil levels shall be maintained in the crankcase. Oil shall be changed in accordance with manufacturer's recommendations, but not less frequently than annually. Per Section 4.7.10.1.2.c of NUREG-1058, "Each fire pump diesel engine shall be demonstrated OPERABLE at least once per 18 months, during shutdown, by subjecting the diesel to an inspection in accordance with	Letter ULNRC-00189 from Bryan (UE) to Rusche (NRC) dated April 15, 1977 / Section 9.5.1.1 NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Sections 9.5.1.1 and 9.5.1.6 NUREG-1058, "Technical Specifications Callaway Plant, Unit No. 1" / Sections 4.7.10.1.1.a, 4.7.10.1.1.f, 4.7.10.1.2.a, and 4.7.10.1.2.c Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 20 NFPA 20, "Standard for the Installation of Centrifugal Fire Pumps," 1974 Edition / Sections 8-6.1, 8-6.2, and 12-3.1

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			procedures prepared in conjunction with its manufacturer's recommendations for the class of service." Per Section 12-3.1 of NFPA 20–1974 Edition, a yearly test shall be made at full capacity and over to make sure that neither pump nor suction pipe is obstructed. Per Section 4.7.10.1.1.f of NUREG-1058, "The Fire Suppression Water System shall be demonstrated OPERABLE at least once per 18 months by performing a system functional test which includes simulated automatic actuation of the system throughout its operating sequence, and: 1) Verifying that each pump develops at least 1500 gpm at a system head of 135 psig, 2) Verifying each pump delivers at least 2250 gpm at a system pressure of 105 psig, 3) Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel, and 4) Verifying that each fire suppression pump starts (sequentially) on decreasing pressure in the fire suppression header at a header pressure greater than or equal to 110 psig." Per Section 9.5.1.6 of NUREG-0830, "The applicant has committed to follow the staff Standard Technical Specifications. The staff finds this acceptable."	

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			The fire pump testing frequencies, as approved in the referenced SER, are still the same as those which were approved. There have been no plant modifications or other changes that would invalidate the basis for approval. Per Section 9.5.1.1 of NUREG-0830, "The water supply system consists of three fire pumps separately connected to a buried, 14-in pipe loop around the plant. There are three 50-percent capacity fire pumps, each rated at 1500 gpm at 347-ft head. One pump is electric motor driven and two are diesel engine driven." "The greatest water demand for the fixed fire suppression systems is 1300 gpm and, coupled with 500 gpm for hose streams, creates a total water demand of 1800 gpm at the residual pressure of 80 psig. The staff finds that the water supply system can deliver the required water demand with one pump out of service. "Based on this evaluation, the staff concludes that the water supply system is adequate, meets the guidelines of Section E.2 of Appendix A to BTP ASB 9.5-1. and is, therefore, acceptable." The fire pumps, as approved in the	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			referenced SER, are still of the same type and configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.4	At least one diesel engine-driven fire pump or two more seismic Category I Class 1E electric motor-driven fire pumps connected to redundant Class 1E emergency power buses capable of providing 100 percent of the required flow rate and pressure shall be provided.	Complies by Previous NRC Approval	Per Section 9.5.1.1 of NUREG-0830, "The water supply system consists of three fire pumps separately connected to a buried, 14-in pipe loop around the plant. There are three 50-percent capacity fire pumps, each rated at 1500 gpm at 347-ft head. One pump is electric motor driven and two are diesel engine driven." "The greatest water demand for the fixed fire suppression systems is 1300 gpm and, coupled with 500 gpm for hose streams, creates a total water demand of 1800 gpm at the residual pressure of 80 psig. The staff finds that the water supply system can deliver the required water demand with one pump out of service. "Based on this evaluation, the staff concludes that the water supply system is adequate, meets the guidelines of Section E.2 of Appendix A to BTP ASB 9.5-1. and is, therefore, acceptable." The fire pump configuration, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Section 9.5.1.1 Letter ULNRC-00189 from Bryan (UE) to Rusche (NRC) dated April 15, 1977 / Section 9.5.1.1

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.5	Each pump and its driver and controls shall be separated from the remaining fire pumps and from the rest of the plant by rated fire barriers.	Complies	No Additional Clarification	Drawing 8600-X-88446, “Building Architectural Plan Fire Pumphouse Fire Protection System,” Rev. 3 / All
3.5.6	Fire pumps shall be provided with automatic start and manual stop only.	Complies	No Additional Clarification	Specification 4645-P23-1, "Technical Specification for Fire Pumps and Accessories," Rev. 5 / Sections 4.4, 5.1.14.1, 5.1.15 Vendor Manual 95211, "IM Fire Pump Protection System," Rev. 47, Tabs 0018 and 0025
3.5.7	Individual fire pump connections to the yard fire main loop shall be provided and separated with sectionalizing valves between connections.	Complies	No Additional Clarification	Drawing 8600-X-88441, “Piping Plan Fire Pumphouse Fire Protection System,” Rev. 15 / All
3.5.8	A method of automatic pressure maintenance of the fire protection water system shall be provided independent of the fire pumps.	Complies	No Additional Clarification	Vendor Manual 95211, "IM Fire Pump Protection System," Rev. 47 / Tab 0032 Drawing 8600-X-89637, “Piping & Instrumentation Diagram Pump PKC1003 & Air Compress. CKC1001 & Acc. TKC1002 Fire Protection System,” Rev. 10 / All

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.9	Means shall be provided to immediately notify the control room, or other suitable constantly attended location, of operation of fire pumps.	Complies	No Additional Clarification	FSAR SA, Section 9.5.1.2.3, Rev. OL-13 / Paragraphs 4 and 5 Specification 4645-P23-1, "Technical Specification for Fire Pumps and Accessories," Rev. 5 / Section 5.1.14
3.5.10	An underground yard fire main loop, designed and installed in accordance with NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances, shall be installed to furnish anticipated water requirements.	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 24 NFPA 24, "Standard for Outside Protection," 1973 Edition / All
3.5.11	Means shall be provided to isolate portions of the yard fire main loop for maintenance or repair without simultaneously shutting off the supply to both fixed fire suppression systems and fire hose stations provided for manual backup. Sprinkler systems and manual hose station standpipes shall be connected to the plant fire protection water main so that a single active failure or a crack to the water supply piping to these systems can be isolated so as not to impair both the primary and backup fire suppression systems.	Complies	No Additional Clarification	Drawing 8600-X-88448, “Fire Loop and Laterals,” Rev. 24 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.12	Threads compatible with those used by local fire departments shall be provided on all hydrants, hose couplings, and standpipe risers. Exception: Fire departments shall be permitted to be provided with adapters that allow interconnection between plant equipment and the fire department equipment if adequate training and procedures are provided.	Complies	No Additional Clarification	FSAR SP, Appendix 9.5A, Rev. OL-14 / Section E.2.(g) Specification M-656, "Hose Racks for Wet Standpipe System," Rev. 6 / Section 4.8 Specification 4645-P-023-008, "Technical Specification for Fire Hydrants - Fire Protection System," Rev. 3 / Section 5 Procedure FPP-ZZ-00012, "Fire Pre-Plan Off Site Support Organizations," Rev. 5 / Section 4.2

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.13	Headers fed from each end shall be permitted inside buildings to supply both sprinkler and standpipe systems, provided steel piping and fittings meeting the requirements of ANSI B31.1, Code for Power Piping, are used for the headers (up to and including the first valve) supplying the sprinkler systems where such headers are part of the seismically analyzed hose standpipe system. Where provided, such headers shall be considered an extension of the yard main system. Each sprinkler and standpipe system shall be equipped with an outside screw and yoke (OS&Y) gate valve or other approved shutoff valve.	Complies by Previous NRC Approval	Per Section 9.5.1.1 of NUREG-0830, "The automatic sprinkler systems and standpipe risers are connected to separate interior water supply headers. The interior headers are fed from each end through separate supply connections to the looped yard system with appropriate valves so that sections can be isolated to perform maintenance or to prevent a single break from impairing the entire distribution system. In addition, the header and divisional valve arrangement is such that no single failure can impair both the primary and backup fire protection systems protecting a single fire area. The water supply valves to the suppression systems are electrically supervised with alarms in the control room. In addition, the sprinkler systems have water flow alarms which alarm in the control room… "…the staff concludes that the sprinkler and standpipe systems are adequate, meet the guidelines of Appendix A, Sections C.3.a and C.3.d, and are, therefore, acceptable." The water supply system connections, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the	NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Section 9.5.1.1 Letter SLNRC 7-3 from Petrick (SNUPPS) to Rusche (NRC) dated April 1, 1977 / Attachment, Table 9.5-4, Sheet 26

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			basis for approval.	
3.5.14	All fire protection water supply and fire suppression system control valves shall be under a periodic inspection program and shall be supervised by one of the following methods. (a) Electrical supervision with audible and visual signals in the main control room or other suitable constantly attended location. (b) Locking valves in their normal position. Keys shall be made available only to authorized personnel. (c) Sealing valves in their normal positions. This option shall be utilized only where valves are located within fenced areas or under the direct control of the owner/operator.	Complies	No Additional Clarification	Procedure OSP-KC-00003, "Fire Suppression Water System Valve Cycling," Rev. 22 / Section 3.2 Note Procedure OSP-KC-00005, "Fire Suppression Water System Valve Position Verification," Rev. 13 / Section 3.3

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.15	Hydrants shall be installed approximately every 250 ft (76 m) apart on the yard main system. A hose house equipped with hose and combination nozzle and other auxiliary equipment specified in NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances, shall be provided at intervals of not more than 1000 ft (305 m) along the yard main system. Exception: Mobile means of providing hose and associated equipment, such as hose carts or trucks, shall be permitted in lieu of hose houses. Where provided, such mobile equipment shall be equivalent to the equipment supplied by three hose houses.	Complies with Clarification	The exception to this requirement is utilized at Callaway Plant by providing equipment on two mobile units.	Drawing 8600-X-88448, “Fire Loop and Laterals,” Rev. 24 / All CA2112, "Fire Brigade Equipment Inventory and Condition Checklist," dated 1/6/06 / All Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 24 NFPA 24, "Standard for Outside Protection," 1973 Edition / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.5.16	The fire protection water supply system shall be dedicated for fire protection use only. Exception No. 1: Fire protection water supply systems shall be permitted to be used to provide backup to nuclear safety systems, provided the fire protection water supply systems are designed and maintained to deliver the combined fire and nuclear safety flow demands for the duration specified by the applicable analysis. Exception No. 2: Fire protection water storage can be provided by plant systems serving other functions, provided the storage has a dedicated capacity capable of providing the maximum fire protection demand for the specified duration as determined in this section.	Submit for NRC Approval	NRC approval is being requested in Attachment L for the use of the fire protection water supply system for purposes other than fire protection.	None
3.6 Standpipe and Hose Stations	N/A	N/A	N/A – General statement; No technical requirements	N/A
3.6.1	For all power block buildings, Class III standpipe and hose systems shall be installed in accordance with NFPA 14, Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems.	Complies with Clarification	Standpipe and hose systems comply with NFPA 14–1976 Edition except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 14 NFPA 14, "Standard for the Installation of Standpipe and Hose Systems," 1976 Edition / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Per Section 7-2.3 of NFPA 14–1976 Edition, the valves in the main connection to automatic sources of water supply shall be open at all times. There are motor-operated valves that isolate the containment standpipes, which must be opened manually from the control room to allow water into the containment standpipe risers. Per Page 9.5B-225 of the attachment to SLNRC 81-050, “To protect the chloride sensitive piping and equipment from fire protection system leakage, the standpipes inside the reactor building are normally dry. Control room operator action is required to charge the standpipes. The probability of a fire occurrence is greater during refueling and maintenance operations. Personnel will, therefore, be available during these operations to take the necessary action in the event of a fire.” Per Page 9.5E-1 of the attachment to SLNRC 81-050, "Wet standpipes for power block fire hoses are designed in accordance with the requirements for Class II service of NFPA No. 14–1976. Hose racks are located so that no more than 100 feet separates adjacent hose racks. Access to permit functioning of the fire brigade is adequately discussed in Appendix 9.5B.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 14 NFPA 14, "Standard for the Installation of Standpipe and Hose Systems," 1976 Edition / Sections 7-2.3 and 7-2.4 Letter SLNRC 81-050 from Petrick (SNUPPS) to Denton (NRC) dated June 29, 1981 / Attachment, Pages 9.5B-225 and 9.5E-1 NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Section 9.5.1.6 NUREG-1058, "Technical Specifications Callaway Plant, Unit No. 1" / Section 4.7.10.4

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			"The standpipe system for the containment is supplied from the fire main loop through a safety-grade containment penetration. The containment standpipes are normally dry and may be charged by operator action at the control room. "Each hose rack is provided with 75 feet of 1-1/2-inch hose, except the diesel generator room which has 100 feet of hose." Per Page 29 of NUREG-0830, "Manual hose stations are located throughout the plant to ensure that an effective hose stream can be directed to any safety-related area in the plant. The standpipes are consistent with the requirements of NFPA 14, "Standard for the Installation of Standpipe and Hose Systems." Standpipes are 4- and 2-1/2-in. diameter pipe for multiple and single hose station supplies, respectively, Based on this evaluation, the staff concludes that the sprinkler and standpipe systems are adequate, meet the guidelines of Appendix A, Sections C.3.a and C.3.d, and are, therefore, acceptable." The standpipe and hose system, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other	

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			changes that would invalidate the basis for approval. Per Section 7-2.3 of NFPA 14–1976 Edition, the standpipe hose valves shall be frequently examined to see that they are tight. Per Section 7-2.4 of NFPA 14–1976 Edition, inspection shall be made frequently to assure that the hose is in proper position on the racks, and that all of the equipment is in place and in good condition; and the hose shall be removed and inspected and reracked at least annually. Per Section 4.7.10.4 of NUREG-1058, "Each of the fire hose stations given in Table 3.7-4 shall be demonstrated OPERABLE: a) at least once per 31 days, by a visual inspection of the fire hose stations accessible during plant operations to assure all required equipment is at the station; b) at least once per 18 months by: 1) Visual inspection of the stations not accessible during plant operations to assure all required equipment is at the station, 2) Removing the hose for inspection and reracking, and 3) Inspecting all gaskets and replacing any degraded gaskets in the couplings." Per Section 9.5.1.6 of NUREG-0830, "The applicant has committed to follow the staff Standard Technical Specifications.	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			The staff finds this acceptable." The standpipe and hose system testing frequencies, as approved in the referenced SER, are still the same as those which were approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	
		Submit for NRC Approval	Hose stations protecting the ESW pump house are fed by the ESW system, not the fire protection water system. The NRC approved the standpipe and hose system in NUREG-0830 but the approval did not specifically include this configuration. This approval is being clarified in Attachment T.	NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Section 9.5.1.6
3.6.2	A capability shall be provided to ensure an adequate water flow rate and nozzle pressure for all hose stations. This capability includes the provision of hose station pressure reducers where necessary for the safety of plant industrial fire brigade members and off-site fire department personnel.	Complies with Clarification	Standpipe and hose station water flow rate and pressure comply with the requirements of this section except as identified below.	Calculation M-KC-452, "Hose Station Adequacy," Rev. 0 / All Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 24, Code Section 4-4.2

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Submit for NRC Approval	Hose stations protecting the ESW pump house are fed by the ESW system, not the fire protection water system. The NRC approved the standpipe and hose system in NUREG-0830 but the approval did not specifically include this configuration. This approval is being clarified in Attachment T.	NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Section 9.5.1.6
3.6.3	The proper type of hose nozzle to be supplied to each power block area shall be based on the area fire hazards. The usual combination spray/straight stream nozzle shall not be used in areas where the straight stream can cause unacceptable damage or present an electrical hazard to fire-fighting personnel. Listed electrically safe fixed fog nozzles shall be provided at locations where high-voltage shock hazards exist. All hose nozzles shall have shutoff capability and be able to control water flow from full open to full closed.	Complies	No Additional Clarification	Drawing M-22KC01, "Piping and Instrumentation Diagram Fire Protection Turbine Building," Rev. 21 / Note 4 Specification 10466-M-656, "Hose Racks for Wet Standpipe System for the Standardized Nuclear Unit Power Plant System (SNUPPS)," Rev. 6 / Section 4.7

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.6.4	Provisions shall be made to supply water at least to standpipes and hose stations for manual fire suppression in all areas containing systems and components needed to perform the nuclear safety functions in the event of a safe shutdown earthquake (SSE).	Complies by Previous NRC Approval	Per Appendix 9.5C of the FSAR SP, by letter dated November 3, 1977, Item 10, the NRC requested SNUPPS to clarify their intent with regard to provisions for seismic standpipe design. SNUPPS responded via Letter SLNRC-78-0008, as stated in Section 9.5.1. Section 9.5.1.2.2.1 of FSAR SP states, "The hose stations and standpipes provided for the Callaway Plant are in accordance with the requirements of BTP 9.5-1, Appendix A for plants which received a construction permit before July 1, 1976 which does not require a Seismic Category I water system. It should be noted that portions of the fire water supply piping have been seismically designed to the requirements of Regulatory Position C.2 of Regulatory Guide 1.29 where their failure could affect safety-related equipment." Section 9.5.1.1 of NUREG-0830 states, "Manual hose stations are located throughout the plant to ensure that an effective stream can be directed to any safety-related area in the plant. The standpipes are consistent with the requirements of NFPA 14, "Standard for the Installation of Standpipe and Hose Systems." Standpipes are 4- and 2-1/2-in. diameter pipe for multiple and single hose station supplies,	FSAR SP, Section 9.5.1.2.2.1, Rev. OL-14f FSAR SP, Appendix 9.5C, Rev. OL-13 / Item 10 NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Section 9.5.1.1 Letter SLNRC 78-8 from Petrick (SNUPPS) to Case (NRC) dated May 3, 1978 / Attachment, Section 9.5.1.2.2.1

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			respectively, Based on this evaluation, the staff concludes that the sprinkler and standpipe systems are adequate, meet the guidelines and are, therefore acceptable." The standpipe and system, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	
3.6.5	Where the seismic required hose stations are cross-connected to essential seismic non-fire protection water supply systems, the fire flow shall not degrade the essential water system requirement.	N/A	There are no seismic required hose stations at Callaway Plant. See Compliance Basis for Section 3.6.4.	N/A
3.7 Fire Extinguishers	Where provided, fire extinguishers of the appropriate number, size, and type shall be provided in accordance with NFPA 10, Standard for Portable Fire Extinguishers. Extinguishers shall be permitted to be positioned outside of fire areas due to radiological conditions.	Complies with Clarification	Fire extinguishers comply with NFPA 10–1975 Edition except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 10 NFPA 10, "Standard for Portable Fire Extinguishers," 1975 Edition / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies with Use of EEEE's	RFR 201007840 justifies the acceptability of extinguishers located on moveable hand carts, extinguishers staged with their bases on the floor, and a number of extinguishers protecting the 1988' elevation of the Auxiliary Building that is less than the number required by NFPA 10.	RFR 201007840, "Fire Extinguisher Code Deviation Evaluation," Rev. 0 / All
3.8 Fire Alarm and Detection systems	N/A	N/A	N/A – General statement; No technical requirements	N/A
3.8.1 Fire Alarm	Alarm initiating devices shall be installed in accordance with NFPA 72, National Fire Alarm Code®. Alarm annunciation shall allow the proprietary alarm system to transmit fire-related alarms, supervisory signals, and trouble signals to the control room or other constantly attended location from which required notifications and response can be initiated. Personnel assigned to the proprietary alarm station shall be permitted to have other duties. The following fire-related signals shall be transmitted:	Complies with Clarification	The fire alarm system complies with NFPA 72D–1975 Edition except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72D NFPA 72D, "Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service," 1975 Edition / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Section 1232 of NFPA 72D–1975 Edition requires that tests be made at least every two months for transmitters and waterflow-actuated devices; semiannually for gate valve supervising switches, manual fire alarm boxes, tank water level devices, building and tank water temperature supervisory devices, and other sprinkler system supervisory devices; and monthly for all other initiating and transmitting devices (other than those reviewed per NFPA 72E). Section 3533 requires detection equipment to be inspected monthly and maintained. Per Section 4.3.3.7.1 of NUREG-1058, "Each of the above required fire detection instruments which are accessible during plant operation shall be demonstrated OPERABLE at least once per 6 months by performance of a TRIP ACTUATING DEVICE OPERATIONAL TEST. Fire detectors which are not accessible during plant operation shall be demonstrated OPERABLE by the performance of a TRIP ACTUATING DEVICE OPERATIONAL TEST during each COLD SHUTDOWN exceeding 24 hours unless performed in the previous 6 months." Per Section 4.3.3.7.2 of NUREG-1058, "The NFPA Standard 72D supervised circuits supervision associated with the detector	Letter SLNRC 84-0014 from Petrick (SNUPPS) to Denton (NRC) dated February 1, 1984 / Enclosure 10 NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Section 9.5.1.6 NUREG-1058, "Technical Specifications Callaway Plant, Unit No. 1" / Section 4.3.3.7.1 and 4.3.3.7.2 Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72D NFPA 72D, "Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service," 1975 Edition / Sections 1232, 2223, and 2231

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			alarms of each of the above required fire detection instruments shall be demonstrated OPERABLE at least once per 6 months." Per Section 9.5.1.6 of NUREG-0830, "The applicant has committed to follow the staff Standard Technical Specifications. The staff finds this acceptable." The fire detection system testing frequencies, as approved in the referenced SER, are still the same as those which were approved. There have been no plant modifications or other changes that would invalidate the basis for approval. Sections 2223 and 2231 of NFPA 72D–1975 Edition requires adequate secondary and remotely-located equipment power supplies. Page 9-3 of NUREG-0830 Supplement 3 states, "The SER states that the plant fire detection system is installed in accordance with NFPA 72D. During its site visit, the staff noted that the back-up power supply may not meet the recommendations of NFPA 72D. The applicant was unable to show compliance, and verbally agreed to prepare an analysis showing how the existing primary/back-up power supply circuitry compares to the requirements of NFPA 72D.	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			"By letter dated February 1, 1984, the applicant provided the comparison. The applicant's comparison indicated that the primary and secondary power supplies comply with the provision of NFPA 72D. In the event of loss of power to the remote panels, loss of automatic activation of some pre-action sprinklers would occur. Because the pre-action systems are continuously supervised, any loss of power would be alarmed in the control room. The Plant Technical Specifications would then require the establishment of a continuous fire watch. Because of the fire watch and the fact that the sprinkler systems remain operable manually, the staff finds this to be an acceptable deviation from its guidelines. On the basis of its review, the staff concludes that the fire detection system power supply is an acceptable deviation from its guidelines in Section C.6.a of BTP CMEB 9.5-1, and is, therefore, acceptable." The fire detection system power supplies, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.8.1(1)	Actuation of any fire detection device	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72D
3.8.1(2)	Actuation of any fixed fire suppression system	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72D
3.8.1(3)	Actuation of any manual fire alarm station	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72D
3.8.1(4)	Starting of any fire pump	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Sections 20 and 72D
3.8.1(5)	Actuation of any fire protection supervisory device	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72D
3.8.1(6)	Indication of alarm system trouble condition	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72D

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.8.1.1	Means shall be provided to allow a person observing a fire at any location in the plant to quickly and reliably communicate to the control room or other suitable constantly attended location.	Complies	No Additional Clarification	Procedure EIP-ZZ-00226, "Fire Response Procedure for Callaway Plant," Rev. 14 / Section 5.1 Safe Work Practices Manual (SWPM), Rev. 18, "Fire Prevention/Protection" Section, Section 1.a
3.8.1.2	Means shall be provided to promptly notify the following of any fire emergency in such a way as to allow them to determine an appropriate course of action:	N/A	N/A – General statement; No technical requirements	N/A
3.8.1.2(1)	General site population in all occupied areas	Complies	No Additional Clarification	Procedure OTN-QF-00001, "Emergency Communications," Rev. 7 / Section 5.3.1
3.8.1.2(2)	Members of the industrial fire brigade and other groups supporting fire emergency response	Complies	No Additional Clarification	Procedure EIP-ZZ-00226, "Fire Response Procedure for Callaway Plant," Rev. 14 / Section 5.2 Procedure OTN-QF-00001, "Emergency Communications," Rev. 7 / Section 5.3

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.8.1.2(3)	Off-site fire emergency response agencies. Two independent means shall be available (e.g., telephone and radio) for notification of off-site emergency services.	Complies	No Additional Clarification	Procedure OTN-QF-00001, "Emergency Communications," Rev. 7 / Section 5.7 EIP-ZZ-00201, "Notifications," Rev. 47 / Section 5.1.2
3.8.2 Detection	If automatic fire detection is required to meet the performance or deterministic requirements of Chapter 4, then these devices shall be installed in accordance with NFPA 72, National Fire Alarm Code, and its applicable appendixes.	Complies with Clarification	Required automatic fire detection systems are identified in Table 4-3. Those fire detection systems comply with NFPA 72E–1978 Edition except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72E NFPA 72E, "Standard on Automatic Fire Detectors," 1978 Edition / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Section 2-6.5 of NFPA 72E–1978 Edition requires that fire detectors shall be installed in all areas where required by the appropriate NFPA Standard or the AHJ. Per Page 9-4 of NUREG-0830 Supplement 3, “The SER states that ionization-type smoke detectors would be installed in all control room cabinets and consoles containing redundant equipment. During its site visit, the staff noted that smoke detectors are not provided for safety-related cabinets as stipulated by Section C.7.b of BTP CMEB 9.5-1. "By letter dated February 1, 1984, the applicant committed to provide detection in the control room cabinets containing redundant safe-shutdown equipment by fuel load. The staff finds this acceptable. "In the rear of the control room complex, smoke detection is provided at the ceiling level. During its site visits, the staff was concerned that because of the ceiling height, there could be a substantial time delay in detecting an incipient fire. "By letter dated February 1, 1984, the applicant committed to provide a duct detector in the control room HVAC exhaust duct by October 1, 1984. The duct detector will provide enhanced detection	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 72E NFPA 72E, "Standard on Automatic Fire Detectors," 1978 Edition / Section 2-6.5 Letter SLNRC 84-0014 from Petrick (SNUPPS) to Denton (NRC) dated February 1, 1984 / Enclosure 9 Letter SLNRC 84-0042 from Petrick (SNUPPS) to Denton (NRC) dated March 14, 1984 / Attachment, Tables 9.5B-3 and 9.5B-4 NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Pages 9-4 and 9-7 Drawing E-2F3501, "Fire Detection/Protection System Control Bldg., Diesel Gen. Bldg. & Comm. Corr.-EL. 2032'-0" & EL. 2047'-6"," / Rev. 10 / All

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			capability and will compensate for the lack of low level detectors, because the HVAC exhaust inlets are near the floor level. On the basis of these commitments, the staff finds that the detection for the control room will meet the guidelines in Section C.7.a of BTP CMEB 9.5-1, and is, therefore, acceptable." Commitments identified above were fulfilled as identified on Drawing E-2F3501. "Per Page 9-7 of NUREG-0830 Supplement 3, "FSAR Tables 9.5B-3 and 9.5B-4 list the plant areas where automatic suppression and detection systems are not provided throughout the fire area. "The in situ and potential transient fire hazards for these areas of the plant have been assessed against the requirements for automatic sprinkler protection stipulated in Section C.5.b of BTP CMEB 9.5-1. The fire hazards in most of these areas are minimal, and partial suppression and detection systems are provided in areas where potential fire hazards exist. "Because of these conditions and the availability of manual fire fighting equipment, the staff concludes that additional automatic sprinkler and detection systems are not necessary. The	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			existing fire protection provides reasonable assurance that one shutdown-related division will remain free of fire damage. The systems are, therefore, acceptable." The fire detection system, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	
		Complies with Use of EEEE's	RFR 201000502 justifies the acceptability of beam pockets throughout the plant that are not provided with fire detectors. FSAR change notice CN 94-30 justifies the acceptability of testing frequency for detection devices, which does not meet the requirements of NFPA 72E.	RFR 201000502, "Fire Detector Spacing Requirements" / All FSARCN 94-30, "Revise Table 9.5.1.2 to allow the use of a sampling plan for testing ionization detectors in safety-related areas in lieu of 100% testing as is currently performed." / All
3.9 Automatic and Manual Water-Based Fire Suppression Systems	N/A	N/A	N/A – General statement; No technical requirements	N/A

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.9.1	If an automatic or manual water-based fire suppression system is required to meet the performance or deterministic requirements of Chapter 4, then the system shall be installed in accordance with the appropriate NFPA standards including the following:	N/A	N/A – General statement; No technical requirements	N/A
3.9.1(1)	NFPA 13, Standard for the Installation of Sprinkler Systems	Complies with Clarification	Required sprinkler systems are identified in Table 4-3. Those sprinkler systems comply with NFPA 13–1976 or 1983 Editions except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Sections 13.1976 and 13.1983 NFPA 13, "Standard for the Installation of Sprinkler Systems," 1976 Edition / All NFPA 13, "Standard for the Installation of Sprinkler Systems," 1983 Edition / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	For the non-ceiling level sprinklers that were installed under obstructions at the request of the NRC, sprinkler deflectors are located greater than 18 inches below noncombustible roof decks. Per Section 9.5.1.1 of NUREG-0830 Supplement 3, "The SER states that the automatic sprinkler systems would be designed to the recommendations of National Fire Protection Association (NFPA) Standard 13. During its site visit, the staff noted that in some corridor areas (e.g., auxiliary building corridor, elevation 1974 feet, west side), the sprinkler heads are located at the ceiling and there are a large number of cable trays, conduits, pipes, and vent ducts beneath the sprinkler heads. These obstructions may render the sprinkler system ineffective against a floor-level exposure fire, and are not in accordance with NFPA 13, which is recommended by Section C.6.c of BTP CMEB 9.5-1. By letter dated February 24, 1984, the applicant committed to perform the following modifications by October 1984: (1) Additional sprinkler heads will be added in the auxiliary building on the 2000-foot elevation, west corridor (three-tray area), and the 2026-foot elevation, north end of east corridor, to protect against	Letter SLNRC 81-050 from Petrick (SNUPPS) to Denton (NRC) dated June 29, 1981 / Attachment, Page 9.5B-225 NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Page 33 NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Section 9.5.1.1 Letter SLNRC 84-0037 from Petrick (SNUPPS) to Denton (NRC) dated February 24, 1984 / All FSAR SP, Appendix 9.5B, Rev. OL-14b / Section A.8.4 Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 13.1976 NFPA 13, "Standard for the Installation of Sprinkler Systems," 1976 Edition / Sections 4-3.2.1 and 4-3.2.3

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			postulated fires in transient combustibles. (2) Sprinkler heads on the 1974-foot elevation of the auxiliary building west corridor that are partially obstructed by structural steel beams will be lowered to avoid spray obstructions. On the basis of this commitment, the staff concludes that the sprinkler system will meet the guidelines in Section C.6.c of BTP CMEB 9.5-1, and is therefore acceptable." Based on review of Section A.8.4 of FSAR SP Appendix 9.5B, this commitment has been implemented. The obstruction of sprinkler heads, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval. Per page 9.5B-225 of the attachment to SLNRC 81-050, “A fixed, manually charged, closed head sprinkler system is provided over the cable trays in Zones RB-3 and RB-4…A manual system is installed to prevent an inadvertent actuation of the sprinklers during	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			normal plant operation." Per Page 33 of NUREG-0830, "A fixed, manually charged closed head sprinkler system is provided over the two cable tray penetration areas…Based on its review, the staff conclude; that the fire protection for the containment meets the guidelines of Appendix A to BTP ASB 9.5-1 and is, therefore, acceptable." The manual sprinkler system protecting cable trays in Zones RB-3 and RB-4, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	
		Complies, with Required Action	See implementation item identified below.	CAR 200902315, "NFPA 805 Transition - Site Organizations Support Tracking CAR"

IMPLEMENTATION ITEMS:

11-805-091 The missing ceiling tiles in the suspended ceiling in fire compartments C-5 and C-6 will be replaced in order to ensure proper operation of sprinkler system SKC34, which is credited in the Fire PRA, in accordance with NFPA 13–1976 Edition. Configuration control on the ceiling tiles will be ensured.

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.9.1(2)	NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection	N/A	Automatic and manual water based suppression systems credited to meet the requirements of Chapter 4 are identified in Table 4-3. There are no Chapter 4 credited NFPA 15 systems.	N/A
3.9.1(3)	NFPA 750, Standard on Water Mist Fire Protection Systems	N/A	Water mist fire protection systems are not used at Callaway Plant.	N/A
3.9.1(4)	NFPA 16, Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems	N/A	Foam-water sprinkler and foam-water spray systems are not used at Callaway Plant.	N/A
3.9.2	Each system shall be equipped with a water flow alarm.	Complies	No Additional Clarification	Specification 4645-23A, "Technical Specification for Fire Protection System," Rev. 16 / Section 15B.4.9 Specification M-650, "Technical Specification for Sprinkler and Water Spray Systems," Rev. 4 / Section 1.4

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.9.3	All alarms from fire suppression systems shall annunciate in the control room or other suitable constantly attended location.	Complies with Clarification	M-22KC series drawings and Drawing J-1073-00052 identify that all waterflow alarms annunciate on panels that connect to KC008, which is located in the control room.	FSAR SP, Section 9.5.1.2.2.1, Rev. OL-14f / Paragraph 3 System Description 10466-M-00KC, "Fire Protection System Description," Rev. 4 / Section 3.1.3 Drawing J-1073-00059, "KC008 and KC365 4120 Addressable Network Fire Alarm System Graphic Command Center Arrangement Details," Rev. 3 / All Drawing M-22KC01, "P&ID, Fire Protection Turbine Building," Rev. 21 / All Drawing M-22KC02, "P&ID, Fire Protection System Sheet 2," Rev. 21 / All Drawing M-22KC03, "P&ID, Fire Protection System Sheet 3," Rev. 24 / All Drawing M-22KC05, "P&ID, Fire Protection System Sheet 5," Rev. 11 / All Drawing M-22KC08, "P&ID, Fire Protection Preaction Sprinkler System Sheet 8," Rev. 11 / All Drawing M-22KC09, "P&ID, Fire Protection System," Rev. 0 / All Drawing J-1073-00052, "KC324 4120 Addressable Network Fire Alarm Control Panel System Operation Matrix," Rev. 4 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.9.4	Diesel-driven fire pumps shall be protected by automatic sprinklers.	Complies	No Additional Clarification	Drawing 104255, “Sprinkler Piping Fire Pumphouse,” Rev. 4 / All
3.9.5	Each system shall be equipped with an OS&Y gate valve or other approved shutoff valve.	Complies	No Additional Clarification	Drawing 104255, “Sprinkler Piping Fire Pumphouse,” Rev. 4 / All Drawing M-22KC01, "P&ID, Fire Protection Turbine Building," Rev. 21 / All Drawing M-22KC02, "P&ID, Fire Protection System Sheet 2," Rev. 21 / All Drawing M-22KC03, "P&ID, Fire Protection System Sheet 3," Rev. 24 / All Drawing M-22KC05, "P&ID, Fire Protection System Sheet 5," Rev. 11 / All Drawing M-22KC08, "P&ID, Fire Protection Preaction Sprinkler System Sheet 8," Rev. 11 / All Drawing M-22KC09, "P&ID, Fire Protection System," Rev. 0 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.9.6	All valves controlling water-based fire suppression systems required to meet the performance or deterministic requirements of Chapter 4 shall be supervised as described in 3.5.14.	Complies	No Additional Clarification	Drawing 104255, “Sprinkler Piping Fire Pumphouse,” Rev. 4 / All Drawing M-22KC01, "P&ID, Fire Protection Turbine Building," Rev. 21 / All Drawing M-22KC02, "P&ID, Fire Protection System Sheet 2," Rev. 21 / All Drawing M-22KC03, "P&ID, Fire Protection System Sheet 3," Rev. 24 / All Drawing M-22KC05, "P&ID, Fire Protection System Sheet 5," Rev. 11 / All Drawing M-22KC08, "P&ID, Fire Protection Preaction Sprinkler System Sheet 8," Rev. 11 / All Drawing M-22KC09, "P&ID, Fire Protection System," Rev. 0 / All
3.10 Gaseous Fire Suppression Systems	N/A	N/A	N/A – General statement; No technical requirements	N/A

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.10.1	If an automatic total flooding and local application gaseous fire suppression system is required to meet the performance or deterministic requirements of Chapter 4, then the system shall be designed and installed in accordance with the following applicable NFPA codes:	N/A	N/A – General statement; No technical requirements	N/A
3.10.1(1)	NFPA 12, Standard on Carbon Dioxide Extinguishing Systems	N/A	Carbon dioxide extinguishing systems are not used in the Power Block.	N/A
3.10.1(2)	NFPA 12A, Standard on Halon 1301 Fire Extinguishing Systems	Complies with Clarification	Required halon suppression systems are identified in Table 4-3. Those halon suppression systems comply with NFPA 12A–1973 Edition except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 12A NFPA 12A, "Standard on Halogenated Fire Extinguishing Agent Systems–Halon 1301," 1973 Edition / All

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Section 2431 of NFPA 12A–1973 Edition requires halon concentrations to be satisfactory to the authority having jurisdiction. Per sections A.17.4, A.18.4, A.27.24, C.9.4, C.10.4, C.15.4, C.16.4, and CC.1.4 of the attachment to SLNRC 81-050, for all halon suppression systems except that protecting the Control Room Cable Chase, "The Halon 1301 system…is capable of attaining a 5-10 percent concentration within 10 seconds from the system actuation signal. The system is designed to maintain at least a 5-percent concentration at the level of the highest combustible for a soak time of 10 minutes. An actuation station is provided to discharge the system manually. An activation by any method will sound a local alarm, close all ventilation dampers, shut off associated ventilation and/or air-conditioning fan motors, and discharge the system after an adequate time delay for evacuation ." Per Page 29 of NUREG-0830, "A Halon total flooding system is used as the primary extinguishing agent in the ESF switchgear rooms, nonvital switchgear and transformer rooms, and switchgear rooms. The system is designed to produce a 5- to 10-percent Halon concentration with a soaking time of 10 min. The system is activated	Letter SLNRC 81-050 from Petrick (SNUPPS) to Denton (NRC) dated June 29, 1981 / Attachment, Sections A.17.4, A.18.4, A.27.24, C.9.4, C.10.4, C.15.4, C.16.4, and CC.1.4 NUREG-0830, "Safety Evaluation Report Related to the Operation of Callaway Plant, Unit No. 1," dated October 1981 / Page 29 Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 12A NFPA 12A, "Standard on Halogenated Fire Extinguishing Agent Systems–Halon 1301," 1973 Edition / Section 2431

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			by cross-zoned ionization detectors. The concentration and soak time are adequate to extinguish potential fires in these areas. "The Halon suppression system is installed in accordance with the requirements of NFPA 12A, 'Standard on Halogenated Fire Extinguishing Agent Systems - Halon 1301.' "The staff has reviewed the concentration, soak times, and design criteria for the Halon fire suppression system. Based on this evaluation, the staff concludes that the gaseous fire suppression systems are adequate, meet the guidelines of Appendix A to BTP ASB 9.5-1, and are in accordance with the applicable portions of NFPA Standard 12A. They are, therefore, acceptable." The halon system concentration, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.10.1(3)	NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems	N/A	Clean agent fire extinguishing systems are not used at Callaway Plant.	N/A
3.10.2	Operation of gaseous fire suppression systems shall annunciate and alarm in the control room or other constantly attended location identified.	Complies with Clarification	M-22KC series drawings identify that all system actuation alarms annunciate on panels that connect to KC008, which is located in the control room.	Drawing M-22KC04, "Fire Protection Halon System P&ID Sheet 4," Rev. 7 / All Drawing M-22KC06, "Fire Protection Halon System P&ID Sheet 6," Rev. 3 Drawing M-22KC04, "Fire Protection Halon System P&ID Sheet 7," Rev. 7 / All Drawing J-1073-00059, "KC008 and KC365 4120 Addressable Network Fire Alarm System Graphic Command Center Arrangement Details," Rev. 3 / All
3.10.3	Ventilation system design shall take into account prevention from over-pressurization during agent injection, adequate sealing to prevent loss of agent, and confinement of radioactive contaminants.	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 12A Calculation KC-43, "NFPA 805 Code Comparison," Rev. 0 / Attachment 4

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.10.4	In any area required to be protected by both primary and backup gaseous fire suppression systems, a single active failure or a crack in any pipe in the fire suppression system shall not impair both the primary and backup fire suppression capability.	N/A	Callaway Plant does not have any areas required to be protected by both primary and backup gaseous fire suppression systems.	Specification 10466-M-658, “Halogenated Agent Extinguishing System,” Rev. 7 / Section 5.3
3.10.5	Provisions for locally disarming automatic gaseous suppression systems shall be secured and under strict administrative control.	Complies	No Additional Clarification	Procedure APA-ZZ-00701, "Control of Fire Protection Impairments," Rev. 18 / All
3.10.6	Total flooding carbon dioxide systems shall not be used in normally occupied areas.	N/A	Carbon dioxide extinguishing systems are not used in the Power Block.	N/A
3.10.7	Automatic total flooding carbon dioxide systems shall be equipped with an audible pre-discharge alarm and discharge delay sufficient to permit egress of personnel. The carbon dioxide system shall be provided with an odorizer.	N/A	Carbon dioxide extinguishing systems are not used in the Power Block.	N/A

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.10.8	Positive mechanical means shall be provided to lock out total flooding carbon dioxide systems during work in the protected space.	N/A	Carbon dioxide extinguishing systems are not used in the Power Block.	N/A
3.10.9	The possibility of secondary thermal shock (cooling) damage shall be considered during the design of any gaseous fire suppression system, but particularly with carbon dioxide.	Complies with Clarification	Halon 1301 does not present a risk of secondary thermal shock. Per Page 4-125 of the SFPE Handbook of Fire Protection Engineering, Halon 1301 is "…stored as a liquid under pressure and released at normal room temperature as a vapor…"	SFPE Handbook of Fire Protection Engineering, Second Edition / Page 4-125

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.10.10	Particular attention shall be given to corrosive characteristics of agent decomposition products on safety systems.	Complies with Clarification	Halon decomposition products do not have any corrosive characteristics that have an effect on safety systems. Per Page 17-94 of the Fire Protection Handbook, "In 1972, following extensive testing by several major companies on the effects of Halon 1301 decomposition products on electrical equipment, the NFPA Committee on Electronic Computer/Data Processing Equipment recognized Halon 1301 total flooding systems as suitable for protection of electronic computer/data processing equipment." Per Page 4-125 of the SFPE Handbook of Fire Protection Engineering, "Areas…where damage to equipment or materials…must be minimized are also ideally protected by this agent…Halon 1301 gets into blocked and baffled spaces readily and leaves no corrosive or abrasive residue after use…"	Fire Protection Handbook, 20th Edition / Page 17-94 SFPE Handbook of Fire Protection Engineering, Second Edition / Page 4-125

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.11 Passive fire Protection Features	This section shall be used to determine the design and installation requirements for passive protection features. Passive fire protection features include wall, ceiling, and floor assemblies, fire doors, fire dampers, and through fire barrier penetration seals. Passive fire protection features also include electrical raceway fire barrier systems (ERFBS) that are provided to protect cables and electrical components and equipment from the effects of fire.	N/A	N/A – General statement; No technical requirements	N/A

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.11.1 Building Separation	Each major building within the power block shall be separated from the others by barriers having a designated fire resistance rating of 3 hours or by open space of at least 50 ft (15.2 m) or space that meets the requirements of NFPA 80A, Recommended Practice for Protection of Buildings from Exterior Fire Exposures. Exception: Where a performance-based analysis determines the adequacy of building separation, the requirements of 3.11.1 shall not apply.	Complies with Clarification	Site walkdown and review of Drawing 8600-X-88100 identifies that the ESW Pump House and UHS Cooling Towers are the only power block structures that are separated from all of the other "in-scope" power block structures by at least 50 ft of open space. The separation between the remaining buildings that make up the power block is discussed below: AUXILIARY BUILDING: The Auxiliary Building is adjacent to the Control, Fuel, Reactor, and Turbine/Communications Corridor Buildings, and the Auxiliary Boiler Room. The Auxiliary Building is separated from all of these adjacent buildings by 3-hour rated barriers. Penetrations have rated protection or are discussed within individual FSA's and identified in the other 3.11.1 compliance bases below. AUXILIARY BOILER ROOM: The Auxiliary Boiler Room is adjacent to the Auxiliary and Turbine Buildings, and less than 50 ft from the Reactor Building. The Auxiliary Boiler Room is separated from adjacent buildings and from the Reactor Building by 3-hour rated barriers. Penetrations have rated protection. CONTROL BUILDING:	NFPA 80A, "Recommended Practice for Protection of Buildings from Exterior Fire Exposures," 1996 Edition Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 80A Request for Resolution (RFR) 201100372, “NFPA-805 Plant Partitioning Task Walkdown Notes” / All

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			The Control Building is adjacent to the Auxiliary, Diesel Generator, and Turbine/Communications Corridor Buildings. The Control Building is separated from all of these adjacent buildings by 3-hour rated barriers. Penetrations have rated protection or are discussed within individual FSA's and identified in the other 3.11.1 compliance bases below. DIESEL GENERATOR BUILDING: The Diesel Generator Building is adjacent to the Control and Auxiliary Buildings. The Diesel Generator Building is separated from these adjacent buildings by 3-hour rated barriers. Penetrations have rated protection or are discussed within individual FSA's and identified in the other 3.11.1 compliance bases below. FUEL BUILDING: The Fuel Building is adjacent to the Reactor and Auxiliary Buildings, and less than 50 ft from the Radwaste Building. The Fuel Building is separated from adjacent buildings by 3-hour rated barriers. Penetrations in these barriers have rated protection or are discussed within individual FSA's and identified in the other 3.11.1 compliance bases below. The separation between the Fuel and Radwaste Buildings meets the requirements of NFPA 80A as documented in Calculation KC-27.	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			RADWASTE BUILDING: The Radwaste Building is less than 50 feet from the Fuel Building and greater than 50 feet from remaining power block structures. The separation between the Radwaste and Fuel Buildings meets the requirements of NFPA 80A as documented in Calculation KC-27. REACTOR BUILDING: The Reactor Building is adjacent to the Auxiliary and Fuel Buildings, and less than 50 ft from the Auxiliary Boiler Room. The Reactor Building is separated from adjacent buildings and from the Auxiliary Boiler Room by 3-hour rated barriers. Penetrations have rated protection or are discussed within individual FSA's and identified in the other 3.11.1 compliance bases below. TURBINE BUILDING: The Turbine Building/Communications Corridor is adjacent to the Auxiliary and Control Buildings and the Auxiliary Boiler Room. The Turbine Building/Communications Corridor is separated from these adjacent buildings by 3-hour rated barriers. Penetrations have rated protection or are discussed within individual FSA's and identified in the other 3.11.1 compliance bases below.	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			The exception to this requirement is utilized for the configurations identified in the other 2.11.1 compliance bases below.	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	A non-rated watertight door is installed in the barrier separating the Control and Auxiliary Buildings. Non-rated missile doors are installed in barriers separating the Auxiliary and Turbine Buildings, and the Control and Turbine Buildings. Per Section 9.5.1.2 of NUREG-0830 Supplement 3, "Where safe shutdown equipment is enclosed by a fire barrier, all walls, ceilings, floors, and associated penetrations that enclose the equipment have a minimum fire rating of 3 hours with the following exceptions: 1-1/2 hour elevator doors, pressure, watertight, and missile-resistant doors, and equipment hatches in the auxiliary building. For fire areas that do not have a 3-hour-fire-rated assembly because of the installation of these doors, each area was evaluated with respect to its fuel load, fire suppression and detection systems, and proximity to safe shutdown equipment to determine if the fire-rated assemblies provided are adequate for the areas affected and meet the guidelines in Section D.1.j of Appendix A to BTP ASB 9.5-1. On the basis of this evaluation, the staff finds the above fire barriers for these areas acceptable." The non-rated watertight and missile doors, as approved in the referenced SER, are still in the same configuration as that which	Letter SLNRC 84-0042 from Petrick (SNUPPS) to Denton (NRC) dated March 14, 1984 / Attachment, Section 9.5.1.2.2.3 NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Section 9.5.1.2 and Page 9-6

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			was approved. There have been no plant modifications or other changes that would invalidate the basis for approval. Unprotected penetrations exist in walls separating the Reactor Building and the Auxiliary and Fuel Buildings. Per Page 9-6 of NUREG-0830 Supplement 3, "The reactor containment walls are penetrated by numerous mechanical and electrical penetrations, as well as by a personnel hatch and a fuel transfer tube. "The containment wall is 4-foot-thick reinforced concrete with a continuous 1/4-inch-thick steel liner. The construction is capable of withstanding a 60-psig overpressure without failure. "Because of the construction of the containment wall and the special nuclear safety-related purposes these penetrations serve, the staff considers that they provide a level of safety equivalent to the technical requirements of Section C.5.b of BTP CMEB 9.5-1." These unprotected penetrations, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			changes that would invalidate the basis for approval. This approval is being clarified in Attachment T of the LAR to include penetrations between the Reactor Building and the yard.	
		Complies with Use of EEEE's	RFR 200906325 justifies the acceptability of non-rated configurations in the barrier separating the Auxiliary and Turbine Buildings. RFR 200906327 justifies the acceptability of differences between the configuration of the TDAFP Room blowout panel (between the Auxiliary and Turbine Buildings) and UL tested configuration. RFR 200906330 justifies the acceptability of conduits that penetrate the frame of Door DSK33021 between the Control and Diesel Generator Buildings.	RFR 200906325, "Rewrite RFR 19355A and 9348A to meet new NRC expectations" / Attachment P1843-FPEEE-005, "Auxiliary/Turbine Building Wall Barrier Evaluation which Separates Fire Area A-23 and Fire Area T-2 with Non Rated Configurations," Rev. 0 RFR 200906327, "Rewrite RFR 21138A to meet new NRC expectations" / Attachment P1843-FPEEE-007, "Evaluate Fire Resistance Capability of the TDAFP Room Blowout Panel," Rev. 1 RFR 200906330, "Rewrite RFR 22280A to meet new NRC expectations" / Attachment P1843-FPEEE-012, "Fire Door Issues Resolution," Rev. 0

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.11.2 Fire Barriers	Fire barriers required by Chapter 4 shall include a specific fire-resistance rating. Fire barriers shall be designed and installed to meet the specific fire resistance rating using assemblies qualified by fire tests. The qualification fire tests shall be in accordance with NFPA 251, Standard Methods of Tests of Fire Endurance of Building Construction and Materials, or ASTM E 119, Standard Test Methods for Fire Tests of Building Construction and Materials.	Complies with Clarification	Per FSAR SP Section 9.5.1.2.2.3, fire barrier walls, floors, and ceilings are provided as indicated necessary by the results of the fire hazards analysis, Appendix 9.5B. The fire barrier ratings and locations are indicated in Figure 9.5.1-2 of the FSAR. The design, construction, test method, and acceptance criteria for the fire barriers and related items are as follows: a. Fire Rated Barriers - Per applicable sections (determined by construction type) of ASTM E-119, UL standards, and state building codes. Procedure QSP-ZZ-65046, "Fire Barrier Inspection," provides instructions for the visual inspection of fire barriers which separate safety-related areas (walls, floor slabs, ceilings) and fire barriers which separate portions of redundant systems important to safe shutdown within a fire area. Except as identified below, fire barriers are of reinforced concrete or masonry block with a minimum fire rating of 3 hours. Structural columns supporting the barriers are steel beams with 3-hour rated structural steel fire proofing.	FSAR SP, Section 9.5.1.2.2.3, Rev. OL-14f Procedure QSP-ZZ-65046, "Fire Barrier Inspection," Rev. 9 / All NFPA 251, "Standard Methods of Tests of Fire Endurance of Building Construction and Materials," 1999 Edition / All Drawing A-2916, "Architectural Finish Schedule," Rev. 4 / All Drawing A-2917, "Architectural Finish Schedule," Rev. 5 / All Drawing A-2918, "Architectural Finish Schedule," Rev. 5 / All Drawing A-2919 "Architectural Finish Schedule," Rev. 1 / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies with Use of EEEE's	RFR 17928A justifies the acceptability of use of Dura-spray fire proofing as a 3-hour rated fire barrier on structural steel. RFR200503420 justifies the acceptability of the thickness of the structural steel fireproofing on Column Line A5-AN in Room 1501, which is less than the minimum thickness required by the installation procedure. MP 05-3059 justifies the acceptability of the cable trench in the floor of the Control Room, which does not conform to ASTM E 119 temperature rating requirements. RFR 201009031 justifies the acceptability of auxiliary steel members that were not protected and represent thermal shorts.	RFR 17928A, "Evaluate Structural Steel for 3-hr Fire Barrier" / All RFR 200503420, "Structural Steel Fireproofing Minimum Thickness" / All MP 05-3059, "Fire Barrier Evaluation - Cable Trench in Control Room Floor" / All RFR 201009031, "Evaluate Structural Steel Thermal Shorts from Wolf Creek OE" / All

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.11.3 Fire Barrier Penetrations	Penetrations in fire barriers shall be provided with listed fire-rated door assemblies or listed rated fire dampers having a fire resistance rating consistent with the designated fire resistance rating of the barrier as determined by the performance requirements established by Chapter 4. (See 3.11.3.4 for penetration seals for through penetration fire stops.) Passive fire protection devices such as doors and dampers shall conform with the following NFPA standards, as applicable: Exception: Where fire area boundaries are not wall-to-wall, floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, a performance-based analysis shall be required to assess the adequacy of fire barrier forming the fire boundary to determine if the barrier will withstand the fire effects of the hazards in the area. Openings in fire barriers shall be permitted to be protected by other means as acceptable to the AHJ.	Complies by Previous NRC Approval	Per Page 9-6 of NUREG-0830 Supplement 3, "The auxiliary building is provided with two sets of equipment hatchways in the northern and southern ends of the auxiliary building corridors. A monorail hoist serves each set of hatchways to allow equipment to be moved from one location to another. Steel hatch covers and automatic sprinkler water curtains are provided for each hatchway at elevations 2000 feet-0 inches, 2026 feet-0 inches, and 2047 feet-0 inches to separate the corridor fire areas. "At elevation 2000 feet-0 inches in the center of the auxiliary building, two adjacent hatchways are provided above the residual heat removal and containment spray valve encapsulation tanks located on elevation 1988 feet-0 inches. These two hatchways are covered with a 3-hour-rated material. "Because of the low fuel loading and configuration of equipment in these areas, the staff finds that the water curtains and steel covers provide a level of safety equivalent to the technical requirements of Section C.5.b of BTP CMEB 9.5-1." The Auxiliary Building hatchways, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no	NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Pages 9-6 and 9-7 Letter SLNRC 81-050 from Petrick (SNUPPS) to Denton (NRC) dated June 29, 1981 / Page 9.5B-8, 9.5B-10, 9.5B-34, 9.5B-36, 9.5B-61, 9.5B-62, and 9.5B-73, 9.5B-211 Letter SLNRC 84-0042 from Petrick (SNUPPS) to Denton (NRC) dated March 14, 1984 / Attachment, Pages 9.5.1-17 through 9.5.1-19 Procedure QSP-ZZ-65046, "Fire Barrier Inspection," Rev. 11 / Attachments 1 and 2

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			plant modifications or other changes that would invalidate the basis for approval. Per Page 9-6 of NUREG-0830 Supplement 3, "The reactor containment walls are penetrated by numerous mechanical and electrical penetrations, as well as by a personnel hatch and a fuel transfer tube. "The containment wall is 4-foot-thick reinforced concrete with a continuous 1/4-inch-thick steel liner. The construction is capable of withstanding a 60-psig overpressure without failure. "Because of the construction of the containment wall and the special nuclear safety-related purposes these penetrations serve, the staff considers that they provide a level of safety equivalent to the technical requirements of Section C.5.b of BTP CMEB 9.5-1." The reactor containment wall penetrations, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval. Per Page 9-7 of NUREG-0830	

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NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			Supplement 3, "In the fuel building Fire Area F-2, the floor is on grade, with the exception of a small pipe trench that opens into the room and connects with the radwaste tunnel. The trench opening in this room is closed by a heavy steel cover plate approximately 4 feet x 8 feet. Combustibles in this area are separated by more than 50 feet. Because of the separation distance and low combustible loading, the staff finds the level of protection acceptable." The pipe trench in the Fuel Building, as approved in the referenced SER, is still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval. Per Page 9-7 of NUREG-0830 Supplement 3, "This fire area (Fire Area 23) is separated from all adjoining areas and buildings by 3-hour-rate fire barriers. The fire area is divided into two compartments by a 2-foot-thick concrete wall. A 9-foot x 24-foot vent opening is located in the ceiling of each compartment. The barrier wall between the two compartments has a 27-foot-wide x 23-foot-high vent opening located approximately 34 feet	

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			above the floor. These vent openings are required to prevent overpressurization of the compartment in the event of a postulated break of main steam piping. Because of the vent opening, the barrier wall cannot be fire rated. "All other penetrations through the fire barriers are fitted with 3-hour-rated penetration seals. Three-hour-rated fire dampers are installed in all HVAC ducts penetrating the fire barriers. "Because of the low combustible loading and configuration of valves in this area, the staff finds this level of protection acceptable." The unprotected vent openings, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	

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		Complies with Use of EEEE's	RFR 200906321 justifies the acceptability of a removable checker plate cover as a seal for a floor penetration. RFR 200906322 justifies the acceptability of removal of Thermo-Lag from hatch covers and cable tray fire stops. RFR 200906325 justifies the acceptability of non-rated configurations in the barrier separating Fire Areas A-23 and TB. RFR 200906327 justifies the acceptability of differences between the configuration of the TDAFP Room blowout panel and UL tested configuration.	RFR 200906321, "Fire Protection Penetration 0P14151028, Non-Rated Checker Plate Cover Configuration" RFR 200906322, "Evaluation of the Hatch Cover Configurations and a Cable Tray Fire Stop Configuration where Thermolag Was Removed" RFR 200906325, "Auxiliary/Turbine Building Wall Barrier Evaluation which Separates Fire Area A-23 and Fire Area T-2 with Non Rated Configurations" / All RFR 200906327, "Evaluate Fire Resistance Capability of the TDAFP Room Blowout Panel" / All
3.11.3(1)	NFPA 80, Standard for Fire Doors and Fire Windows	Complies with Clarification	Fire doors comply with NFPA 80–1977 Edition except as identified below.	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 80 NFPA 80, "Standard for Fire Doors and Windows," 1977 Edition / All

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Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Per Section 9.5.1.2 of NUREG-0830 Supplement 3, "Where safe shutdown equipment is enclosed by a fire barrier, all walls, ceilings, floors, and associated penetrations that enclose the equipment have a minimum fire rating of 3 hours with the following exceptions: 1-1/2 hour elevator doors, pressure, watertight, and missile-resistant doors, and equipment hatches in the auxiliary building. For fire areas that do not have a 3-hour-fire-rated assembly because of the installation of these doors, each area was evaluated with respect to its fuel load, fire suppression and detection systems, and proximity to safe shutdown equipment to determine if the fire-rated assemblies provided are adequate for the areas affected and meet the guidelines in Section D.1.j of Appendix A to BTP ASB 9.5-1. On the basis of this evaluation, the staff finds the above fire barriers for these areas acceptable." The 1-1/2 hour elevator, pressure, watertight, and missile resistant doors, and equipment hatches, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Section 9.5.1.2 Letter SLNRC 84-0042 from Petrick (SNUPPS) to Denton (NRC) dated March 14, 1984 / Attachment, Section 9.5.1.2.2.3

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies with Use of EEEE's	RFR 19347A justifies the acceptability of holding the Control Room Pantry door in the open position even though it separates two fire areas. RFR 200906330 justifies the acceptability of several fire door noncompliances throughout the plant, including conduit penetrations through door frames, and excessive fire door gap clearances.	RFR 200906330, "Fire Door Issues Resolution" / All RFR 19347A, "Verify Fire Doors to be Locked and Inspected" / All
		Complies, with Required Action	See implementation items identified below.	Procedure SDP-KC-00002, "Fire Door Position Verification," Rev. 8 / All OSP-KC-00015, "Fire Door Inspections," Rev. 13 CAR 201101832, "Track Implementation Items for NFPA-805 Project" / All

IMPLEMENTATION ITEMS:

11-080-007	The scope of Procedure SDP-KC-00002, "Fire Door Position Verification," will be revised to include all doors credited to meet the requirements of NFPA 805.
11-080-008	The scope of Procedure OSP-KC-00015, "Fire Door Inspections," will be revised to include all doors credited to meet the requirements of NFPA 805.

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.11.3(2)	NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems	Complies	No Additional Clarification	Calculation KC-27, "NFPA Code Conformance Review," Rev. 0 / Appendix A, Section 90A NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," 1976 Edition / All
3.11.3(3)	NFPA 101, Life Safety Code	Complies with Clarification	The requirements of NFPA 101 applicable to fire doors and fire dampers are bound by NFPA 80 and NFPA 90A. NFPA 101 section 8.2.3.2.1 refers to NFPA 80 and NFPA 101 section 9.2.1 refers to NFPA 90A.	NFPA 101, "Life Safety Code®," 2000 Edition / Sections 8.2.3.2.1 and 9.2.1
3.11.4 Through Penetration Fire Stops	Through penetration fire stops for penetrations such as pipes, conduits, bus ducts, cables, wires, pneumatic tubes and ducts, and similar building service equipment that pass through fire barriers shall be protected as follows.	N/A	N/A – General statement; No technical requirements	N/A

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.11.4(a)	The annular space between the penetrating item and the through opening in the fire barrier shall be filled with a qualified fire-resistive penetration seal assembly capable of maintaining the fire resistance of the fire barrier. The assembly shall be qualified by tests in accordance with a fire test protocol acceptable to the AHJ or be protected by a listed fire-rated device for the specified fire-resistive period.	Complies with Clarification	Fire barrier penetration seals comply with the requirements of this section except as identified below.	FSAR SA, Section 9.5, Rev. OL-13 FSAR SP, Section 9.5.1.2.2.3(b), Rev. OL-14f

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies by Previous NRC Approval	Per Section 9.5.1.2 of NUREG-0830 Supplement 3, "The applicant has agreed to provide 3-hour-approved designs for all fire penetration seals used in the penetration cable trays, conduits, and piping which pass the penetration qualification tests including, the time-temperature exposure fire curve specified by ASTM E-119, "Fire Test of building Construction and materials," of the American Society for Testing and Materials (ASTM). "By letter dated February 1, 1984, the applicant stated that the acceptance criterion for the penetration qualification test was in excess of the 325°F maximum temperature permitted on the unexposed side by ASTM E-119. The applicant stated that the acceptance criterion used was a maximum temperature rise on the unexposed surface of the fire stop of 325 °F above ambient. In addition, at no time during the test period did any visible flaming occur on the unexposed side of the test assembly, and no openings developed that permitted the hose stream test to penetrate the seals. "Although the penetration seals do not meet the specific ASTM E-119 temperature rise limitations, the test results showed that fire would not spread to the unexposed side	Letter SLNRC 84-0014 from Petrick (SNUPPS) to Denton (NRC) dated February 1, 1984 / Enclosure 8 NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No. 1," Supplement 3, dated May 1984 / Section 9.5.1.2

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			of a protected fire barrier during a 3-hour test period. Few if any areas in the plant contain a 3-hour combustible loading. Therefore, the staff has reasonable assurance that the integrity and temperature transmission through the penetration assembly will not affect the capability to achieve and maintain safe shutdown considering the effects of fire involving fixed and potential transient combustible in the plant. " "…On the basis of its evaluation, the staff concludes that the protection provided for fire barriers and fire barrier penetrations is an acceptable deviation from the guidelines in Section C.5 of BTP CMEB 9.5-1, and is, therefore, acceptable." The fire penetration seals, as approved in the referenced SER, are still in the same configuration as that which was approved. There have been no plant modifications or other changes that would invalidate the basis for approval.	

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
		Complies with Use of EEEE's	RFR 17935A justifies the acceptability of penetration seals in the Upper Cable Spreading Room that are not consistent with typical configurations or penetration seal qualification test reports. RFR 20696A justifies the acceptability of flexible fire barrier penetration seals using rolled fiber blankets.	RFR 17935A, "Evaluate Fire Barrier Penetrations in 8" Slab" / All RFR 20696A, "Evaluate Fire Barrier Pen Seal Test of FB-3 Seal" / All
3.11.4(b)	Conduits shall be provided with an internal fire seal that has an equivalent fire-resistive rating to that of the fire barrier through opening fire stop and shall be permitted to be installed on either side of the barrier in a location that is as close to the barrier as possible. Exception: Openings inside conduit 4 in. (10.2 cm) or less in diameter shall be sealed at the fire barrier with a fire-rated internal seal unless the conduit extends greater than 5 ft (1.5 m) on each side of the fire barrier. In this case the conduit opening shall be provided with noncombustible material to prevent the passage of smoke and hot gases. The fill depth of the material packed to a depth of 2 in. (5.1 cm) shall constitute an acceptable smoke and hot gas seal in this application.	Complies	No Additional Clarification	Specification 10466-M-663, "Technical Specification for Furnishing and Field Installation of Penetration Closures for the Standardized Nuclear Unit Power Plant System," Rev. 5 / All Drawing M-2Y003, "Conduit Fire Stop / Smoke & Gas Seal," Rev. 0 / All M-663-00017, "Penetration Seal Typical Details," Rev. 19 / Section 3.5

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.11.5 Electrical Raceway Fire Barrier Systems (ERFBS)	ERFBS required by Chapter 4 shall be capable of resisting the fire effects of the hazards in the area. ERFBS shall be tested in accordance with and shall meet the acceptance criteria of NRC Generic Letter 86-10, Supplement 1, “Fire Endurance Test Acceptance Criteria for Fire Barrier Systems Used to Separate Safe Shutdown Trains Within the Same Fire Area.” The ERFBS needs to adequately address the design requirements and limitations of supports and intervening items and their impact on the fire barrier system rating. The fire barrier system’s ability to maintain the required nuclear safety circuits free of fire damage for a specific thermal exposure, barrier design, raceway size and type, cable size, fill, and type shall be demonstrated. Exception No. 1: When the temperatures inside the fire barrier system exceed the maximum temperature allowed by the acceptance criteria of Generic Letter 86-10, “Fire Endurance Acceptance Test Criteria for Fire Barrier Systems Used to Separate Redundant Safe Shutdown Training Within the Same Fire Area,” Supplement 1, functionality of the cable at these elevated temperatures shall be demonstrated. Qualification demonstration of these cables shall be performed in accordance with the electrical testing requirements of Generic Letter 86-10, Supplement 1, Attachment 1, “Attachment Methods for Demonstrating Functionality of Cables Protected by Raceway Fire Barrier Systems During and After Fire Endurance	Complies with Clarification	In Fire Area A-1, the following Chapter 4-required ERFBS that are compliant with this requirement are provided: Raceways 1U1042, 1U1043, 1U1044, 1U1045, 1U1K5C, and 1UJ029 are provided with 1-hour-rated Darmatt fire wrap in Fire Zone 1206. Raceway 1U1037 is provided with 1-hour-rated Darmatt fire wrap in Fire Zones 1206 and 1207. Raceways 1U1198, 1U1318, 1U1339, 1U1360, 1U1F2A, 1U1F2B, 1U1F2C, 1U1J3A, 1U1J3B, 1U1J3C, 1U1J3S, 1U1J9U, 1UJ001, 1UJ002, and 1UJ062 are provided with 1-hour-rated Darmatt fire wrap in Fire Zone 1101. In Fire Area A-6, raceways 1J1L01 and 1U1K01 are provided with a Darmatt fire wrap in Fire Zone 1127. Per CAR 200607577, this fire wrap is improperly installed (i.e., inadequate due to “framing issue”). The fire rating of this ERFBS is degraded from the intended three-hour rating of the design criteria to a one-hour rating. This condition represents a variance from the deterministic requirements of NFPA 805, Section 4.2.3; it was analyzed and found acceptable via Section 4.2.4 of NFPA 805 in Calculation KC-86. In Fire Area A-18, raceway 1J1097	Procedure MTT-ZZ-I0019, "Installation Manual for Darmatt KM-1 Fire Protection Systems," Rev. 1 / All Procedure QSP-ZZ-65046, "Fire Barrier Inspection," Rev. 11 / All Specification S-1064, "Technical Specification for Furnishing and Installation of Fire Barrier Materials," Rev. 1 / Section 5.4.4 Calculation KC-81, "Fire Safety Analysis for Fire Area A-1," Rev. 0 / All Calculation KC-86, "Fire Safety Analysis for Fire Area A-6," Rev. 0 / All Calculation KC-98, "Fire Safety Analysis for Fire Area A-18," Rev. 0 / All Calculation KC-104, "Fire Safety Analysis for Fire Area A-24," Rev. 0 / All Calculation KC-107, "Fire Safety Analysis for Fire Area A-27," Rev. 0 / All Calculation KC-153, "Fire Safety Analysis for Fire Area RB-1," Rev. 0 / All Raceway Drawing E-2R8900, "Raceway Notes, Symbols and Details," Rev. 87/88/89/ Sheets 47-59G, 63-65

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
	Test Exposure." Exception No. 2: ERFBS systems employed prior to the issuance of Generic Letter 86-10, Supplement 1, are acceptable providing that the system successfully met the limiting end point temperature requirements as specified by the AHJ at the time of acceptance.		is provided with a Darmatt one-hour-rated fire wrap in Fire Zone 1410. Per CAR 200607577, the one-hour fire wrap is degraded (i.e., notched). The fire rating of this ERFBS is degraded from the intended one-hour rating of the design criteria. This condition represents a variance from the deterministic requirements of NFPA 805, Section 4.2.3; it was analyzed and found acceptable via Section 4.2.4 of NFPA 805 in Calculation KC-98. In Fire Area A-24, the following Chapter 4-required ERFBS that are compliant with this requirement are provided: Raceways 4J1013, 4J1014, 4J1038, 4J3C1C, and 4JJ046 are provided with 3-hour-rated Darmatt fire wrap in Fire Zone 1323. In Fire Area A-27, the following Chapter 4-required ERFBS that are compliant with this requirement are provided: Raceways 1B2A05, 1B2A06, 1B2A07, 1U1G1B, and 5U1Y6G and Panel BB07 are provided with 1-hour-rated Darmatt fire wrap in Fire Zone 1403. In Fire Area RB-1, the following Chapter 4-required ERFBS that are compliant with this requirement are provided: Raceway 1J1027 is provided with 1-hour Darmatt fire wrap in Fire Zones RB4 and RB5.	

Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)
Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
			ERFBS that are installed for fire modeling or Fire PRA that are not credited by the NSCA will be maintained under the Callaway Plant fire protection program as ERFBS. ERFBS that are not credited by the NSCA or any other aspect of the fire protection program will be maintained for housekeeping purposes but will not be maintained as rated ERFBS under the fire protection program.	

B. NEI 04-02 Table B-2 – Nuclear Safety Capability Assessment – Methodology Review

146 Pages Attached

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

A comprehensive list of systems and equipment and their interrelationships to be analyzed for a fire event shall be developed. The equipment list shall contain an inventory of those critical components required to achieve the nuclear safety performance criteria of Section 1.5. Components required to achieve and maintain the nuclear safety functions and components whose fire-induced failure could prevent the operation or result in the maloperation of those components needed to meet the nuclear safety criteria shall be included. Availability and reliability of equipment selected shall be evaluated.

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.0	Deterministic Methodology	This section discusses a generic deterministic methodology and criteria that licensees can use to perform a post-fire safe shutdown analysis to address regulatory requirements. The plant-specific analysis approved by NRC is reflected in the plant's licensing basis. The methodology described in this section is also an acceptable method of performing a post-fire safe shutdown analysis. This methodology is indicated in Figure 3-1. Other methods acceptable to NRC may also be used. Regardless of the method selected by an individual licensee, the criteria and assumptions provided in this guidance document may apply. The methodology described in Section 3 is based on a computer database oriented approach, which is utilized by several licensees to model Appendix R data relationships. This guidance document, however, does not require the use of a computer database oriented approach. The requirements of Appendix R Sections III.G.1, III.G.2 and III.G.3 apply to equipment and cables required for achieving and maintaining safe shutdown in any fire area. Although equipment and cables for fire detection and suppression systems, communications systems and 8-hour emergency lighting systems are important features, this guidance document does not address them.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

A deterministic methodology was used to assess conformance with the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805 for the Callaway Plant.

The Callaway Plant NFPA 805 Nuclear Safety Capability Assessment (NSCA) deterministic methodology has been reviewed in detail against the guidance, criteria, and assumptions contained within NEI 00-01, Chapter 3, as documented in the subsequent sections of this table (i.e., Table B-2 from NEI 04-02).

The results of this review conclude that the Callaway Plant NSCA has been performed consistent with (i.e., aligns with) the deterministic methodology guidance, criteria, and assumptions from Chapter 3 of NEI 00-01.

With the exception of a few specific paragraphs annotated with quotation marks, all other information contained herein from Callaway Plant Calculation KC-26 is

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

paraphrased.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.1	Safe Shutdown Systems and Path Development	This section discusses the identification of systems available and necessary to perform the required safe shutdown functions. It also provides information on the process for combining these systems into safe shutdown paths. Appendix R Section III.G.1.a requires that the capability to achieve and maintain hot shutdown be free of fire damage. It is expected that the term “free of fire damage” will be further clarified in a forthcoming Regulatory Issue Summary. Appendix R Section III.G.1.b requires that repairs to systems and equipment necessary to achieve and maintain cold shutdown be completed within 72 hours. It is the intent of the NRC that requirements related to the use of manual operator actions will be addressed in a forthcoming rulemaking. The goal of post-fire safe shutdown is to assure that one train of shutdown systems, structures, and components remains free of fire damage for a single fire in any single plant fire area. This goal is accomplished by determining those functions important to achieve and maintain hot shutdown. Safe shutdown systems are selected so that the capability to perform these required functions is a part of each safe shutdown path. The functions important to post-fire safe shutdown generally include, but are not limited to the following: - Reactivity Control - Pressure Control Systems - Inventory Control Systems - Decay Heat Removal Systems - Process Monitoring - Support Systems * Electrical systems * Cooling systems These functions are of importance because they have a direct bearing on the safe shutdown goal of being able to achieve and maintain hot shutdown which ensures the integrity of the fuel, the reactor pressure vessel, and the primary containment. If these functions are preserved, then the plant will be safe because the fuel, the reactor and the primary containment will not be damaged. By assuring that this equipment is not damaged and remains functional, the protection of the health and safety of the public is assured. In addition to the above listed functions, Generic Letter 81-12 specifies consideration of associated circuits with the potential for spurious equipment operation and/or loss of power source, and the common enclosure failures. Spurious operations/actuations can affect the accomplishment of the post-fire safe shutdown functions listed above. Typical examples of the effects of the spurious operations of concern are the following: - A loss of reactor pressure vessel/reactor coolant inventory in excess of the safe shutdown makeup capability

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

- A flow loss or blockage in the inventory makeup or decay heat removal systems being used for the required safe shutdown path.

Spurious operations are of concern because they have the potential to directly affect the ability to achieve and maintain hot shutdown, which could affect the fuel and cause damage to the reactor pressure vessel or the primary containment. Common power source and common enclosure concerns could also affect these and must be addressed.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns with Intent

Alignment Basis

Callaway Plant systems / functions / components required to achieve and maintain "safe and stable" plant conditions post-fire per the Nuclear Safety Performance Criteria of NFPA 805 are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The identification and analysis of these systems / functions / components includes addressing associated circuit issues for spurious operations, high/low pressure interfaces, common power supplies, and common enclosures. These associated circuit issues are discussed in Section 8.7, Associated Circuits - Purpose and Scope, of Callaway Plant Calculation KC-26.

The Callaway Plant definition for "safe and stable" plant operation post-fire per the Nuclear Safety Performance Criteria of NFPA 805 is provided in Section 5.6, Definition of "Safe and Stable" Plant Conditions for Callaway Plant, of Callaway Plant Calculation KC-26.

A computer database tool, SAFE-PB, is utilized to demonstrate that the Nuclear Safety Performance Criteria of NFPA 805 are met for each fire area of the plant. The computer database tool is identified as the "NSCA database" in the remainder of this table, and is described in Section 9.0, Description of SAFE-PB, of Callaway Plant Calculation KC-26.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1 Criteria/Assumptions	The following criteria and assumptions may be considered when identifying systems available and necessary to perform the required safe shutdown functions and combining these systems into safe shutdown paths.

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.1 Criteria/Assumptions	[BWR] GE Report GE-NE-T43-00002-00-01-R01 entitled "Original Safe Shutdown Paths For The BWR" addresses the systems and equipment originally designed into the GE boiling water reactors (BWRs) in the 1960s and 1970s, that can be used to achieve and maintain safe shutdown per Section III.G.1 of 10CFR 50, Appendix R. Any of the shutdown paths (methods) described in this report are considered to be acceptable methods for achieving redundant safe shutdown.

Applicability

Not Applicable

Comments

Callaway Plant is PWR; BWR guidance not applicable.

Alignment Statement

Not Applicable

Alignment Basis

Not Applicable

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.2 Criteria/Assumptions	[BWR] GE Report GE-NE-T43-00002-00-03-R01 provides a discussion on the BWR Owners' Group (BWROG) position regarding the use of Safety Relief Valves (SRVs) and low pressure systems (LPCI/CS) for safe shutdown. The BWROG position is that the use of SRVs and low pressure systems is an acceptable methodology for achieving redundant safe shutdown in accordance with the requirements of 10CFR50 Appendix R Sections III.G.1 and III.G.2. The NRC has accepted the BWROG position and issued an SER dated Dec. 12, 2000.

Applicability	Comments
Not Applicable	Callaway Plant is PWR; BWR guidance not applicable.

Alignment Statement

Not Applicable

Alignment Basis

Not Applicable

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.3 Criteria/Assumptions	[PWR] Generic Letter 86-10, Enclosure 2, Section 5.3.5 specifies that hot shutdown can be maintained without the use of pressurizer heaters (i.e., pressure control is provided by controlling the makeup/charging pumps). Hot shutdown conditions can be maintained via natural circulation of the RCS through the steam generators. The cooldown rate must be controlled to prevent the formation of a bubble in the reactor head. Therefore, feedwater (either auxiliary or emergency) flow rates as well as steam release must be controlled.

Applicability	Comments
Applicable	None

Alignment Statement

Not Required

Alignment Basis

Reactor Coolant System (RCS) pressure control capabilities required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The NSCA model requires that pressurizer heater capability be available for RCS pressure control. The Pressurizer Backup Group heaters are analyzed to remain available from the Main Control Room (or Auxiliary Shutdown Panel) for RCS pressure control. The Pressurizer Control Group heaters are only analyzed for loss of Main Control Room trip capability.

The NSCA model also allows for RCS pressure control to be achieved utilizing the Chemical and Volume Control System (CVCS) to add RCS inventory (and increase RCS pressure) and the Auxiliary Feedwater System (AFW) (to remove decay heat, and decrease RCS pressure).

RCS inventory is supplied with the CVCS utilizing either of two essential charging pumps, with pump suction taken from the borated Refueling Water Storage Tank (RWST), and pump discharge injected into the RCS through the RCP seals and/or the boron injection header. The non-credited charging pump(s) are analyzed for loss of Main Control Room trip capability.

Feedwater for decay heat removal is supplied from either the Turbine Driven Auxiliary Feedwater (AFW) Pump (supplies all four Steam Generators [SGs]) or the two Motor Driven Auxiliary Feedwater Pumps (MDAFW). MDAFW-A supplies SGs B and C, MDAFW-B supplies SGs A and D. Atmospheric steam dump valves (ASDs) are modeled to be operable as required for the credited SG (1 of 4). The non-credited AFW pump(s) are analyzed for loss of Main Control Room trip capability.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.4 Criteria/Assumptions	The classification of shutdown capability as alternative shutdown is made independent of the selection of systems used for shutdown. Alternative shutdown capability is determined based on an inability to assure the availability of a redundant safe shutdown path. Compliance to the separation requirements of Sections III.G.1 and III.G.2 may be supplemented by the use of manual actions to the extent allowed by the regulations and the licensing basis of the plant, repairs (cold shutdown only), exemptions, deviations, GL 86-10 fire hazards analyses or fire protection design change evaluations, as appropriate. These may also be used in conjunction with alternative shutdown capability.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Unlike 10 CFR 50 Appendix R, NFPA 805 makes no distinction for alternative / dedicated shutdown.

Auxiliary Shutdown Panel RP118B is the primary control station for implementation of the 10 CFR 50 Appendix R Alternate Shutdown Strategy in the event of a fire that requires the evacuation of the Main Control Room.

Based on the definition provided in RG 1.205, and the additional guidance provided in FAQ 07-0030 Revision 5 (ML110070485), Auxiliary Shutdown Panel RP118B is also considered to be the Primary Control Station for NFPA 805, with the associated enabling, control, and indication functions as identified:

• Enable RP118B with isolation transfer switches/control switches located at RP118B

• Steam Generator B (2) pressure indication (ABPIC0002B)

• Steam Generator B (2) wide range level indication (AELI0502A)

• Steam Generator B (2) AFW flow indication (ALFI0003B)

• Open control for steam supply valve from Steam Generator B (2) to TDAFP (ABHV0005)

• Open and close control for Steam Generator B (2) Atmospheric Steam Dump Valve (ABPV0002)

• Open and close control for Steam Generator B (2) AFW flow control valve from TDAFP (ALHV0010)

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Open and close control for Essential Service Water to suction of MDAFW Pump B (ALHV0030)

• Open and close control for Condensate Storage Tank to suction of MDAFW Pump B (ALHV0034)

• MDAFW Pump B suction pressure indication (ALPI0024B)

• Trip and close control for MDAFW Pump B breaker (NB0205)

• Steam Generator D (4) pressure indication (ABPIC0004B)

• Steam Generator D (4) wide range level indication (AELI0504A)

• Steam Generator D (4) AFW flow indication from MDAFW Pump B (ALFI0001B)

• Open and close control for Steam Generator D (4) Atmospheric Steam Dump Valve (ABPV0004)

• Open and close control for Steam Generator D (4) AFW flow control valve from MDAFW Pump B (ALHV0005)

• Open and close control for Essential Service Water to suction of TDAFP (ALHV0033)

• TDAFP suction pressure indication (ALPI0026B)

• Open and close control for TDAFP Governor Control valve (FCFV0313)

• Open and close control for TDAFP Trip and Throttle valve (FCHV0312)

• Pressurizer level indication (BBLI0460B)

• Reactor Coolant System pressure indication (BBPI0406X)

• Reactor Coolant System Loop 2 cold leg temperature indication (BBTI0423X)

• Reactor Coolant System Loop 4 hot leg temperature indication (BBTI0443A)

• Intermediate and source range neutron monitoring indication (SENI0061X and SENI0061Y)

• Trip and close control for Pressurizer Backup Group B breaker (PG2201)

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NRC approval for the design of the Auxiliary Shutdown Panel, and for the overall Alternate Shutdown Strategy to meet the requirements of 10 CFR 50 Appendix R, Section III.G.3, was provided in NUREG-0830, SER Supplement No. 3, Docket No, STN 50-483, May 1984, and in NUREG-0830, SER Supplement No. 4, Docket No, STN 50-483, October 1984. Clarification regarding this approval is requested in Attachment T of the Callaway Plant NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report.

Enabling of the Auxiliary Shutdown Panel involves the transfer of control from the Main Control Room to RP118B through an operator action to manually position three isolation transfer switches and five control switches which are located on RP118B. Following activation of the Auxiliary Shutdown Panel, the plant operator is provided with the capability to control and monitor secondary side decay heat removal capability utilizing the Auxiliary Feedwater System, the capability to control Reactor Coolant System (RCS) pressure, and the capability to monitor critical RCS process parameters which are necessary to verify that natural circulation has been established in the RCS and that it is being successfully maintained thereafter.

The Auxiliary Shutdown Panel has been transitioned to NFPA 805 as the Primary Control Station for meeting the NSPC in the event of a fire that requires evacuation of the Main Control Room.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

NUREG-0830, SER Supplement No. 3, Docket No, STN 50-483, May 1984

NUREG-0830, SER Supplement No. 4, Docket No, STN 50-483, October 1984

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.5 Criteria/Assumptions	At the onset of the postulated fire, all safe shutdown systems (including applicable redundant trains) are assumed operable and available for post-fire safe shutdown. Systems are assumed to be operational with no repairs, maintenance, testing, Limiting Conditions for Operation, etc. in progress. The units are assumed to be operating at full power under normal conditions and normal lineups.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.1.1.5 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.6 Criteria/Assumptions	No Final Safety Analysis Report accidents or other design basis events (e.g. loss of coolant accident, earthquake), single failures or non-fire induced transients need be considered in conjunction with the fire.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.1.1.6 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.7 Criteria/Assumptions	For the case of redundant shutdown, offsite power may be credited if demonstrated to be free of fire damage. Offsite power should be assumed to remain available for those cases where its availability may adversely impact safety (i.e., reliance cannot be placed on fire causing a loss of offsite power if the consequences of offsite power availability are more severe than its presumed loss). No credit should be taken for a fire causing a loss of offsite power. For areas where train separation cannot be achieved and alternative shutdown capability is necessary, shutdown must be demonstrated both where offsite power is available and where offsite power is not available for 72 hours.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.1.1.7 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection.

Callaway Plant Calculation KC-26, Section 7.7, Electrical Distribution Model Overview, describes how the NSCA models offsite power, including the Alternate Emergency Power System (AEPS), as well as onsite power from the emergency diesel generators. As part of the NSCA model (through component-to-component logic success path in the NSCA database tool), offsite power is only credited in fire areas where it can be demonstrated to be free of fire damage.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref

3.1.1.8 Criteria/Assumptions

NEI 00-01 Section 3 Guidance

Post-fire safe shutdown systems and components are not required to be safety-related.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.1.1.8 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection.

The Callaway Plant NSCA model does include non-safety related plant systems / functions / components. For example, non-safety related offsite power capability is included in the NSCA model as described in Callaway Plant Calculation KC-26, Section 7.7, Electrical Distribution Model Overview.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.9 Criteria/Assumptions	The post-fire safe shutdown analysis assumes a 72-hour coping period starting with a reactor scram/trip. Fire-induced impacts that provide no adverse consequences to hot shutdown within this 72-hour period need not be included in the post-fire safe shutdown analysis. At least one train can be repaired or made operable within 72 hours using onsite capability to achieve cold shutdown.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns with Intent

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.1.1.9 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection.

From Section 3.0 of KC-26:

"The NFPA 805 Nuclear Safety Performance Criteria (NSPC) requires the licensee to demonstrate that the plant can achieve and maintain a “safe and stable” condition, but it does not explicitly require the licensee to demonstrate that cold shutdown can be achieved within 72 hours and maintained indefinitely thereafter. The Callaway NFPA 805 NSPC analysis has defined the “safe and stable” condition as being able to achieve and maintain Hot Standby until such time as the plant can either transition to Cold Shutdown, or can safely return to power operation."

"Safe and stable" for Callaway Plant is defined in Section 5.6, Definition of “Safe and Stable” Plant Conditions for Callaway Plant, of Callaway Plant Calculation KC-26.

From Section 5.6 of KC-26:

"The NFPA 805 Nuclear Safety Performance Criteria (NSPC) Analysis for Callaway Plant has been developed to ensure that the plant can achieve and maintain the reactor fuel in a 'safe and stable' condition assuming that a fire event occurs during Callaway Plant Mode 1 (Power Operation), Mode 2 (Startup), Mode 3 (Hot Standby), and Mode 4 (Hot Shutdown), up to the point at which the MCC breakers for the Residual Heat Removal Loop Suction Isolation Valves, BBPV8702A, BBPV8702B, EJHV8701A, and EJHV8701B, are unlocked and closed. Refer to the Callaway Plant NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report Attachment C (Table B-3) for the Systems and Components credited with supporting 'safe and stable' plant conditions by fire area.

The NFPA 805 Nuclear Safety Capability Assessment (NSCA) has demonstrated that Callaway Plant can achieve and maintain 'safe and stable' conditions for at

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

least 10 hours with the minimum shift operating staff before having to take action to recharge the nitrogen accumulators. This initial 10 hours provides sufficient time for the Emergency Response Organization (ERO) to respond and be available to support 'safe and stable' actions to extend Hot Standby conditions."

From Section 7.0 of KC-26:

"The transition from Hot Standby to Cold Shutdown and plant operation in Cold Shutdown is not required to demonstrate that the NSPC “safe and stable” plant conditions defined for the Callaway Plant have been met. Operator manual actions and/or repair activities associated with these capabilities are not identified as Variances from the Deterministic Requirements of NFPA 805 (VFDRs), and are not implemented into the plant operations fire response procedures."

From Section 3.0 of KC-26:

"The capability to transition to Cold Shutdown, and to achieve and maintain Cold Shutdown has been analyzed in the Callaway NSCA. Operator manual actions and repair activities necessary to transition to Cold Shutdown, and to achieve and maintain Cold Shutdown have been identified in this document, and have been qualitatively assessed to ensure their feasibility (inclusive of the failure mode for motor operated valves as described in USNRC Information Notice 92-18) in consideration of the “safe and stable” mission time for the plant; however, these operator actions and repair activities are not required to demonstrate that the NSPC “safe and stable” plant conditions defined for the Callaway Plant have been met, are not identified as Variances from the Deterministic Requirements of NFPA 805 [VFDRs], and are not implemented into the plant operations fire response procedures)."

The 72 hour requirement from NEI 00-01 is only applicable to the 10 CFR 50 Appendix R licensing basis. The Callaway Plant NSCA model does include plant systems / functions / components required for the transition from Hot Standby to Cold Shutdown, and the achievement and maintenance of Cold Shutdown. However, these plant systems / functions / components are not required for the NSCA, and are not credited in the plant operations fire response procedures.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.1.10 Criteria/Assumptions	Manual initiation from the main control room or emergency control stations of systems required to achieve and maintain safe shutdown is acceptable where permitted by current regulations or approved by NRC; automatic initiation of systems selected for safe shutdown is not required but may be included as an option.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.1.1.10 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection.

From Section 3.0 of KC-26:

"The Callaway Plant NSCA credits Main Control Room operator action to align NSCA systems / functions / components. The Callaway Plant NSCA does not credit automatic initiation of NSCA systems / functions / components unless specifically modeled and analyzed. Automatic function of the Condensate Storage Tank (CST) Auxiliary Feedwater Low Suction Pressure (LSP) design feature and automatic function of the Load Shed / Load Sequencing Panels are two automatic functions that are explicitly modeled and credited in the NSCA."

"The effects of fires on the Reactor Protection System (RPS), Reactor Trip Breakers, Reactor Trip Bypass Breakers, and Control Rod Drive Mechanisms are not considered to preclude the initiation of an automatic or manual reactor trip and control rod insertion due to the RPS fail-safe design. The RPS channels are designed fail in the trip condition on loss of power. The reactor trip breakers and reactor trip bypass breakers are designed to trip on loss of DC control power. Similarly, the control rod drive clutch mechanisms are designed to release the control rods on loss of power. This is based on Generic Letter 86-10 Enclosure 2, Section 3.8.4."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref

3.1.1.11 Criteria/Assumptions

NEI 00-01 Section 3 Guidance

Where a single fire can impact more than one unit of a multi-unit plant, the ability to achieve and maintain safe shutdown for each affected unit must be demonstrated.

Applicability

Not Applicable

Comments

Callaway Plant is a single-unit plant; multi-unit guidance not applicable.

Alignment Statement

Not Applicable

Alignment Basis

Not Applicable

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2 Shutdown Functions	The following discussion on each of these shutdown functions provides guidance for selecting the systems and equipment required for safe shutdown. For additional information on BWR system selection, refer to GE Report GENE-T43-00002-00-01-R01 entitled "Original Safe Shutdown Paths for the BWR."

Applicability	Comments
Applicable	None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.1 Reactivity Control	[BWR] Control Rod Drive System The safe shutdown performance and design requirements for the reactivity control function can be met without automatic scram/trip capability. Manual scram/reactor trip is credited. The post-fire safe shutdown analysis must only provide the capability to manually scram/trip the reactor.

Applicability
Not Applicable

Comments
Callaway Plant is PWR; BWR guidance not applicable

Alignment Statement
Not Applicable

Alignment Basis
Not Applicable

Reference Documents
Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.1 Reactivity Control	[PWR] Makeup/Charging There must be a method for ensuring that adequate shutdown margin is maintained by ensuring borated water is utilized for RCS makeup/charging.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Reactivity control capabilities required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The Callaway Plant NSCA model requires short term reactivity control to be provided through automatic or manual reactor trip and the subsequent insertion of the control rods.

The effects of fires on the Reactor Protection System (RPS), Reactor Trip Breakers, Reactor Trip Bypass Breakers, and Control Rod Drive Mechanisms are not considered to preclude the initiation of an automatic or manual reactor trip and control rod insertion due to the RPS fail-safe design. The RPS channels are designed fail in the trip condition on loss of power. The reactor trip breakers and reactor trip bypass breakers are designed to trip on loss of DC control power. Similarly, the control rod drive clutch mechanisms are designed to release the control rods on loss of power. This is based on Generic Letter 86-10 Enclosure 2, Section 3.8.4.

The Callaway Plant NSCA model requires long term reactivity control to be provided utilizing the Chemical and Volume Control System (CVCS) to add borated Reactor Coolant System (RCS) inventory.

Borated RCS inventory is supplied with the CVCS utilizing either of two essential charging pumps, with pump suction taken from the borated Refueling Water Storage Tank (RWST), and pump discharge injected into the RCS through the RCP seals and/or the boron injection header.

The credited source of borated water is the RWST, and the Volume Control Tank (VCT) is isolated to prevent dilution of borated water and inadvertent reduction of the shutdown margin.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.2 Pressure Control Systems	[BWR] Safety Relief Valves (SRVs) The SRVs are opened to maintain hot shutdown conditions or to depressurize the vessel to allow injection using low pressure systems. These are operated manually. Automatic initiation of the Automatic Depressurization System is not a required function.

Applicability

Not Applicable

Comments

Callaway Plant is PWR; BWR guidance not applicable

Alignment Statement

Not Applicable

Alignment Basis

Not Applicable

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.2 Pressure Control Systems	[PWR] Makeup/Charging RCS pressure is controlled by controlling the rate of charging/makeup to the RCS. Although utilization of the pressurizer heaters and/or auxiliary spray reduces operator burden, neither component is required to provide adequate pressure control. Pressure reductions are made by allowing the RCS to cool/shrink, thus reducing pressurizer level/pressure. Pressure increases are made by initiating charging/makeup to maintain pressurizer level/pressure. Manual control of the related pumps is acceptable.

Applicability
Applicable

Comments
None

Alignment Statement
Aligns

Alignment Basis
Reactor Coolant System (RCS) pressure control capabilities required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The Callaway Plant NSCA model requires that pressurizer heater capability be utilized for RCS pressure control. The Pressurizer Backup Group heaters are analyzed to remain operable from the Main Control Room (or Auxiliary Shutdown Panel) for RCS pressure control. The Pressurizer Control Group heaters are only analyzed for loss of Main Control Room trip capability.

The Callaway Plant NSCA model also allows for RCS pressure control to be achieved utilizing the Chemical and Volume Control System (CVCS) to add RCS inventory (and increase RCS pressure) and the Auxiliary Feedwater System (AFW) (to remove decay heat, and decrease RCS pressure).

Addition of RCS inventory is accomplished with the CVCS utilizing either of two essential charging pumps, with pump suction taken from the borated Refueling Water Storage Tank (RWST), and pump discharge injected into the RCS through the RCP seals and/or the boron injection header. The non-credited charging pump(s) are analyzed for loss of Main Control Room trip capability.

Feedwater is supplied from either the Turbine Driven Auxiliary Feedwater (AFW) Pump (supplies all four Steam Generators [SGs]) or the two Motor Driven Auxiliary Feedwater Pumps (MDAFW). MDAFW-A supplies SGs B and C, MDAFW-B supplies SGs A and D. Atmospheric steam dump valves (ASDs) are modeled to be operable as required for the credited SG (1 of 4). The non-credited AFW pump(s) are analyzed for loss of Main Control Room trip capability.

Reference Documents
Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.3 Inventory Control	[BWR] Systems selected for the inventory control function should be capable of supplying sufficient reactor coolant to achieve and maintain hot shutdown. Manual initiation of these systems is acceptable. Automatic initiation functions are not required.

Applicability

Not Applicable

Comments

Callaway Plant is PWR; BWR guidance not applicable.

Alignment Statement

Not Applicable

Alignment Basis

Not Applicable

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.3 Inventory Control	[PWR] Systems selected for the inventory control function should be capable of maintaining level to achieve and maintain hot shutdown. Typically, the same components providing inventory control are capable of providing pressure control. Manual initiation of these systems is acceptable. Automatic initiation functions are not required.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Reactor Coolant System (RCS) inventory control capabilities required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The Callaway Plant NSCA model requires the Chemical and Volume Control System (CVCS) to be utilized for RCS inventory control.

Addition of RCS inventory is accomplished with the CVCS utilizing either of two essential charging pumps, with pump suction taken from the borated Refueling Water Storage Tank (RWST), and pump discharge injected into the RCS through the RCP seals and/or the boron injection header. The non-credited charging pump(s) are analyzed for loss of Main Control Room trip capability.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.4 Decay Heat Removal	[BWR] Systems selected for the decay heat removal function(s) should be capable of: - Removing sufficient decay heat from primary containment, to prevent containment over-pressurization and failure. - Satisfying the net positive suction head requirements of any safe shutdown systems taking suction from the containment (suppression pool). - Removing sufficient decay heat from the reactor to achieve cold shutdown. This does not restrict the use of other systems.

Applicability

Not Applicable

Comments

Callaway Plant is PWR; BWR guidance not applicable.

Alignment Statement

Not Applicable

Alignment Basis

Not Applicable

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.4 Decay Heat Removal	[PWR] Systems selected for the decay heat removal function(s) should be capable of: - Removing sufficient decay heat from the reactor to reach hot shutdown conditions. Typically, this entails utilizing natural circulation in lieu of forced circulation via the reactor coolant pumps and controlling steam release via the Atmospheric Dump valves. - Removing sufficient decay heat from the reactor to reach cold shutdown conditions. This does not restrict the use of other systems.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Reactor Coolant System (RCS) decay heat removal capabilities required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The Callaway Plant NSCA model requires the Auxiliary Feedwater System (AFW) to be utilized for RCS decay heat removal.

Decay heat removal is achieved by initially tripping the Reactor Coolant Pumps (RCPs) and establishing natural circulation through at least 1 of the 4 Steam Generators (SGs). The SG code safety valves or the SG atmospheric steam dump valves (ASDs) are credited release steam.

"Safe and stable" for Callaway Plant is defined in Section 5.6, Definition of “Safe and Stable” Plant Conditions for Callaway Plant, of Callaway Plant Calculation KC-26.

From Section 5.6 of KC-26:

"The NFPA 805 Nuclear Safety Performance Criteria (NSPC) Analysis for Callaway Plant has been developed to ensure that the plant can achieve and maintain the reactor fuel in a 'safe and stable' condition assuming that a fire event occurs during Callaway Plant Mode 1 (Power Operation), Mode 2 (Startup), Mode 3 (Hot Standby), and Mode 4 (Hot Shutdown), up to the point at which the MCC breakers for the Residual Heat Removal Loop Suction Isolation Valves, BBPV8702A, BBPV8702B, EJHV8701A, and EJHV8701B, are unlocked and closed. Refer to the Callaway Plant NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report Attachment C (Table B-3) for the Systems and Components credited with supporting 'safe and stable' plant conditions by fire area.

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

The NFPA 805 Nuclear Safety Capability Assessment (NSCA) has demonstrated that Callaway Plant can achieve and maintain 'safe and stable' conditions for at least 10 hours with the minimum shift operating staff before having to take action to recharge the nitrogen accumulators. This initial 10 hours provides sufficient time for the Emergency Response Organization (ERO) to respond and be available to support 'safe and stable' actions to extend Hot Standby conditions."

From Section 7.0 of KC-26:

"The transition from Hot Standby to Cold Shutdown and plant operation in Cold Shutdown is not required to demonstrate that the NSPC “safe and stable” plant conditions defined for the Callaway Plant have been met. Operator manual actions and/or repair activities associated with these capabilities are not identified as Variances from the Deterministic Requirements of NFPA 805 (VFDRs), and are not implemented into the plant operations fire response procedures."

From Section 3.0 of KC-26:

"The capability to transition to Cold Shutdown, and to achieve and maintain Cold Shutdown has been analyzed in the Callaway NSCA. Operator manual actions and repair activities necessary to transition to Cold Shutdown, and to achieve and maintain Cold Shutdown have been identified in this document, and have been qualitatively assessed to ensure their feasibility (inclusive of the failure mode for motor operated valves as described in USNRC Information Notice 92-18) in consideration of the “safe and stable” mission time for the plant; however, these operator actions and repair activities are not required to demonstrate that the NSPC “safe and stable” plant conditions defined for the Callaway Plant have been met, are not identified as Variances from the Deterministic Requirements of NFPA 805 [VFDRs], and are not implemented into the plant operations fire response procedures)."

The 72 hour requirement from NEI 00-01 is only applicable to the 10 CFR 50 Appendix R licensing basis. The Callaway Plant NSCA model does include plant systems / functions / components required for the transition from Hot Standby to Cold Shutdown, and the achievement and maintenance of Cold Shutdown. However, these plant systems / functions / components are not required for the NSCA, and are not credited in the plant operations fire response procedures.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.5 Process Monitoring	The process monitoring function is provided for all safe shutdown paths. IN 84-09, Attachment 1, Section IX "Lessons Learned from NRC Inspections of Fire Protection Safe Shutdown Systems (10CFR50 Appendix R)" provides guidance on the instrumentation acceptable to and preferred by the NRC for meeting the process monitoring function. This instrumentation is that which monitors the process variables necessary to perform and control the functions specified in Appendix R Section III.L.1. Such instrumentation must be demonstrated to remain unaffected by the fire. The IN 84-09 list of process monitoring is applied to alternative shutdown (III.G.3). IN 84-09 did not identify specific instruments for process monitoring to be applied to redundant shutdown (III.G.1 and III.G.2). In general, process monitoring instruments similar to those listed below are needed to successfully use existing operating procedures (including Abnormal Operating Procedures). BWR: -Reactor coolant level and pressure -Suppression pool level and temperature -Emergency or isolation condenser level -Diagnostic instrumentation for safe shutdown system -Level indication for tanks needed for safe shutdown The specific instruments required may be based on operator preference, safe shutdown procedural guidance strategy (symptomatic vs. prescriptive), and systems and paths selected for safe shutdown.

Applicability

Not Applicable

Comments

Callaway Plant is PWR; BWR guidance not applicable

Alignment Statement

Not Applicable

Alignment Basis

Not Applicable

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.5 Process Monitoring	The process monitoring function is provided for all safe shutdown paths. IN 84-09, Attachment 1, Section IX "Lessons Learned from NRC Inspections of Fire Protection Safe Shutdown Systems (10CFR50 Appendix R)" provides guidance on the instrumentation acceptable to and preferred by the NRC for meeting the process monitoring function. This instrumentation is that which monitors the process variables necessary to perform and control the functions specified in Appendix R Section III.L.1. Such instrumentation must be demonstrated to remain unaffected by the fire. The IN 84-09 list of process monitoring is applied to alternative shutdown (III.G.3). IN 84-09 did not identify specific instruments for process monitoring to be applied to redundant shutdown (III.G.1 and III.G.2). In general, process monitoring instruments similar to those listed below are needed to successfully use existing operating procedures (including Abnormal Operating Procedures). PWR: -Reactor coolant temperature (hot leg / cold leg) -Pressurizer pressure and level -Neutron flux monitoring (source range) -Level indication for tanks needed for safe shutdown -Steam generator level and pressure -Diagnostic instrumentation for safe shutdown systems The specific instruments required may be based on operator preference, safe shutdown procedural guidance strategy (symptomatic vs. prescriptive), and systems and paths selected for safe shutdown.

Applicability	Comments
Applicable	None

Alignment Statement

Not in Alignment, but Prior NCR Approval

Alignment Basis

Process monitoring instrumentation required to achieve and maintain a "safe and stable" plant condition post-fire is identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The Callaway Plant NSCA model requires the following instrumentation to be utilized for process monitoring. This instrumentation is consistent with minimum process monitoring instrumentation expectations identified in USNRC Information Notice (IN) 84-09, and as previously approved by the USNRC in the 10 CFR 50 Appendix R licensing basis for the Callaway Plant.

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Reactor coolant temperature (T-hot / T-cold): These instruments are modeled in support of the Decay Heat Removal Performance Goal.

• Pressurizer pressure and level: These instruments are modeled in support of the Inventory and Pressure Control Performance Goal.

• Neutron flux monitoring (source range): These instruments are modeled in support of the Reactivity Control Performance Goal.

• Level indication for various tanks: These instruments are included in the system logics for which the tank is required.

• Steam Generator (SG) level and pressure: These instruments are modeled in support of the Decay Heat Removal Performance Goal.

• Diagnostic instrumentation for safe shutdown systems: Diagnostic instrumentation such as pump suction pressure, flow, and temperature are generally provided by local indicators that require no electrical power. Where beneficial to reduce operator burden, instruments that read out in the Main Control Room have been included in the model and logically associated with the component being monitored. In addition, instruments which provide permissive or controlling signals to safe shutdown components are modeled in direct support of the component as part of the cable selection process.

Notes:
• The RCS temperature instruments are modeled with the steam generator level instruments. The required instrumentation is a single T-hot instrument and a single T-cold instrument, which can be on different credited loops. This configuration was previously approved by the USNRC in the 10 CFR 50 Appendix R licensing basis for the Callaway Plant.
• Reactor Coolant System (RCS) pressure is assumed to be uniform throughout the RCS, including the pressurizer.
• Neutron flux monitors have indication in the Main Control Room and at the Auxiliary Shutdown Panel.
• The various tanks required for safe shutdown include the Condensate Storage Tank (CST), Refueling Water Storage Tank (RWST), and Emergency Diesel Generator (EDG) Fuel Oil Tanks.
• SG level indication requires wide range level indication. When wide range level indication is unavailable, SG level is monitored using narrow range level. AFW flow indication is credited where available, but not required. This configuration was previously approved by the USNRC in the 10 CFR 50 Appendix R licensing basis for the Callaway Plant.
• CST, RWST and EDG Fuel Oil Tank level indication is not provided at the Auxiliary Shutdown Panel RP118B. This does not align with Section 3.1.2.5 of NEI 00-01. However, this configuration was previously approved by the USNRC in the 10 CFR 50 Appendix R licensing basis for the Callaway Plant.

NRC approval for the design of the Auxiliary Shutdown Panel, and for the overall Alternate Shutdown Strategy to meet the requirements of 10 CFR 50 Appendix R, Section III.G.3, was provided in NUREG-0830, SER Supplement No. 3, Docket No, STN 50-483, May 1984, and in NUREG-0830, SER Supplement No. 4, Docket No, STN 50-483, October 1984. Clarification regarding this approval is requested in Attachment T of the Callaway Plant NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

NUREG-0830, SER Supplement No. 3, Docket No, STN 50-483, May 1984

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NUREG-0830, SER Supplement No. 4, Docket No, STN 50-483, October 1984

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref

3.1.2.6 Support Systems

NEI 00-01 Section 3 Guidance

[Blank Heading - No specific guidance]

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic heading. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref

3.1.2.6.1 Electrical Systems

NEI 00-01 Section 3 Guidance

AC Distribution System

Power for the Appendix R safe shutdown equipment is typically provided by a medium voltage system such as 4.16 KV Class 1E busses either directly from the busses or through step down transformers/ load centers/ distribution panels for 600, 480 or 120 VAC loads.

For redundant safe shutdown performed in accordance with the requirements of Appendix R Section III.G.1 and 2, power may be supplied from either offsite power sources or the emergency diesel generator depending on which has been demonstrated to be free of fire damage. No credit should be taken for a fire causing a loss of offsite power. Refer to Section 3.1.1.7.

DC Distribution System

Typically, the 125VDC distribution system supplies DC control power to various 125VDC control panels including switchgear breaker controls. The 125VDC distribution panels may also supply power to the 120VAC distribution panels via static inverters. These distribution panels typically supply power for instrumentation necessary to complete the process monitoring functions.

For fire events that result in an interruption of power to the AC electrical bus, the station batteries are necessary to supply any required control power during the interim time period required for the diesel generators to become operational.

Once the diesels are operational, the 125 VDC distribution system can be powered from the diesels through the battery chargers.

The DC control centers may also supply power to various small horsepower Appendix R safe shutdown system valves and pumps. If the DC system is relied upon to support safe shutdown without battery chargers being available, it must be verified that sufficient battery capacity exists to support the necessary loads for sufficient time (either until power is restored, or the loads are no longer required to operate).

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

Electrical distribution systems required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.7, Electrical Distribution Model Overview.

The Callaway Plant NSCA model includes diverse Class 1E and non-Class 1E electrical distribution system capabilities to provide the vital support function of electrical power for the mechanical systems / functions / components of the NSCA model.

AC power may be supplied by offsite power through the switchyard or by offsite power through the Alternate Emergency Power System (AEPS), or AC power may be supplied by onsite power from the emergency diesel generators.

The AC power supplies provide power to 13kV and 4kV buses, which in turn supply 480V AC buses. The 480V AC buses are the normal supply for 120V AC buses.

Battery backed 125V DC supplies power to 120V AC distribution panels via inverters and static transfer switches. The static transfer switches are used as a backup to automatically supply 120V AC from a 480V AC source through a constant voltage transformer.

Section 8.7, Associated Circuits - Purpose and Scope, of Callaway Plant Calculation KC-26 identifies the electrical design calculations that demonstrate the capacity of the Class 1E and non-Class 1E station batteries as being adequate to supply power for station loads for a minimum of 240 minutes (4 hours) without charging.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.6.2 Cooling Systems [Main Section]	Various cooling water systems may be required to support safe shutdown system operation, based on plant-specific considerations. Typical uses include: - RHR/SDC/DH Heat Exchanger cooling water - Safe shutdown pump cooling (seal coolers, oil coolers) - Diesel generator cooling - HVAC system cooling water.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Cooling water systems required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The Callaway Plant NSCA model requires the Component Cooling Water System (CCW) and the Essential Service Water System (ESW) to provide the vital support function of cooling water for the other mechanical systems / functions / components of the NSCA model.

The Component Cooling Water System (CCW) is cooled by the Essential Service Water System (ESW). There are two CCW trains; each provides cooling water to the following:

• RHR Heat Exchangers

• RHR Pump Seal Coolers

• CCP Pump Oil Cooler

• Fuel Pool Cooling Heat Exchanger

• Seal Return Heat Exchanger

• RCP Thermal Barrier Heat Exchanger

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Excess Letdown Heat Exchanger

In addition to cooling the CCW heat exchangers, the two ESW trains are credited to cool the following:

• Diesel Generator Coolers

• AFW Pump Room Coolers

• Control Room A/C Condensers

• Class 1E Switchgear A/C Condensers

• RHR Pump Room Coolers

• CCW Pump Room Coolers

• CCP Room Coolers

• Penetration Room Coolers

• Containment Air Coolers

The ESW system is also a backup water source for the AFW pumps and for CCW (manual makeup only).

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.2.6.2 Cooling Systems [HVAC]	HVAC Systems may be required to assure that safe shutdown equipment remains within its operating temperature range, as specified in manufacturer's literature or demonstrated by suitable test methods, and to assure protection for plant operations staff from the effects of fire (smoke, heat, toxic gases, and gaseous fire suppression agents). HVAC systems may be required to support safe shutdown system operation, based on plant-specific configurations. Typical uses include: - Main control room, cable spreading room, relay room - ECCS pump compartments - Diesel generator rooms - Switchgear rooms Plant-specific evaluations are necessary to determine which HVAC systems are essential to safe shutdown equipment operation.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Heating ventilation and air conditioning systems (HVAC) required to achieve and maintain a "safe and stable" plant condition post-fire are identified in Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection.

The NSCA model requires HVAC to provide the vital support function of air cooling for plant equipment operability (of other mechanical systems / functions / components in the NSCA model), and to maintain Main Control Room habitability for plant operations personnel.

HVAC systems are required for the following plant areas:

• Main Control Room

• Containment

• Class 1E Switchgear Rooms

• Electrical Penetration Rooms

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Diesel Generator Rooms

• Class 1E Battery Rooms

• Vital Inverter Rooms

• Vital DC Switchgear Rooms

• ESW Pump Rooms

• Ultimate Heat Sink (UHS) Electrical Equipment Rooms

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.1.3	Methodology for Shutdown System Selection	Refer to NEI-00-01 Rev 1 Figure 3-2 for a flowchart illustrating the various steps involved in selecting safe shutdown systems and developing the shutdown paths. The following methodology may be used to define the safe shutdown systems and paths for an Appendix R analysis:

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.1.3.1	Identify Safe Shutdown Functions	Review available documentation to obtain an understanding of the available plant systems and the functions required to achieve and maintain safe shutdown. Documents such as the following may be reviewed: - Operating Procedures (Normal, Emergency, Abnormal) - System descriptions - Fire Hazard Analysis - Single-line electrical diagrams - Piping and Instrumentation Diagrams (P&IDs) - [BWR] GE Report GE-NE-T43-00002-00-01-R02 entitled "Original Shutdown Paths for the BWR"

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Section 4.0, NSCA Design Inputs, of Callaway Plant Calculation KC-26 identifies the following types of documents and databases as sources of design input utilized for the development of the NSCA model:

• Callaway Plant FSAR

• Callaway Plant Technical Specifications

• Callaway Plant Design Basis Documents

• Callaway Plant Design Calculations

• Callaway Plant Piping and Instrumentation Diagrams

• Callaway Plant Electrical One-line Diagrams (electrical drawings)

• Callaway Plant Electrical Three-line Diagrams (electrical drawings)

• Callaway Plant Electrical Schematic Diagrams (electrical drawings)

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Callaway Plant Instrument Loop Diagrams (electrical drawings)

• Callaway Plant Operating Procedures

• Callaway Plant Piping and Instrumentation Diagrams

• Callaway Plant Electrical One-line Diagrams (electrical drawings)

• Callaway Plant Electrical Three-line Diagrams (electrical drawings)

• Callaway Plant Electrical Schematic Diagrams (electrical drawings)

• Callaway Plant Instrument Loop Diagrams (electrical drawings)

• Callaway Plant Raceway Plan Drawings

• Callaway Plant Exposed Conduit Drawings

• Callaway Plant USNRC Safety Evaluation Reports and Supplements

• Plant fire zone boundary partitioning drawings from Callaway Report R1843-004-001, Callaway Plant NFPA 805 Fire PRA Plant Boundary Definition and Partitioning

• The NSCA database tool.*

*The NSCA database tool is a safety-related cable and raceway database that is populated with information from Callaway's Cable and Raceway Tracking System (CARTS) and DIRECTOR databases.

The NSCA database tool is described in Section 9.0, Description of SAFE-PB, of Callaway Plant Calculation KC-26.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.1.3.2	Identify Combinations of Systems That Satisfy Each Safe Shutdown Function	Given the criteria/assumptions defined in Section 3.1.1, identify the available combinations of systems capable of achieving the safe shutdown functions of reactivity control, pressure control, inventory control, decay heat removal, process monitoring and support systems such as electrical and cooling systems (refer to Section 3.1.2). This selection process does not restrict the use of other systems. In addition to achieving the required safe shutdown functions, consider spurious operations and power supply issues that could impact the required safe shutdown function.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to identify the combinations of plant systems that satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 7.0 of KC-26:

"The purpose of NSCA model development and component selection activity is to create an accurate plant model that represents the Nuclear Safety Performance Criteria (NSPC) requirements from NFPA 805, Section 1.5.1. The NSCA model must identify and include plant systems / functions / components that are required to actively function in order satisfy the NSPC requirements. The NSCA model also must identify include plant systems / functions / components that are not required to actively function, but whose mal-operation (i.e., spurious operation), alone or in combination, could be adverse to meeting the NSPC requirements. The plant model should, within constraints of complexity and cost, maximize the diversity and number of potential success paths that are available to satisfy the NSPC requirements."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.1.3.3	Define Combination of Systems for Each Safe Shutdown Path	Select combinations of systems with the capability of performing all of the required safe shutdown functions and designate this set of systems as a safe shutdown path. In many cases, paths may be defined on a divisional basis since the availability of electrical power and other support systems must be demonstrated for each path. During the equipment selection phase, identify any additional support systems and list them for the appropriate path.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to determine the combinations of plant systems that satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Callaway Plant Calculation KC-26, Section 7.0, also identifies the overall process utilized to logically relate individual systems in support of each performance goal. Success paths for each performance goal are specified (i.e., performance goal-to-system logic success paths in the NSCA database tool). Each success path represents the minimum system combinations required to achieve a specific performance goal.

Certain support systems / functions, such as electrical power and cooling water, are modeled to directly support specific components and systems rather than to directly support performance goals. These relationships are illustrated by component-to-component logic success paths in the Callaway Plant NSCA model.

These relationships are maintained electronically in the NSCA database.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.1.3.4 Assign Shutdown Paths to Each Combination of Systems	Assign a path designation to each combination of systems. The path will serve to document the combination of systems relied upon for safe shutdown in each fire area. Refer to Attachment 1 to this document for an example of a table illustrating how to document the various combinations of systems for selected shutdown paths.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to determine the combinations of plant systems that satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Callaway Plant Calculation KC-26, Section 7.0, identifies that each performance goal may have multiple success paths representing a different combination of systems / functions (i.e., performance goal-to-system logic success paths in the NSCA database tool). Each combination of systems that represents a unique success path for a given performance goal is assigned a path number in the NSCA database tool. The path number is automatically assigned by the NSCA database tool.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.2	Safe Shutdown Equipment Selection	The previous section described the methodology for selecting the systems and paths necessary to achieve and maintain safe shutdown for an exposure fire event (see Section 5.0 DEFINITIONS for "Exposure Fire"). This section describes the criteria/assumptions and selection methodology for identifying the specific safe shutdown equipment necessary for the systems to perform their Appendix R function. The selected equipment should be related back to the safe shutdown systems that they support and be assigned to the same safe shutdown path as that system. The list of safe shutdown equipment will then form the basis for identifying the cables necessary for the operation or that can cause the maloperation of the safe shutdown systems.

Applicability	Comments
Applicable	None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

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NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.2.1	Criteria/Assumptions	Consider the following criteria and assumptions when identifying equipment necessary to perform the required safe shutdown functions:

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.1.1 Criteria/Assumptions	Safe shutdown equipment can be divided into two categories. Equipment may be categorized as (1) primary components or (2) secondary components. Typically, the following types of equipment are considered to be primary components: - Pumps, motor operated valves, solenoid valves, fans, gas bottles, dampers, unit coolers, etc. - All necessary process indicators and recorders (i.e., flow indicator, temperature indicator, turbine speed indicator, pressure indicator, level recorder) - Power supplies or other electrical components that support operation of primary components (i.e., diesel generators, switchgear, motor control centers, load centers, power supplies, distribution panels, etc.). Secondary components are typically items found within the circuitry for a primary component. These provide a supporting role to the overall circuit function. Some secondary components may provide an isolation function or a signal to a primary component via either an interlock or input signal processor. Examples of secondary components include flow switches, pressure switches, temperature switches, level switches, temperature elements, speed elements, transmitters, converters, controllers, transducers, signal conditioners, hand switches, relays, fuses and various instrumentation devices. Determine which equipment should be included on the Safe Shutdown Equipment List (SSEL). As an option, include secondary components with a primary component(s) that would be affected by fire damage to the secondary component. By doing this, the SSEL can be kept to a manageable size and the equipment included on the SSEL can be readily related to required post-fire safe shutdown systems and functions.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.2.1.1 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 8.0, Circuit Identification and Analysis (component selection is also performed during the circuit identification and analysis activity).

There is no explicit distinction made in the Callaway Plant NSCA between primary and secondary equipment; however, a similar approach is maintained through

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

the system-to-component logic success paths and the component-to-component logic success paths in the NSCA database tool.

• Mechanical and electrical system components such as pumps, air operated valves, motor operated valves, and solenoid operated valves, fans, heaters, electrically controlled circuit breakers, transformers, switchgear, motor control centers, batteries, battery chargers, inverters, distribution panels, automatic transfer switches, diesel generators and engines, strainers, instrumentation, and dampers, etc. which have an active function in achieving safe shutdown are included in the NSCA.

• Mechanical and electrical system passive components such as pumps, air operated valves, motor operated valves, and solenoid operated valves, fans, heaters, electrically controlled circuit breakers, instrumentation, and dampers, etc. are included in the NSCA if they maintain a system boundary or if the spurious operation(s) of the passive component(s) has an adverse impact on NSCA capabilities.

• Mechanical system passive components such as tanks, vessels, and heat exchangers which have no spurious failure mode are included in the NSCA for completeness.

• For air operated valves, the convention used for the Callaway Plant NSCA is for the component-to-cable logic success path to associate the required cable ID(s) to the pilot solenoid valve ID(s) or valve I/P ID (i.e., 4EMK04CA fails EMHY8843; 6BGI44CB fails BGHY0182), and for the component-to-component logic success path to associate the pilot solenoid valve ID(s) or valve I/P ID to the air operated valve ID (i.e., EMHY8843 fails EMHV8843; BGHY0182 fails BGHV0182).

• For process monitoring instrumentation, the convention used for the Callaway Plant NSCA is for the component-to-cable logic success path to associate the required cable ID(s) to the transmitting component ID (i.e., 1BBI16KA fails BBPT0455), and for the component-to-component logic success path to associate the indicator ID to the transmitting component ID (i.e., BBPT0455 fails BBPI0455).

• Control panels and discrete electrical and instrumentation components such as hand switches, relays, starters, fuses, indicating lights, molded case and other non-electrically operated circuit breakers, electrical disconnects, pull boxes, junction boxes, terminal boxes, signal converters, amplifiers, bistables, relay cards, instrument power supplies, etc. (excluding the transmitting devices and indicating devices) are not explicitly identified or included in the NFPA 805 NSPC Equipment List. These secondary components or sub-components are represented in the NSCA by virtue of the circuit conductors and cables that interconnect them to the primary component.

• Manual valves that are repositioned for credited NFPA 805 Recovery Actions are included in the NFPA 805 NSPC Equipment List.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.1.2 Criteria/Assumptions	Assume that exposure fire damage to manual valves and piping does not adversely impact their ability to perform their pressure boundary or safe shutdown function (heat sensitive piping materials, including tubing with brazed or soldered joints, are not included in this assumption). Fire damage should be evaluated with respect to the ability to manually open or close the valve should this be necessary as a part of the post-fire safe shutdown scenario.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.2.1.2 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 10.0, Deterministic Fire Area Assessment and Results.

Consideration of the fluid boundary isolation provided by a normally closed manual valve is applicable to, and included the development of the NSCA model and component selection, and the deterministic fire area assessment.

Consideration of the flowpath alignment provided by a normally open manual valve is applicable to, and included the development of the NSCA model and component selection, and the deterministic fire area assessment.

• Manual valves that are repositioned for credited NFPA 805 Recovery Actions are included in the NFPA 805 NSPC Equipment List, and are subject to assessment of feasibility per KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref

3.2.1.3 Criteria/Assumptions

NEI 00-01 Section 3 Guidance

Assume that manual valves are in their normal position as shown on P&IDs or in the plant operating procedures.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.2.1.3 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 10.0, Deterministic Fire Area Assessment and Results.

Consideration of the fluid boundary isolation provided by a normally closed manual valve is applicable to, and included the development of the NSCA model and component selection, and the deterministic fire area assessment.

Consideration of the flowpath alignment provided by a normally open manual valve is applicable to, and included the development of the NSCA model and component selection, and the deterministic fire area assessment.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.1.4 Criteria/Assumptions	Assume that a check valve closes in the direction of potential flow diversion and seats properly with sufficient leak tightness to prevent flow diversion. Therefore, check valves do not adversely affect the flow rate capability of the safe shutdown systems being used for inventory control, decay heat removal, equipment cooling or other related safe shutdown functions.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.2.1.4 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 10.0, Deterministic Fire Area Assessment and Results.

Consideration of the fluid boundary isolation provided by a check valve is applicable to, and included the development of the NSCA model and component selection, and the deterministic fire area assessment.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.1.5 Criteria/Assumptions	Instruments (e.g., resistance temperature detectors, thermocouples, pressure transmitters, and flow transmitters) are assumed to fail upscale, midscale, or downscale as a result of fire damage, whichever is worse. An instrument performing a control function is assumed to provide an undesired signal to the control circuit.

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.2.1.5 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, Section 8.0, Circuit Identification and Analysis (component selection is also performed during the circuit identification and analysis activity), and Section 10.0, Deterministic Fire Area Assessment and Results.

Consideration of these instrumentation failure modes is applicable to, and included the development of the NSCA model and component selection, the circuit identification and analysis, and the deterministic fire area assessment.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.1.6 Criteria/Assumptions	Identify equipment that could spuriously operate or mal-operate and impact the performance of equipment on a required safe shutdown path during the equipment selection phase. Consider Bin 1 of RIS 2004-03 during the equipment identification process.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns with Intent

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. This criteria / assumption listed in Section 3.2.1.6 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 8.0, Circuit Identification and Analysis (component selection is also performed during the circuit identification and analysis activity).

Identification of spurious equipment for the Callaway Plant NSCA does not include binning as described in RIS 2004-03.

• Mechanical and electrical system passive components such as pumps, air operated valves, motor operated valves, and solenoid operated valves, fans, heaters, electrically controlled circuit breakers, instrumentation, and dampers, etc. are included in the NSCA if they maintain a system boundary or if the spurious operation(s) of the passive component(s) has an adverse impact on NSCA capabilities.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.1.7 Criteria/Assumptions	Identify instrument tubing that may cause subsequent effects on instrument readings or signals as a result of fire. Determine and consider the fire area location of the instrument tubing when evaluating the effects of fire damage to circuits and equipment in the fire area.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection and fire area assessment. This criteria / assumption listed in Section 3.2.1.7 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 7.8 of KC-26:

Consideration of the potential adverse NSCA impact resulting from the heating of instrument tubing sensing lines is applicable to, and included the development of the NSCA model and component selection, and the deterministic fire area assessment.

Instrument tubing sensing lines for NSCA instrumentation have been identified, located, and incorporated into the NSCA model as components with a "-SL" suffix. These instrument tubing sensing line components fail their associated transmitting device through the component-to-component logic success path relationship in the NSCA model database. The instrument tubing sensing lines components are evaluated on a fire area basis, as applicable.

From Section 10.2 of KC-26:

"• When resolving component and cable failures the analyst is required to consider, and address as necessary, the potential impact resulting from the following:

• heating of instrument tubing sensing lines resulting in erroneous or unreliable signals from NSCA analyzed instrumentation (refer to Section 7.8 of [Calculation KC-26])"

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.2.2	Methodology for Equipment Selection	Refer to NEI-00-01 Rev 1 Figure 3-3 for a flowchart illustrating the various steps involved in selecting safe shutdown equipment. Use the following methodology to select the safe shutdown equipment for a post-fire safe shutdown analysis:

Applicability	Comments
Applicable	None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.2.1 Identify the System Flow Path for Each Shutdown Path	Mark up and annotate a P&ID to highlight the specific flow paths for each system in support of each shutdown path. Refer to Attachment 2 for an example of an annotated P&ID illustrating this concept.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns with Intent

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to identify the combinations of plant components for each plant system that is identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

A review of P&IDs, electrical drawings, instrument loop diagrams, etc. is performed to identify the NSCA systems, and to identify and develop the NSCA system-to-component logic relationships (i.e., Boolean logic / success paths) and the NSCA component-to-component logic success path relationships (i.e., success paths).

The reviewed documentation (i.e., drawing markups) is not required to be maintained as part of the NSCA record; however, the reviewed documentation (i.e., document numbers and revision levels) is recorded for configuration management.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.2.2.2	Identify the Equipment in Each Safe Shutdown System Flow Path Including Equipment That May Spuriously Operate and Affect System Operation	Review the applicable documentation (e.g. P&IDs, electrical drawings, instrument loop diagrams) to assure that all equipment in each system's flow path has been identified. Assure that any equipment that could spuriously operate and adversely affect the desired system function(s) is also identified. If additional systems are identified which are necessary for the operation of the safe shutdown system under review, include these as systems required for safe shutdown. Designate these new systems with the same safe shutdown path as the primary safe shutdown system under review (Refer to Figure 3-1).

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to identify the combinations of plant components for each plant system that is identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

A review of P&IDs, electrical drawings, instrument loop diagrams, etc. is performed to identify the NSCA systems, and to identify and develop the NSCA system-to-component logic relationships (i.e., Boolean logic / success paths) and the NSCA component-to-component logic success path relationships (i.e., success paths).

This is an iterative process.

• Mechanical and electrical system components such as pumps, air operated valves, motor operated valves, and solenoid operated valves, fans, heaters, electrically controlled circuit breakers, transformers, switchgear, motor control centers, batteries, battery chargers, inverters, distribution panels, automatic transfer switches, diesel generators and engines, strainers, instrumentation, and dampers, etc. which have an active function in achieving safe shutdown are included in the NSCA.

• Mechanical and electrical system passive components such as pumps, air operated valves, motor operated valves, and solenoid operated valves, fans, heaters, electrically controlled circuit breakers, instrumentation, and dampers, etc. are included in the NSCA if they maintain a system boundary or if the spurious operation(s) of the passive component(s) has an adverse impact on NSCA capabilities.

• Mechanical system passive components such as tanks, vessels, and heat exchangers which have no spurious failure mode are included in the NSCA for completeness.

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Control panels and discrete electrical and instrumentation components such as hand switches, relays, starters, fuses, indicating lights, molded case and other non-electrically operated circuit breakers, electrical disconnects, pull boxes, junction boxes, terminal boxes, signal converters, amplifiers, bistables, relay cards, instrument power supplies, etc. (excluding the transmitting devices and indicating devices) are not explicitly identified or included in the NFPA 805 NSPC Equipment List. These secondary components or sub-components are represented in the NSCA by virtue of the circuit conductors and cables that interconnect them to the primary component.

• Manual valves that are repositioned for credited NFPA 805 Recovery Actions are included in the NFPA 805 NSPC Equipment List.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.2.2.3	Develop a List of Safe Shutdown Equipment and Assign the corresponding System and Safe Shutdown Path(s) Designation to Each	Prepare a table listing the equipment identified for each system and the shutdown path that it supports. Identify any valves or other equipment that could spuriously operate and impact the operation of that safe shutdown system. Assign the safe shutdown path for the affected system to this equipment. During the cable selection phase, identify additional equipment required to support the safe shutdown function of the path (e.g., electrical distribution system equipment). Include this additional equipment in the safe shutdown equipment list. Attachment 3 to this document provides an example of a (SSEL). The SSEL identifies the list of equipment within the plant considered for safe shutdown and it documents various equipment-related attributes used in the analysis.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to identify the combinations of plant components for each plant system that is identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

The NFPA 805 NSPC Equipment List is maintained as Attachment 7-5 to Callaway Plant Calculation KC-26. Other attachments of KC-26 include data such as NSCA component fire zone and fire area location, NSCA component description, NSCA component association to system logic success path (i.e., system-to-component logic), NSCA system association to performance goal logic success path (i.e., performance goal-to-system logic), etc. This data is also contained within the NSCA database. The NSCA database also contains NSCA component drawing references.

Note: The NFPA 805 NSPC Equipment List also includes and specifically identifies Fire PRA and NPO equipment.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.2.2.4	Identify Equipment Information Required for the Safe Shutdown Analysis	Collect additional equipment-related information necessary for performing the post-fire safe shutdown analysis for the equipment. In order to facilitate the analysis, tabulate this data for each piece of equipment on the SSEL. Refer to Attachment 3 to this document for an example of a SSEL. Examples of related equipment data should include the equipment type, equipment description, safe shutdown system, safe shutdown path, drawing reference, fire area, fire zone, and room location of equipment. Other information such as the following may be useful in performing the safe shutdown analysis: normal position, hot shutdown position, cold shutdown position, failed air position, failed electrical position, high/low pressure interface concern, and spurious operation concern.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to identify the combinations of plant components for each plant system that is identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

The NFPA 805 NSPC Equipment List is maintained as Attachment 7-5 to Callaway Plant Calculation KC-26. Attachment 7-5 includes the following data associated with each NSCA Component ID:

- System ID
- System Desig. (by EPM)
- Component Type (by EPM) (e.g. MOV, AOV, Pilot Solenoid, etc. / failure position on loss of power and / or air, as applicable)
- Normal Pos. (normal component position with the plant operating at power)
- Hot Pos (SSD and/or PRA) (required hot shutdown position)
- Cold Pos (SSD) (required cold shutdown position)
- Comments #1 (amplifying notes and comments, including identification of high/low pressure interfaces)

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Comments #2 (additional amplifying notes and comments)

• Support Equipment (e.g., associated support components required for the NSCA component to perform its required function – primarily electrical distribution components; these associated support components are also identified as NSCA components)

• Needs Power (e.g., if the NSCA component needs electrical power to perform its required function(s); Y- yes, N - no, or NA – not applicable)

Other attachments of KC-26 include data such as NSCA component fire zone and fire area location, NSCA component description, NSCA component association to system logic success path (i.e., system-to-component logic), NSCA system association to performance goal logic success path (i.e., performance goal-to-system logic), etc. This data is also contained within the NSCA database. The NSCA database also contains NSCA component drawing references.

Note: The NFPA 805 NSPC Equipment List also includes and specifically identifies Fire PRA and NPO equipment.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.2.2.5 Identify Dependencies Between Equipment, Supporting Equipment, Safe Shutdown Systems and Safe Shutdown Paths	In the process of defining equipment and cables for safe shutdown, identify additional supporting equipment such as electrical power and interlocked equipment. As an aid in assessing identified impacts to safe shutdown, consider modeling the dependency between equipment within each safe shutdown path either in a relational database or in the form of a Safe Shutdown Logic Diagram (SSLD). Attachment 4 provides an example of a SSLD that may be developed to document these relationships.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 7.0, NSCA Model Development and Component Selection, identifies the overall process utilized to identify the combinations of plant components for each plant system that is identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Supporting equipment is tied to supported components through the use of component-to-component logic success path relationships in the NSCA database tool. The NSCA includes these component-to-component logic success path relationships when determining the effect of the a postulated fire event.

The NFPA 805 NSPC Equipment List is maintained as Attachment 7-5 to Callaway Plant Calculation KC-26. Attachment 7-5 includes the following data associated with each NSCA Component ID:

• System ID

• System Desig. (by EPM)

• Component Type (by EPM) (e.g. MOV, AOV, Pilot Solenoid, etc. / failure position on loss of power and / or air, as applicable)

• Normal Pos. (normal component position with the plant operating at power)

• Hot Pos (SSD and/or PRA) (required hot shutdown position)

• Cold Pos (SSD) (required cold shutdown position)

• Comments #1 (amplifying notes and comments, including identification of high/low pressure interfaces)

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

• Comments #2 (additional amplifying notes and comments)

• Support Equipment (e.g., associated support components required for the NSCA component to perform its required function – primarily electrical distribution components; these associated support components are also identified as NSCA components)

• Needs Power (e.g., if the NSCA component needs electrical power to perform its required function(s); Y- yes, N - no, or NA – not applicable)

Other attachments of KC-26 include data such as NSCA component fire zone and fire area location, NSCA component description, NSCA component association to system logic success path (i.e., system-to-component logic), NSCA system association to performance goal logic success path (i.e., performance goal-to-system logic), etc. This data is also contained within the NSCA database. The NSCA database also contains NSCA component drawing references.

Note: The NFPA 805 NSPC Equipment List also includes and specifically identifies Fire PRA and NPO equipment.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

2.4.2.2.1 Circuits Required in Nuclear Safety Functions. Circuits required for the nuclear safety functions shall be identified. This includes circuits that are required for operation, that could prevent the operation, or that result in the maloperation of the equipment identified in 2.4.2.1. This evaluation shall consider fire-induced failure modes such as hot shorts (external and internal), open circuits, and shorts to ground, to identify circuits that are required to support the proper operation of components required to achieve the nuclear safety performance criteria, including spurious operation and signals. This will ensure that a comprehensive population of circuitry is evaluated.

2.4.2.2.2 Other Required Circuits. Other circuits that share common power supply and/or common enclosure with circuits required to achieve nuclear safety performance criteria shall be evaluated for their impact on the ability to achieve nuclear safety performance criteria.

(a) Common Power Supply Circuits. Those circuits whose fire-induced failure could cause the loss of a power supply required to achieve the nuclear safety performance criteria shall be identified. This situation could occur if the upstream protection device (i.e., breaker or fuse) is not properly coordinated with the downstream protection device.

(b) Common Enclosure Circuits. Those circuits that share enclosures with circuits required to achieve the nuclear safety performance criteria and whose fire-induced failure could cause the loss of the required components shall be identified. The concern is that the effects of a fire can extend outside of the immediate fire area due to fire-induced electrical faults on inadequately protected cables or via inadequately sealed fire area boundaries.

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.3	Safe Shutdown Cable Selection and Location	This section provides industry guidance on the recommended methodology and criteria for selecting safe shutdown cables and determining their potential impact on equipment required for achieving and maintaining safe shutdown of an operating nuclear power plant for the condition of an exposure fire. The Appendix R safe shutdown cable selection criteria are developed to ensure that all cables that could affect the proper operation or that could cause the maloperation of safe shutdown equipment are identified and that these cables are properly related to the safe shutdown equipment whose functionality they could affect. Through this cable-to-equipment relationship, cables become part of the safe shutdown path assigned to the equipment affected by the cable.

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1 Criteria/Assumptions	To identify an impact to safe shutdown equipment based on cable routing, the equipment must have cables that affect it identified. Carefully consider how cables are related to safe shutdown equipment so that impacts from these cables can be properly assessed in terms of their ultimate impact on safe shutdown system equipment. Consider the following criteria when selecting cables that impact safe shutdown equipment:

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1.1 Criteria/Assumptions	The list of cables whose failure could impact the operation of a piece of safe shutdown equipment includes more than those cables connected to the equipment. The relationship between cable and affected equipment is based on a review of the electrical or elementary wiring diagrams. To assure that all cables that could affect the operation of the safe shutdown equipment are identified, investigate the power, control, instrumentation, interlock, and equipment status indication cables related to the equipment. Consider reviewing additional schematic diagrams to identify additional cables for interlocked circuits that also need to be considered for their impact on the ability of the equipment to operate as required in support of post fire safe shutdown. As an option, consider applying the screening criteria from Section 3.5 as a part of this section. For an example of this see Section 3.3.1.4.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. The criteria / assumptions listed in Section 3.3.1.1 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 8.0, Circuit Identification and Analysis.

Callaway Plant Calculation KC-26, Section 8.0, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

The circuit identification and analysis process includes consideration of "on-scheme" and "off-scheme" circuits (i.e., power, control, breaker protection current sensing loops, instrumentation, permissives, interlocks, etc.) with respect to the required function(s) for each NSCA component.

This is an iterative process which may result in the addition of new NSCA components to the NFPA 805 NSPC Equipment List, and the addition of new component-to-component logic success path relationships to the NSCA model. The new NSCA components added the NFPA 805 NSPC Equipment List are also subject to the circuit identification and analysis process described above.

The final set of NSCA cables identified to support the required function of each NSCA component are maintained utilizing a component-to-cable logic success path relationship in the NSCA database. The NSCA component-to-cable logic success path relationship is also provided in Callaway Plant Calculation KC-26, Attachment 8-1.

Reference Documents

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

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Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1.2 Criteria/Assumptions	In cases where the failure (including spurious actuations) of a single cable could impact more than one piece of safe shutdown equipment, include the cable with each piece of safe shutdown equipment.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. The criteria / assumptions listed in Section 3.3.1.2 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 8.0, Circuit Identification and Analysis.

Callaway Plant Calculation KC-26, Section 8.0, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

The circuit identification and analysis process includes consideration of "on-scheme" and "off-scheme" circuits (i.e., power, control, breaker protection current sensing loops, instrumentation, permissives, interlocks, etc.) with respect to the required function(s) for each NSCA component.

This is an iterative process which may result in the addition of new NSCA components to the NFPA 805 NSPC Equipment List, and the addition of new component-to-component logic success path relationships to the NSCA model. The new NSCA components added the NFPA 805 NSPC Equipment List are also subject to the circuit identification and analysis process described above.

A single cable, if determined to be required for more than one NSCA component, may be associated to each unique NSCA component ID utilizing the component-to-cable logic success path relationship in the NSCA database. Typically in the case of power cables, one cable may me associated to a single NSCA support component ID, and that NSCA support component ID may be associated to one or more other NSCA supported component IDs utilizing the component-to-component logic success path relationship in the NSCA database.

The final set of NSCA cables identified to support the required function of each NSCA component are maintained utilizing a component-to-cable logic success path relationship in the NSCA database. The NSCA component-to-cable logic success path relationship is also provided in Callaway Plant Calculation KC-26, Attachment 8-1.

The final set of NSCA support components identified to support the required function of each NSCA supported component are maintained utilizing a component-to-component logic success path relationship in the NSCA database. The NSCA component-to-component logic success path relationship is also provided in

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

Callaway Plant Calculation KC-26, Attachment 7-4 and Attachment 7-5.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1.3 Criteria/Assumptions	Electrical devices such as relays, switches and signal resistor units are considered to be acceptable isolation devices. In the case of instrument loops, review the isolation capabilities of the devices in the loop to determine that an acceptable isolation device has been installed at each point where the loop must be isolated so that a fault would not impact the performance of the safe shutdown instrument function.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. The criteria / assumptions listed in Section 3.3.1.3 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 8.0, Circuit Identification and Analysis.

Callaway Plant Calculation KC-26, Section 8.0, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Section 8.2 of Callaway Plant Calculation KC-26 provides the following considerations with respect to isolation devices and their application:

• Electrical devices such as fuses, molded case circuit breakers, relays (coil-to-contact), switches, and signal resistor units are considered to be acceptable isolation devices. In the case of instrument loops, review the isolation capabilities of the devices in the loop to determine that an acceptable isolation device has been installed at each point where the loop must be isolated so that a fault would not impact the performance of the safe shutdown instrument function. Circuit breakers that require DC control power to perform the protective overcurrent trip function are acceptable isolation devices provided that the DC control power and trip circuitry (inclusive of the current sensing loop) are demonstrated to be free of fire damage.

• Circuit identification and analysis must consider the normal position of switch and relay contacts within control circuits, similarly the circuit identification and analysis must consider the potential impact from switch and relay contacts having been repositioned following initiation of the fire event.

• Circuit identification and analysis for electrical distribution systems must consider the potential adverse impact from spurious closure, spurious trip, failure to trip on demand, failure to trip on overcurrent, etc. for all electrically operated circuit breakers, including loss of DC control power for close and trip function and including protective circuits (i.e., overcurrent protection, differential overcurrent protection, etc.).

Note that selective coordination of breakers / fuses is initially assumed during the circuit identification and analysis for each unique NSCA component. Selective

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

coordination of breakers / fuses is subsequently confirmed for the electrical distribution systems, electrical distribution components, and electrical distribution alignments included in the NSCA, NPO, and Fire PRA as part of the associated circuits assessment provided in Callaway Plant Calculation KC-26, Section 8.7, Associated Circuits - Purpose and Scope.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1.4 Criteria/Assumptions	Screen out cables for circuits that do not impact the safe shutdown function of a component (i.e., annunciator circuits, space heater circuits and computer input circuits) unless some reliance on these circuits is necessary. However, they must be isolated from the component's control scheme in such a way that a cable fault would not impact the performance of the circuit.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. The criteria / assumptions listed in Section 3.3.1.4 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 8.0, Circuit Identification and Analysis.

Callaway Plant Calculation KC-26, Section 8.0, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Section 8.2 of Callaway Plant Calculation KC-26 provides the considerations with respect to the screening of cables and /or circuits that do not impact the required function for each NSCA component, as applicable.

Not required cables are generally only identified in the NSCA database for primary scheme (i.e., "on-scheme") cables that are determined not to be required for the NSCA, NPO, or Fire PRA. These cables are identified in the NSCA database at the discretion of the preparer and reviewer of the circuit identification and analysis for each NSCA component to document that the primary scheme cables were indeed included and addressed in the circuit identification and analysis activity. The not required cables are typically assigned one of the following cable functions in the NSCA database:

• RC: 1 - isolated annunciation input circuit

• RC: 2 - isolated permissive/interlock

• RC: 3 - isolated space heater circuit

• RC: 4 - power cable to passive component (i.e., non high/low pressure interface MOV)

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

• RC: 5 - isolated computer input circuit

• RC: 6 - isolated or non-isolated indication/auto initiation circuit that cannot adversely impact required function of analyzed component

The final set of NSCA cables identified as not being required to support the required function of each NSCA component are maintained utilizing a component-to-cable logic success path relationship in the NSCA database. The NSCA component-to-cable logic success path relationship is also provided in Callaway Plant Calculation KC-26, Attachment 8-1.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1.5 Criteria/Assumptions	For each circuit requiring power to perform its safe shutdown function, identify the cable supplying power to each safe shutdown and/or required interlock component. Initially, identify only the power cables from the immediate upstream power source for these interlocked circuits and components (i.e., the closest power supply, load center or motor control center). Review further the electrical distribution system to capture the remaining equipment from the electrical power distribution system necessary to support delivery of power from either the offsite power source or the emergency diesel generators (i.e., onsite power source) to the safe shutdown equipment. Add this equipment to the safe shutdown equipment list. Evaluate the power cables for this additional equipment for associated circuits concerns.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. The criteria / assumptions listed in Section 3.3.1.5 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 8.0, Circuit Identification and Analysis (component selection is also performed during the circuit identification and analysis activity).

Callaway Plant Calculation KC-26, Section 7.0, identifies the overall process utilized to develop the NSCA model and select components required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

The NSCA model development and component selection process includes consideration for the following:

• With respect to the convention for identifying and associating electrical distribution equipment to NSCA components, the NSCA model development and component selection should utilize a “building block” approach consistent with NEI 00-01 Criteria / Assumption 3.3.1.5. The boundary for NSCA model development and component selection (for each NSCA component) should include only, as applicable, the upstream electrical power source for each NSCA component.

Callaway Plant Calculation KC-26, Section 8.0, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

The circuit identification and analysis process includes consideration for the following:

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

• With respect to the convention for associating power cables to NSCA components, the NSCA circuit identification and analysis should utilize a “building block” approach consistent with NEI 00-01 Criteria / Assumption 3.3.1.5. The boundary for NSCA circuit identification and analysis (for each NSCA component) should include only, as applicable, the power cables from the NSCA component to the upstream electrical power source.

Application of NEI 00-01 Criteria / Assumption 3.3.1.5 for the Callaway Plant NSCA is reflected in the final set of NSCA support components identified to support the required function of each NSCA supported component. These relationships are maintained utilizing a component-to-component logic success path relationship in the NSCA database. The NSCA component-to-component logic success path relationship is also provided in Callaway Plant Calculation KC-26, Attachment 7-4 and Attachment 7-5.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1.6 Criteria/Assumptions	The automatic initiation logics for the credited post-fire safe shutdown systems are not required to support safe shutdown. Each system can be controlled manually by operator actuation in the main control room or emergency control station. If operator actions outside the MCR are necessary, those actions must conform to the regulatory requirements on manual actions. However, if not protected from the effects of fire, the fire-induced failure of automatic initiation logic circuits must not adversely affect any post-fire safe shutdown system function.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. The criteria / assumptions listed in Section 3.3.1.6 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 8.0, Circuit Identification and Analysis (component selection is also performed during the circuit identification and analysis activity).

Callaway Plant Calculation KC-26, Section 7.0, identifies the overall process utilized to develop the NSCA model and select components required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

The NSCA model development and component selection process includes consideration for the following:

• Unless specifically included in the NFPA 805 NSPC Equipment List and modeled in the NSCA, credit is not taken in the NSCA model development and component selection for the actuation of any automatic safety features to assist in the operation of components to achieve the NFPA 805 NSPC. With respect to automatic signals, the model development and component selection for the NSCA ensures that components functional requirements are included in the NFPA 805 NSPC Equipment List and the NSCA database, as applicable, to identify NSCA components where the circuit identification and analysis will need to include the capability for the plant operator to reposition the NSCA component from the Main Control Room in the event that an ESFAS actuation had occurred, following manual reset of the ESFAS signal.

Section 7.10 of Callaway Plant Calculation KC-26 provides a discussion for the treatment of a valid and/or spurious actuation of the Engineered Safety Features Actuation System (ESFAS) in the Callaway Plant NSCA.

Callaway Plant Calculation KC-26, Section 8.0, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

Section 8.2 of Callaway Plant Calculation KC-26 provides the considerations with respect to the treatment of automatic signals in the circuit identification and analysis activity, as applicable.

Unless specifically included in the NFPA 805 NSPC Equipment List and modeled in the NSCA, credit is not taken in the circuit identification and analysis for the actuation of any automatic safety features to assist in the operation of components to achieve the NFPA 805 NSPC. With respect to automatic signals, based on component functional requirements identified in the NFPA 805 NSPC Equipment List and the NSCA database, the circuit identification and analysis for NSCA components ensures that circuits are included in the NSCA model, as applicable, that allow the plant operator to reposition the NSCA component from the Main Control Room in the event that an ESFAS actuation had occurred, following manual reset of the ESFAS actuation signal.

The NFPA 805 NSPC Equipment List is maintained as Attachment 7-5 to Callaway Plant Calculation KC-26.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.1.7 Criteria/Assumptions	Cabling for the electrical distribution system is a concern for those breakers that feed associated circuits and are not fully coordinated with upstream breakers. With respect to electrical distribution cabling, two types of cable associations exist. For safe shutdown considerations, the direct power feed to a primary safe shutdown component is associated with the primary component. For example, the power feed to a pump is necessary to support the pump. Similarly, the power feed from the load center to an MCC supports the MCC. However, for cases where sufficient branch-circuit coordination is not provided, the same cables discussed above would also support the power supply. For example, the power feed to the pump discussed above would support the bus from which it is fed because, for the case of a common power source analysis, the concern is the loss of the upstream power source and not the connected load. Similarly, the cable feeding the MCC from the load center would also be necessary to support the load center.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection. The criteria / assumptions listed in Section 3.3.1.7 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 8.0, Circuit Identification and Analysis.

Selective coordination of breakers / fuses has been confirmed for the electrical distribution systems, electrical distribution components, and electrical distribution alignments included in the NSCA, NPO, and Fire PRA as part of the associated circuits assessment provided in Callaway Plant Calculation KC-26, Section 8.7, Associated Circuits - Purpose and Scope. Selective coordination of breakers / fuses has been established through a review of the Callaway Plant Electrical Design Calculations identified in the associated circuits assessment.

From Section 8.7 of KC-26:

"The calculations identified in the references section of this assessment (i.e., Section 8.7 of Callaway Plant Calculation KC-26) address breaker / fuse coordination for the overall plant electrical design. These calculations envelop the topic of Associated Circuits by Common Power Supply (i.e., breaker / fuse coordination) with respect to 10 CFR 50 Appendix R and NFPA 805. The calculations address all of the electrical power supplies and electrical alignments being credited in the NFPA 805 NSPC Analysis and the Fire PRA. The calculations are performed consistent with accepted industry practices, and demonstrate that selective coordination has been achieved through the proper application and sizing of circuit overcurrent protection devices.

Furthermore, plant circuit breakers that require an external source of control power to perform their protective overcurrent trip function have been identified and

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

analyzed. The analysis was performed to ensure that all load breakers on the credited switchgear will remain functional to isolate potentially fire affected (non-credited) loads."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.3.2	Associated Circuit Cables	Associated Circuit Cables Appendix R, Section III.G.2, requires that separation features be provided for equipment and cables, including associated nonsafety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve hot shutdown. The three types of associated circuits were identified in Reference 6.1.5 and further clarified in a NRC memorandum dated March 22, 1982 from R. Mattson to D. Eisenhut, Reference 6.1.6. They are as follows: - Spurious actuations - Common power source - Common enclosure

Applicability	Comments
Applicable	None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.3.2 [A]	Associated Circuit Cables - Cable Whose Failure May Cause Spurious Actuations	Cables Whose Failure May Cause Spurious Actuations Safe shutdown system spurious actuation concerns can result from fire damage to a cable whose failure could cause the spurious actuation/mal-operation of equipment whose operation could affect safe shutdown. These cables are identified in Section 3.3.3 together with the remaining safe shutdown cables required to support control and operation of the equipment.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Section 8.2 of Callaway Plant Calculation KC-26 describes that the circuit identification and analysis for each NSCA component is defined from the functional requirements identified in the NFPA 805 NSPC Equipment List and the NSCA database. These functional requirements include: 1) normal position (at-power), required position for hot standby, and required position for cold shutdown.

Plant components whose spurious operation alone, or in combination with other components, could adversely affect NSCA capabilities are included in the NFPA 805 NSPC Equipment List (as NSCA components).

One or more cable is identified by the circuit identification and analysis as being required for an NSCA component if its failure alone (or their failure in combination) could adversely affect the desired position(s) / function(s) for the NSCA component, as applicable, based on consideration of the effects of open circuits, short circuits, and/or grounds.

• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA).

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA).

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

• No credit is taken for self-healing of electrical failures.

• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit.

The final set of NSCA cables identified to support the required function of each NSCA component are maintained utilizing a component-to-cable logic success path relationship in the NSCA database. The NSCA component-to-cable logic success path relationship is also provided in Callaway Plant Calculation KC-26, Attachment 8-1. The NSCA database and Attachment 8-1 identify the spurious cables together with other NSCA cables required to support control and operation of the NSCA components.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.3.2 [B]	Associated Circuit Cables - Common Power Source Cable	Common Power Source Cables The concern for the common power source associated circuits is the loss of a safe shutdown power source due to inadequate breaker/fuse coordination. In the case of a fire-induced cable failure on a non-safe shutdown load circuit supplied from the safe shutdown power source, a lack of coordination between the upstream supply breaker/fuse feeding the safe shutdown power source and the load breaker/fuse supplying the non-safe shutdown faulted circuit can result in loss of the safe shutdown bus. This would result in the loss of power to the safe shutdown equipment supplied from that power source preventing the safe shutdown equipment from performing its required safe shutdown function. Identify these cables together with the remaining safe shutdown cables required to support control and operation of the equipment. Refer to Section 3.5.2.4 for an acceptable methodology for analyzing the impact of these cables on post-fire safe shutdown.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

The electrical power distribution systems at Callaway Plant are described in Chapter 8.0, Electric Power, of the Callaway - SP, Final Safety Analysis Report (FSAR), Revision OL-14, dated December, 2004. Chapter 8 of the FSAR includes discussions of the design bases for the electrical distribution system, and provides reference to the applicable codes and standards that were utilized in the design of the systems, inclusive of cable design and sizing, selection of circuit protection, electrical separation, etc. The FSAR documents that high level design criteria that Callaway must continue to meet as changes are made to the facility through design modifications.

Callaway Plant has performed electrical design calculations which establish protective device setpoints and coordination.

Callaway Plant Calculation KC-26, Section 8.7, Associated Circuits - Purpose and Scope, confirms that selective coordination of breakers / fuses is maintained the electrical distribution systems, electrical distribution components, and electrical distribution alignments included in the NSCA, NPO, and Fire PRA. Selective coordination of breakers / fuses has been established through review of the Callaway Plant Electrical Design Calculations identified in Section 8.7.

From Section 8.7 of KC-26:

"The calculations identified in the references section of this assessment (i.e., Section 8.7 of Callaway Plant Calculation KC-26) address breaker / fuse coordination for the overall plant electrical design. These calculations envelop the topic of Associated Circuits by Common Power Supply (i.e., breaker / fuse coordination) with respect to 10 CFR 50 Appendix R and NFPA 805. The calculations address all of the electrical power supplies and electrical alignments being credited in the NFPA 805 NSPC Analysis and the Fire PRA. The calculations are performed consistent with accepted industry practices, and demonstrate that selective

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

coordination has been achieved through the proper application and sizing of circuit overcurrent protection devices.

Furthermore, plant circuit breakers that require an external source of control power to perform their protective overcurrent trip function have been identified and analyzed. The analysis was performed to ensure that all load breakers on the credited switchgear will remain functional to isolate potentially fire affected (non-credited) loads."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.3.2 [C]	Associated Circuit Cables - Common Enclosure Cables	Common Enclosure Cables The concern with common enclosure associated circuits is fire damage to a cable whose failure could propagate to other safe shutdown cables in the same enclosure either because the circuit is not properly protected by an isolation device (breaker/fuse) such that a fire-induced fault could result in ignition along its length, or by the fire propagating along the cable and into an adjacent fire area. This fire spread to an adjacent fire area could impact safe shutdown equipment in that fire area, thereby resulting in a condition that exceeds the criteria and assumptions of this methodology (i.e., multiple fires). Refer to Section 3.5.2.5 for an acceptable methodology for analyzing the impact of these cables on post-fire safe shutdown.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.7, Associated Circuits - Purpose and Scope, addresses common enclosure concerns, inclusive of an assessment for the open circuiting of current transformer (CT) secondaries.

From Section 8.7 of KC-26:

For common enclosure:

"Chapter 8 of the FSAR includes discussions of the design bases for the electrical distribution system, and provides reference to the applicable codes and standards that were utilized in the design of the systems, inclusive of cable design and sizing, selection of circuit protection, electrical separation, etc. The FSAR documents the high level design criteria that Callaway must continue to meet as changes are made to the facility through design modifications.

At Callaway, circuits are provided with overcurrent protection devices that will trip prior to damage to the cable in areas away from the fire. The Callaway Plant electrical single line drawings are identified in the references section of this assessment (i.e., KC-26, Section 8.7.1). These drawings were reviewed with respect to the application of overcurrent protection devices at various voltage levels for both Class 1E and Non-Class 1E circuits. This upper tier review in concert with proper cable sizing practices demonstrated by the available calculations discussed in the breaker / fuse coordination of this assessment (i.e., KC-26, Section 8.7.6) and by the general notes on the single line drawings which specify minimum cable sizes for standard breaker and fuse sizes establish a confidence level for cable protective device applications throughout the plant. These practices indicate that associated circuits of concern by common enclosure will not impact the ability to achieve a safe shutdown."

For current transformers:

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

"In all cases but one, the Callaway plant electrical design has addressed the possibility for CT secondary ignition failures in fire areas remote from the CT through the application of isolation transducers to isolate CT secondary circuits that leave the enclosure (typically switchgear) where the CT is physically located. Where this is not the case, other design features of the CT (i.e., CT turns ratio or relay accuracy class) will ensure that the CT does not pose a secondary ignition fire hazard. Where this is not the case, a fire hazard assessment has been performed to address the potential impact to deterministic safe shutdown capability resulting from a postulated secondary fire occurring in all of the fire area through which the CT secondary current loop is routed. These fire hazard assessments have identified no adverse impact to deterministic safe shutdown capability.

In one case, the CT could not be screened out by any means. Callaway Plant has requested approval from the NRC for this non-screened CT in the NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report Attachment X."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref

3.3.3 Methodology for Cable Selection and Location

NEI 00-01 Section 3 Guidance

Refer to Figure 3-4 for a flowchart illustrating the various steps involved in selecting the cables necessary for performing a post-fire safe shutdown analysis. Use the following methodology to define the cables required for safe shutdown including cables that may cause associated circuits concerns for a post-fire safe shutdown analysis:

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.3.1 Identify Circuits Required for the Operation of the Safe Shutdown Equipment	For each piece of safe shutdown equipment defined in section 3.2, review the appropriate electrical diagrams including the following documentation to identify the circuits (power, control, instrumentation) required for operation or whose failure may impact the operation of each piece of equipment: - Single-line electrical diagrams - Elementary wiring diagrams - Electrical connection diagrams - Instrument loop diagrams. For electrical power distribution equipment such as power supplies, identify any circuits whose failure may cause a coordination concern for the bus under evaluation. If power is required for the equipment, include the closest upstream power distribution source on the safe shutdown equipment list. Through the iterative process described in Figures 3-2 and 3-3, include the additional upstream power sources up to either the offsite or the emergency power source.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Section 8.2 of Callaway Plant Calculation KC-26 describes the circuit identification and analysis for each NSCA component to ensure that the functional requirements identified in the NFPA 805 NSPC Equipment List and the NSCA database for the NSCA component are met. These functional requirements include: 1) normal position (at-power), required position for hot standby, and required position for cold shutdown.

One or more cable is identified by the circuit identification and analysis as being required for an NSCA component if its failure alone (or their failure in combination) could adversely affect the desired position(s) / function(s) for the NSCA component, as applicable, based on consideration of the effects of open circuits, short circuits, and/or grounds.

• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and analysis for high/low pressure interface valves.

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only postulated in the circuit identification and analysis for high/low pressure interface valves.

• No credit is taken for self-healing of electrical failures.

• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit.

Section 8.2 of Calculation Plant Calculation KC-26 also identifies the process of iterative review, and the potential for new NSCA components to be identified through the circuit identification and analysis.

The final set of NSCA cables identified to support the required function of each NSCA component are maintained utilizing a component-to-cable logic success path relationship in the NSCA database. The NSCA component-to-cable logic success path relationship is also provided in Callaway Plant Calculation KC-26, Attachment 8-1. The NSCA database and Attachment 8-1 identify the NSCA cables required to support control and operation of the NSCA components. The NSCA database also includes drawing references with revision numbers for configuration management.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.3.3.2	Identify Interlocked Circuits and Cables Whose Spurious Operation or Mal-operation Could Affect Shutdown	In reviewing each control circuit, investigate interlocks that may lead to additional circuit schemes, cables and equipment. Assign to the equipment any cables for interlocked circuits that can affect the equipment. While investigating the interlocked circuits, additional equipment or power sources may be discovered. Include these interlocked equipment or power sources in the safe shutdown equipment list (refer to NEI-00-01 Rev 1 Figure 3-3) if they can impact the operation of the equipment under consideration.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Section 8.2 of Callaway Plant Calculation KC-26 describes that the circuit identification and analysis for each NSCA component includes a review for secondary scheme (i.e., "off-scheme") circuits to ensure that the functional requirements identified in the NFPA 805 NSPC Equipment List and the NSCA database for the NSCA component are met. These functional requirements include: 1) normal position (at-power), required position for hot standby, and required position for cold shutdown.

One or more cable is identified by the circuit identification and analysis as being required for an NSCA component if its failure alone (or their failure in combination) could adversely affect the desired position(s) / function(s) for the NSCA component, as applicable, based on consideration of the effects of open circuits, short circuits, and/or grounds.

• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and analysis for high/low pressure interface valves.

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only postulated in the circuit identification and analysis for high/low pressure interface valves.

• No credit is taken for self-healing of electrical failures.

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit.

Section 8.2 of Calculation Plant Calculation KC-26 also identifies the process of iterative review, and the potential for new NSCA components to be identified through the circuit identification and analysis.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.3.3 Assign Cables to the Safe Shutdown Equipment	Given the criteria/assumptions defined in Section 3.3.1, identify the cables required to operate or that may result in maloperation of each piece of safe shutdown equipment. Tabulate the list of cables potentially affecting each piece of equipment in a relational database including the respective drawing numbers, their revision and any interlocks that are investigated to determine their impact on the operation of the equipment. In certain cases, the same cable may support multiple pieces of equipment. Relate the cables to each piece of equipment, but not necessarily to each supporting secondary component. If adequate coordination does not exist for a particular circuit, relate the power cable to the power source. This will ensure that the power source is identified as affected equipment in the fire areas where the cable may be damaged.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to identify and analyze circuits for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Section 8.2 of Callaway Plant Calculation KC-26 describes the circuit identification and analysis for each NSCA component to ensure that the functional requirements identified in the NFPA 805 NSPC Equipment List and the NSCA database for the NSCA component are met. These functional requirements include: 1) normal position (at-power), required position for hot standby, and required position for cold shutdown.

One or more cable is identified by the circuit identification and analysis as being required for an NSCA component if its failure alone (or their failure in combination) could adversely affect the desired position(s) / function(s) for the NSCA component, as applicable, based on consideration of the effects of open circuits, short circuits, and/or grounds.

• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and analysis for high/low pressure interface valves.

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

postulated in the circuit identification and analysis for high/low pressure interface valves.

• No credit is taken for self-healing of electrical failures.

• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit.

The final set of NSCA cables identified to support the required function of each NSCA component are maintained utilizing a component-to-cable logic success path relationship in the NSCA database. The NSCA component-to-cable logic success path relationship is also provided in Callaway Plant Calculation KC-26, Attachment 8-1. The NSCA database and Attachment 8-1 identify the NSCA cables required to support control and operation of the NSCA components. The NSCA database also includes drawing references with revision numbers for configuration management.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.5	Circuit Analysis and Evaluation	This section on circuit analysis provides information on the potential impact of fire on circuits used to monitor, control and power safe shutdown equipment. Applying the circuit analysis criteria will lead to an understanding of how fire damage to the cables may affect the ability to achieve and maintain post-fire safe shutdown in a particular fire area. This section should be used in conjunction with Section 3.4, to evaluate the potential fire-induced impacts that require mitigation. Appendix R Section III.G.2 identifies the fire-induced circuit failure types that are to be evaluated for impact from exposure fires on safe shutdown equipment. Section III.G.2 of Appendix R requires consideration of hot shorts, shorts-to-ground and open circuits.

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref

3.5.1 Criteria/Assumptions

NEI 00-01 Section 3 Guidance

Apply the following criteria/assumptions when performing fire-induced circuit failure evaluations.

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.5.1.1 Criteria/Assumptions	Consider the following circuit failure types on each conductor of each unprotected safe shutdown cable to determine the potential impact of a fire on the safe shutdown equipment associated with that conductor. - A hot short may result from a fire-induced insulation breakdown between conductors of the same cable, a different cable or from some other external source resulting in a compatible but undesired impressed voltage or signal on a specific conductor. A hot short may cause a spurious operation of safe shutdown equipment. - An open circuit may result from a fire-induced break in a conductor resulting in the loss of circuit continuity. An open circuit may prevent the ability to control or power the affected equipment. An open circuit may also result in a change of state for normally energized equipment. (e.g. [for BWRs] loss of power to the Main Steam Isolation Valve (MSIV) solenoid valves due to an open circuit will result in the closure of the MSIVs). Note that RIS 2004-03 indicates that open circuits, as an initial mode of cable failures, are considered to be of very low likelihood. The risk-informed inspection process will focus on failures with relatively high probabilities. - A short-to-ground may result from a fire-induced breakdown of a cable insulation system, resulting in the potential on the conductor being applied to ground potential. A short-to-ground may have all of the same effects as an open circuit and, in addition, a short-to-ground may also cause an impact to the control circuit or power train of which it is a part. Consider the three types of circuit failures identified above to occur individually on each conductor of each safe shutdown cable on the required safe shutdown path in the fire area.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.5.1.1 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• Circuit analysis may be utilized to assess and disposition specific circuit failures modes (as documented in the NSCA equipment resolutions). Circuit analysis

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

conforms to the criteria / assumptions identified in Section 3. 0 and Section 8.0, Circuit Identification and Analysis, of Callaway Plant Calculation KC-26. The circuit analysis may discount spurious operation based on a fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.5.1.2 Criteria/Assumptions	Assume that circuit contacts are positioned (i.e., open or closed) consistent with the normal mode/position of the safe shutdown equipment as shown on the schematic drawings. The analyst must consider the position of the safe shutdown equipment for each specific shutdown scenario when determining the impact that fire damage to a particular circuit may have on the operation of the safe shutdown equipment.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.5.1.2 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• Circuit analysis may be utilized to assess and disposition specific circuit failures modes (as documented in the NSCA equipment resolutions). Circuit analysis conforms to the criteria / assumptions identified in Section 3. 0 and Section 8.0, Circuit Identification and Analysis, of Callaway Plant Calculation KC-26. The circuit analysis may discount spurious operation based on a fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage.

From Section 8.2 of KC-26:

Circuit identification and analysis is performed in the NSCA database for each NSCA component as applicable (circuit identification and analysis is not required for mechanical equipment, etc.). The circuit identification and analysis process involves the following steps:

a. identify and understand the normal position for the component at-power, or non-power, as applicable

b. identify and understand the desired position(s) / function(s) for the component at-power and/or non-power, as applicable

c. identify and understand the design function and response for the component under accident conditions, as applicable

From Section 8.2 of KC-26:

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

"• Circuit identification and analysis must consider the normal position of switch and relay contacts within control circuits, similarly the circuit identification and analysis must consider the potential impact from switch and relay contacts having been repositioned following initiation of the fire event."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.5.1.3 Criteria/Assumptions	Assume that circuit failure types resulting in spurious operations exist until action has been taken to isolate the given circuit from the fire area, or other actions have been taken to negate the effects of circuit failure that is causing the spurious actuation. The fire is not assumed to eventually clear the circuit fault. Note that RIS 2004-03 indicates that fire-induced hot shorts typically self-mitigate after a limited period of time.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.5.1.3 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• Circuit analysis may be utilized to assess and disposition specific circuit failures modes (as documented in the NSCA equipment resolutions). Circuit analysis conforms to the criteria / assumptions identified in Section 3. 0 and Section 8.0, Circuit Identification and Analysis, of Callaway Plant Calculation KC-26. The circuit analysis may discount spurious operation based on a fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage.

From Section 8.2 of KC-26:

"• No credit is taken for self-healing of electrical failures."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref

3.5.1.4 Criteria/Assumptions

NEI 00-01 Section 3 Guidance

When both trains are in the same fire area outside of primary containment, all cables that do not meet the separation requirements of Section III.G.2 are assumed to fail in their worst case configuration.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.5.1.4 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• An initial deterministic analysis is run with the NSCA database tool for each fire area (or analysis area). The initial fire area analysis assumes that all NSCA equipment and NSCA cables physically located in the fire area fail to their worst case condition or state.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.5.1.5 Criteria/Assumptions	The following guidance provides the NRC inspection focus from Bin 1 of RIS 2004-03 in order to identify any potential combinations of spurious operations with higher risk significance. Bin 1 failures should also be the focus of the analysis; however, NRC has indicated that other types of failures required by the regulations for analysis should not be disregarded even if in Bin 2 or 3. If Bin 1 changes in subsequent revisions of RIS 2004-03, the guidelines in the revised RIS should be followed.

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.5.1.5 Criteria/Assumptions	Cable Failure Modes. For multiconductor cables testing has demonstrated that conductor-to-conductor shorting within the same cable is the most common mode of failure. This is often referred to as "intra-cable shorting." It is reasonable to assume that given damage, more than one conductor-to-conductor short will occur in a given cable. A second primary mode of cable failure is conductor-to-conductor shorting between separate cables, commonly referred to as "inter-cable shorting." Inter-cable shorting is less likely than intra-cable shorting. Consistent with the current knowledge of fire-induced cable failures, the following configurations should be considered: A. For any individual multiconductor cable (thermoset or thermoplastic), any and all potential spurious actuations that may result from intra-cable shorting, including any possible combination of conductors within the cable, may be postulated to occur concurrently regardless of number. However, as a practical matter, the number of combinations of potential hot shorts increases rapidly with the number of conductors within a given cable. For example, a multiconductor cable with three conductors (3C) has 3 possible combinations of two (including desired combinations), while a five conductor cable (5C) has 10 possible combinations of two (including desired combinations), and a seven conductor cable (7C) has 21 possible combinations of two (including desired combinations). To facilitate an inspection that considers most of the risk presented by postulated hot shorts within a multiconductor cable, inspectors should consider only a few (three or four) of the most critical postulated combinations. B. For any thermoplastic cable, any and all potential spurious actuations that may result from intra-cable and inter-cable shorting with other thermoplastic cables, including any possible combination of conductors within or between the cables, may be postulated to occur concurrently regardless of number. (The consideration of thermoset cable inter-cable shorts is deferred pending additional research.) C. For cases involving the potential damage of more than one multiconductor cable, a maximum of two cables should be assumed to be damaged concurrently. The spurious actuations should be evaluated as previously described. The consideration of more than two cables being damaged (and subsequent spurious actuations) is deferred pending additional research. D. For cases involving direct current (DC) circuits, the potential spurious operation due to failures of the associated control cables (even if the spurious operation requires two concurrent hot shorts of the proper polarity, e.g., plus-to-plus and minus-to-minus) should be considered when the required source and target conductors are each located within the same multiconductor cable. E. Instrumentation Circuits. Required instrumentation circuits are beyond the scope of this associated circuit approach and must meet the same requirements as required power and control circuits. There is one case where an instrument circuit could potentially be considered an associated circuit. If fire-induced damage of an instrument circuit could prevent

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

operation (e.g., lockout permissive signal) or cause maloperation (e.g., unwanted start/stop/reposition signal) of systems necessary to achieve and maintain hot shutdown, then the instrument circuit may be considered an associated circuit and handled accordingly.

Likelihood of Undesired Consequences

Determination of the potential consequence of the damaged associated circuits is based on the examination of specific NPP piping and instrumentation diagrams (P&IDs) and review of components that could prevent operation or cause maloperation such as flow diversions, loss of coolant, or other scenarios that could significantly impair the NPP's ability to achieve and maintain hot shutdown. When considering the potential consequence of such failures, the [analyst] should also consider the time at which the prevented operation or maloperation occurs. Failures that impede hot shutdown within the first hour of the fire tend to be most risk significant in a first-order evaluation. Consideration of cold-shutdown circuits is deferred pending additional research.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA circuit identification and analysis. The criteria / assumptions listed in Section 3.5.1.5 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 8.0, Circuit Identification and Analysis.

From Section 8.2 of KC-26:

"e. Postulate the effects of open circuits, short circuits, and/or grounds upon the desired position(s) / function(s) for the component at-power and/or non-power, as applicable"

"• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA).

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA).

• No credit is taken for self-healing of electrical failures.

• Multiple AC and DC grounds are postulated in the circuit identification and analysis. Multiple grounds in ungrounded AC or DC systems can result in clearing of fuses, or tripping of breakers."

"• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit. However, the deterministic NSCA area-by-area analyses may discount spurious operation based on the fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage."

Circuit identification and analysis for the Callaway Plant NSCA does not include limiting assumptions as described in RIS 2004-03.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.5.2	Types of Circuit Failures	Appendix R requires that nuclear power plants must be designed to prevent exposure fires from defeating the ability to achieve and maintain post-fire safe shutdown. Fire damage to circuits that provide control and power to equipment on the required safe shutdown path and any other equipment whose spurious operation/mal-operation could affect shutdown in each fire area must be evaluated for the effects of a fire in that fire area. Only one fire at a time is assumed to occur. The extent of fire damage is assumed to be limited by the boundaries of the fire area. Given this set of conditions, it must be assured that one redundant train of equipment capable of achieving hot shutdown is free of fire damage for fires in every plant location. To provide this assurance, Appendix R requires that equipment and circuits required for safe shutdown be free of fire damage and that these circuits be designed for the fire-induced effects of a hot short, short-to-ground, and open circuit. With respect to the electrical distribution system, the issue of breaker coordination must also be addressed. This section will discuss specific examples of each of the following types of circuit failures: - Open circuit - Short-to-ground - Hot short.

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.5.2.1 Circuit Failures Due to an Open Circuit	This section provides guidance for addressing the effects of an open circuit for safe shutdown equipment. An open circuit is a fire-induced break in a conductor resulting in the loss of circuit continuity. An open circuit will typically prevent the ability to control or power the affected equipment. An open circuit can also result in a change of state for normally energized equipment. For example, a loss of power to the main steam isolation valve (MSIV) solenoid valves [for BWRs] due to an open circuit will result in the closure of the MSIV. NOTE: The EPRI circuit failure testing indicated that open circuits are not likely to be the initial fire-induced circuit failure mode. Consideration of this may be helpful within the safe shutdown analysis. Consider the following consequences in the safe shutdown circuit analysis when determining the effects of open circuits: - Loss of electrical continuity may occur within a conductor resulting in deenergizing the circuit and causing a loss of power to, or control of, the required safe shutdown equipment. - In selected cases, a loss of electrical continuity may result in loss of power to an interlocked relay or other device. This loss of power may change the state of the equipment. Evaluate this to determine if equipment fails safe. - Open circuit on a high voltage (e.g., 4.16 kV) ammeter current transformer (CT) circuit may result in secondary damage.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to perform circuit identification and analysis for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 8.2 of KC-26:

"e. Postulate the effects of open circuits, short circuits, and/or grounds upon the desired position(s) / function(s) for the component at-power and/or non-power, as applicable"

"• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA).

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA)."

"• Multiple AC and DC grounds are postulated in the circuit identification and analysis. Multiple grounds in ungrounded AC or DC systems can result in clearing of fuses, or tripping of breakers."

"• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit. However, the deterministic NSCA area-by-area analyses may discount spurious operation based on the fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage."

Callaway Plant Calculation KC-26, Section 8.7, Associated Circuits - Purpose and Scope, addresses common enclosure concerns, inclusive of an assessment for the open circuiting of current transformer (CT) secondaries.

From Section 8.7 of KC-26:

For current transformers:

"In all cases but one, the Callaway plant electrical design has addressed the possibility for CT secondary ignition failures in fire areas remote from the CT through the application of isolation transducers to isolate CT secondary circuits that leave the enclosure (typically switchgear) where the CT is physically located. Where this is not the case, other design features of the CT (i.e., CT turns ratio or relay accuracy class) will ensure that the CT does not pose a secondary ignition fire hazard. Where this is not the case, a fire hazard assessment has been performed to address the potential impact to deterministic safe shutdown capability resulting from a postulated secondary fire occurring in all of the fire area through which the CT secondary current loop is routed. These fire hazard assessments have identified no adverse impact to deterministic safe shutdown capability.

In one case, the CT could not be screened out by any means. Callaway Plant has requested approval from the NRC for this non-screened CT in the NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report Attachment X."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.5.2.2	Circuit Failures Due to a Short-to-Ground	This section provides guidance for addressing the effects of a short-to-ground on circuits for safe shutdown equipment. A short-to-ground is a fire-induced breakdown of a cable insulation system resulting in the potential on the conductor being applied to ground potential. A short-to-ground can cause a loss of power to or control of required safe shutdown equipment. In addition, a short-to-ground may affect other equipment in the electrical power distribution system in the cases where proper coordination does not exist. Consider the following consequences in the post-fire safe shutdown analysis when determining the effects of circuit failures related to shorts-to-ground: - A short to ground in a power or a control circuit may result in tripping one or more isolation devices (i.e. breaker/fuse) and causing a loss of power to or control of required safe shutdown equipment. - In the case of certain energized equipment such as HVAC dampers, a loss of control power may result in loss of power to an interlocked relay or other device that may cause one or more spurious operations.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to perform circuit identification and analysis for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 8.2 of KC-26:

"e. Postulate the effects of open circuits, short circuits, and/or grounds upon the desired position(s) / function(s) for the component at-power and/or non-power, as applicable"

"• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA).

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA)."

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

"• Multiple AC and DC grounds are postulated in the circuit identification and analysis. Multiple grounds in ungrounded AC or DC systems can result in clearing of fuses, or tripping of breakers."

"• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit. However, the deterministic NSCA area-by-area analyses may discount spurious operation based on the fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.5.2.3 Circuit Failures Due to a Hot Short	This section provides guidance for analyzing the effects of a hot short on circuits for required safe shutdown equipment. A hot short is defined as a fire induced insulation breakdown between conductors of the same cable, a different cable or some other external source resulting in an undesired impressed voltage on a specific conductor. The potential effect of the undesired impressed voltage would be to cause equipment to operate or fail to operate in an undesired manner. Consider the following specific circuit failures related to hot shorts as part of the post-fire safe shutdown analysis: - A hot short between an energized conductor and a de-energized conductor within the same cable may cause a spurious actuation of equipment. The spuriously actuated device (e.g., relay) may be interlocked with another circuit that causes the spurious actuation of other equipment. This type of hot short is called a conductor-to-conductor hot short or an internal hot short. - A hot short between any external energized source such as an energized conductor from another cable (thermoplastic cables only) and a de-energized conductor may also cause a spurious actuation of equipment. This is called a cable-to-cable hot short or an external hot short. Cable-to-cable hot shorts between thermoset cables are not postulated to occur pending additional research.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to perform circuit identification and analysis for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 8.2 of KC-26:

"e. Postulate the effects of open circuits, short circuits, and/or grounds upon the desired position(s) / function(s) for the component at-power and/or non-power, as applicable"

"• Multiple simultaneous circuit failures are postulated in the circuit identification and analysis (affecting multiple cables, affecting multiple conductors within cables). No limit is prescribed to the number or type circuit failures that are postulated to occur except as modified by the following:

• Spurious operation, when resulting only from properly sequenced three-phase to three-phase external hot shorts is only postulated in the circuit identification and

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NFPA 805 Section: 2.4.2.2 Nuclear Safety Capability Circuit Analysis

analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA).

• Spurious operation, when only resulting from positive to positive (+ to +) and negative to negative (- to -) external DC hot shorts in ungrounded DC circuits is only postulated in the circuit identification and analysis for high/low pressure interface valves and high consequence Fire PRA valves (as defined by the Fire PRA)."

"• The circuit identification and analysis does not screen out cables on the basis of jacket material, insulation material, shielding, and/or the cable being routed in a dedicated conduit. However, the deterministic NSCA area-by-area analyses may discount spurious operation based on the fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.3 Nuclear Safety Equipment and Cable Location

Physical location of equipment and cables shall be identified.

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.3.3.4 Identify Routing of Cables	Identify the routing for each cable including all raceway and cable endpoints. Typically, this information is obtained from joining the list of safe shutdown cables with an existing cable and raceway database.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Section 8.6 of Callaway Plant Calculation KC-26, describes the overall process for assigning fire zone locations to NSCA components and NSCA cable via raceways. This includes assigning fire zone locations to NSCA cable to/from equipment.

Fire zone location is performed through review of plant equipment and raceway layout drawings, and plant fire zone boundary partitioning drawings from Callaway Report R1843-004-001, Callaway Plant NFPA 805 Fire PRA Plant Boundary Definition and Partitioning.

The fire zone location for NSCA components, NSCA cable via raceways, and NSCA cable to/from equipment, is identified in Callaway Plant Calculation KC-26, Attachment 8-2 (NSCA components), Attachment 8-3 (NSCA cable to/from equipment), and Attachment 8-4 (NSCA cable raceways), and in the NSCA database.

Fire areas are assigned to NSCA components, NSCA cable to/from equipment, and NSCA cable via raceways based on the fire zone-to-fire area relationships maintained in the NSCA database. Callaway Plant Calculation KC-26, Section 6.0, Identification of Callaway Plant Fire Areas / Compartments, includes Attachment 6-1 which provides a table of the fire zone-to-fire area relationships. Cable fire areas are automatically assigned by the NSCA database through the relationship of a cable to its respective via raceways and their fire areas, and to its respective to/from equipment and their fire areas.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.3 Nuclear Safety Equipment and Cable Location

NEI 00-01 Ref

3.3.3.5 Identify Location of Raceway and Cables by Fire Area

NEI 00-01 Section 3 Guidance

Identify the fire area location of each raceway and cable endpoint identified in the previous step and join this information with the cable routing data. In addition, identify the location of field-routed cable by fire area. This produces a database containing all of the cables requiring fire area analysis, their locations by fire area, and their raceway.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

See Section 3.3.3.4 of this table.

The existing methodology aligns with NEI 00-01 guidance.

Reference Documents

Not Applicable

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NFPA 805 Section: 2.4.2.3 Nuclear Safety Equipment and Cable Location

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.5.2.4	Circuit Failures Due to Inadequate Circuit Coordination	The evaluation of associated circuits of a common power source consists of verifying proper coordination between the supply breaker/fuse and the load breakers/fuses for power sources that are required for safe shutdown. The concern is that, for fire damage to a single power cable, lack of coordination between the supply breaker/fuse and the load breakers/fuses can result in the loss of power to a safe shutdown power source that is required to provide power to safe shutdown equipment. A coordination study should demonstrate the coordination status for each required common power source. For coordination to exist, the time-current curves for the breakers, fuses and/or protective relaying must demonstrate that a fault on the load circuits is isolated before tripping the upstream breaker that supplies the bus. Furthermore, the available short circuit current on the load circuit must be considered to ensure that coordination is demonstrated at the maximum fault level. The methodology for identifying potential associated circuits of a common power source and evaluating circuit coordination cases of associated circuits on a single circuit fault basis is as follows: - Identify the power sources required to supply power to safe shutdown equipment. - For each power source, identify the breaker/fuse ratings, types, trip settings and coordination characteristics for the incoming source breaker supplying the bus and the breakers/fuses feeding the loads supplied by the bus. - For each power source, demonstrate proper circuit coordination using acceptable industry methods. - For power sources not properly coordinated, tabulate by fire area the routing of cables whose breaker/fuse is not properly coordinated with the supply breaker/fuse. Evaluate the potential for disabling power to the bus in each of the fire areas in which the associated circuit cables of concern are routed and the power source is required for safe shutdown. Prepare a list of the following information for each fire area: - Cables of concern. - Affected common power source and its path. - Raceway in which the cable is enclosed. - Sequence of the raceway in the cable route. - Fire zone/area in which the raceway is located. For fire zones/areas in which the power source is disabled, the effects are mitigated by appropriate methods. - Develop analyzed safe shutdown circuit dispositions for the associated circuit of concern cables routed in an area of the

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.3 Nuclear Safety Equipment and Cable Location

same path as required by the power source. Evaluate adequate separation based upon the criteria in Appendix R, NRC staff guidance, and plant licensing bases.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to perform circuit identification and analysis for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Selective coordination of breakers / fuses has been confirmed for the electrical distribution systems, electrical distribution components, and electrical distribution alignments included in the NSCA, NPO, and Fire PRA as part of the associated circuits assessment provided in Callaway Plant Calculation KC-26, Section 8.7, Associated Circuits - Purpose and Scope. Selective coordination of breakers / fuses has been established through a review of the Callaway Plant Electrical Design Calculations identified in the associated circuits assessment.

From Section 8.7 of KC-26:

"The calculations identified in the references section of this assessment (i.e., Section 8.7 of Callaway Plant Calculation KC-26) address breaker / fuse coordination for the overall plant electrical design. These calculations envelop the topic of Associated Circuits by Common Power Supply (i.e., breaker / fuse coordination) with respect to 10 CFR 50 Appendix R and NFPA 805. The calculations address all of the electrical power supplies and electrical alignments being credited in the NFPA 805 NSPC Analysis and the Fire PRA. The calculations are performed consistent with accepted industry practices, and demonstrate that selective coordination has been achieved through the proper application and sizing of circuit overcurrent protection devices.

Furthermore, plant circuit breakers that require an external source of control power to perform their protective overcurrent trip function have been identified and analyzed. The analysis was performed to ensure that all load breakers on the credited switchgear will remain functional to isolate potentially fire affected (non-credited) loads."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.3 Nuclear Safety Equipment and Cable Location

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.5.2.5	Circuit Failures Due to Common Enclosure Concerns	The common enclosure associated circuit concern deals with the possibility of causing secondary failures due to fire damage to a circuit either whose isolation device fails to isolate the cable fault or protect the faulted cable from reaching its ignition temperature, or the fire somehow propagates along the cable into adjoining fire areas. The electrical circuit design for most plants provides proper circuit protection in the form of circuit breakers, fuses and other devices that are designed to isolate cable faults before ignition temperature is reached. Adequate electrical circuit protection and cable sizing are included as part of the original plant electrical design maintained as part of the design change process. Proper protection can be verified by review of as-built drawings and change documentation. Review the fire rated barrier and penetration designs that preclude the propagation of fire from one fire area to the next to demonstrate that adequate measures are in place to alleviate fire propagation concerns.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 8.0, Circuit Identification and Analysis, identifies the overall process utilized to perform circuit identification and analysis for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

Callaway Plant Calculation KC-26, Section 8.7, Associated Circuits - Purpose and Scope, addresses common enclosure concerns, inclusive of an assessment for the open circuiting of current transformer (CT) secondaries.

From Section 8.7 of KC-26:

For common enclosure:

"Chapter 8 of the FSAR includes discussions of the design bases for the electrical distribution system, and provides reference to the applicable codes and standards that were utilized in the design of the systems, inclusive of cable design and sizing, selection of circuit protection, electrical separation, etc. The FSAR documents the high level design criteria that Callaway must continue to meet as changes are made to the facility through design modifications.

At Callaway, circuits are provided with overcurrent protection devices that will trip prior to damage to the cable in areas away from the fire. The Callaway Plant electrical single line drawings are identified in the references section of this assessment (i.e., KC-26, Section 8.7.1). These drawings were reviewed with respect to the application of overcurrent protection devices at various voltage levels for both Class 1E and Non-Class 1E circuits. This upper tier review in concert with proper cable sizing practices demonstrated by the available calculations discussed in the breaker / fuse coordination of this assessment (i.e., KC-26, Section

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.3 Nuclear Safety Equipment and Cable Location

8.7.6) and by the general notes on the single line drawings which specify minimum cable sizes for standard breaker and fuse sizes establish a confidence level for cable protective device applications throughout the plant. These practices indicate that associated circuits of concern by common enclosure will not impact the ability to achieve a safe shutdown."

For current transformers:

"In all cases but one, the Callaway plant electrical design has addressed the possibility for CT secondary ignition failures in fire areas remote from the CT through the application of isolation transducers to isolate CT secondary circuits that leave the enclosure (typically switchgear) where the CT is physically located. Where this is not the case, other design features of the CT (i.e., CT turns ratio or relay accuracy class) will ensure that the CT does not pose a secondary ignition fire hazard. Where this is not the case, a fire hazard assessment has been performed to address the potential impact to deterministic safe shutdown capability resulting from a postulated secondary fire occurring in all of the fire area through which the CT secondary current loop is routed. These fire hazard assessments have identified no adverse impact to deterministic safe shutdown capability.

In one case, the CT could not be screened out by any means. Callaway Plant has requested approval from the NRC for this non-screened CT in the NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report Attachment X."

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

An engineering analysis shall be performed in accordance with the requirements of Section 2.3 for each fire area to determine the effects of fire or fire suppression activities on the ability to achieve the nuclear safety performance criteria of Section 1.5. See Chapter 4 for methods of achieving these performance criteria (performance-based or deterministic).

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.4	Fire Area Assessment and Compliance Strategies	By determining the location of each component and cable by fire area and using the cable to equipment relationships described above, the affected safe shutdown equipment in each fire area can be determined. Using the list of affected equipment in each fire area, the impacts to safe shutdown systems, paths and functions can be determined. Based on an assessment of the number and types of these impacts, the required safe shutdown path for each fire area can be determined. The specific impacts to the selected safe shutdown path can be evaluated using the circuit analysis and evaluation criteria contained in Section 3.5 of this document. Having identified all impacts to the required safe shutdown path in a particular fire area, this section provides guidance on the techniques available for individually mitigating the effects of each of the potential impacts.

Applicability	Comments
Applicable	None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1 Criteria/Assumptions	The following criteria and assumptions apply when performing fire area compliance assessment to mitigate the consequences of the circuit failures identified in the previous sections for the required safe shutdown path in each fire area.

Applicability	Comments
Applicable	None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref

3.4.1.1 Criteria/Assumptions

NEI 00-01 Section 3 Guidance

Assume only one fire in any single fire area at a time.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.4.1.1 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• A deterministic NSCA is performed for each fire area of the plant utilizing the NSCA database tool to determine the final NSCA compliance strategy assuming one all consuming fire in a single fire area at a time. The objective is to recover at least one NSCA success path for each NSCA performance goal-to-system logic based on identification of the least impacted train of plant equipment.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1.2 Criteria/Assumptions	Assume that the fire may affect all unprotected cables and equipment within the fire area. This assumes that neither the fire size nor the fire intensity is known. This is conservative and bounds the exposure fire that is required by the regulation.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.4.1.2 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• An initial deterministic analysis is run with the NSCA database tool for each fire area (or analysis area). The initial fire area analysis assumes that all unprotected NSCA equipment and NSCA cables physically located in the fire area fail to their worst case condition or state.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1.3 Criteria/Assumptions	Address all cable and equipment impacts affecting the required safe shutdown path in the fire area. All potential impacts within the fire area must be addressed. The focus of this section is to determine and assess the potential impacts to the required safe shutdown path selected for achieving post-fire safe shutdown and to assure that the required safe shutdown path for a given fire area is properly protected.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.4.1.3 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• Where the initial NSCA analysis run identifies that there is no success path available to satisfy the NSPC in a given fire area, then subsequent iterations of the NSCA analysis is required, as necessary, to recover ("resolve") at least one success path to satisfy the NSPC in the given fire area. Separation requirements for the deterministic approach to demonstrate the NSPC are identified from NFPA 805, Section 4.2.3. These requirements must be satisfied for the fire area to be deterministically compliant.

• The NSCA compliance strategy for these “resolved” fire areas in the NSCA database typically ends up crediting the least affected success path. This strategy for “resolution” generally involves the resolution of supporting functions first (i.e., electrical distribution, cooling water, etc.), followed by resolution of the supported front line systems / functions / components (i.e., Reactivity Control, Inventory Control, etc.).

• The deterministic NSCA for each “resolved” fire area in the NSCA database may rely on NSCA database equipment and/or cable resolutions.

• NSCA equipment resolutions identify and provide a traceable link for each component failure on a fire area basis that requires further engineering justification to be determined acceptable as-is (i.e., not having any adverse impact to the NSCA), or that requires further engineering review to identify and PROPOSE a plant change such as an OPERATOR MANUAL ACTION, or a physical plant modification. Each equipment resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• NSCA cable resolutions identify and provide a traceable link for protected cables in the fire area (i.e., raceway protected by ERFBS, raceway embedded in

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

concrete with evaluation, raceway routed in buried ductbank through one or more manhole). Each cable resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• Circuit analysis may be utilized to assess and disposition specific circuit failures modes (as documented in the NSCA equipment resolutions). Circuit analysis conforms to the criteria / assumptions identified in Section 3. 0 and Section 8.0, Circuit Identification and Analysis, of Callaway Plant Calculation KC-26. The circuit analysis may discount spurious operation based on a fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1.4 Criteria/Assumptions	Use manual actions where appropriate to achieve and maintain post fire safe shutdown conditions in accordance with NRC requirements.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.4.1.4 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 3.0 of KC-26:

"For NFPA 805, manual operator actions to achieve and maintain “safe and stable” plant conditions are not allowed by the separation requirements of NFPA 805 Section 4.2.3 with respect to demonstrating the Nuclear Safety Performance Criteria of NFPA 805 Section 1.5.1 is met. Recovery actions (RA) may be credited to achieve and maintain “safe and stable” plant conditions provided that they are evaluated per the risk-informed, performance based (RIPB) requirements of NFPA 805 Section 4.2.4, and determined to be feasible and reliable (for Fire PRA credited RAs), or determined to be feasible and not adverse to plant risk (for defense-in-depth credited RAs)."

From Section 10.2 of KC-26:

• The deterministic NSCA for each “resolved” fire area in the NSCA database may rely on NSCA equipment and/or cable resolutions.

• NSCA equipment resolutions identify and provide a traceable link for each component failure on a fire area basis that requires further engineering justification to be determined acceptable as-is (i.e., not having any adverse impact to the NSCA), or that requires further engineering review to identify and PROPOSE a plant change such as an OPERATOR MANUAL ACTION, or a physical plant modification. Each equipment resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• All proposed operator manual actions are subject to a preliminary review for feasibility (inclusive of the failure mode for motor operated valves as described in USNRC Information Notice 92-18).

• NSCA equipment resolutions that propose operator manual actions are identified as “separation issues”, and Variations from the Deterministic Requirements

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

(i.e., VFDR) of NFPA 805, Section 4.2.3.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1.5 Criteria/Assumptions	Where appropriate to achieve and maintain cold shutdown within 72 hours, use repairs to equipment required in support of post-fire shutdown.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns with Intent

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. This criteria / assumption listed in Section 3.4.1.5 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

"The NFPA 805 Nuclear Safety Performance Criteria (NSPC) requires the licensee to demonstrate that the plant can achieve and maintain a “safe and stable” condition, but it does not explicitly require the licensee to demonstrate that cold shutdown can be achieved within 72 hours and maintained indefinitely thereafter. The Callaway NFPA 805 NSPC analysis has defined the “safe and stable” condition as being able to achieve and maintain Hot Standby until such time as the plant can either transition to Cold Shutdown, or can safely return to power operation."

"Safe and stable" for Callaway Plant is defined in Section 5.6, Definition of “Safe and Stable” Plant Conditions for Callaway Plant, of Callaway Plant Calculation KC-26.

From Section 5.6 of KC-26:

"The NFPA 805 Nuclear Safety Performance Criteria (NSPC) Analysis for Callaway Plant has been developed to ensure that the plant can achieve and maintain the reactor fuel in a 'safe and stable' condition assuming that a fire event occurs during Callaway Plant Mode 1 (Power Operation), Mode 2 (Startup), Mode 3 (Hot Standby), and Mode 4 (Hot Shutdown), up to the point at which the MCC breakers for the Residual Heat Removal Loop Suction Isolation Valves, BBPV8702A, BBPV8702B, EJHV8701A, and EJHV8701B, are unlocked and closed. Refer to the Callaway Plant NFPA 805 License Amendment Request, LDCN 11-0012, Transition Report Attachment C (Table B-3) for the Systems and Components credited with supporting 'safe and stable' plant conditions by fire area.

The NFPA 805 Nuclear Safety Capability Assessment (NSCA) has demonstrated that Callaway Plant can achieve and maintain 'safe and stable' conditions for at least 10 hours with the minimum shift operating staff before having to take action to recharge the nitrogen accumulators. This initial 10 hours provides sufficient time for the Emergency Response Organization (ERO) to respond and be available to support 'safe and stable' actions to extend Hot Standby conditions."

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

From Section 10.2 of KC-26:

"The capability to transition to Cold Shutdown, and to achieve and maintain Cold Shutdown has been analyzed in the Callaway NSCA. Operator manual actions and repair activities necessary to transition to Cold Shutdown, and to achieve and maintain Cold Shutdown have been identified in this document, and have been qualitatively assessed to ensure their feasibility (inclusive of the failure mode for motor operated valves as described in USNRC Information Notice 92-18) in consideration of the “safe and stable” mission time for the plant; however, these operator actions and repair activities are not required to demonstrate that the NSPC “safe and stable” plant conditions defined for the Callaway Plant have been met, are not identified as Variances from the Deterministic Requirements of NFPA 805 [VFDRs], and are not implemented into the plant operations fire response procedures)."

The 72 hour requirement from NEI 00-01 is only applicable to the 10 CFR 50 Appendix R licensing basis. The Callaway Plant NSCA model does include plant systems / functions / components required for the transition from Hot Standby to Cold Shutdown, and the achievement and maintenance of Cold Shutdown. However, these plant systems / functions / components are not required for the NSCA, and are not credited in the plant operations fire response procedures.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1.6 Criteria/Assumptions	Appendix R compliance requires that one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage (III.G.1.a). When cables or equipment, including associated circuits, are within the same fire area outside primary containment and separation does not already exist, provide one of the following means of separation for the required safe shutdown path(s): - Separation of cables and equipment and associated nonsafety circuits of redundant trains within the same fire area by a fire barrier having a 3-hour rating (III.G.2.a). - Separation of cables and equipment and associated nonsafety circuits of redundant trains within the same fire area by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area (III.G.2.b). - Enclosure of cable and equipment and associated non-safety circuits of one redundant train within a fire area in a fire barrier having a one-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area (III.G.2.c). For fire areas inside noninerted containments, the following additional options are also available: - Separation of cables and equipment and associated nonsafety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards (III.G.2.d); - Installation of fire detectors and an automatic fire suppression system in the fire area (III.G.2.e); or - Separation of cables and equipment and associated non-safety circuits of redundant trains by a noncombustible radiant energy shield (III.G.2.f). Use exemptions, deviations and licensing change processes to satisfy the requirements mentioned above and to demonstrate equivalency depending upon the plant's license requirements.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.4 Fire Area Assessment

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA fire area assessment. The criteria / assumptions listed in Section 3.4.1.6 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 10.2 of KC-26:

• Where the initial NSCA analysis run identifies that there is no success path available to satisfy the NSPC in a given fire area, then subsequent iterations of the NSCA analysis is required, as necessary, to recover ("resolve") at least one success path to satisfy the NSPC in the given fire area. Separation requirements for the deterministic approach to demonstrate the NSPC are identified from NFPA 805, Section 4.2.3. These requirements must be satisfied for the fire area to be deterministically compliant.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1.7 Criteria/Assumptions	Consider selecting other equipment that can perform the same safe shutdown function as the impacted equipment. In addressing this situation, each equipment impact, including spurious operations, is to be addressed in accordance with regulatory requirements and the NPP's current licensing basis.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection and fire area assessment. The criteria / assumptions listed in Section 3.4.1.7 of NEI 00-01 are explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 7.0 of KC-26:

"The purpose of NSCA model development and component selection activity is to create an accurate plant model that represents the Nuclear Safety Performance Criteria (NSPC) requirements from NFPA 805, Section 1.5.1. The NSCA model must identify and include plant systems / functions / components that are required to actively function in order satisfy the NSPC requirements. The NSCA model also must identify include plant systems / functions / components that are not required to actively function, but whose mal-operation (i.e., spurious operation), alone or in combination, could be adverse to meeting the NSPC requirements. The plant model should, within constraints of complexity and cost, maximize the diversity and number of potential success paths that are available to satisfy the NSPC requirements."

From Section 10.2 of KC-26:

• Where the initial NSCA analysis run identifies that there is no success path available to satisfy the NSPC in a given fire area, then subsequent iterations of the NSCA analysis is required, as necessary, to recover ("resolve") at least one success path to satisfy the NSPC in the given fire area. Separation requirements for the deterministic approach to demonstrate the NSPC are identified from NFPA 805, Section 4.2.3. These requirements must be satisfied for the fire area to be deterministically compliant.

• The NSCA compliance strategy for these "resolved" fire areas in the NSCA database typically ends up crediting the least affected success path. This strategy for "resolution" generally involves the resolution of supporting functions first (i.e., electrical distribution, cooling water, etc.), followed by resolution of the supported front line systems / functions / components (i.e., Reactivity Control, Inventory Control, etc.).

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.1.8 Criteria/Assumptions	Consider the effects of the fire on the density of the fluid in instrument tubing and any subsequent effects on instrument readings or signals associated with the protected safe shutdown path in evaluating post fire safe shutdown capability. This can be done systematically or via procedures such as Emergency Operating Procedures.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 3.0, NSCA Criteria / Assumptions, lists criteria / assumptions pertaining to the NSCA model development and component selection and fire area assessment. This criteria / assumption listed in Section 3.4.1.8 of NEI 00-01 is explicitly stated in the calculation.

KC-26, Section 3.0, identifies the criteria / assumptions utilized in KC-26, Section 7.0, NSCA Model Development and Component Selection, and Section 10.0, Deterministic Fire Area Assessment and Results.

From Section 7.8 of KC-26:

Consideration of the potential adverse NSCA impact resulting from the heating of instrument tubing sensing lines is applicable to, and included the development of the NSCA model and component selection, and the deterministic fire area assessment.

Instrument tubing sensing lines for NSCA instrumentation have been identified, located, and incorporated into the NSCA model as components with a "-SL" suffix. These instrument tubing sensing line components fail their associated transmitting device through the component-to-component logic success path relationship in the NSCA model database. The instrument tubing sensing lines components are evaluated on a fire area basis, as applicable.

From Section 10.2 of KC-26:

"• When resolving component and cable failures the analyst is required to consider, and address as necessary, the potential impact resulting from the following:

• heating of instrument tubing sensing lines resulting in erroneous or unreliable signals from NSCA analyzed instrumentation (refer to Section 7.8 of [Calculation KC-26])"

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.4.2	Methodology for Fire Area Assessment	Refer to Figure 3-5 for a flowchart illustrating the various steps involved in performing a fire area assessment. Use the following methodology to assess the impact to safe shutdown and demonstrate Appendix R compliance:

Applicability

Applicable

Comments

None

Alignment Statement

Not Required

Alignment Basis

Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference Documents

Not Applicable

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.2.1 Identify the Affected Equipment by Fire Area	Identify the safe shutdown cables, equipment and systems located in each fire area that may be potentially damaged by the fire. Provide this information in a report format. The report may be sorted by fire area and by system in order to understand the impact to each safe shutdown path within each fire area (see Attachment 5 for an example of an Affected Equipment Report).

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 10.0, Deterministic Fire Area Assessment and Results, identifies the overall process utilized to perform deterministic fire area assessment and the fire area assessment results for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 10.2 of KC-26:

• An initial deterministic analysis is run with the NSCA database tool for each fire area (or analysis area). The initial fire area analysis assumes that all NSCA equipment and NSCA cables physically located in the fire area fail to their worst case condition or state.

The NSCA analysis structure and results for each fire area are displayed on the computer screen as a tree structure beginning with performance goals on the left leading to system logic. The system logic display shows all equipment in every success path. This tree structure diagram of the NSCA model shows the results of the analysis in the following way.

• Failed equipment, cables, systems, and performance goals (displayed in red text)

• Resolved equipment, cables, systems (displayed in blue text, with check mark)

• Design Change (ACP) logics, if applicable (displayed in bold text)

• All items that show with black text are unaffected by the initial failures used in this analysis.

The following hardcopy reports are available from the NSCA database tool for each deterministic analysis area. These reports (for the final "resolved" fire areas) are include in Attachment 10-2 of Callaway Plant Calculation KC-26:

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

• Status of Goals – a list of all NSCA performance goals, identifies each NSCA performance goal as useable or failed

• Status of Systems by Goals – identifies the NSCA systems associated with each NSCA performance goal as useable or failed, identifies each NSCA performance goal as useable or failed

• Status of Systems - a list of all NSCA systems, identifies each NSCA system as useable or failed

• Status of Safe Shutdown Equipment - a list of all NSCA components, identifies each component as useable, failed, or resolved; for each failed NSCA component, identifies the failed component-to-component logic success path (i.e., support component) and failed component-to-cable logic success path (i.e., required cable), as applicable; for each resolved NSCA component, identifies the equipment resolution (includes the equipment VFDR statement with the associated equipment VFDR closure statement, as applicable)

• Status of Safe Shutdown Equipment by System - identifies the NSCA components associated with each NSCA system as useable, failed, or resolved, identifies each NSCA system as useable or failed; for each failed NSCA component, identifies the failed component-to-component logic success path (i.e., support component) and failed component-to-cable logic success path (i.e., required cable), as applicable; for each resolved NSCA component, identifies the equipment resolution (includes the equipment VFDR statement with the associated equipment VFDR closure statement, as applicable)

• Failed Safe Shutdown Cables - a list of all NSCA cables in the fire area, identifies each cable as useable, failed, or recovered

• Failed Safe Shutdown Cables, Fire Zone Location in this Analysis - a list of all NSCA cables in the fire area, identifies the fire zone(s) each cable is contained within, inside the fire area

• Analysis Cables status for this analysis - identifies the NSCA cables in the fire area as useable, failed, or resolved; for each resolved NSCA cable, identifies the cable resolution (includes the cable VFDR statement with the associated cable VFDR closure statement, as applicable)

• Resolutions used in this analysis - a list of all resolved NSCA components followed by a list of all resolved NSCA cables (for cables in the fire area); for each resolved NSCA component, identifies the equipment resolution (includes the equipment VFDR statement with the associated equipment VFDR closure statement, as applicable); for each resolved NSCA cable, identifies the cable resolution (includes the cable VFDR statement with the associated cable VFDR closure statement, as applicable)

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

Attachment B - NEI 04-02 TABLE B-2 - Nuclear Safety Capability Assessment Methodology Review

NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.2.2 Determine the Shutdown Paths Least Impacted By a Fire in Each Fire Area	Based on a review of the systems, equipment and cables within each fire area, determine which shutdown paths are either unaffected or least impacted by a postulated fire within the fire area. Typically, the safe shutdown path with the least number of cables and equipment in the fire area would be selected as the required safe shutdown path. Consider the circuit failure criteria and the possible mitigating strategies, however, in selecting the required safe shutdown path in a particular fire area. Review support systems as a part of this assessment since their availability will be important to the ability to achieve and maintain safe shutdown. For example, impacts to the electric power distribution system for a particular safe shutdown path could present a major impediment to using a particular path for safe shutdown. By identifying this early in the assessment process, an unnecessary amount of time is not spent assessing impacts to the frontline systems that will require this power to support their operation. Based on an assessment as described above, designate the required safe shutdown path(s) for the fire area. Identify all equipment not in the safe shutdown path whose spurious operation or mal-operation could affect the shutdown function. Include these cables in the shutdown function list. For each of the safe shutdown cables (located in the fire area) that are part of the required safe shutdown path in the fire area, perform an evaluation to determine the impact of a fire-induced cable failure on the corresponding safe shutdown equipment and, ultimately, on the required safe shutdown path. When evaluating the safe shutdown mode for a particular piece of equipment, it is important to consider the equipment's position for the specific safe shutdown scenario for the full duration of the shutdown scenario. It is possible for a piece of equipment to be in two different states depending on the shutdown scenario or the stage of shutdown within a particular shutdown scenario. Document information related to the normal and shutdown positions of equipment on the safe shutdown equipment list.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 10.0, Deterministic Fire Area Assessment and Results, identifies the overall process utilized to perform deterministic fire area assessment and the fire area assessment results for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 10.2 of KC-26:

• Where the initial NSCA analysis run identifies that there is no success path available to satisfy the NSPC in a given fire area, then subsequent iterations of the

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NSCA analysis is required, as necessary, to recover ("resolve") at least one success path to satisfy the NSPC in the given fire area. Separation requirements for the deterministic approach to demonstrate the NSPC are identified from NFPA 805, Section 4.2.3. These requirements must be satisfied for the fire area to be deterministically compliant.

• The NSCA compliance strategy for these “resolved” fire areas in the NSCA database typically ends up crediting the least affected success path. This strategy for “resolution” generally involves the resolution of supporting functions first (i.e., electrical distribution, cooling water, etc.), followed by resolution of the supported front line systems / functions / components (i.e., Reactivity Control, Inventory Control, etc.).

The NSCA model development and component selection process (refer to Section 7.0, NSCA Model Development and Component Selection, of Callaway Plant Calculation KC-26) identifies components whose spurious operation alone (i.e., single spurious operation - SO), or in combination with other components (i.e., multiple spurious operation - MSO), could be adverse to the NSCA functional requirements of one or more NSCA system / function / component, and includes these components (as NSCA components) in the respective system-to-component logic success path and/or the respective component-to-component logic success path. Consequently, "resolving" one success path for each NSPC performance goal in the deterministic analysis implicitly includes addressing the spurious operation(s) that could be adverse to meeting each NSPC performance goal.

• The deterministic NSCA for each “resolved” fire area in the NSCA database may rely on NSCA database equipment and/or cable resolutions.

• NSCA equipment resolutions identify and provide a traceable link for each component failure on a fire area basis that requires further engineering justification to be determined acceptable as-is (i.e., not having any adverse impact to the NSCA), or that requires further engineering review to identify and PROPOSE a plant change such as an OPERATOR MANUAL ACTION, or a physical plant modification. Each equipment resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• NSCA cable resolutions identify and provide a traceable link for protected cables in the fire area (i.e., raceway protected by ERFBS, raceway embedded in concrete with evaluation, raceway routed in buried ductbank through one or more manhole). Each cable resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• Circuit analysis may be utilized to assess and disposition specific circuit failures modes (as documented in the NSCA equipment resolutions). Circuit analysis conforms to the criteria / assumptions identified in Section 3. 0 and Section 8.0, Circuit Identification and Analysis, of Callaway Plant Calculation KC-26. The circuit analysis may discount spurious operation based on a fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage.

The NSCA database generated hardcopy reports and other supplemental reports created to document the final "resolved" assessment for each fire area are included in Attachment 10-2 of Callaway Plant Calculation KC-26. These reports identify the credited success path for each NSPC performance goal.

NSCA component position information is identified in the NFPA 805 NSPC Equipment List (Attachment 7-5 of Callaway Plant Calculation KC-26), and in the NSCA database.

Reference Documents

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref	NEI 00-01 Section 3 Guidance
3.4.2.3 Determine Safe Shutdown Equipment Impacts	Using the circuit analysis and evaluation criteria contained in Section 3.5 of this document, determine the equipment that can impact safe shutdown and that can potentially be impacted by a fire in the fire area, and what those possible impacts are.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns

Alignment Basis

Callaway Plant Calculation KC-26, Section 10.0, Deterministic Fire Area Assessment and Results, identifies the overall process utilized to perform deterministic fire area assessment and the fire area assessment results for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 10.2 of KC-26:

• Where the initial NSCA analysis run identifies that there is no success path available to satisfy the NSPC in a given fire area, then subsequent iterations of the NSCA analysis is required, as necessary, to recover ("resolve") at least one success path to satisfy the NSPC in the given fire area. Separation requirements for the deterministic approach to demonstrate the NSPC are identified from NFPA 805, Section 4.2.3. These requirements must be satisfied for the fire area to be deterministically compliant.

• The NSCA compliance strategy for these “resolved” fire areas in the NSCA database typically ends up crediting the least affected success path. This strategy for “resolution” generally involves the resolution of supporting functions first (i.e., electrical distribution, cooling water, etc.), followed by resolution of the supported front line systems / functions / components (i.e., Reactivity Control, Inventory Control, etc.).

• The deterministic NSCA for each “resolved” fire area in the NSCA database may rely on NSCA database equipment and/or cable resolutions.

• NSCA equipment resolutions identify and provide a traceable link for each component failure on a fire area basis that requires further engineering justification to be determined acceptable as-is (i.e., not having any adverse impact to the NSCA), or that requires further engineering review to identify and PROPOSE a plant change such as an OPERATOR MANUAL ACTION, or a physical plant modification. Each equipment resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• Circuit analysis may be utilized to assess and disposition specific circuit failures modes (as documented in the NSCA equipment resolutions). Circuit analysis conforms to the criteria / assumptions identified in Section 3. 0 and Section 8.0, Circuit Identification and Analysis, of Callaway Plant Calculation KC-26. The circuit analysis may discount spurious operation based on a fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

of voltage.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.4.2.4	Develop a Compliance Strategy or Disposition to Mitigate the Effects Due to Fire Damage to Each Required Component or Cable	The available deterministic methods for mitigating the effects of circuit failures are summarized as follows (see Figure 1-2): - Provide a qualified 3-fire rated barrier. - Provide a 1-hour fire rated barrier with automatic suppression and detection. - Provide separation of 20 feet or greater with automatic suppression and detection and demonstrate that there are no intervening combustibles within the 20 foot separation distance. - Reroute or relocate the circuit/equipment, or perform other modifications to resolve vulnerability. - Provide a procedural action in accordance with regulatory requirements. - Perform a cold shutdown repair in accordance with regulatory requirements. - Identify other equipment not affected by the fire capable of performing the same safe shutdown function. - Develop exemptions, deviations, Generic Letter 86-10 evaluation or fire protection design change evaluations with a licensing change process. Additional options are available for non-inerted containments as described in 10 CFR 50 Appendix R section III.G.2.d, e and f.

Applicability	Comments
Applicable	None

Alignment Statement

Aligns with Intent

Alignment Basis

Callaway Plant Calculation KC-26, Section 10.0, Deterministic Fire Area Assessment and Results, identifies the overall process utilized to perform deterministic fire area assessment and the fire area assessment results for the NSCA components identified as being required to satisfy each of the Nuclear Safety Performance Criteria (NSPC) from Section 1.5.1 of NFPA 805.

From Section 10.2 of KC-26:

• Where the initial NSCA analysis run identifies that there is no success path available to satisfy the NSPC in a given fire area, then subsequent iterations of the NSCA analysis is required, as necessary, to recover ("resolve") at least one success path to satisfy the NSPC in the given fire area. Separation requirements for the deterministic approach to demonstrate the NSPC are identified from NFPA 805, Section 4.2.3. These requirements must be satisfied for the fire area to be deterministically compliant.

• The NSCA compliance strategy for these “resolved” fire areas in the NSCA database typically ends up crediting the least affected success path. This strategy for

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

"resolution" generally involves the resolution of supporting functions first (i.e., electrical distribution, cooling water, etc.), followed by resolution of the supported front line systems / functions / components (i.e., Reactivity Control, Inventory Control, etc.).

• The deterministic NSCA for each "resolved" fire area in the NSCA database may rely on NSCA database equipment and/or cable resolutions.

• NSCA equipment resolutions identify and provide a traceable link for each component failure on a fire area basis that requires further engineering justification to be determined acceptable as-is (i.e., not having any adverse impact to the NSCA), or that requires further engineering review to identify and PROPOSE a plant change such as an OPERATOR MANUAL ACTION, or a physical plant modification. Each equipment resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• NSCA cable resolutions identify and provide a traceable link for protected cables in the fire area (i.e., raceway protected by ERFBS, raceway embedded in concrete with evaluation, raceway routed in buried ductbank through one or more manhole). Each cable resolution includes descriptive text fields in the NSCA database to document the engineering review basis.

• Circuit analysis may be utilized to assess and disposition specific circuit failures modes (as documented in the NSCA equipment resolutions). Circuit analysis conforms to the criteria / assumptions identified in Section 3. 0 and Section 8.0, Circuit Identification and Analysis, of Callaway Plant Calculation KC-26. The circuit analysis may discount spurious operation based on a fire affected cable being routed in a dedicated conduit, and therefore being protected from external sources of voltage.

• NSCA equipment resolutions that propose operator manual actions are identified as "separation issues", and Variations from the Deterministic Requirements (i.e., VFDR) of NFPA 805, Section 4.2.3.

The NSCA database generated hardcopy reports and other supplemental reports created to document the final "resolved" assessment for each fire area are included in Attachment 10-2 of Callaway Plant Calculation KC-26. These reports identify the credited success path for each NSPC performance goal.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0

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NFPA 805 Section: 2.4.2.4 Fire Area Assessment

NEI 00-01 Ref		NEI 00-01 Section 3 Guidance
3.4.2.5	Document the Compliance Strategy or Disposition Determined to Mitigate the Effects Due to Fire Damage to Each Required Component or Cable	Assign compliance strategy statements or codes to components or cables to identify the justification or mitigating actions proposed for achieving safe shutdown. The justification should address the cumulative effect of the actions relied upon by the licensee to mitigate a fire in the area. Provide each piece of safe shutdown equipment, equipment not in the path whose spurious operation or mal-operation could affect safe shutdown, and/or cable for the required safe shutdown path with a specific compliance strategy or disposition. Refer to Attachment 6 for an example of a Fire Area Assessment Report documenting each cable disposition.

Applicability

Applicable

Comments

None

Alignment Statement

Aligns

Alignment Basis

See the Alignment Basis for Item 3.4.2.2. The methodology for assigning compliance strategies (i.e., creating equipment and cable resolutions in the NSCA database) is consistent with the prescribed method.

Reference Documents

Calculation KC-26, "Nuclear Safety Capability Assessment," Revision 0