Duke Energy Carolinas, LLC
Catawba Nuclear Station

Transition to 10 CFR 50.48(c) - NFPA 805
Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition

DUKE ENERGY.

Transition Report

September 25, 2013

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Executive Summary

Duke Energy Carolinas, LLC (Duke Energy) will transition the Catawba Nuclear Station fire protection program to a new Risk-Informed, Performance-Based alternative per 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805," which incorporates by reference National Fire Protection Association Standard NFPA 805. The licensing basis for the Catawba Nuclear Station Renewed Facility Operating License, Condition 2.C (5), will be superseded for both Units 1 and 2.

On February 28, 2005, Duke Energy submitted a letter of intent to transition the Duke Energy fleet to NFPA 805 in accordance with 10 CFR 50.48(c). The Nuclear Regulatory Commission (NRC) responded in a letter dated June 8, 2005, that it would be premature to begin transition of Catawba Nuclear Station pending lessons learned from the Oconee Nuclear Station pilot transition. On June 4, 2007, Duke Energy informed the NRC that they would commence the Catawba Nuclear Station transition on July 2, 2007, with an expected completion date of July 2, 2010. The NRC acknowledged the intent to transition in a letter dated January 4, 2008, and in accordance with a revision to the enforcement policy, extended the period of enforcement discretion from 24 to 36 months. On March 31, 2010, Duke Energy requested that the NRC extend the enforcement discretion period to six months past the date of the Safety Evaluation Report for the second pilot plant in accordance with COMSECY-08-0022, "Request for an Extension of Discretion for the Interim Enforcement Policy for Fire Protection Issues on 10 CFR Section 50.48(c), "National Fire Protection Association Standard NFPA 805"." The NRC approved this extension in a letter dated June 30, 2010. On June 23, 2011, Duke Energy committed to submit a License Amendment Request to transition Catawba Nuclear Station to NFPA 805 by September 30, 2013. On July 28, 2011, the NRC found the Duke Energy request was consistent with SRM-SECY-11-0061, "A Request to Revise the Interim Enforcement Policy for Fire Protection Issues on 10 CFR 50.48(c) to Allow Licensees to Submit License Amendment Requests in a Staggered Approach" and approved extension of the enforcement discretion period in accordance with the interim enforcement policy published in the Federal Register (76 FR 40777). In accordance with that policy, the enforcement discretion period will continue until NRC review of the License Amendment Request is completed.

The transition process consisted of a review and update of Catawba Nuclear Station documentation, including the development of a Fire Probabilistic Risk Assessment using NUREG/CR-6850 as guidance. This Transition Report summarizes the transition process and results. This Transition Report contains information:

- Required by 10 CFR 50.48(c).
- Recommended by guidance document Nuclear Energy Institute (NEI) 04-02, Revision 2, "Guidance for Implementing a Risk-informed, Performance-based Fire Protection Program Under 10 CFR 50.48(c)", and appropriate Frequently Asked Questions (FAQs).
- Recommended by guidance document Regulatory Guide (RG) 1.205, Revision 1, "Risk-Informed, Performance-Based Fire Protection for Existing Light Water Nuclear Power Plants."

Section 4 of the Transition Report provides a summary of compliance with the following NFPA 805 requirements:

- Fundamental Fire Protection Program Elements and Minimum Design Requirements
- Nuclear Safety Performance Criteria, including:
  - Non-Power Operational Modes
  - Fire Risk Evaluations
- Radioactive Release Performance Criteria
- Monitoring Program
- Program Documentation, Configuration Control, and Quality Assurance

Section 5 of the Transition Report provides regulatory evaluations and associated attachments, including:

- Changes to License Condition
- Changes to Technical Specifications, Orders, and Exemptions,
- Determination of No Significant Hazards and evaluation of Environmental Considerations.

The attachments to the Transition Report include detail to support the transition process and results.

NFPA 805 allows the licensee to use a Performance-based approach that can either be deterministic or risk-informed. NFPA 805 Chapter 3 requirements (Attachment A) are examples of deterministic design elements that must be met, while the Fire Area review (Attachment C and W) summarizes fire risk evaluations that have been performed for plant fire areas. These fire risk evaluations use risk-informed, performance-based methods to ensure that the change in risk is acceptable, and that defense-in-depth and safety margins are maintained.

Attachment H contains the approved FAQs not yet incorporated into the endorsed revision of NEI 04-02. These FAQs have been used to clarify the guidance in RG 1.205, NEI 04-02, and the requirements of NFPA 805 and in the preparation of this License Amendment Request.

Acronym List

AB	Auxiliary Building
AD	Standby Shutdown (Diesel)
AFW	Auxiliary Feedwater
AHJ	Authority Having Jurisdiction
ANS	American Nuclear Society
ANSI	American National Standards Institute
AP	Abnormal Procedure
APCSB	Auxiliary and Power Conversion Systems Branch
ASD	Alternate Shutdown
ASME	American Society of Mechanical Engineers
ASP	Auxiliary Shutdown Panel
ASTM	American Society for Testing and Materials
ATWS	Anticipated Transient Without Scram
AUX	Auxiliary
BB	Steam Generator Blowdown
BTP	Branch Technical Position
BTU	British Thermal Unit
BWR	Boiling Water Reactor
BWROG	Boiling Water Reactor Owners Group
CA	Auxiliary Feedwater
CAFTA	Computer Aided Fault Tree Analysis
CAPT	Turbine Driven Auxiliary Feedwater Pump
CC	Capability Category
CCDP	Conditional Core Damage Probability
CCF	Common Cause Failure

CCFP	Conditional Containment Failure Probabilities
CDF	Core Damage Frequency
CF	Feedwater
CFAST	Consolidated Fire and Smoke Transport
CFR	Code of Federal Regulation
CLERP	Combined Large Early Release Probability
CMEB	Chemical Engineering Branch
CNS	Catawba Nuclear Station; also Catawba Nuclear Station Units 1 and 2
CO_2	Carbon Dioxide
CPT	Control Power Transformer
CT	Current Transformer
DC	Direct Current
ΔCDF	Change in Core Damage Frequency
ΔLERF	Change in Large Early Release Frequency
DG	Diesel Generator
DH	Doghouse
DID	Defense in Depth
Duke Energy	Duke Energy Carolinas, LLC
ECCS	Emergency Core Cooling System
EEEE	Existing Engineering Equivalency Evaluation
EIR	Engineering Information Record
EMT	Electrical Metallic Tubing
ENA	In-Core Instrumentation
ENC	Excore Neutron Flux (Wide Range)
EP	Emergency Procedure
EPE	600 VAC Essential Auxiliary Power

EPRI	Electric Power Research Institute
ERFBS	Electrical Raceway Fire Barrier Systems
ES	Equipment Select
ESD	Engineering Support Document
ESFAS	Engineering Safety Feature Actuation System
ETL	600/208/120 VAC SSF Auxiliary Power
ETM	SSF 250/125 VDC Auxiliary Power
EXS	Miscellaneous Electrical Operated Equipment
F&O	Facts and Observations
FA	Fire Area
FAQ	Frequently Asked Question
FDW	Feedwater
FM	Factory Mutual
FMEA	Failure Modes and Effects Analysis
FP	Fire Protection
FPIE	Full Power Internal Events
FRE	Fire Risk Evaluation
FSAR	Facility Safety Analysis Report
FW	Refueling Water
FWST	Refueling Water Storage Tank
GDC	General Design Criteria
HDPE	High Density Polyethylene Piping
HELB	High Energy Line Break
HEP	Human Error Probability
HFE	Human Failure Event
HGL	Hot Gas Layer

HHSI	High Head Safety Injection
HPI	High Pressure Injection
HRE	Higher Risk Evolution
HRPOS	Higher Risk Plant Operating State
HRR	Heat Release Rate
HSB	Hot Standby
HSS	High Safety Significant
HVAC	Heating Ventilation Air Conditioning
HX	Heat Exchanger
IEPRA	Internal Events Probabilistic Risk Assessment
ILE	Pressurizer Pressure and Level Control
IN	NRC Information Notice
INPO	Institute of Nuclear Power Operations
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination for External Events
ISLOCA	Interfacing System Loss of Coolant Accident
KC	Component Cooling
KF	Spent Fuel Pool Cooling
KR	Recirculated Cooling water
KSF	Key Safety Function
LAR	License Amendment Request
LERF	Large Early Release Frequency
LLOCA	Large Loss of Coolant Accident
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
LPCI	Low Pressure Coolant Injection

LSS	Low Safety Significant
MAAP	Modular Accident Analysis Program
MCA	Multi-Compartment Analysis
MCB	Main Control Board
MCC	Motor Control Center
MCR	Main Control Room
MCUB	Min Cut Upper Bound
MDCAP	Motor Driven Auxiliary Feedwater Pump
MFW	Main Feedwater
MGL	Multiple Greek Layer
MHIF	Multiple High Impedance Fault
MI	Mineral Insulated
MLOCA	Medium Loss of Coolant Accident
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valve
MSO	Multiple Spurious Operations
MTC	Moderator Temperature Coefficient
M/U	Makeup
MVR	Motor Operated Valve Rupture
N/A	Not Applicable
N31	Nuclear Instrumentation Source Range Detector Channel 1
N32	Nuclear Instrumentation Source Range Detector Channel 2
NC	Reactor Coolant
NCL	Non Coordinated Load
ND	Residual Heat Removal
NEI	Nuclear Energy Institute

NEO	Nuclear Equipment Operator
NFPA 805	National Fire Protection Association Standard 805
NI	Safety Injection
NIST	National Institute of Standards and Technology
NM	Nuclear Sampling
NPO	Non-Power Operational
NPP	Nuclear Power Plant
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
NS	Containment Spray
NSCA	Nuclear Safety Capability Assessment
NSP	Non-Suppression Probability
NSWPS	Nuclear Service Water Pump Structure
NUREG	Document prepared by NRC Staff
NUREG/CR	Document prepared by NRC Contractors
NV	Chemical and Volume Control
OAC	Operator Aid Computer
OMA	Operator Manual Action
OP	Operational Procedure
OPS	Operations
OS&Y	Outside Screw and Yoke
PAU	Physical Analysis Unit
PB	Performance Based
PCS	Primary Control Station
P/H	Pump House
PORC	Plant Operational Review Committee

PORV	Power Operated Relief Valve
POS	Plant Operating State
PRA	Probabilistic Risk Assessment
PRM	Plant Response Model
PRT	Pressurizer Relief Tank
PSA	Probabilistic Safety Analysis
PT	Pressure Transmitter
PVC	Polyvinyl Chloride
PWR	Pressurized Water Reactor
PWROG	Pressurized Water Reactor Owners Group
PZR	Pressurizer
RA	Recovery Action
RAW	Risk Achievement Worth
RCA	Radiologically Controlled Area
RCS	Reactor Coolant System
RF	Interior Fire Protection
RF/RY	Fire Water System
RG	Regulatory Guide
RHR	Residual Heat Removal
RI-PB	Risk-Informed, Performance-Based
RIS	Regulatory Issues Summary
RL	Low Pressure Service Water
RN	Nuclear Service Water
RP	Radiation Protection
RPV	Reactor Pressure Vessel
RSGSF	Retired Steam Generator Storage Facility

RWST	Refueling Water Storage Tank
rx-yr	Reactor Year
RY	Exterior Fire Protection System
SA	Main Steam to Auxiliary Equipment
SAAG	Severe Accident Analysis Group
SAROS	Safety and Reliability Optimization Services
SB	Service Building
SFP	Spent Fuel Pool
SFPE	Society of Fire Protection Engineers
S/G	Steam Generator
SGTR	Steam Generator Tube Rupture
SLC	Selected Licensee Commitment
SLOCA	Small Loss of Coolant Accident
SM	Main Steam
SNSWP	Standby Nuclear Service Water Pond
SP	Special Publication
SPA	Single Point of Access
SPOC	Single Point of Contact
SR	Supporting Requirement
SRP	Standard Review Plan (NUREG-0800)
SRV	Service Building/Safety Relief Valve
SSA	Safe Shutdown Analysis
SSC	Structure, System, or Component
SSD	Safe Shutdown
SSE	Safe Shutdown Earthquake
SSEL	Safe Shutdown Equipment List

SSER	Supplemental Safety Evaluation Report
SSF	Standby Shutdown Facility
SSHR	Secondary Side Heat Removal
SSLD	Safe Shutdown Logic Diagram
SSPS	Solid State Protection System
SSS	Standby Shutdown System
SV	Main Steam Vent to Atmosphere
SWGR	Switchgear
TB	Turbine Building
TDCAP	Turbine Driven Auxiliary Feedwater Pump
THERP	Technique for Human Error Rate Prevention
TR	Technical Report
TS	Technical Specification
TSC	Technical Support Center
U1	Unit 1
U2	Unit 2
UAM	Unreviewed Analysis Method
UFSAR	Updated Final Safety Analysis Report
UL	Underwriters Laboratory
V&V	Verification and Validation
VAC	Volts Alternating Current
VC	Control Room Area Ventilation System
VCT	Volume Control Tank
VFDR	Variance From Deterministic Requirement
WCC	Work Control Center
WL	Liquid Radwaste

YC	Control Area Chilled Water System
ZOI	Zone of Influence

1.0 INTRODUCTION

The Nuclear Regulatory Commission (NRC) has promulgated an alternative rule for fire protection requirements at nuclear power plants, 10 CFR 50.48(c), National Fire Protection Association Standard 805 (NFPA 805). Duke Energy Carolinas, LLC (Duke Energy) is implementing the Nuclear Energy Institute (NEI) methodology NEI 04-02, "Guidance for Implementing a Risk-informed, Performance-based Fire Protection Program Under 10 CFR 50.48(c)", to transition Catawba Nuclear Station Units 1 and 2 (CNS) from its current fire protection licensing basis to the new requirements as outlined in NFPA 805. This report describes the transition methodology utilized and documents how it complies with the new requirements.

1.1 Background

1.1.1 NFPA 805 – Requirements and Guidance

On July 16, 2004 the NRC amended 10 CFR 50.48, Fire Protection, to add a new subsection, 10 CFR 50.48(c), which establishes new Risk-Informed, Performance-Based (RI-PB) fire protection requirements. 10 CFR 50.48(c) incorporates by reference, with exceptions, NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants – 2001 Edition, as a voluntary alternative to 10 CFR 50.48 Section (b), Appendix R, and Section (f), Decommissioning.

As stated in 10 CFR 50.48(c)(3)(i), any licensee's adoption of a RI-PB program that complies with the rule is voluntary. This rule may be adopted as an acceptable alternative method for complying with either 10 CFR 50.48(b), for plants licensed to operate before January 1, 1979, or the fire protection license conditions for plants licensed to operate after January 1, 1979 (10 CFR 50.48(a)), or 10 CFR 50.48(f), plants shutdown in accordance with 10 CFR 50.82(a)(1).

NEI developed NEI 04-02 to assist licensees in adopting NFPA 805 and making the transition from their current fire protection licensing basis to one based on NFPA 805. The NRC issued Regulatory Guide (RG) 1.205, Risk-Informed, Performance-Based Fire Protection for Existing Light Water Nuclear Power Plants, which endorses NEI 04-02, with exceptions, in December 2009.[1]

A depiction of the primary document relationships is shown in Figure 1-1:

[1] Where referred to in this document NEI 04-02 is Revision 2 and RG 1.205 is Revision 1.

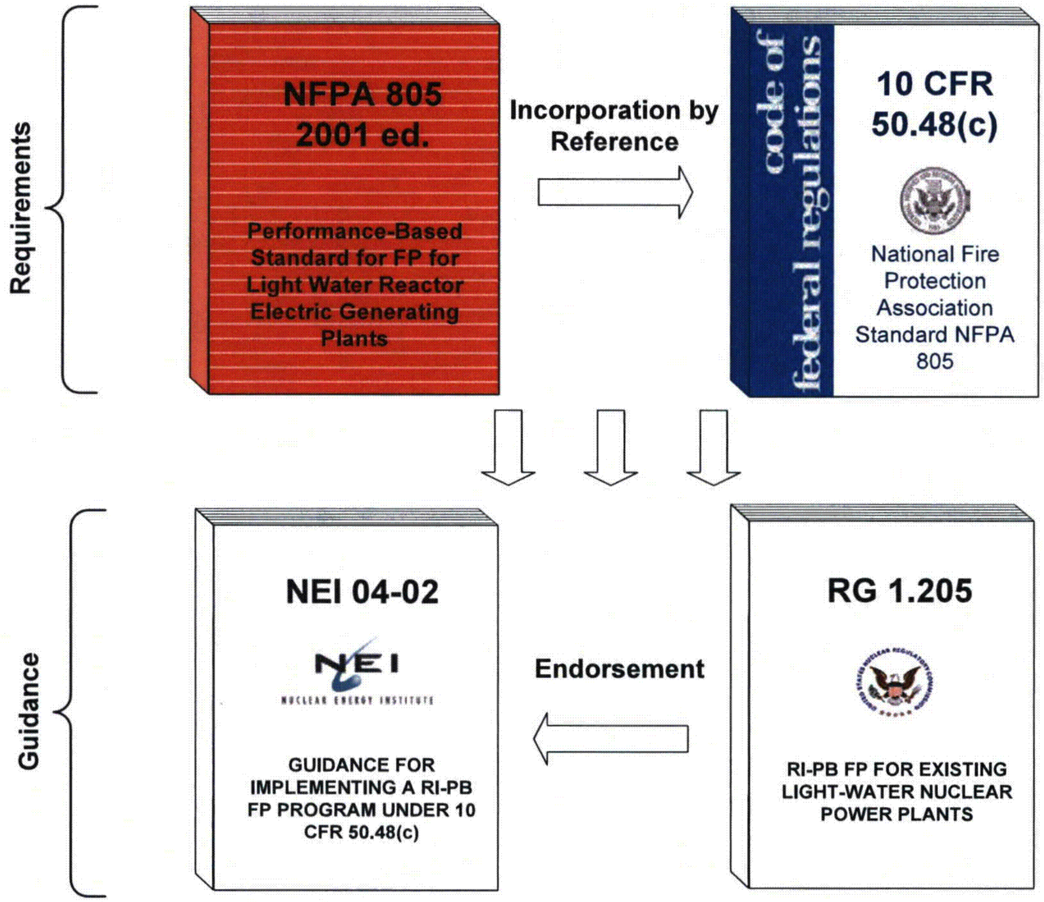

Figure 1-1 NFPA 805 Transition – Implementation Requirements/Guidance

1.1.2 Transition to 10 CFR 50.48(c)

1.1.2.1 Start of Transition

Duke Energy submitted a letter of intent to the NRC on February 28, 2005 (ML050670305) for the Duke Energy Fleet to adopt NFPA 805 in accordance with 10 CFR 50.48(c).

By letter dated June 8, 2005 (ML051080005), the NRC stated that it was premature to grant enforcement discretion for CNS, but that CNS should learn from the insights of Oconee Nuclear Station and that Duke Energy should provide a letter at a later date to state when transition would actually begin. The NRC indicated that enforcement discretion would be provided at that time.

By letter dated June 4, 2007 (ML072260422), Duke Energy informed the NRC that CNS would commence transition to NFPA 805 on July 2, 2007 with an expected completion date of July 2, 2010.

By letter dated January 4, 2008 (ML072780045), the NRC acknowledged CNS intent to transition to NFPA 805, and in accordance with the revision to the enforcement policy published in the Federal Register (71 FR 19905) extending the enforcement discretion

period from 24 to 36 months, considered the CNS enforcement discretion period to expire on July 2, 2010.

By letter dated March 31, 2010 (ML100920065), Duke Energy requested that in accordance with COMSECY-08-0022, the period of enforcement discretion for CNS be extended to six months past the date of the safety evaluation approving the second pilot plant License Amendment Request (LAR).

By letter dated June 30, 2010 (ML101800534), the NRC informed Duke Energy that the NRC Staff had reviewed the licensee's request and determined that the licensee had made substantial progress in their transition to NFPA 805, and accordingly the enforcement discretion would be extended until 6 months past the date of the SER approving the second pilot plant transition.

By letter dated June 23, 2011 (ML11180A273), Duke Energy committed to submit a LAR for NFPA 805 transition by September 30, 2013 and requested that enforcement discretion for fire protection issues be extended to correspond with the LAR submittal date.

By letter dated July 28, 2011 (ML11201A207), the NRC stated that the NRC Staff had reviewed the licensee's June 23, 2011 letter and found it consistent with Commission direction provided in SRM-SECY-11-0061, dated June 10, 2011 (ML111610616). Therefore, the CNS request to extend enforcement discretion was granted in accordance with the Interim Enforcement Policy concerning enforcement discretion for certain fire protection Issues as published in the Federal Register on July 12, 2011 (76 FR 40777). In accordance with NRC Enforcement Policy, the enforcement discretion period will continue until the NRC approval of the CNS LAR is completed.

1.1.2.2 Transition Process

The transition to NFPA 805 includes the following high level activities:

- A new fire safe shutdown analysis
- A new Fire Probabilistic Risk Assessment (PRA) using NUREG/CR-6850, EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, as guidance and a revision to the Internal Events PRAs to support the Fire PRAs
- Completion of activities required to transition the pre-transition Licensing Basis to 10 CFR 50.48(c) as specified in NEI 04-02 and RG 1.205

1.2 Purpose

The purpose of the Transition Report is as follows:

1) Describe the process implemented to transition the current fire protection program to comply with the additional requirements of 10 CFR 50.48(c).
2) Summarize the results of the transition process.
3) Explain the bases for conclusions that the fire protection program complies with 10 CFR 50.48(c) requirements.
4) Describe the new fire protection licensing basis.

5) Describe the configuration management processes used to manage post-transition changes to the station and the fire protection program, and resulting impact on the licensing basis.

2.0 OVERVIEW OF EXISTING FIRE PROTECTION PROGRAM

2.1 Current Fire Protection Licensing Basis

CNS Unit 1 was licensed to operate on January 17, 1985. CNS Unit 2 was licensed to operate on May 15, 1986. As a result, the CNS Unit 1 and Unit 2 fire protection program is based on compliance with 10 CFR 50.48(a), and the following License Condition:

Duke Energy Carolinas, LLC CNS Units 1 and 2 License Condition 2.C (5) states:

(5) Fire Protection Program (Section 9.5.1, SER, SSER #2, SSER #3, SSER #4, SSER #5)*

Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report, as amended, for the facility and as approved in the SER through Supplement 5, subject to the following provision:

> The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

*The parenthetical notation following the title of this renewed operating license condition denotes the section of the Safety Evaluation Report and/or its supplement wherein this renewed license condition is discussed.

2.2 NRC Acceptance of the Fire Protection Licensing Basis

During construction of CNS, in response to the NRC's request in a letter dated September 30, 1976, Duke Energy performed a fire hazards analysis which analyzed the CNS fire protection program against the guidance of Appendix A to Branch Technical Position (BTP) Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1. The results of the analysis were communicated to the NRC by letter dated December 1977, with revisions dated June 1979 and August 1981. CNS also provided the NRC with an evaluation against the technical requirements of 10 CFR 50 Appendix R in the revised Fire Protection Review dated October 23, 1981. These analyses served as the basis for the Appendix A to BTP APCSB 9.5-1 Safety Evaluation Report, dated February 1983, and Supplemental Safety Evaluation Report (SSER) #2 dated June 1984, SSER #3 dated July 1984, SSER #4 dated December 1984, and SSER #5 dated February 1986.

In the original safety evaluation dated February 1983, the NRC approved five deviations from the guidelines of BTP Chemical Engineering Branch (CMEB) 9.5-1 to include unlabeled fire doors, deletion of fire detectors in safety related areas, unlabeled water supply valves, automatic sprinklers for safe shutdown areas and seismic design of standpipe systems. Four items remained open including Safe Shutdown Analysis, description of the Standby Shutdown System (SSS), design of the Bulk Gas System, and divisional separation in battery rooms.

In a letter dated April 14, 1983, Duke Energy addressed the concerns with the battery rooms.

In SSER #2 dated June 1984, the NRC acknowledged Duke Energy's letter dated April 14, 1983, providing additional information regarding the design of the Bulk Gas System and concluded that the design is acceptable. The NRC also concluded that the Safe Shutdown Analysis and the description of the SSS are still open items.

In SSER #3 the NRC addressed the results of an audit performed in November of 1983. As a result of the audit, the NRC reached several agreements with CNS concerning the adequacy of the plant fire protection program. The NRC also expressed a number of concerns pertaining to previous CNS commitments and the degree of compliance with NRC's fire protection criteria. By letters dated January 17 and 25, February 2, 10, 20 and 29, March 14, April 9 and 25, May 11, and June 29, 1984, CNS provided additional information on the fire protection program. Based on this information the NRC approved nine additional deviations from the guidelines of BTP CMEB 9.5-1 for a total of fourteen deviations, which include:

1. The composition of the fire brigade (Section 9.5.1.5).
2. Unlabeled fire doors (Section 9.5.1.5)*.
3. The absence of certain fire rated seals in penetrations of exterior walls and roofs (Section 9.5.1.5).
4. Certain non-fire-rated hatchway covers (Section 9.5.1.5).
5. Protection of penetrations of fire area boundaries in the reactor building (Section 9.5.1.5).
6. Protection of certain HVAC penetrations of fire barriers (Section 9.5.1.5).
7. Deletion of certain fire detectors in safety related areas (Section 9.5.1.7)*.
8. Unlabeled water supply valves (Section 9.5.1.7)*.
9. Automatic sprinklers for safe shutdown areas (Section 9.5.1.7)*.
10. Unsupervised water flow alarms (Section 9.5.1.7).
11. Seismic design of standpipe systems (Section 9.5.1.7)*.
12. Standpipe protection in the annulus and pipe tunnel (Section 9.5.1.7).
13. Partial sprinkler coverage in the auxiliary feed pump area (Section 9.5.1.8).
14. Unprotected steel over the turbine driven auxiliary feedwater pump pit (Section 9.5.1.8).

*Approved in original SER.

Although the NRC Staff had not yet completed its review of the alternate shutdown system, it determined that no safety issues existed during fuel load. Open items to be completed prior to initial criticality were also discussed in SSER #3. These items included justification for the adequacy of the standby makeup pump capacity, specific identification of the required cold shutdown repair materials and procedures for their installation, and post-fire shutdown procedures and training.

In SSER #4 the NRC reiterated issues related to safe shutdown capability that required resolution and acknowledged that Duke Energy had addressed those issues in letters

dated July 5, 1983, April 11, May 8, and June 28 and 29, 1984, in accordance with the guidance of Standard Review Plan (SRP) Section 9.5.1 (NUREG-0800).

In SSER #5, the NRC referenced an inspection performed in April, 1985, where they identified an issue with the lack of 1 hour fire protection of the cable tray supports in the auxiliary feedwater pump room. Technical justification for the condition was transmitted to the NRC by letter dated May 31, 1985. The NRC concluded that the supports do not need additional protection and agreed to close the issue.

3.0 TRANSITION PROCESS

3.1 Background

Section 4.0 of NEI 04-02 describes the process for transitioning from compliance with the current fire protection licensing basis to the new requirements of 10 CFR 50.48(c). NEI 04-02 contains the following steps:

1) Licensee determination to transition the licensing basis and devote the necessary resources to it;
2) Submit a Letter of Intent to the NRC stating the licensee's intention to transition the licensing basis in accordance with a tentative schedule;
3) Conduct the transition process to determine the extent to which the current fire protection licensing basis supports compliance with the new requirements and the extent to which additional analyses, plant and program changes, and alternative methods and analytical approaches are needed;
4) Submit a LAR;
5) Complete transition activities that can be completed prior to the receipt of the License Amendment;
6) Receive a Safety Evaluation; and
7) Complete implementation of the new licensing basis, including completion of modifications identified in Attachment S.

3.2 NFPA 805 Process

Section 2.2 of NFPA 805 establishes the general process for demonstrating compliance with NFPA 805. This process is illustrated in Figure 3-1. It shows that except for the fundamental fire protection requirements, compliance can be achieved on a fire area basis either by deterministic or RI-PB methods. Consistent with the guidance in NEI 04-02, Duke Energy has implemented the NFPA 805 Section 2.2 process by first determining the extent to which its current fire protection program supports findings of deterministic compliance with the requirements in NFPA 805. RI-PB methods are being applied to the requirements for which deterministic compliance could not be shown.

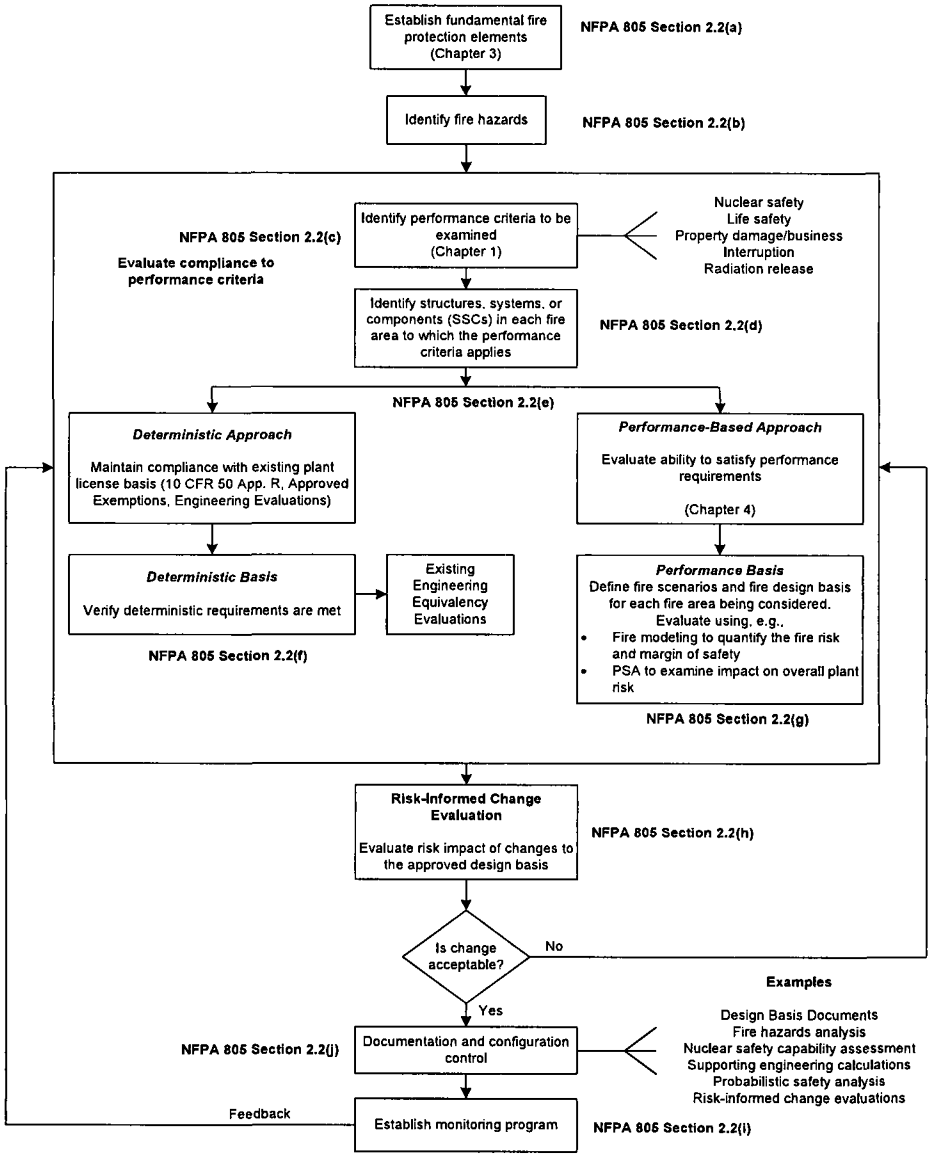

Figure 3-1 NFPA 805 Process [NEI 04-02 Figure 3-1 based on Figure 2-2 of NFPA 805][2]

3.3 NEI 04-02 – NFPA 805 Transition Process

NFPA 805 contains technical processes and requirements for a RI-PB fire protection program. NEI 04-02 was developed to provide guidance on the overall process (programmatic, technical, and licensing) for transitioning from a traditional fire protection licensing basis to a new RI-PB method based upon NFPA 805, as shown in Figure 3-2.

[2] Note: 10 CFR 50.48(c) does not incorporate by reference Life Safety and Plant Damage/Business Interruption goals, objectives and criteria. See 10 CFR 50.48(c) for specific exceptions to the incorporation by reference of NFPA 805.

Section 4.0 of NEI 04-02 describes the detailed process for assessing a fire protection program for compliance with NFPA 805, as shown in Figure 3-2.

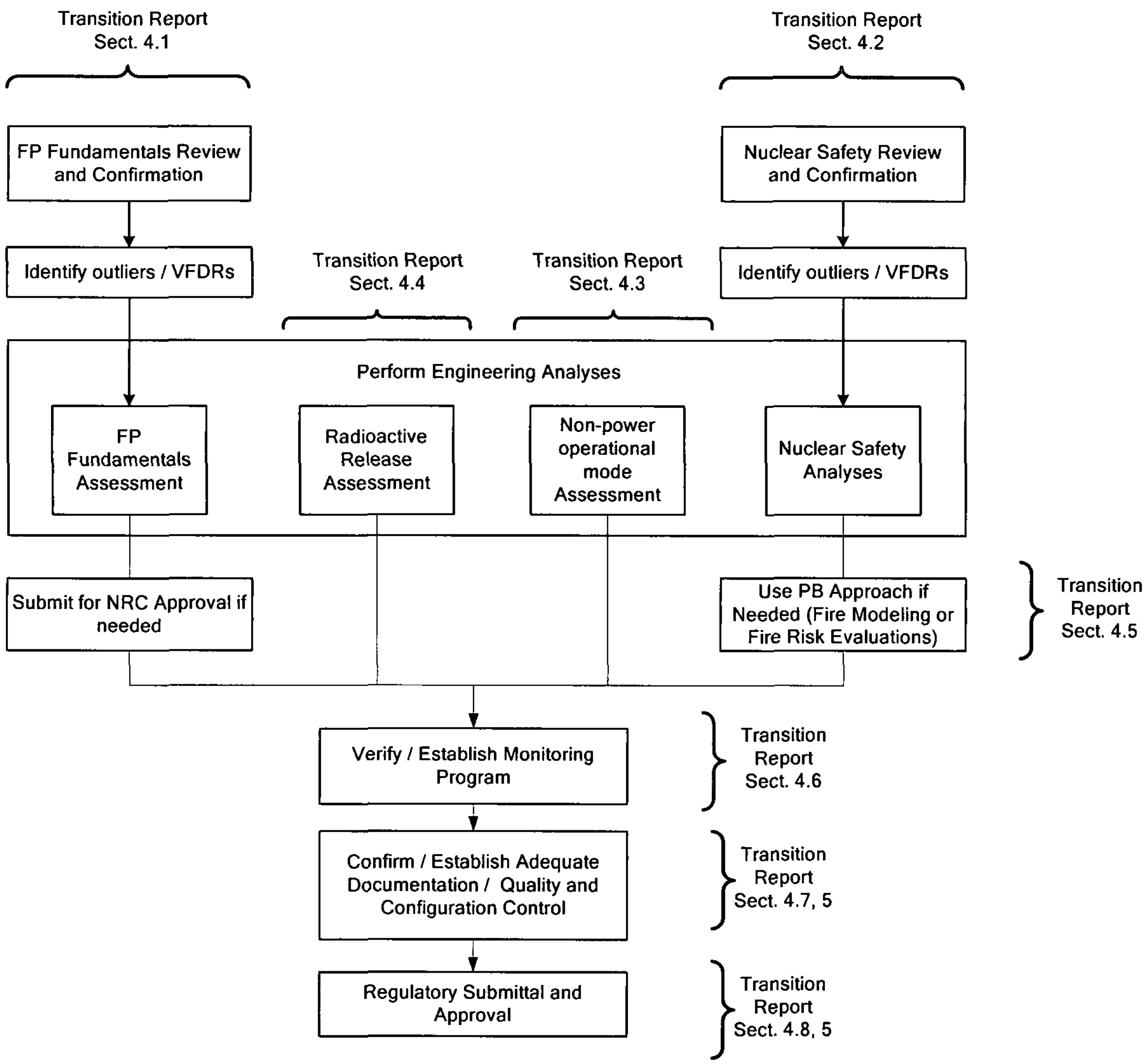

Figure 3-2 Transition Process (Simplified) [based on NEI 04-02 Figure 4-1]

3.4 NFPA 805 Frequently Asked Questions

The NRC has worked with NEI and two Pilot Plants (Oconee Nuclear Station and Harris Nuclear Plant) to define the licensing process for transitioning to a new licensing basis under 10 CFR 50.48(c) and NFPA 805. Both the NRC and the industry recognized the need for additional clarifications to the guidance provided in RG 1.205, NEI 04-02, and the requirements of NFPA 805. The NFPA 805 Frequently Asked Question (FAQ) process was jointly developed by NEI and NRC to facilitate timely clarifications of NRC positions. This process is described in a letter from the NRC dated July 12, 2006, to NEI (ML061660105) and in Regulatory Issues Summary (RIS) 2007-19, Process for

Communicating Clarifications of Staff Positions Provided in RG 1.205 Concerning Issues Identified during the Pilot Application of NFPA Standard 805, dated August 20, 2007 (ML071590227).

Under the FAQ Process, transition issues are submitted to the NEI NFPA 805 Task Force for review, and subsequently presented to the NRC during public FAQ meetings. Once the NEI NFPA 805 Task Force and NRC reach agreement, the NRC issues a memorandum to indicate that the FAQ is acceptable. NEI 04-02 will be revised to incorporate the approved FAQs. This is an on-going revision process that will continue through the transition of NFPA 805 plants. Final closure of the FAQs will occur when future revisions of RG 1.205, endorsing the related revisions of NEI 04-02, are approved by the NRC. It is expected that additional FAQs will be written and existing FAQs will be revised as plants continue NFPA 805 transition after the Pilot Plant Safety Evaluations.

Attachment H contains the list of approved FAQs not yet incorporated into the endorsed revision of NEI 04-02. These FAQs have been used to clarify the guidance in RG 1.205, NEI 04-02, and the requirements of NFPA 805 and in the preparation of this LAR.

4.0 COMPLIANCE WITH NFPA 805 REQUIREMENTS

4.1 Fundamental Fire Protection Program and Design Elements

The Fundamental Fire Protection Program and Design Elements are established in Chapter 3 of NFPA 805. Section 4.3.1 of NEI 04-02 provides a systematic process for determining the extent to which the pre-transition licensing basis and plant configuration meets these criteria and for identifying the fire protection program changes that would be necessary for compliance with NFPA 805. NEI 04-02 Appendix B-1 provides guidance on documenting compliance with the program requirements of NFPA 805 Chapter 3.

4.1.1 Overview of Evaluation Process

The comparison of the CNS Fire Protection Program to the requirements of NFPA 805 Chapter 3 was performed and documented in a calculation entitled, "NFPA 805 Transition B-1 Table/Report." The calculation used the guidance contained in NEI 04-02, Section 4.3.1 and Appendix B-1 (See Figure 4-1).

Each section and subsection of NFPA 805 Chapter 3 was reviewed against the current fire protection program. Upon completion of the activities associated with the review, the following compliance statement(s) was used:

- Comply - For those sections/subsections determined to meet the specific requirements of NFPA 805.
- Complies with Clarification - For those sections/subsections determined to meet the requirements of NFPA 805 with clarification.
- Complies with previous NRC approval - For those sections/subsections where the specific NFPA 805 Chapter 3 requirements are not met but previous NRC approval of the configuration exists.
- Complies with use of Existing Engineering Equivalency Evaluations (EEEEs) - For those sections/subsections determined to be equivalent to the NFPA 805 Chapter 3 requirements as documented by engineering analysis.
- Submit for NRC Approval - For those sections/subsections for which approval is sought in this LAR submittal in accordance with 10 CFR 50.48(c)(2)(vii). A summary of the bases of acceptability is provided (See Attachment L for details).
- N/A - NFPA 805 requirement does not apply to CNS.

In some cases multiple compliance statements have been assigned to a specific NFPA 805 Chapter 3 section/subsection. Where this is the case, each compliance/compliance basis statement clearly references the corresponding requirement of NFPA 805 Chapter 3.

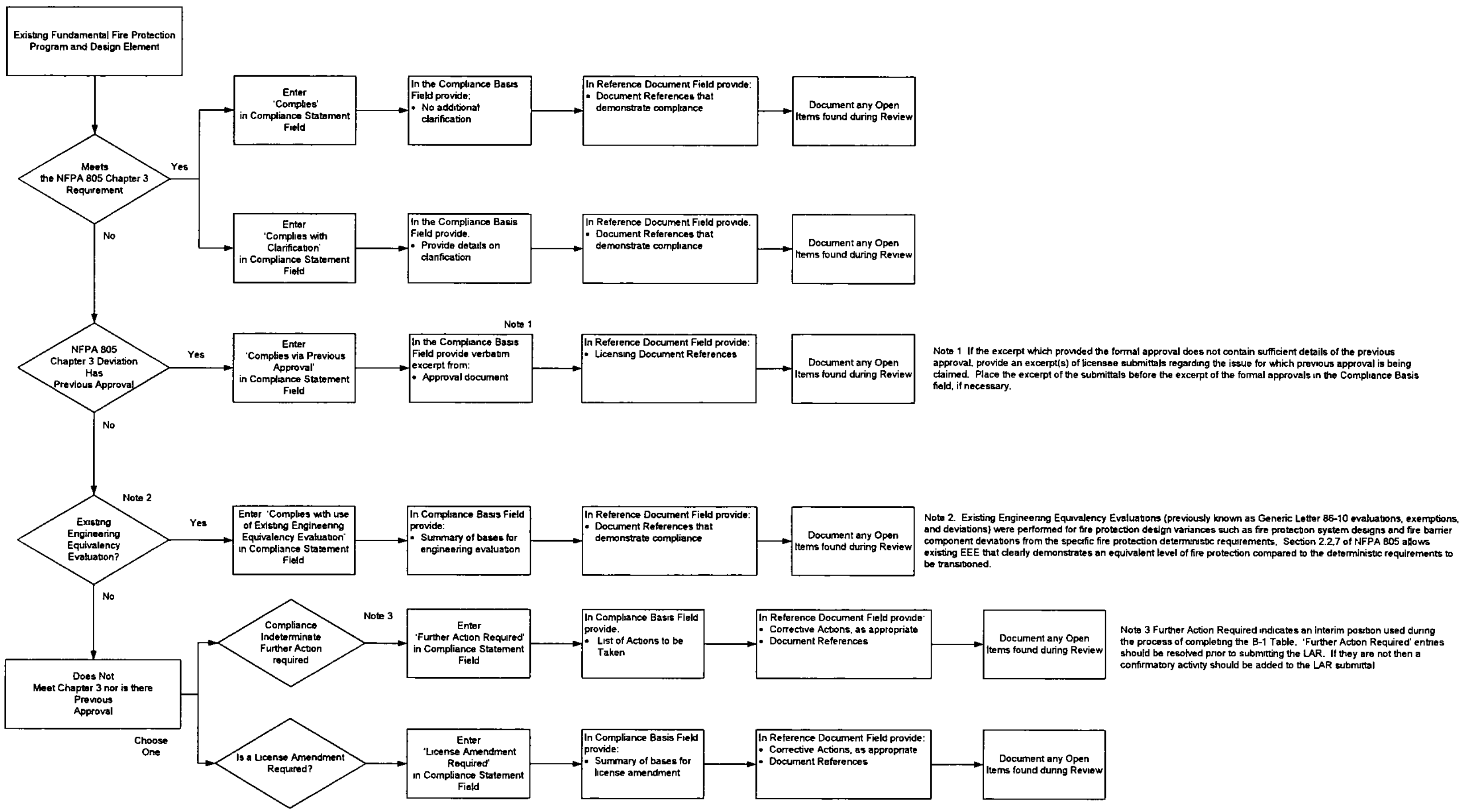

Figure 4-1 - Fundamental Fire Protection Program and Design Elements Transition Process [Based on NEI 04-02 Figure 4-2][3]

[3] Figure 4-1 depicts the process used during the transition and therefore contains elements (i.e., open items) that represent interim resolutions. Additional detail on the transition of EEEEs is included in Section 4.2.2.

4.1.2 Results of the Evaluation Process

4.1.2.1 NFPA 805 Chapter 3 Requirements Met or Previously Approved by the NRC

Attachment A contains the NEI 04-02 Table B-1, Transition of Fundamental Fire Protection Program and Design Elements. This table provides the compliance basis for the requirements in NFPA 805 Chapter 3. Except as identified in Section 4.1.2.3, Attachment A demonstrates that the fire protection program at CNS either:

- Complies directly with the requirements of NFPA 805 Chapter 3,
- Complies with clarification with the requirements of NFPA 805 Chapter 3,
- Complies through the use of existing engineering equivalency evaluations which are valid and of appropriate quality, or
- Complies with a previously NRC approved alternative to NFPA 805 Chapter 3 and therefore the specific requirement of NFPA 805 Chapter 3 is supplanted.
- Not applicable to the requirements of NFPA 805 Chapter 3.

4.1.2.2 NFPA 805 Chapter 3 Requirements Requiring Clarification of Prior NRC Approval

NFPA 805 Section 3.1 states in part, "Previously approved alternatives from the fundamental protection program attributes of this chapter by the Authority Having Jurisdiction (AHJ) take precedence over the requirements contained herein." In some cases prior NRC approval of an NFPA 805 Chapter 3 program attribute may be unclear. Duke Energy requests that the NRC concur with their finding of prior approval for the following sections of NFPA 805 Chapter 3:

- None.

4.1.2.3 NFPA 805 Chapter 3 Requirements Not Met and Not Previously Approved by NRC

The following sections of NFPA 805 Chapter 3 are not specifically met nor do previous NRC approvals of alternatives exist:

- 3.2.3(1) – Approval is requested for the use of the Electric Power Research Institute (EPRI) Report TR1006756, Surveillance Frequency Optimization and Maintenance Guide.
- 3.3.5.1 – Approval is requested for existing wiring above suspended ceilings.
- 3.3.5.2 – Approval is requested for embedded/buried Polyvinyl Chloride (PVC) conduit.
- 3.3.12(1) – Approval is requested for potential oil misting from the reactor coolant pumps/motors.

The specific deviation and a discussion of how the alternative satisfies 10 CFR 50.48(c)(2)(vii) requirements are provided in Attachment L. Duke Energy requests NRC approval of these performance-based methods.

4.1.3 Definition of Power Block and Plant

Where used in NFPA 805 Chapter 3 the terms "Power Block" and "Plant" refer to structures that have equipment required for nuclear plant operations, such as Containment, Auxiliary Building, Service Building, Control Building, Fuel Building, Radioactive Waste, Water Treatment, Turbine Building, and intake structures or structures that are identified in the facility's pre-transition licensing basis.

All structures within the CNS Owner Controlled Area were reviewed to determine the potential impact of fire on the nuclear safety criteria described in Section 1.5 of NFPA 805. This was accomplished by identifying the structures that contain equipment that could affect any of the following:

- Plant operation for power generation,
- Equipment important to safety, or
- The ability to maintain nuclear safety performance criteria in the event of a fire.

The switchyard is not included in the power block definition as the NFPA 805 analysis boundary begins at the main and auxiliary transformers.

Structures required to meet the radioactive release criteria described in Section 1.5 of NFPA 805, but not required to meet the nuclear safety criteria are not defined as "power block." Separate screening of structures was performed for the radioactive release review as discussed in Section 4.4 and Attachment E.

These structures are listed in Attachment I and define the "power block" and "plant".

4.2 Nuclear Safety Performance Criteria

The Nuclear Safety Performance Criteria are established in Section 1.5 of NFPA 805. Chapter 4 of NFPA 805 provides the methodology to determine the fire protection systems and features required to achieve the performance criteria outlined in Section 1.5. Section 4.3.2 of NEI 04-02 provides a systematic process for determining the extent to which the pre-transition licensing basis meets these criteria and for identifying any necessary fire protection program changes. NEI 04-02, Appendix B-2 provides guidance on documenting the transition of Nuclear Safety Capability Assessment Methodology and the Fire Area compliance strategies.

4.2.1 Nuclear Safety Capability Assessment Methodology

The Nuclear Safety Capability Assessment (NSCA) Methodology review consists of four processes:

- Establishing compliance with NFPA 805 Section 2.4.2.
- Establishing the Safe and Stable Conditions for the Plant.
- Establishing Recovery Actions.
- Evaluating Multiple Spurious Operations.

The methodology for demonstrating reasonable assurance that a fire during non-power operational (NPO) modes will not prevent the plant from achieving and maintaining the

fuel in a safe and stable condition is an additional requirement of 10 CFR 50.48(c) and is addressed in Section 4.3.

4.2.1.1 Compliance with NFPA 805 Section 2.4.2

Overview of Process

NFPA 805 Section 2.4.2 Nuclear Safety Capability Assessment states:

"The purpose of this section is to define the methodology for performing a nuclear safety capability assessment. The following steps shall be performed:
(1) Selection of systems and equipment and their interrelationships necessary to achieve the nuclear safety performance criteria in Chapter 1
(2) Selection of cables necessary to achieve the nuclear safety performance criteria in Chapter 1
(3) Identification of the location of nuclear safety equipment and cables
(4) Assessment of the ability to achieve the nuclear safety performance criteria given a fire in each fire area"

The NSCA methodology review evaluated the CNS existing post-fire safe shutdown analysis (SSA) methodology against the guidance provided in NEI 00-01, Revision 1 (ML050310295) Chapter 3, "Deterministic Methodology," as discussed in Appendix B-2 of NEI 04-02. The methodology is depicted in Figure 4-2 and consisted of the following activities:

- Each specific section of NFPA 805 2.4.2 was correlated to the corresponding section of Chapter 3 of NEI 00-01 Revision 1. Based upon the content of the NEI 00-01 methodology statements, a determination was made of the applicability of the section to the station.
- The plant-specific methodology was compared to applicable sections of NEI 00-01 and one of the following alignment statements and its associated basis were assigned to the section:
  - Not Required
  - Not Applicable
  - Aligns
  - Aligns with intent
  - Does Not Align
  - Does Not Align but has Previous Approval

The comparison of the CNS existing post-fire SSA to NEI 00-01 Chapter 3 (NEI 04-02 Table B-2) was performed and documented in a calculation entitled, "NFPA 805 Transition NEI 04-02 B-2 Table/Report – Nuclear Safety Capability Assessment Methodology Review."

In addition, a review of NEI 00-01, Revision 2, (ML091770265) Chapter 3, was conducted to identify the substantive changes from NEI 00-01, Revision 1 that are applicable to an NFPA 805 fire protection program. This review was performed and documented in a calculation entitled, "NFPA 805 Transition NEI 04-02 B-2 Table/Report – Nuclear Safety Capability Assessment Methodology Review."

Results from Evaluation Process

The method used to perform the CNS existing post-fire SSA with respect to selection of systems and equipment, selection of cables, and identification of the location of equipment and cables, either meets the NRC endorsed guidance from NEI 00-01, Revision 1, Chapter 3 (as supplemented by the gap analysis) directly with the following breaker coordination modification:

- Committed modifications: For NEI guidance criteria 3.3.1.7, the following MCCs were identified as requiring modification for elimination of breaker coordination issues in the CNS corrective action program:
    - 1EMXA
    - 1EMXB
    - 1EMXC
    - 1EMXD
    - 1EMXI
    - 1EMXJ
    - 1EMXK
    - 1EMXL
    - 2EMXA
    - 2EMXB
    - 2EMXC
    - 2EMXD
    - 2EMXI
    - 2EMXJ
    - 2EMXK
    - 2EMXL

  Modifications will be performed to eliminate breaker coordination issues.

See committed modifications in Table S-2b of Attachment S.

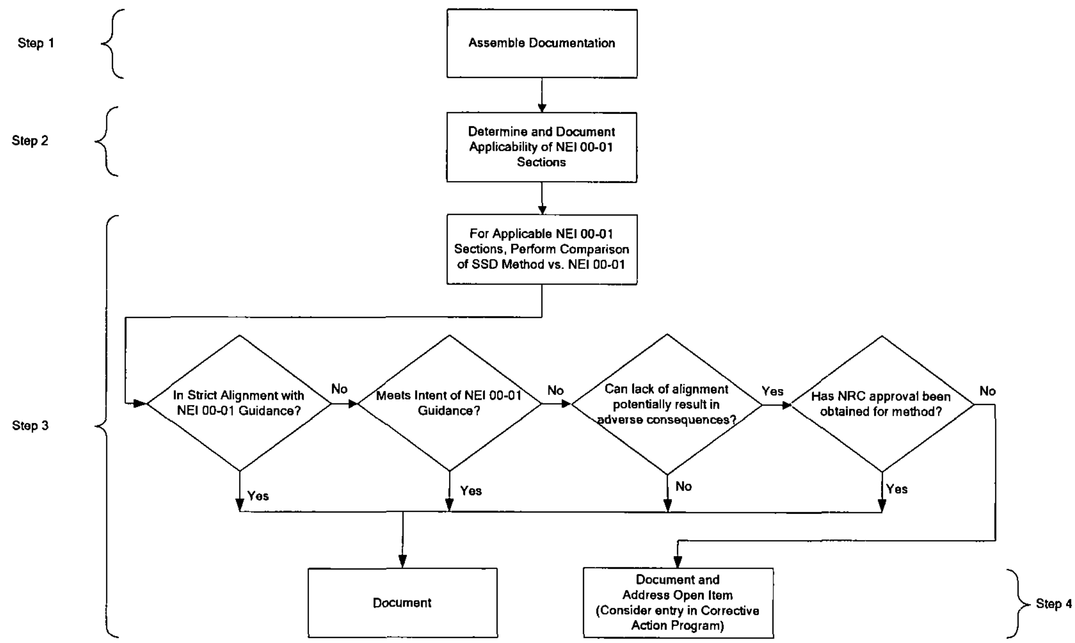

Figure 4-2 – Summary of Nuclear Safety Methodology Review Process (FAQ 07-0039)

Comparison to NEI 00-01 Revision 2

An additional review was performed of NEI 00-01, Revision 2, Chapter 3, for specific substantive changes in the guidance from NEI 00-01, Revision 1 that are applicable to an NFPA 805 transition. The results of this review are summarized below:

- Post fire manual operation of rising stem valves in the fire area of concern (NEI 00-01 Section 3.2.1.2):

  NEI 00-01, Revision 2 added additional guidance for evaluating for post-fire coefficient of friction for rising stem valves. There are no valves exposed to the fire which are required to be operated following a fire for HSB only. Therefore, this additional guidance is not applicable to CNS.

- Analysis of open circuits on high voltage (e.g., 4.16 kV) ammeter current transformers (NEI 00-01 Section 3.5.2.1):

  NEI 00-01, Revision 2 added additional guidance on the open circuit of a high voltage ammeter current transformer (CT) circuit. CNS properly considered this additional guidance in Engineering Information Record (EIR) 51-9183972-002, "Catawba Nuclear Station Units 1 & 2 NFPA 805 Transition - Deterministic Safe Shutdown Analysis."

- Analysis of control power for switchgear with respect to breaker coordination (NEI 00-01 Section 3.5.2.4):

  NEI 00-01, Revision 2 added additional guidance to ensure breaker coordination. This guidance included examples for breakers that have internal breaker tripping devices that do not require control power and breakers that do require control

power for tripping. The latter requires an evaluation to ensure the availability of control power. CNS performed circuit analysis that evaluated for this condition.

4.2.1.2 Safe and Stable Conditions for the Plant

Overview of Process

The nuclear safety goals, objectives and performance criteria of NFPA 805 allow more flexibility than the previous deterministic programs based on 10 CFR 50 Appendix R and NUREG 0800, Section 9.5-1 (and NEI 00-01, Chapter 3) since NFPA 805 only requires the licensee to maintain the fuel in a safe and stable condition rather than achieve and maintain cold shutdown.

NFPA 805, Section 1.6.56, defines Safe and Stable Conditions as follows

> *"For fuel in the reactor vessel, head on and tensioned, safe and stable conditions are defined as the ability to maintain Keff <0.99, with a reactor coolant temperature at or below the requirements for hot shutdown for a boiling water reactor and hot standby for a pressurized water reactor. For all other configurations, safe and stable conditions are defined as maintaining Keff <0.99 and fuel coolant temperature below boiling."*

The nuclear safety goal of NFPA 805 requires "*...reasonable assurance that a fire during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition*" without a specific reference to a mission time or event coping duration.

For the plant to be in a safe and stable condition, it may not be necessary to perform a transition to cold shutdown as currently required under 10 CFR 50, Appendix R. Therefore, the unit may remain at the temperature defined by a hot standby (HSB) plant operating state for the event.

Results

Based on the calculation entitled, "NFPA 805 Transition - NEI 04-02 Table B-3 – Fire Area Transition," the NFPA 805 licensing basis for CNS to achieve proposed safe and stable conditions is as follows:

Demonstration of the Nuclear Safety Performance Criteria for safe and stable conditions was performed in two analyses.

- At-Power analysis, Modes 1-3 prior to manually initiating a cooldown. This analysis is discussed in Section 4.2.4.
- Non-Power analysis, which includes Mode 3 after initiating a manual cooldown, 4, 5, 6 and No Mode. This analysis is discussed in Section 4.3.

The 'At Power' safe shutdown analysis postulates a single fire occurring at 100% power and provides the listing of damaged equipment that may be needed to restore a success path to meet a particular nuclear safety performance goal. The 'At Power' safe and stable strategy includes entry into HSB (Mode 3) and stops prior to the point of manually initiating a cooldown.

The following long term actions can be instituted as needed:

- The site emergency organization can be established.
- More resources can be made available.
- Additional material can be available from both within and outside the corporation.
- Damage repairs can be completed as desired / needed resulting in additional success paths being made available
- Offsite power is expected to be restored.

Safe and stable conditions at HSB may continue long term with the following activities:

Fuel oil

- For SSF train - The SSF Diesel Generator (DG) fuel tank needs replenishing approximately every 72 hours. Fuel oil may also be obtained from offsite vendors.
- For A or B train - The safety related DGs need replenishing approximately every 7 days per design basis accident. Alternatively, the fire affected train's respective DG fuel can be pumped to the non-fire affected train DG providing approximately 14 days of fuel. Fuel oil may also be obtained from offsite vendors.

Feedwater

- An assured source of 225,000 gallons of condensate grade water is available per unit for A train, B train, or SSF success path.
- For SSF train - the embedded Condenser Circulating Water piping volume will provide suction to the Turbine Driven Auxiliary Feedwater Pump for 72 hours. This piping is normally isolated, but may be aligned via valves which receive power from the SSF. Pressure transmitters will automatically align RN and/ or this suction source or it may be aligned manually. Manual actions can replenish the water in this piping if required.
- For A or B train, although Lake Wylie is expected to be available, the assured source is the SNSWP via Nuclear Service Water.

Reactor Coolant (NC) inventory

- For SSF train - The SFP will provide available inventory via the Standby Makeup Pump for at least 72 hours. SFP makeup can be provided from the Refueling Water Storage Tank (FWST) as well as several other sources to extend the available supply.
- For A or B train - Charging flow to the Reactor Coolant Pump seals will provide a steady state supply of inventory. The assured source is the FWST (approximately 380,000 gal.) and then realignment to containment sump.

Decay Heat

Long term safe and stable conditions can be maintained with natural circulation and Steam Generator steaming with assured adequate feedwater.

The transition for CNS to a new NFPA 805 fire protection licensing basis under 10 CFR 50.48 (c) per NEI 04-02 requires that the licensee perform an engineering analysis to assess the impact of fires occurring in all operational modes, including non-power operations. For all non-power modes, the equipment required to demonstrate key safety functions are identified using a pinch point analysis. The 'Non-Power' safe and stable strategy includes cooldown initiating from hot standby portions of Mode 3 and Modes 4, 5, 6 and defueled, i.e. No-Mode, and places residual heat removal in service for long term cooling capability.

The balance of 'At Power' and 'Non-Power' strategies meets the definition of nuclear safety goal of NFPA 805, Section 1.3.1, in that "reasonable assurance that a fire during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition."

4.2.1.3 Establishing Recovery Actions

Overview of Process

NEI 04-02 and RG 1.205 suggest that a licensee submit a summary of its approach for addressing the transition of Operator Manual Actions (OMAs) as recovery actions in the LAR (Regulatory Position 2.2.1 and NEI-04-02, Section 4.6). As a minimum, NEI 04-02 suggests that the assumptions, criteria, methodology, and overall results be included for the NRC to determine the acceptability of the licensee's methodology.

The discussion below provides the methodology used to transition pre-transition OMAs and to determine the population of post-transition recovery actions. This process is based on FAQ 07-0030 (ML110070485) and consists of the following steps:

- Step 1: Clearly define the primary control station(s) and determine which pre-transition OMAs are taken at primary control station(s) (Activities that occur in the Main Control Room are not considered pre-transition OMAs). Activities that take place at primary control station(s) or in the Main Control Room are not recovery actions, by definition.
- Step 2: Determine the population of recovery actions that are required to resolve variances from deterministic requirements (VFDRs) (to meet the risk acceptance criteria or maintain a sufficient level of defense-in-depth).
- Step 3: Evaluate the additional risk presented by the use of recovery actions required to demonstrate the availability of a success path
- Step 4: Evaluate the feasibility of the recovery actions
- Step 5: Evaluate the reliability of the recovery actions

Results

The review results are documented in the following calculations entitled, "NFPA 805 Primary Control Station (PCS) and Recovery Actions (RA)", "NFPA 805 Transition, Fire Risk Evaluations (FREs)", and "NFPA 805 Transition Recovery Action Feasibility Review." Refer to Attachment G for the detailed evaluation process and summary of the results from the process.

4.2.1.4 Evaluation of Multiple Spurious Operations

Overview of Process

NEI 04-02 suggests that a licensee submit a summary of its approach for addressing potential fire-induced MSOs for NRC review and approval. As a minimum, NEI 04-02 suggests that the summary contain sufficient information relevant to methods, tools, and acceptance criteria used to enable the NRC to determine the acceptability of the licensee's methodology. The methodology utilized to address MSOs for CNS is summarized below.

As part of the NFPA 805 transition project, a review and evaluation of CNS susceptibility to fire-induced MSOs was performed. The process was conducted in accordance with NEI 04-02 and RG 1.205, as supplemented by FAQ 07-0038 Revision 3 (ML110140242). The PWR Generic MSO list dated March 25, 2008 was utilized.

The approach outlined in Figure 4-3 (based on FAQ 07-0038) is one acceptable method to address fire-induced MSOs. This method used insights from the Fire PRA developed in support of transition to NFPA 805 and consists of the following:

- Identifying potential MSOs of concern.
- Conducting an expert panel to assess plant specific vulnerabilities (e.g., per NEI 00-01, Rev. 1 Section F.4.2).
- Updating the Fire PRA model and existing post-fire SSA to include the MSOs of concern.
- Evaluating for NFPA 805 Compliance.
- Documenting Results.

This process is intended to support the transition to a new licensing basis. Post-transition changes would use the RI-PB change process. The post-transition change process for the assessment of a specific MSO would be a simplified version of this process, and may not need the level of detail shown in the following section (e.g., An expert panel may not be necessary to identify and assess a new potential MSO. Identification of new potential MSOs may be part of the plant change review process and/or inspection process).

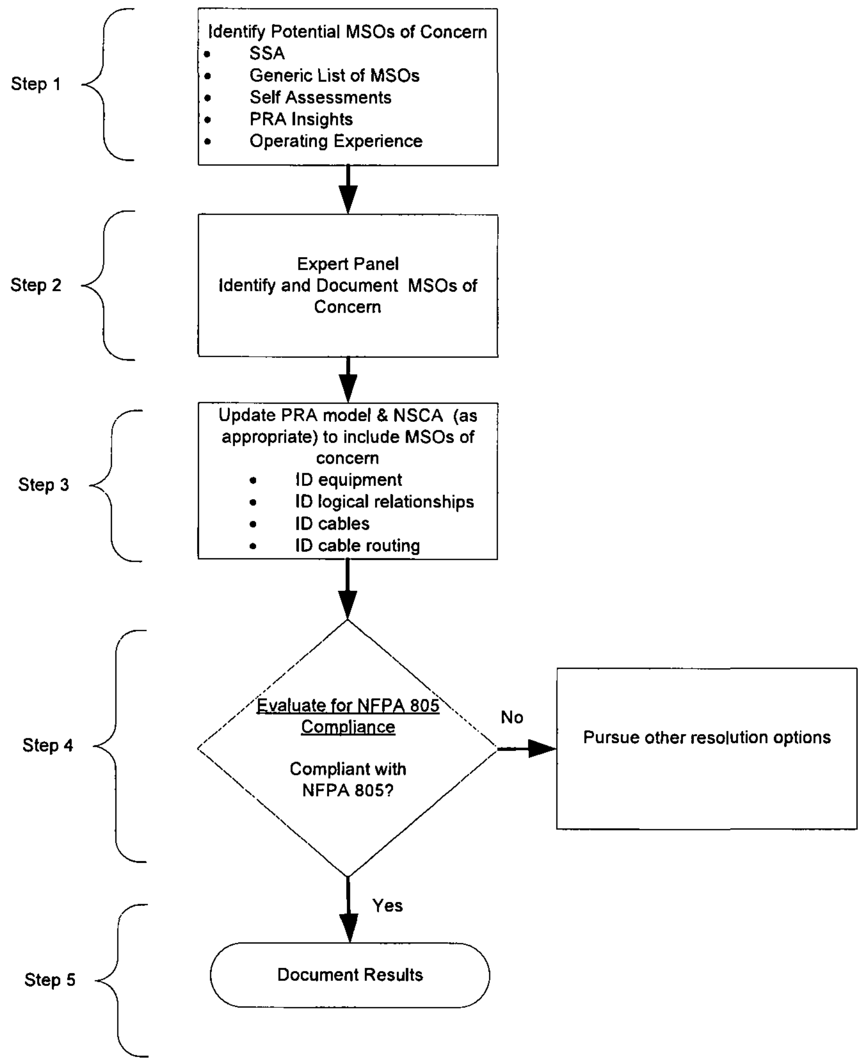

Figure 4-3 – Multiple Spurious Operations – Transition Resolution Process (Based on FAQ 07-0038)

Results

Refer to Attachment F for the process used and the results from the process.

4.2.2 Existing Engineering Equivalency Evaluation Transition

Overview of Evaluation Process

The EEEEs that support compliance with NFPA 805 Chapter 3 or Chapter 4 (both those that existed prior to the transition and those that were created during the transition) were reviewed using the methodology contained in NEI 04-02. The methodology for performing the EEEE review included the following determinations:

- The EEEE is not based solely on quantitative risk evaluations,
- The EEEE is an appropriate use of an engineering equivalency evaluation,
- The EEEE is of appropriate quality,

- The standard license condition is met,
- The EEEE is technically adequate,
- The EEEE reflects the plant as-built condition, and
- The basis for acceptability of the EEEE remains valid.

In accordance with the guidance in RG 1.205, Regulatory Position 2.3.2 and NEI 04-02, as clarified by FAQ 07-0054, Demonstrating Compliance with Chapter 4 of NFPA 805, EEEEs that demonstrate that a fire protection system or feature is "adequate for the hazard" are summarized in the LAR as follows:

- If not requesting specific approval for "adequate for the hazard" EEEEs, then the EEEE was referenced where required and a brief description of the evaluated condition was provided.
- If requesting specific NRC approval for "adequate for the hazard" EEEEs, then EEEE was referenced where required to demonstrate compliance and was 0included in Attachment L for NRC review and approval.

In all cases, the reliance on EEEEs to demonstrate compliance with NFPA 805 requirements was documented in the LAR.

Results

The review results for EEEEs are documented in a calculation entitled, "NFPA-805 Transition Engineering Equivalency Evaluation Review."

In accordance with the guidance provided in RG 1.205, Regulatory Position 2.3.2, NEI 04-02, as clarified by FAQ 07-0054, Demonstrating Compliance with Chapter 4 of NFPA 805, EEEEs used to demonstrate compliance with Chapters 3 and 4 of NFPA 805 are referenced in the Attachments A and C as appropriate.

None of the transitioning EEEEs require NRC approval.

4.2.3 Licensing Action Transition

The existing licensing actions review was performed in accordance with NEI 04-02. The methodology for the licensing action review included the following:

- Determination of the bases for acceptability of the licensing action.
- Determination that these bases for acceptability are still valid and required for NFPA 805.

Results

Attachment K contains the detailed results of the Licensing Action Review.

The following licensing actions will be transitioned into the NFPA 805 fire protection program as previously approved (NFPA 805 Section 2.2.7). These licensing actions are considered compliant under 10 CFR 50.48(c).

- 01. Commitment to utilize metallic sheathed MI cable as a radiant energy shield in containment per Section III.G.2 of Appendix R to 10 CFR 50.
- 02. Deviation from Item C.5.a(5) of BTP CMEB 9.5-1 regarding unlabeled fire doors.

- 07. Deviation from Item C.6.c of BTP CMEB 9.5-1 related to standpipe protection in the annulus and pipe tunnel.
- 08. Deviation from Item C.6.c(1) of BTP CMEB 9.5-1 regarding unlisted water supply valves.
- 09. Deviation from Item C.6.c(1) of BTP CMEB 9.5-1 related to seismic design of standpipe systems.
- 12. Deviation from C.5.a of BTP CMEB 9.5-1 regarding protection of HVAC penetrations of fire barriers.
- 13. Deviation from Section C.5.a of BTP CMEB 9.5-1 regarding unprotected structural steel over the turbine driven auxiliary feedwater pump pit.
- 17. Installation of Safe Shutdown System per NRC SER Requirement.
- 18. Protection of penetrations of fire area boundaries in the Reactor Building.

The following licensing actions are no longer necessary and will not be transitioned into the NFPA 805 fire protection program:

- 03. Deviation from C.5.b and C.5.c of SRP 9.5-1 regarding unprotected structural steel supporting protected cables in the Auxiliary Feedwater (AFW) pump room.
- 06. Deviation from Item C.6.a of BTP CMEB 9.5-1 related to unsupervised water flow alarms.
- 10. Deviation from Section C.3.b of BTP CMEB 9.5-1 regarding composition of the fire brigade.
- 15. Deviation from Section C.6.a of BTP CMEB 9.5-1 regarding the absence of certain fire rated seals in penetrations of exterior walls and roofs.

Deviations 03, 06, 10, and 15 are no longer required because NFPA 805 Chapter 3 contains an equivalent requirement.

- 11. Deviation from Section C.5.a of BTP CMEB 9.5-1 non-fire-rated hatchway covers.

Deviation 11 is no longer required because the subject licensing action has been demonstrated adequate for the hazard in a calculation entitled, “CNS Penetration Seal Database and 86-10 Evaluations.”

- 04. Deviation from Item C.5.b of BTP CMEB 9.5-1 regarding partial coverage sprinkler system.
- 05. Deviation from Item C.5.b of BTP CMEB 9.5-1 related to fire areas containing safe shutdown related equipment without having automatic suppression.
- 14. Deviation from Section C.6.a of BTP CMEB 9.5-1 regarding absence of certain fire detectors in safety related areas.
- 16. Deviation from Section C.7.c of BTP CMEB 9.5-1 regarding no fixed fire suppression in the Cable Spreading Room.

Deviations 04, 05, 14, and 16 are no longer required. The NFPA 805 transition compliance strategy is in accordance with Section 4.2.4, and uses a performance based approach that evaluates fire protection systems and features requirements.

CNS is a NUREG-0800 (Standard Review Plan) plant licensed to operate after January 1, 1979, and as such,10 CFR 50 Appendix R is not applicable and exemptions from the regulation were not necessary. Since the deviations are either compliant with 10 CFR 50.48(c) or no longer necessary, as discussed in Attachment M, upon issuance of the new 10 CFR 50.48(c) license condition, the current Duke Energy license condition will be superseded. It is Duke Energy's understanding that implicit in the superseding of the current license condition, all prior fire protection program Safety Evaluation Reports and commitments will be superseded in their entirety.

4.2.4 Fire Area Transition

Overview of Evaluation Process

The Fire Area Transition (NEI 04-02 Table B-3) was performed using the methodology contained in NEI 04-02 and FAQ 07-0054. The methodology for performing the Fire Area Transition, depicted in Figure 4-4, is outlined as follows:

Step 1 - Assembled documentation. Gathered industry and plant-specific fire area analyses and licensing basis documents.

Step 2 – Documented fulfillment of nuclear safety performance criteria.

- Assessed accomplishment of nuclear safety performance goals. Documented the method of accomplishment, in summary level form, for the fire area.
- Documented evaluation of effects of fire suppression activities. Documented the evaluation of the effects of fire suppression activities on the ability to achieve the nuclear safety performance criteria.
- Performed licensing action reviews. Performed a review of the licensing aspects of the selected fire area and document the results of the review. See Section 4.2.3.
- Performed existing engineering equivalency evaluation reviews. Performed a review of existing engineering equivalency evaluations (or created new evaluations) documenting the basis for acceptability. See Section 4.2.2.
- Pre-transition OMA reviews. Performed a review of pre-transition OMAs to determine those actions taking place outside of the main control room or outside of the primary control station(s). See Section 4.2.1.3.

Step 3 – VFDR Identification and characterization and resolution considerations. Identified variances from the deterministic requirements of NFPA 805, Section 4.2.3. Documented variances as either a separation issue or a degraded fire protection system or feature. Developed VFDR problem statements to support resolution.

Step 4 – Performance-Based evaluations (Fire Modeling or Fire Risk Evaluations) See Section 4.5.2 for additional information.

Step 5 – Final Disposition.

- Documented final disposition of the VFDRs in Attachment C (NEI 04-02 Table B-3).
- For recovery action compliance strategies, ensured the manual action feasibility analysis of the required recovery actions was completed. Note: if a recovery action cannot meet the feasibility requirements established per NEI 04-02, then alternate means of compliance was considered.
- Documented the post transition NFPA 805 Chapter 4 compliance basis.

Step 6 – Documented required fire protection systems and features. Reviewed the NFPA 805 Section 4.2.3 compliance strategies (including fire area licensing actions and engineering evaluations) and the NFPA 805 Section 4.2.4 compliance strategies (including simplifying deterministic assumptions) to determine the scope of fire protection systems and features 'required' by NFPA 805 Chapter 4. The 'required' fire protection systems and features are subject to the applicable requirements of NFPA 805 Chapter 3.

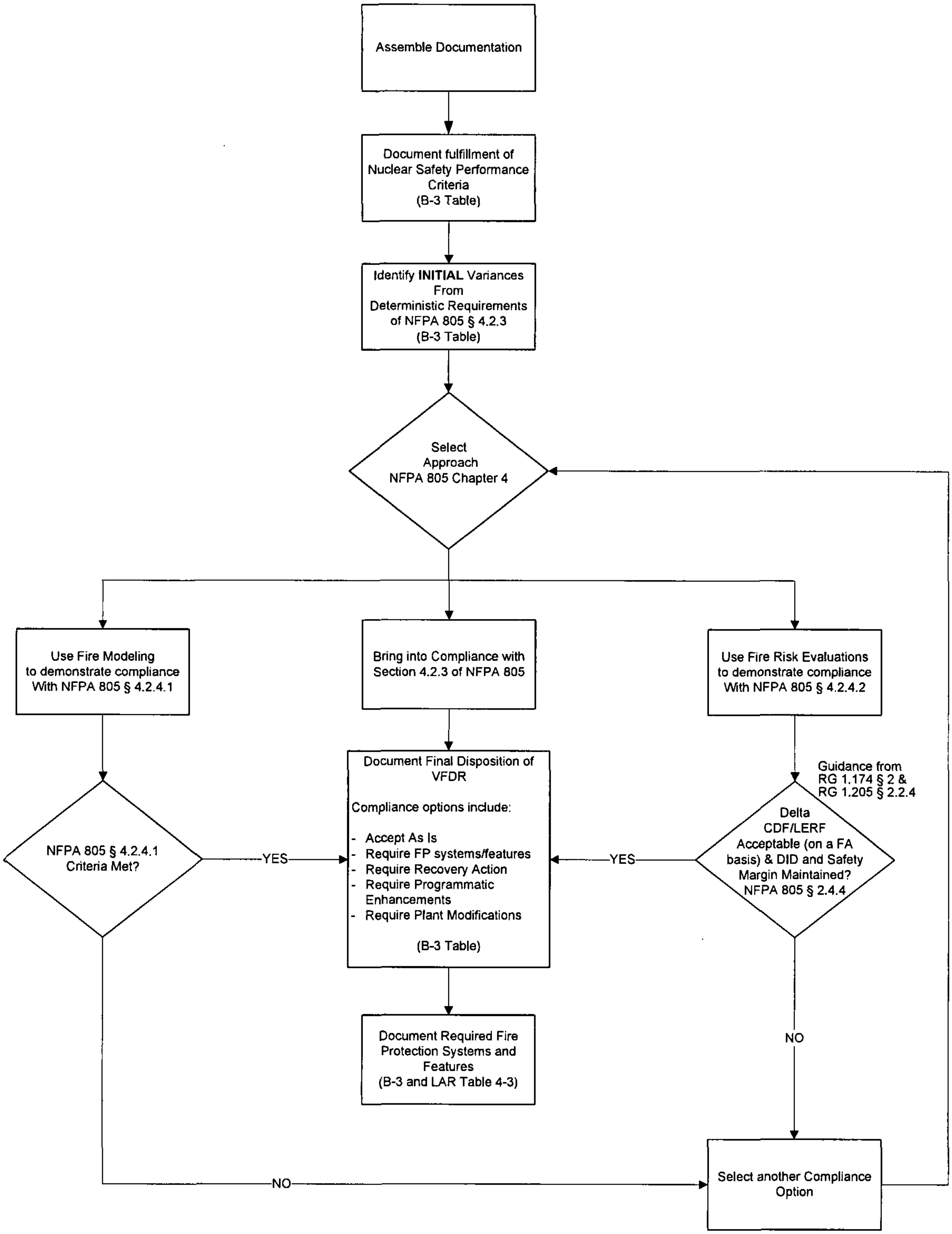

Figure 4-4 – Summary of Fire Area Review [Based on FAQ 07-0054 Revision 1]

Results of the Evaluation Process

Table C-1 of Attachment C contains the results of the Fire Area Transition review (NEI 04-02 Table B-3). On a fire area basis, Table C-1 of Attachment C summarizes compliance with Chapter 4 of NFPA 805.

NEI 04-02 Table B-3 includes the following summary level information for each fire area:

- Compliance Basis – NFPA 805 post-transition regulatory bases are included.
- Performance Goal Summary – An overview of the method of accomplishment of each of the performance criteria in NFPA 805 Section 1.5 is provided.
- Reference Documents – Specific references to Nuclear Safety Capability Assessment Documents are provided.
- Fire Suppression Activities Effect on Nuclear Safety Performance Criteria – A summary of the method of accomplishment is provided.
- Licensing Actions – Specific references to deviations / safety evaluations that will remain part of the post-transition licensing basis. A brief description of the condition and the basis for acceptability of the licensing action is provided.
- EEEE – Specific references to EEEE that rely on determinations of "adequate for the hazard" that will remain part of the post-transition licensing basis. A brief description of the condition and the basis for acceptability is provided.
- VFDRs – Specific variances from the deterministic requirements of NFPA 805 Section 4.2.3. Refer to Section 4.5.2 for a discussion of the performance-based approach.

4.3 Non-Power Operational Modes

4.3.1 Overview of Evaluation Process

CNS implemented the process outlined in NEI 04-02 and FAQ 07-0040, Clarification on Non-Power Operations. The goal (as depicted in Figures 4-5 and 4-6) is to ensure that contingency plans are established when the plant is in a Non-Power Operational (NPO) mode where the risk is intrinsically high. During low risk periods, normal risk management controls and fire prevention/protection processes and procedures will be utilized.

The process to demonstrate that the nuclear safety performance criteria are met during NPO modes involved the following steps:

- Reviewed the existing Outage Management Processes.
- Identified Equipment/Cables:
  - Reviewed plant systems to determine success paths that support each of the defense-in-depth Key Safety Functions (KSFs), and
  - Identified cables required for the selected components and determined their routing.
- Performed Fire Area Assessments (identify pinch points – plant locations where a single fire may damage all success paths of a KSF).
- Managed pinch-points associated with fire-induced vulnerabilities during the outage.

The process is depicted in Figures 4-5 and 4-6. The results are presented in Section 4.3.2.

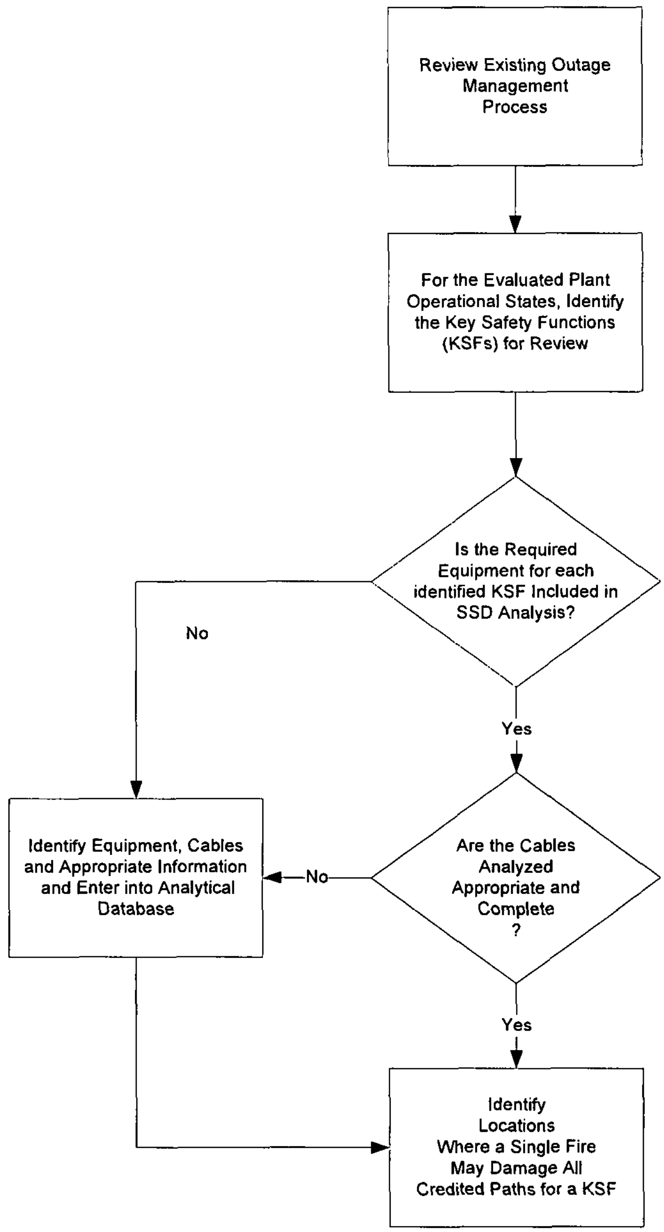

Figure 4-5 Review POSs, KSFs, Equipment, and Cables, and Identify Pinch Points

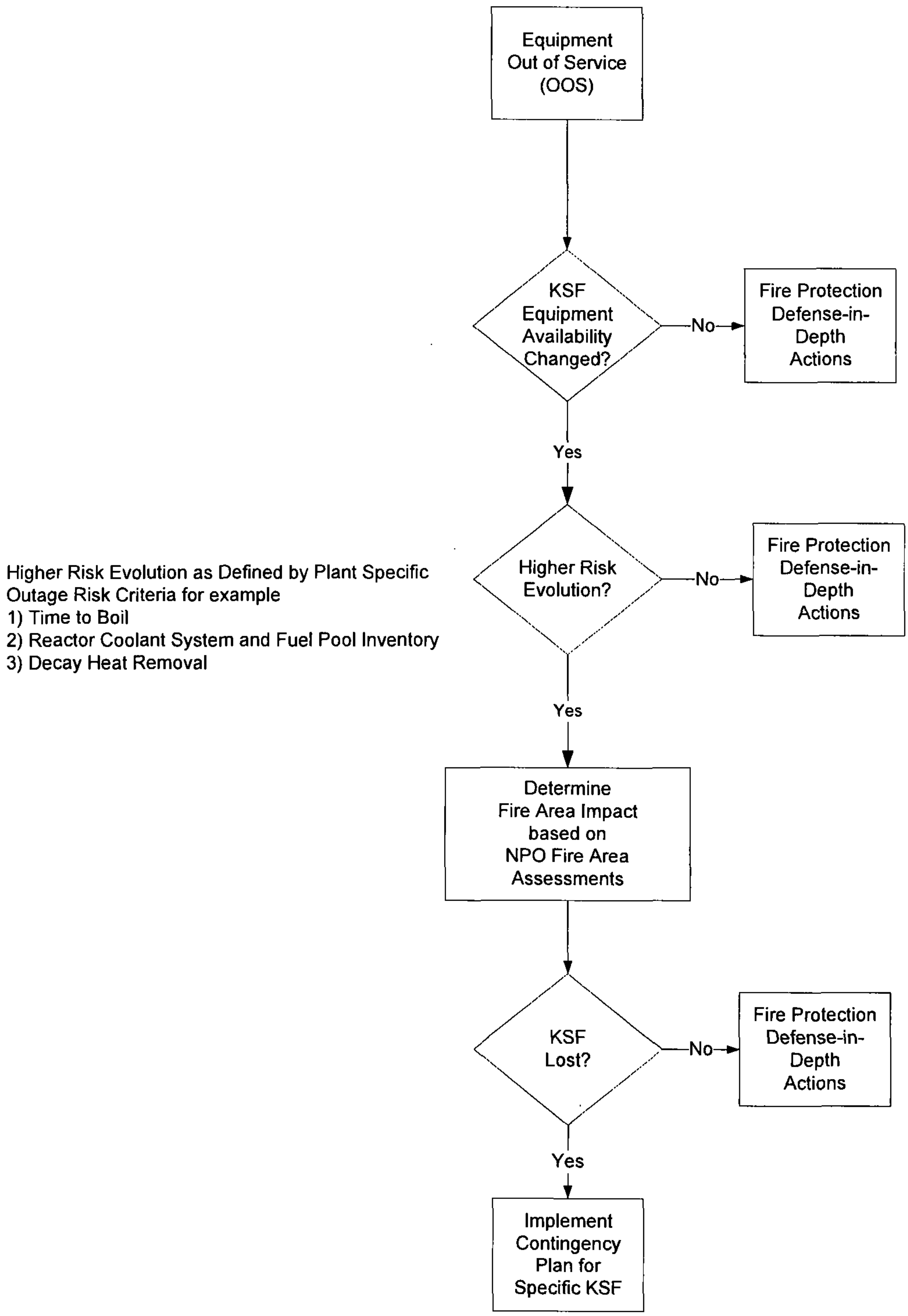

Figure 4-6 Manage Pinch Points

4.3.2 Results of the Evaluation Process

Based on FAQ 07-0040, the Plant Operating States considered for equipment and cable selection are defined in report entitled "Catawba Nuclear Station - NFPA 805 Non-Power Operations Component Selection Modes 3-6 & Defueled." Systems were identified to provide the following five KSFs:

1. Decay Heat Removal Capability,
2. Inventory Control (including Reactor Vessel Level indication),
3. Reactivity Control,
4. Spent Fuel Pool Cooling, and
5. Electrical Power Availability (to the extent that it supports the Decay Heat Removal, Inventory Control, Reactivity Control and Spent Fuel Pool Cooling functions).

Components from the chosen systems were grouped into NPO Function Codes, which were then related to establish KSF success paths. The list of new NPO components or existing NSCA components with different NPO functional states (e.g. Valve Open versus Closed) is identified as well. The selection of cables and spurious operations considerations were performed identically to the NSCA so that a comprehensive and conservative listing of cables and components was selected for the NPO analysis.

In the calculation entitled, "NFPA 805 Non-Power Fire Area Assessments (Pinch Points Analysis)," fire areas were tabulated to evaluate the availability of KSF Success Paths for NPO support. The Pinch Point Table was developed using the existing information in the SSA database which also contains the supplemental information on additional components or functional states. If any credited component was impacted in that fire area, that success path was considered not available for NPO. In accordance with FAQ 07-0040, any evaluated fire area in which all of the credited success paths for a given KSF are lost is considered a pinch point.

The list of recommendations specified in the evaluation considers the following actions from FAQ 07-0040:

1. Restriction of hot work in analysis pinch point areas during periods of increased vulnerability.
2. Verification of functional detection and / or suppression in the vulnerable pinch point analysis areas.
3. Limitation of transient combustible materials in analysis pinch point areas during periods of increased vulnerability.
4. Plant equipment configuration changes (e.g., removing power from equipment once it is placed in its desired position). Note that although this action may be used for future outage planning, it was not used to exclude any pinch points as part of the evaluation which supports this license amendment.
5. Provision of additional fire patrols at periodic intervals or other appropriate compensatory measures (such as surveillance cameras in pinch point areas during periods of increased vulnerability.
6. Rescheduling work to a period with lower risk or higher defense-in-depth.

See Attachment D for more complete details. Based on incorporation of the recommendations from the KSF pinch point evaluations into appropriate plant procedures prior to implementation of the NFPA 805 fire protection program, the performance goals for NPO Modes are fulfilled and the requirements of NFPA 805 are met. See Implementation Item 12 in Table S-3 of Attachment S.

4.4 Radioactive Release Performance Criteria

4.4.1 Overview of Evaluation Process

The review of the fire protection program against NFPA 805 requirements for fire suppression related radioactive release was performed using the methodology contained in a calculation entitled "NFPA 805 Transition, Radiological Release Evaluation." The methodology consisted of the following:

The Nuclear Safety Performance Criteria (NSPC) already requires the prevention of fuel cladding damage. The use of NFPA 805 Section 4.2.3 explicitly meets the radioactive release objective by limiting the source term (no fuel damage). As such, radiological release due to fuel damage should not require a separate examination since no such damage is assumed to occur.

The radioactive release performance criteria (NFPA 805 Section 1.5.2) requires that radiation release to unrestricted areas due to direct affects of fire suppression activities shall be low as reasonably achievable and shall not exceed applicable 10 CFR 20 limits. This limits the radioactive release review to fire fighting activities and the control of combustion products (smoke and particulates) and the control of fire fighting agents (water). The potential for radioactive release due to fire fighting activities is addressed via evaluation of fire strategies and training materials.

Each fire area was screened to determine if a potential for Radioactive Release was possible. Areas outside of the radiologically controlled area (RCA) were viewed as having no risk and have been subsequently screened out. Compartments were then identified based on the presence of common smoke and runoff control systems. If a fire area was found to have a unique condition, although within the boundaries of a building that may be identified as a compartment, that fire area will be identified as an individual compartment during the analysis process.

The CNS fire strategies were reviewed to screen the potential to contain radioactive or contaminated materials. Information is provided in Attachment E for each compartment that is screened in (affects radioactive release) or screened out (cannot affect radioactive release). These fire strategies were evaluated to ensure that the locations that have the potential for radioactive release due to fire fighting activities are subject to specific steps for containment and monitoring of potentially contaminated smoke and fire suppression water. Available engineering or procedural controls for water release and smoke were then reviewed to determine how effectively the specific steps in the fire strategies provide guidelines for the containment and monitoring of potentially contaminated smoke and fire suppression water. The fire strategies assume the plant is at power operation in terms of identifying specific hazards; however the strategies employed do not rely on the operational status of the unit(s) and are therefore valid during outage periods as well. These are also documented in Attachment E.

The fire brigade training materials were reviewed to ensure they are consistent with the fire strategies in terms of containment and monitoring of potentially contaminated smoke and fire suppression water. Attachment E summarizes if the radioactive release performance criteria are met for each fire strategy fire area. This review covers all plant operating modes since the fire strategies are not mode specific.

FAQ 09-0056 provides additional guidance on treatment of Radioactive Release. Within the guidance are two paths, a qualitative review and a quantitative review. CNS has chosen to perform a qualitative review.

The qualitative evaluation uses three methods of providing reasonable assurance that an uncontrolled radioactive release does not exceed 10 CFR 20 limits:

- Contain effluent from the fire and fire suppression activities.
- Engage all Fire Brigade Responders.
- Engagement of Radiation Protection Technician.

By using this approach, three levels of defense are provided to prevent radioactive release limits from being exceeded: Contain the source of the release by engineering or administrative controls; have response personnel engaged and acting on the potential failure of the containment method; and provide a radiation protection professional to support and monitor operations.

4.4.2 Results of the Evaluation Process

The calculation entitled "NFPA 805 Transition, Radiological Release Evaluation" contains a list of implementation items which will support meeting the radioactive release performance criteria. See Implementation Item 1 in Table S-3 of Attachment S. Individual fire area results are documented in Attachment E by compartment.

By using RCA engineered ventilation systems, providing training to responders, implementing additional guidance for the control of and response to fires involving radioactive material and having a "caution" statement for the use of alternate ventilation methods, the philosophy to control airborne release is addressed within the fire strategies. Where engineering controls are not available administrative controls are implemented. The individual compartment reviews and results are documented in Attachment E.

The unrestricted release of radioactive material through runoff is most likely to occur when water from a RCA escapes a physical boundary and enters the site storm drain system or flows overland directly to Lake Wylie or the Standby Nuclear Service Water Pond. With the exception of the Radiation Materials Control Building and the Retired Steam Generator Storage Facility, yard drainage around RCAs is collected by Yard Drain Collection Sumps Nos. 1, 2 and 3 and is processed in the Conventional Wastewater Treatment System prior to release to Lake Wylie. In a significant storm event, Yard Drain Collection Sumps overflow directly to the lake. Additional administrative controls, including a diagram of relevant storm drain locations will be added to the fire strategies. See Implementation Item 1 in Table S-3 of Attachment S.

No reference to runoff was identified in any of the fire strategies. A statement that the control of runoff is important for locations that are adjacent to the exterior of the RCA

buildings will be added to the fire strategies. See Implementation Item 1 in Table S-3 of Attachment S.

Training of the fire brigade personnel is a line of defense in preventing the radioactive release during fire fighting activities. A review of the lesson plans and fire brigade standard operating procedures found no objectives that address fire fighting concerns for controlling radioactive smoke or runoff. Limited statements to coordinate with radiation protection were identified in procedures but with no direct relationship to preventing radioactive release. These statements will be added to procedures. See Implementation Item 1 in Table S-3 of Attachment S.

The radioactive release review determined the fire protection program will be compliant with the requirements of NFPA 805 and the guidance in NEI 04-02 and RG 1.205 upon completion of the Implementation Items identified in Attachment E.

4.5 Fire PRA and Performance-Based Approaches

RI-PB evaluations are an integral element of an NFPA 805 fire protection program. Key parts of RI-PB evaluations include:

- A Fire PRA (discussed in Section 4.5.1 and Attachments U, V, and W).
- NFPA 805 Performance-Based Approaches (discussed in Section 4.5.2).

4.5.1 Fire PRA Development and Assessment

In accordance with the guidance in RG 1.205, a Fire PRA model was developed for CNS consistent with the requirements of Part 4 "Requirements for Fires At Power PRA," of the American Society of Mechanical Engineers (ASME) and American Nuclear Society (ANS) combined PRA Standard, ASME/ANS RA-Sa-2009, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Application," (hereafter referred to as Fire PRA Standard). Duke Energy conducted a peer review by independent industry analysts in accordance with RG 1.200 prior to a risk-informed submittal. The resulting fire risk assessment model is used as the analytical tool to perform Fire Risk Evaluations during the transition process.

Section 4.5.1.1 describes the Internal Events PRA model. Section 4.5.1.2 describes the Fire PRA model. Section 4.5.1.3 describes the results and resolution of the peer review of the Fire PRA, and Section 4.5.1.4 describes insights gained from the Fire PRA.

4.5.1.1 Internal Events PRA

The CNS base internal events PRA model cr3a was the starting point for the Fire PRA.

The most recent full scope CNS Internal Events PRA Peer Review was performed in March 2002 using the peer review process described in NEI 00-02. More recently, focused scope peer reviews have been conducted on the CNS Large Early Release Frequency (LERF) PRA model and the CNS Internal Flooding PRA model. The CNS Internal Events PRA was judged to meet Capability Category II consistent with RG 1.205 guidance. The Internal Events PRA quality and results are discussed in Attachment U.

4.5.1.2 Fire PRA

The development of the Fire PRA Model was based on the current approved Full Power Internal Events (FPIE) PRA model. The process for creation of the Fire PRA model and quantification of that model use a methodology consistent with the guidance provided in NUREG/CR-6850/EPRI TR 1011989 and subsequent clarifications documented in responses to NFPA 805 FAQs. No unreviewed methods or deviations from NUREG/CR-6850 were utilized in the Fire PRA model development.
The Fire PRA quality and results are discussed in the subsequent sections and in Attachments V and W, respectively.

Fire Model Utilization in the Application

Fire modeling was performed as part of the Fire PRA development (NFPA 805 Section 4.2.4.2). RG 1.205, Regulatory Position 4.2 and Section 5.1.2 of NEI 04-02, provide guidance to identify fire models that are acceptable to the NRC for plants implementing a risk-informed, performance-based licensing basis.

The fire models used and the acceptability of their use are included in Attachment J.

4.5.1.3 Results of Fire PRA Peer Review

The CNS Fire PRA Peer Review was performed on July 12-16, 2010 using the NEI 07-12 Fire PRA peer review process, the combined PRA standard, ASME/ANS RA-Sa–2009, and RG 1.200, Revision 2. The purpose of this review was to provide a method for establishing the technical adequacy of the Fire PRA for the spectrum of potential risk-informed plant licensing applications for which the Fire PRA may be used. The peer review findings were addressed and the dispositions reviewed to validate that no changes were made which meet the definition of a PRA model upgrade per RG 1.200. Therefore, no additional peer reviews, partial scope or focused scope, were required to be conducted for the CNS Fire PRA.

The CNS Fire PRA was judged to meet Capability Category II consistent with RG 1.205 guidance. A total of twenty (20) F&O findings and twenty-nine (29) F&O suggestions (plus 1 best practice F&O) were generated. The capability categories are defined in ASME/ANS RA-Sa-2009, Part 4, "Requirements for Fires At-Power PRA". The peer review report noted that there were thirteen (13) SRs where the standard was not met. Sixteen (16) F&Os were issued against SRs which met Capability Category I (some classified as "findings" and some addressed via "suggestions"). The findings have been resolved with the dispositions summarized in Table V-1. The impact of those areas where only the Capability Category I requirement was met is summarized in Table V-2. All F&Os that were defined as suggestions have been dispositioned and will be available for NRC review. No changes were made in the resolution of the findings that meet the definition of a model upgrade as defined by RG 1.200, therefore a follow-up peer review is not required. The Fire PRA is judged to be adequate to support the NFPA 805 Licensing Basis.

4.5.1.4 Risk Insights

Risk insights were documented as part of the development of the Fire PRA. The total plant fire core damage frequency (CDF)/LERF was derived using the NUREG/CR-6850 methodology for fire PRA development and is useful in identifying the areas of the plant

where fire risk is greatest. A review of the fire initiating events that individually represent greater than 1% of the calculated fire risk is included in Table W-2 of Attachment W.

4.5.2 Performance-Based Approaches

NFPA 805 outlines the approaches for conducting performance-based analyses. As specified in Section 4.2.4, there are two types of analyses performed for the performance-based approach:

- Fire Modeling (NFPA 805 Section 4.2.4.1).
- Fire Risk Evaluation (NFPA 805 Section 4.2.4.2).

4.5.2.1 Fire Modeling Approach

The fire modeling approach was not utilized for the transition.

4.5.2.2 Fire Risk Approach

Overview of Evaluation Process

The Fire Risk Evaluations were completed as part of the CNS NFPA 805 transition. These Fire Risk Evaluations were developed using the process described below. This methodology is based upon the requirements of NFPA 805, industry guidance in NEI 04-02, and RG 1.205. These are summarized in Table 4-1.

Table 4-1 Fire Risk Evaluation Guidance Summary Table

Document	Section(s)	Topic
NFPA 805	2.2(h), 4.2.4, A.2.2(h), A.2.4.4, D.5	Change Evaluation (2.2(h), 2.2.9, 2.4.4 A.2.2(h), A.2.4.4, D.5) Risk of Recovery Actions (4.2.4) Use of Fire Risk Evaluation (4.2.4.2)
NEI 04-02 Revision 2	4.4, 5.3, Appendix B, Appendix I, Appendix J	Change Evaluation, Change Evaluation Forms (App. I), No specific discussion of Fire Risk Evaluation
RG 1.205 Revision 1	C.2.2.4, C.2.4, C.3.2	Risk Evaluations (C.2.2.4) Recovery Actions (C.2.4)

During the transition to NFPA 805, variances from the deterministic approach in Section 4.2.3 of NFPA 805 were evaluated using a Fire Risk Evaluation per Section 4.2.4.2 of NFPA 805. A Fire Risk Evaluation was performed for each fire area containing variances from the deterministic requirements of Section 4.2.3 of NFPA 805 (VFDRs).

If the Fire Risk Evaluation meets the acceptance criteria, this is confirmation that a success path effectively remains free of fire damage and that the performance-based approach is acceptable per Section 4.2.4.2 of NFPA 805.

The Fire Risk Evaluation process consists of the following steps (Figure 4-7 depicts the Fire Risk Evaluation process) used during transition. This is generally based on FAQ 07-0054 Revision 1:

Step 1 – Preparation for the Fire Risk Evaluation.

- Definition of the Variances from the Deterministic Requirements. The definition of the VFDR includes a description of problem statement and the section of NFPA 805 that is not met, type of VFDR (e.g., separation issue or degraded fire protection system), and proposed evaluation per applicable NFPA 805 section.
- Some VFDR's are resolved deterministically by committed modifications. The list of committed modifications are found in Table S-2 of Attachment S. VFDR's resolved deterministically were not included in the fire risk evaluation summary.
- Preparatory Evaluation – Fire Risk Evaluation Team Review. Using the information obtained during the development of the NEI 04-02 B-3 Table and the Fire PRA, a team review of the VFDR was performed. Depending on the scope and complexity of the VFDR, the team may include the Safe Shutdown/NSCA Engineer, the Fire Protection Engineer, and the Fire PRA Engineer. The purpose and objective of this team review was to address the following;
  - Review of the Fire PRA modeling treatment of VFDR.
  - Ensure discrepancies were captured and resolved.

Step 2 – Performed the Fire Risk Evaluation

- The Evaluator coordinated as necessary with the Safe Shutdown/NSCA Engineer, Fire Protection Engineer and Fire PRA Engineer to assess the VFDR using the Fire Risk Evaluation process to perform the following:
  - Change in Risk Calculation with consideration for additional risk of recovery actions and required fire protection systems and features due to fire risk.
  - Fire area change in risk summary.

Step 3 – Reviewed the Acceptance Criteria

- The acceptance criteria for the Fire Risk Evaluation consist of two parts. One is quantitatively based and the other is qualitatively based. The quantitative figures of merit are the change in core damage frequency (ΔCDF) and change in large early release frequency (ΔLERF). The qualitative factors are defense-in-depth and safety margin.
  - Risk Acceptance Criteria. The transition risk evaluation was measured quantitatively for acceptability using the ΔCDF and ΔLERF criteria from RG 1.174, as clarified in RG 1.205 Section C.2.2.4.
  - Defense-in-Depth. A review of the impact of the change on defense-in-depth was performed, using the guidance NEI 04-02. NFPA 805 defines defense-in-depth as:
    - Preventing fires from starting,
    - Rapidly detecting fires and controlling and extinguishing promptly those fires that do occur, thereby limiting damage, and
    - Providing adequate level of fire protection for structures, systems and components important to safety; so that a fire that is not promptly extinguished will not prevent essential plant safety functions from being performed.

In general, the defense-in-depth requirement was considered to be satisfied if the proposed change does not result in a substantial imbalance among these elements (or echelons).

The review of defense-in-depth was qualitative and addressed each of the elements with respect to the proposed change. Defense-in-depth was performed on a fire area basis.

Fire protection features and systems relied upon to ensure defense-in-depth were identified as a result of the assessment of defense-in-depth.

- Safety Margin Assessment. A review of the impact of the change on safety margin was performed. An acceptable set of guidelines for making that assessment is summarized below. Other equivalent acceptance guidelines may also be used.
  - Codes and standards or their alternatives accepted for use by the NRC are met, and
  - Safety analysis acceptance criteria with respect to Fire Modeling, Plant System Performance in response to a fire, and PRA Logic Model analysis in the fire protection licensing basis are met, or provides sufficient margin to account for analysis and data uncertainty.

  The requirements related to safety margins for the change analysis are described for each of the specific analysis types used in support of the FRE.

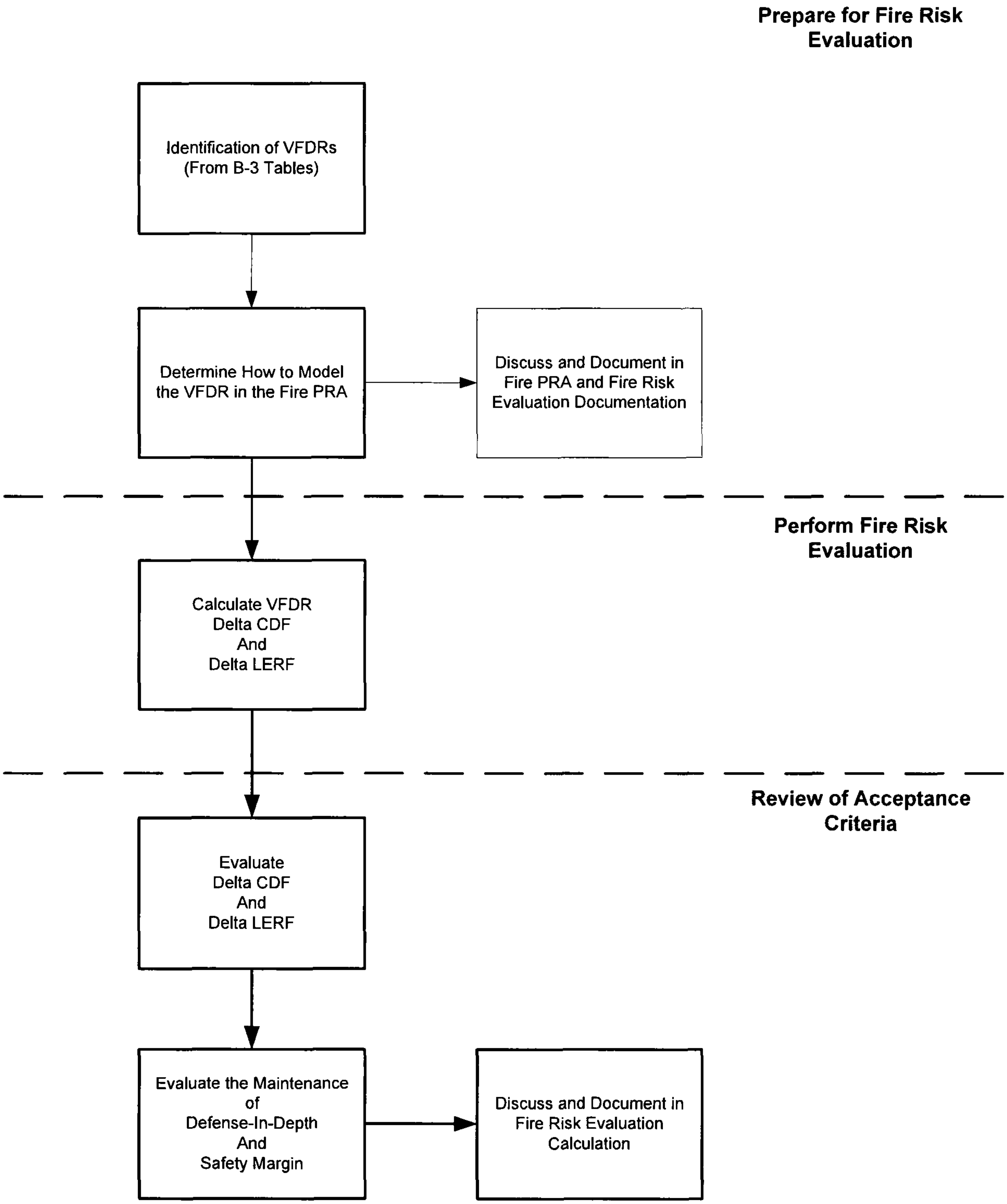

Figure 4-7 – Fire Risk Evaluation Process (NFPA 805 Transition)
[Based on FAQ 07-0054 Revision 1]

Results of Evaluation Process

Disposition of VFDRs

The CNS existing post-fire SSA and the NFPA 805 transition project activities have identified a number of variances from the deterministic requirements of NFPA 805 Section 4.2.3. These variances were dispositioned using the fire risk evaluation process.

Each variance dispositioned using a Fire Risk Evaluation was assessed against the Fire Risk Evaluation acceptance criteria of ΔCDF and ΔLERF; and maintenance of defense-in-depth and safety margin criteria from Section 5.3.5 of NEI 04-02 and RG 1.205. The results of these calculations are summarized in Table C-1 of Attachment C, NEI 04-02 Table B-3 - Fire Area Transition.

No recovery actions were specifically credited to satisfy the risk criteria for the population of VFDRs that state there is a pre-existing OMA and the disposition is identified as no further action.

Following completion of transition activities and planned modifications and program changes, the plant will be compliant with 10 CFR 50.48(c).

Risk Change Due to NFPA 805 Transition

In accordance with the guidance in RG 1.205, Section C.2.2.4, Risk Evaluations, risk increases or decreases for each fire area using Fire Risk Evaluations and the overall plant should be provided. Note that the risk increase due to the use of recovery actions was included in the risk change for transition for each fire area.

RG 1.205 Section C.2.2.4.2 states in part

> *"The total increase or decrease in risk associated with the implementation of NFPA 805 for the overall plant should be calculated by summing the risk increases and decreases for each fire area (including any risk increases resulting from previously approved recovery actions). The total risk increase should be consistent with the acceptance guidelines in Regulatory Guide 1.174. Note that the acceptance guidelines of Regulatory Guide 1.174 may require the total CDF, LERF, or both, to evaluate changes where the risk impact exceeds specific guidelines. If the additional risk associated with previously approved recovery actions is greater than the acceptance guidelines in Regulatory Guide 1.174, then the net change in total plant risk incurred by any proposed alternatives to the deterministic criteria in NFPA 805, Chapter 4 (other than the previously approved recovery actions), should be risk neutral or represent a risk decrease."*

The risk increases and decreases are provided in Attachment W. Note: When used in the context of delta risk, 0.00E+00 is defined as negligible, including cases where the results are below the truncation limit or where the VFDRs were not modeled due to their insignificant contribution to risk.

4.6 Monitoring Program

4.6.1 Overview of NFPA 805 Requirements and NEI 04-02 Guidance on the NFPA 805 Fire Protection System and Feature Monitoring Program

Section 2.6 of NFPA 805 states:

> *"A monitoring program shall be established to ensure that the availability and reliability of the fire protection systems and features are maintained and to assess the performance of the fire protection program in meeting the performance criteria. Monitoring shall ensure that the assumptions in the engineering analysis remain valid."*

As part of the transition review, the adequacy of the inspection and testing program to address fire protection systems and equipment within plant inspection and the compensatory measures programs will be reviewed. In addition, the adequacy of the plant corrective action program in determining the causes of equipment and programmatic failures and minimizing their recurrence will also be reviewed as part of the transition to a risk-informed, performance-based licensing basis.

4.6.2 Overview of Post-Transition NFPA 805 Monitoring Program

This section describes the process that will be utilized to implement the post-transition NFPA 805 monitoring program. The monitoring program will be implemented in accordance with FAQ 10-0059 after the safety evaluation issuance as part of the fire protection program transition to NFPA 805. See Implementation Item 5 in Table S-3 of Attachment S. The monitoring process is comprised of four phases.

- Phase 1 – Scoping,
- Phase 2 – Screening Using Risk Criteria,
- Phase 3 – Risk Target Value Determination, and
- Phase 4 – Monitoring Implementation.

Figure 4-8 provides detail on the Phase 1 and 2 processes.

The results of these phases will be documented in the CNS NFPA 805 Monitoring Program Calculation during implementation.

Phase 1 – Scoping

In order to meet the NFPA 805 requirements for monitoring, the following categories of SSCs and programmatic elements will be reviewed during the implementation phase for inclusion in the NFPA 805 monitoring program:

- Structures, Systems, and Components required to comply with NFPA 805, specifically:
  - Fire protection systems and features
    - Required by the Nuclear Safety Capability Assessment
    - Modeled in the Fire PRA
    - Required by Chapter 3 of NFPA 805

- Nuclear Safety Capability Assessment equipment[4]
  - Nuclear safety equipment
  - Fire PRA equipment
  - NPO equipment
- Structures, systems and components relied upon to meet radioactive release criteria

- Fire Protection Programmatic Elements

Phase 2 – Screening Using Risk Criteria

The equipment from Phase 1 scoping will be screened to determine the appropriate level of NFPA 805 monitoring. As a minimum, the SSCs identified in Phase 1 will be part of an inspection and test program and system/program health reporting. If not in the current program, the SSCs will be added in order to assure that the criteria can be met reliably.

The following screening process will be used to determine those SSCs that may require additional monitoring beyond normal inspection and test program and system/program health reporting and will be documented in the CNS NFPA 805 Monitoring Program Calculation.

1. Fire Protection Systems and Features

Those fire protection systems and features identified in Phase 1 are candidates for additional monitoring in the NFPA 805 program commensurate with risk significance.

Risk significance is determined at the component, programmatic element, and/or functional level on an individual fire area basis. Compartments smaller than fire areas may be used provided the compartments are independent (i.e., share no fire protection SSCs). If compartments smaller than fire areas are used the basis will be documented in the CNS NFPA 805 Monitoring Program Calculation to be developed during implementation.

The Fire PRA is used to establish the risk significance based on the following screening criteria:

Risk Achievement Worth (RAW) of the monitored parameter ≥ 2.0

(AND) either

(CDF) x (RAW) ≥ 1.0E-7 per year

(OR)

(LERF) x (RAW) ≥ 1.0E-8 per year

CDF, LERF, and $RAW_{(monitored\ parameter)}$ are calculated for each fire area. The 'monitored parameter' will be established at a level commensurate with the amenability of the

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[4] For the purposes of the NFPA 805 Monitoring, "NSCA equipment" is intended to include Nuclear Safety Equipment, Fire PRA equipment, and NPO equipment.

parameter to risk measurement (e.g., a fire barrier may be more conducive to risk measurement than an individual barrier penetration).

Fire protections systems and features that meet or exceed the criteria identified above are considered High Safety Significant (HSS) and will be included in the Monitoring Program Software. The remaining required fire protection systems and features will be monitored via the existing inspection and test program and/or in the existing system / program health reporting as described in EDM 201, "Risk Category, Scoping, Health Grouping, and ER Strategy."

2. Nuclear Safety Capability Assessment Equipment

Required NSCA equipment, except the NPO scope, identified in Phase 1 will be screened for safety significance using the Fire PRA and the Maintenance Rule guidelines differentiating HSS equipment from Low Safety Significant (LSS) equipment. The screening will also ensure that the Maintenance Rule functions are consistent with the required functions of the NSCA equipment.

HSS NSCA equipment not currently monitored in Maintenance Rule will be included in the Maintenance Rule. All NSCA equipment that are not HSS are considered LSS and need not be included in the monitoring program.

For non-power operational modes, the qualitative use of fire prevention to manage fire risk during Higher Risk Evolutions does not lend itself to quantitative risk measurement. Therefore, fire risk management effectiveness is monitored programmatically similar to combustible material controls and other fire prevention programs. Additional monitoring beyond inspection and test programs and system/program health reporting is not considered necessary.

3. SSCs Relied upon for Radioactive Release Criteria

The evaluations performed to meet the radioactive release performance criteria are qualitative in nature. The SSCs relied upon to meet the radioactive release performance criteria are not amenable to quantitative risk measurement. Additionally, since 10 CFR Part 20 limits for radiological effluents are not being exceeded, equipment relied upon to meet the radioactive release performance criteria is considered inherently low risk. Therefore, additional monitoring beyond inspection and test programs and system/program health reporting is not considered necessary.

4. Fire Protection Programmatic Elements

In accordance with FAQ 10-0059 and the CNS NFPA 805 Monitoring Program, monitoring of programmatic elements is required in order to "assess the performance of the fire protection program in meeting the performance criteria". These programs form the bases for many of the analytical assumptions used to evaluate compliance with NFPA 805 requirements. Programmatic aspects include:

- Transient Combustible Control; Transient Exclusion Zones,
- Hot Work Control; Administrative Controls,
- Impairment and compensatory measures including program compliance and effectiveness, and

- Fire Brigade Effectiveness

Monitoring of programmatic elements is more qualitative in nature since the programs do not lend themselves to the numerical methods of reliability and availability. Therefore, monitoring is conducted using the existing system and program health programs. Fire protection health reports, self-assessments, regulator and insurance company reports provide inputs to the monitoring program.

Phase 3 – Risk Target Value Determination

Phase 3 establishes the target values for reliability and availability for the fire protection systems and features that met or exceeded the screening criteria and the HSS NSCA equipment established in Phase 2.

Target values for reliability and availability for the fire protection systems and features are established at the component level, program level, or functionally through the use of the pseudo system or 'performance monitoring group' concept. The actual action level is determined based on the number of component, program or functional failures within a sufficiently bounding time period (~2-3 operating cycles). In addition, the EPRI Technical Report (TR) 1006756, "Fire Protection Surveillance Optimization and Maintenance Guide for Fire Protection Systems and Features" will be used as input for establishing reliability targets, action levels, and monitoring frequency.

Since the HSS NSCA equipment will be identified using the Maintenance Rule guidelines, the associated equipment specific performance criteria will be established as in the Maintenance Rule.

When establishing the action level threshold for reliability and availability, the action level will be no lower than the fire PRA assumptions. Unacceptable levels of availability, reliability, and performance will be reviewed against established action levels. The monitoring program failure criteria and action level targets will be documented in the CNS NFPA 805 Monitoring Program Calculation.

Note that fire protection systems and features, NSCA equipment, SSCs required to meet the radioactive release criteria, and fire protection program elements that do not meet the screening criteria in Phase 2 will be included in the existing inspection and test programs and the system and program health programs. Reliability and availability criteria will not be assigned.

Phase 4 – Monitoring Implementation

Phase 4 is the implementation of the monitoring program, once the monitoring scope and criteria are established. Monitoring consists of periodically gathering, trending, and evaluating information pertinent to the performance, and/or availability of the equipment and comparing the results with the established goals and performance criteria to verify that the goals are being met. Results of monitoring activities will be analyzed in a timely manner to assure that appropriate action is taken. The corrective action process will be used to address performance of fire protection and nuclear safety SSCs that do not meet performance criteria.

For fire protection systems and features and NSCA HSS equipment that are monitored, unacceptable levels of availability, reliability, and performance will be reviewed against

the established action levels. If an action level is triggered, corrective action in accordance with the Corrective Action Program will be initiated to identify the unacceptable performance. A corrective action plan will then be developed to ensure the performance returns to the established level.

When applicable, a sensitivity study can be performed to determine the margin below the action level that still provides acceptable fire PRA results to help prioritize corrective actions if the action level is reached.

A periodic assessment will be performed (e.g., at a frequency of approximately every two to three operating cycles), taking into account, where practical, industry wide operating experience. This will be conducted as part of other established assessment activities. Issues that will be addressed include:

- Review systems with performance criteria. Do performance criteria still effectively monitor the functions of the system? Do the criteria still monitor the effectiveness of the fire protection and NSCA systems?
- Have the supporting analyses been revised such that the performance criteria are no longer applicable or new fire protection and NSCA SSCs, programmatic elements and/ or functions need to be in scope?
- Based on the performance during the assessment period, are there any trends in system performance that should be addressed that are not being addressed?

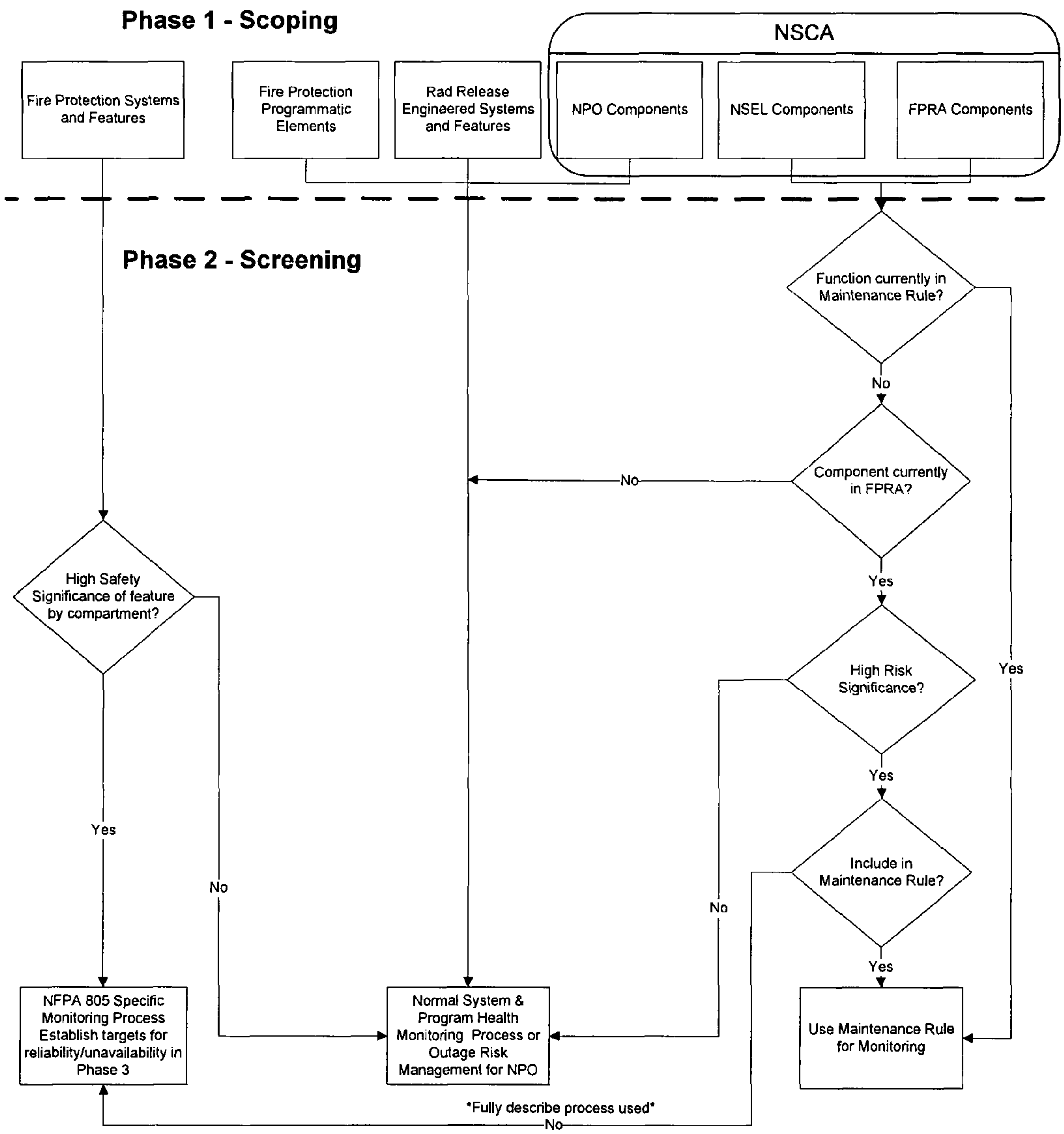

Figure 4-8 – NFPA 805 Monitoring – Scoping and Screening

Since the HSS SSCs will be identified using the Maintenance Rule guidelines, the associated SSC specific performance criteria will be established as in the Maintenance Rule. The actual action level is determined based on the number of component, program or functional failures within a sufficiently bounding time period (~2-3 operating cycles). Unacceptable levels of availability, reliability, and performance will be reviewed against established action levels. The Monitoring Program failure criteria and action level targets will be documented.

4.7 Program Documentation, Configuration Control, and Quality Assurance

4.7.1 Compliance with Documentation Requirements in Section 2.7.1 of NFPA 805

In accordance with the requirements and guidance in NFPA 805 Section 2.7.1 and NEI 04-02, CNS has documented analyses to support compliance with 10 CFR 50.48(c). The analyses are being performed in accordance with Duke Energy's processes for ensuring assumptions are clearly defined, that results are easily understood, that results are clearly and consistently described, and that sufficient detail is provided to allow future review of the entire analyses.

Analyses, as defined by NFPA 805 Section 2.4, performed to demonstrate compliance with 10 CFR 50.48(c) will be maintained for the life of the plant and organized to facilitate review for accuracy and adequacy. Note these analyses do not include items such as periodic tests, hot work permits, fire impairments, etc.

The Fire Protection Design Basis Document described in Section 2.7.1.2 of NFPA 805 and necessary supporting documentation described in Section 2.7.1.3 of NFPA 805 will be created as part of transition to 10 CFR 50.48(c) to ensure program implementation following receipt of the safety evaluation. Appropriate cross references will be established to supporting documents as required by Duke Energy processes. See Implementation Item 9 in Table S-3 of Attachment S. Figure 4-9 depicts the planned post-transition documentation and relationships.

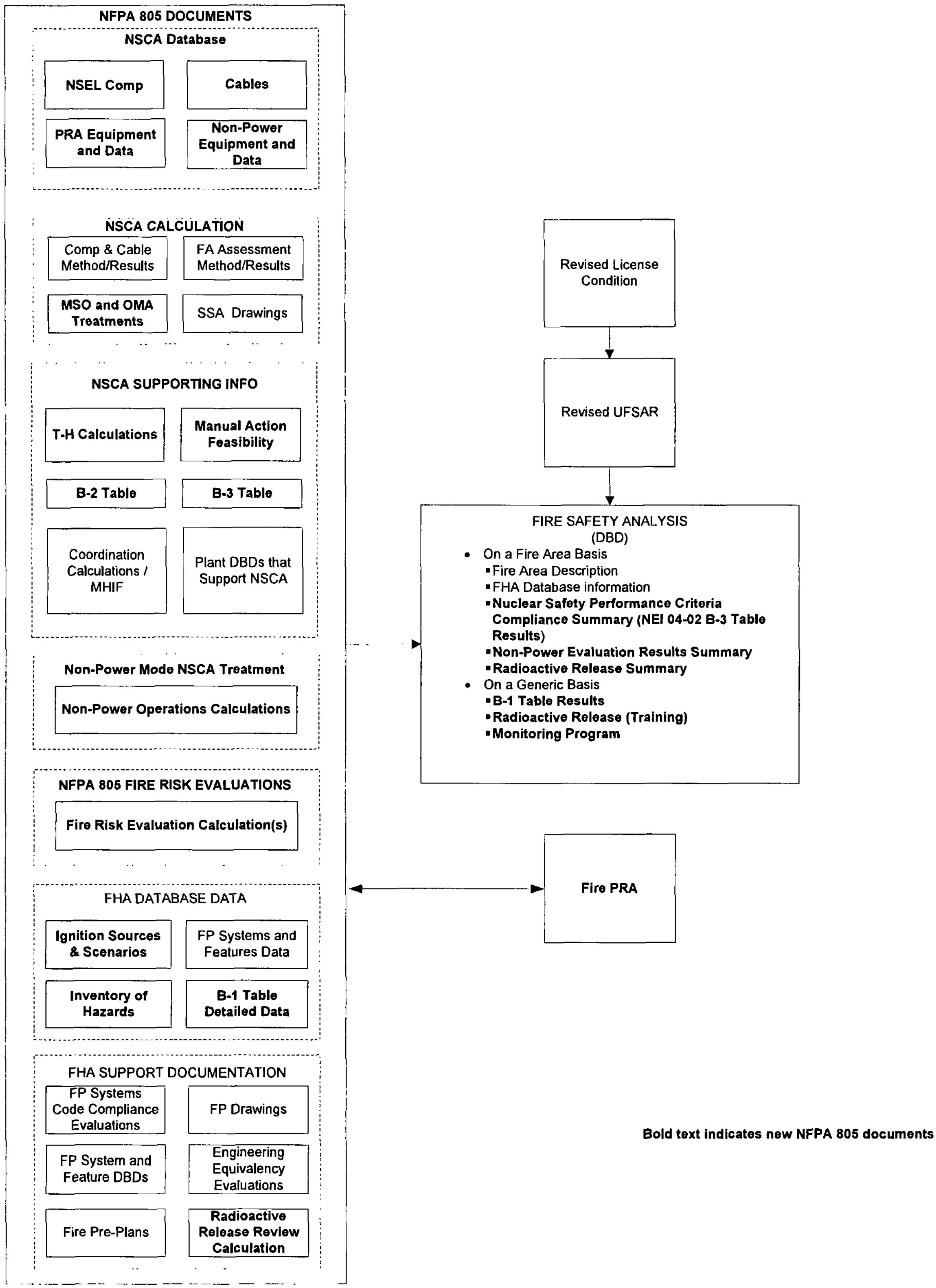

Figure 4-9 – NFPA 805 Planned Post-Transition Documents and Relationships

4.7.2 Compliance with Configuration Control Requirements in Section 2.7.2 and 2.2.9 of NFPA 805

Program documentation established, revised, or utilized in support of compliance with 10 CFR 50.48(c) is subject to Duke Energy's configuration control processes that meet the requirements of Section 2.7.2 of NFPA 805. This includes the appropriate procedures and configuration control processes for ensuring that changes impacting the fire protection program are reviewed appropriately. The RI-PB post transition change process methodology is based upon the requirements of NFPA 805, and industry guidance in NEI 04-02, and RG 1.205. These requirements are summarized in Table 4-2.

Table 4-2 Change Evaluation Guidance Summary Table

Document	Section(s)	Topic
NFPA 805	2.2(h), 2.2.9, 2.4.4, A.2.2(h), A.2.4.4, D.5	Change Evaluation
NEI 04-02	5.3, Appendix B, Appendix I, Appendix J	Change Evaluation, Change Evaluation Forms (Appendix I)
RG 1.205	C.2.2.4, C.3.1, C.3.2, C.4.3	Risk Evaluation, Standard License Condition, Change Evaluation Process, Fire PRA

The Plant Change Evaluation Process consists of the following 4 steps and is depicted in Figure 4-10:

- Defining the Change
- Performing the Preliminary Risk Screening.
- Performing the Risk Evaluation
- Evaluating the Acceptance Criteria

Change Definition

The Change Evaluation process begins by defining the change or altered condition to be examined and the baseline configuration as defined by the Design Basis and Licensing Basis (NFPA 805 Licensing Basis post-transition).

1. The baseline is defined as that plant condition or configuration that is consistent with the Design Basis and Licensing Basis (NFPA 805 Licensing Basis post-transition).
2. The changed or altered condition or configuration that is not consistent with the Design Basis and Licensing Basis is defined as the proposed alternative.

Preliminary Risk Review

Once the definition of the change is established, a screening is then performed to identify and resolve minor changes to the fire protection program. This screening is consistent with fire protection regulatory review processes in place at nuclear plants under traditional licensing bases. This screening process is modeled after the NEI 02-03 process. This process will address most administrative changes (e.g., changes to the combustible control program, organizational changes, etc.).

The characteristics of an acceptable screening process that meets the "assessment of the acceptability of risk" requirement of Section 2.4.4 of NFPA 805 are:

- The quality of the screen is sufficient to ensure that potentially greater than minimal risk increases receive detailed risk assessments appropriate to the level of risk.
- The screening process must be documented and be available for inspection by the NRC.
- The screening process does not pose undue evaluation or maintenance burden.

If any of the above is not met, proceed to the Risk Evaluation step.

Risk Evaluation

The screening is followed by engineering evaluations that may include fire modeling and risk assessment techniques. The results of these evaluations are then compared to the acceptance criteria. Changes that satisfy the acceptance criteria of NFPA 805 Section 2.4.4 and the license condition can be implemented within the framework provided by NFPA 805. Changes that do not satisfy the acceptance criteria cannot be implemented within this framework. The acceptance criteria require that the resultant change in CDF and LERF be consistent with the license condition. The acceptance criteria also include consideration of defense-in-depth and safety margin, which would typically be qualitative in nature.

The risk evaluation involves the application of fire modeling analyses and risk assessment techniques to obtain a measure of the changes in risk associated with the proposed change. In certain circumstances, an initial evaluation in the development of the risk assessment could be a simplified analysis using bounding assumptions provided the use of such assumptions does not unnecessarily challenge the acceptance criteria discussed below.

Acceptability Determination

The Change Evaluations are assessed for acceptability using the ΔCDF and ΔLERF criteria from the license condition. The proposed changes are also assessed to ensure they are consistent with the defense-in-depth philosophy and that sufficient safety margins were maintained.

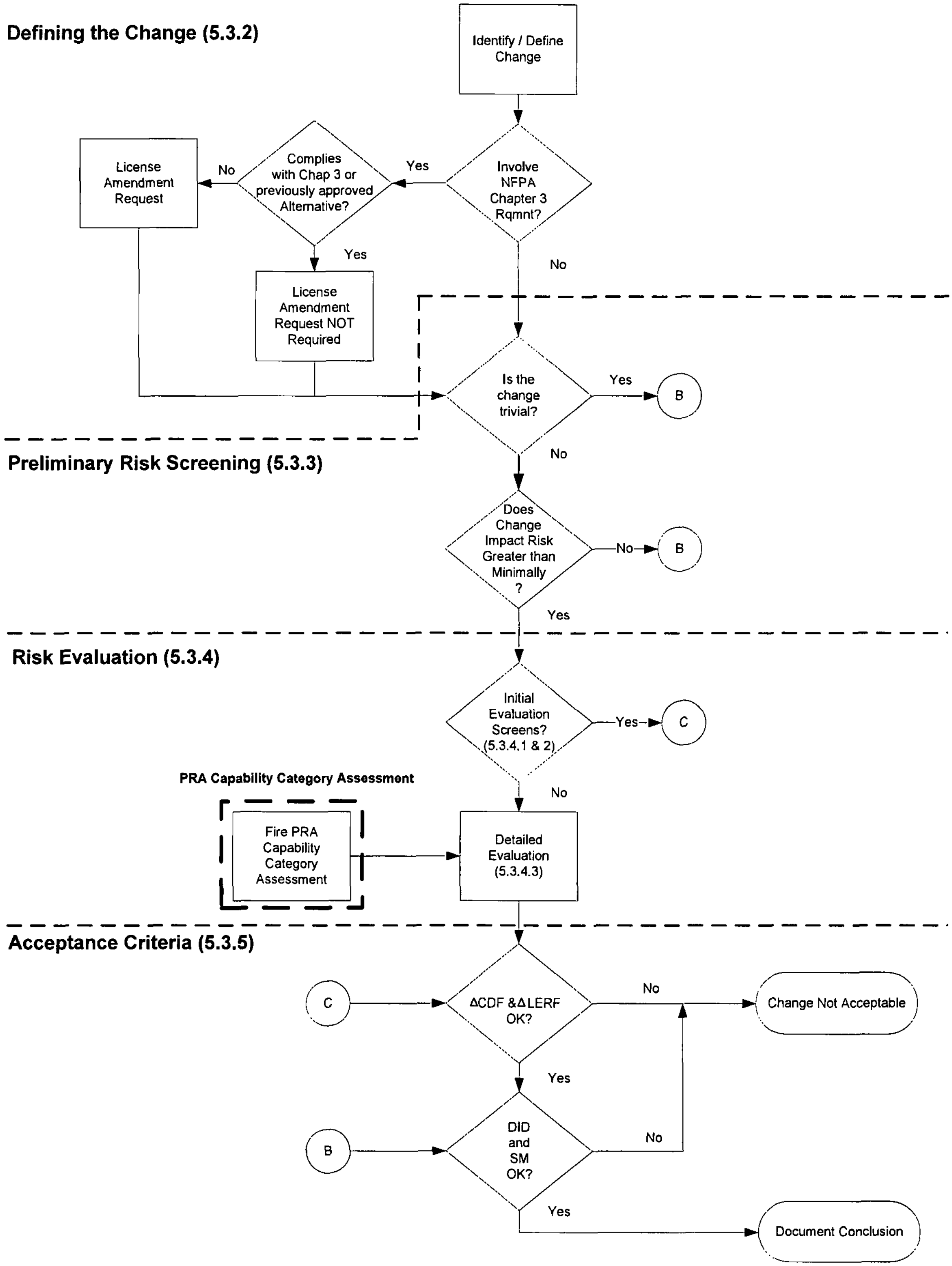

Figure 4-10 Plant Change Evaluation [NEI 04-02 Figure 5-1]
Note references in Figure refer to NEI 04-02 Sections

The CNS Fire Protection Program configuration is defined by the program documentation. To the greatest extent possible, the existing configuration control processes for modifications, calculations and analyses, and Fire Protection Program License Basis Reviews will be utilized to maintain configuration control of the Fire Protection program documents. The configuration control procedures which govern the various CNS documents and databases that currently exist will be revised to reflect the new NFPA 805 licensing bases requirements.

Several NFPA 805 document types such as: NSCA Supporting Information, Non-Power Mode NSCA Treatment, etc., generally require new control procedures and processes to be developed since they are new documents and databases created as a result of the transition to NFPA 805. The new procedures will be modeled after the existing processes for similar types of documents and databases. System level design basis documents will be revised to reflect the NFPA 805 role that the system components now play.

The process for capturing the impact of proposed changes to the plant on the Fire Protection Program will continue to be a multiple step review. The first step of the review is an initial screening for process users to determine if there is a potential to impact the Fire Protection program as defined under NFPA 805 through a series of screening questions/checklists contained in one or more procedures depending upon the configuration control process being used. Reviews that identify potential Fire Protection program impacts will be sent to qualified individuals (Fire Protection, Safe Shutdown/NSCA, Fire PRA) to ascertain the program impacts, if any. If Fire Protection program impacts are determined to exist as a result of the proposed change, the issue would be resolved by one of the following:

- Deterministic Approach: Comply with NFPA 805 Chapter 3 and 4.2.3 requirements.
- Performance-Based Approach: Utilize the NFPA 805 change process developed in accordance with NEI 04-02, RG 1.205, and the NFPA 805 fire protection license condition to assess the acceptability of the proposed change. This process would be used to determine if the proposed change could be implemented "as-is" or whether prior NRC approval of the proposed change is required.

This process follows the requirements in NFPA 805 and the guidance outlined in RG 1.174 which requires the use of qualified individuals, procedures that require calculations be subject to independent review and verification, record retention, peer review, and a corrective action program that ensures appropriate actions are taken when errors are discovered. See Implementation Item 10 in Table S-3 of Attachment S.

4.7.3 Compliance with Quality Requirements in Section 2.7.3 of NFPA 805

Fire Protection Program Quality

Duke Energy will maintain the existing Fire Protection Quality Assurance program. The QA Topical will be revised to update the definition of QA 3 to match post 805 criteria. See Implementation Item 15 in Table S-3 of Attachment S.

During the transition to 10 CFR 50.48(c), CNS performed work in accordance with the quality requirements of Section 2.7.3 of NFPA 805.

Future NFPA 805 analyses will be conducted in accordance with the requirements of NFPA 805 Section 2.7.3.

Fire PRA Quality

Configuration control of the Fire PRA model will be maintained by integrating the Fire PRA model into the existing processes used to ensure configuration control of the internal events PRA model. This process conforms with Section 1-5 of the ASME PRA Standard and ensures that Duke Energy maintains an as-built, as-operated PRA model of the plant. The process has been peer reviewed. Quality assurance of the Fire PRA is assured via the same processes applied to the internal events model.

This process follows the guidance outlined in RG 1.174 which requires the use of qualified individuals, procedures that require calculations be subject to independent review and verification, record retention, peer review, and a corrective action program that ensures appropriate actions are taken when errors are discovered. Although the entire scope of the formal 10 CFR 50 Appendix B program is not applied to the PRA models or processes in general, often parts of the program are used as a convenient method for complying with the requirements of RG 1.174.

With respect to Quality Assurance Program requirements for independent reviews of calculations and evaluations, those existing requirements for Fire Protection Program documents will remain unchanged. Duke Energy specifically requires that the calculations and evaluations in support of the NFPA 805 LAR, exclusive of the Fire PRA, be performed within the scope of the QA program which requires independent review as defined by Duke Energy procedures.

The Fire PRA follows the recommendations of NUREG/CR-6850, where the sources of uncertainty in the Fire PRA were identified and specific parameters were analyzed for sensitivity in support of the NFPA 805 Fire Risk Evaluation process. Specifically with regard to uncertainty, an uncertainty and sensitivity matrix was developed and included in CNS calculation, "Catawba Fire PRA Summary Report." In addition to the sensitivity and uncertainty analyses provided in the Summary Report, additional sensitivity analyses in support of delta risk are addressed in calculation, "NFPA 805 Fire PRA Application Calculation."

While the removal of conservatism inherent in the Fire PRA is a long-term goal, the Fire PRA results were deemed sufficient for evaluating the risk associated with this application. While Duke Energy continues to strive toward a more "realistic" estimate of fire risk, use of mean values continues to be the best estimate of fire risk. During the Fire Risk Evaluation process, the uncertainty and sensitivity associated with specific Fire PRA parameters were considerations in the evaluation of the change in risk relative to the applicable acceptance thresholds.

Specific Requirements of NFPA 805 Section 2.7.3

The following discusses how the requirements of NFPA 805 Section 2.7.3 were met during the transition process. Post-transition, Duke Energy will perform work in accordance with NFPA 805 Section 2.7.3 requirements.

NFPA 805 Section 2.7.3.1 – Review

Analyses, calculations, and evaluations performed in support of compliance with 10 CFR 50.48(c) are performed in accordance with Duke Energy procedures that require independent review.

NFPA 805 Section 2.7.3.2 – Verification and Validation

Calculational models and numerical methods used in support of compliance with 10 CFR 50.48(c) were verified and validated as required by Section 2.7.3.2 of NFPA 805.

NFPA 805 Section 2.7.3.3 – Limitations of Use

Engineering methods and numerical models used in support of compliance with 10 CFR 50.48(c) were applied appropriately as required by Section 2.7.3.3 of NFPA 805.

NFPA 805 Section 2.7.3.4 – Qualification of Users

Cognizant personnel who use and apply engineering analysis and numerical methods in support of compliance with 10 CFR 50.48(c) are competent and experienced as required by Section 2.7.3.4 of NFPA 805.

During the transition to 10 CFR 50.48(c), work was performed in accordance with the quality requirements of Section 2.7.3 of NFPA 805. Personnel who used and applied engineering analysis and numerical methods (e.g. fire modeling) in support of compliance with 10 CFR 50.48(c) are competent and experienced as required by NFPA 805 Section 2.7.3.4.

Post-transition, for personnel performing fire modeling or Fire PRA development and evaluation, Duke Energy will develop and maintain qualification requirements for individuals assigned various tasks. Individuals will be qualified to appropriate job performance requirements per ACAD 98-004. Engineering training guidelines will be developed to identify and document required training and mentoring to ensure individuals are appropriately qualified per the requirements of NFPA 805 Section 2.7.3.4 to perform assigned work. See Implementation Item 11 in Table S-3 of Attachment S.

NFPA 805 Section 2.7.3.5 – Uncertainty Analysis

Uncertainty analyses were performed as required by 2.7.3.5 of NFPA 805 and the results were considered in the context of the application. This is of particular interest in fire modeling and Fire PRA development. Note: 10 CFR 50.48(c)(2)(iv) states that NFPA 805 Section 2.7.3.5 is not required for the deterministic approach because conservatism is included in the deterministic criteria.

4.8 Summary of Results

4.8.1 Results of the Fire Area Review

A summary of the NFPA 805 compliance basis and the required fire protection systems and features is provided in Table C-2 of Attachment C. The table provides the following information from the NEI 04-02 Table B-3:

- Fire Area / Fire Zone: Fire Area/Zone Identifier.

- Description: Fire Area/Zone Description.
- NFPA 805 Regulatory Basis: Post-transition NFPA 805 Chapter 4 compliance basis (Note: Compliance is determined on a Fire Area basis therefore a compliance basis is not provided for individual fire zones.)
- Required Fire Protection System / Feature: Detection / suppression required in the Fire Area based on NFPA 805 Chapter 4 compliance. Other Required Features may include Electrical Raceway Fire Barrier Systems, fire barriers, etc. The documentation of required fire protection systems and features does not include the documentation of the fire area boundaries. Fire area boundaries are required and documentation of the fire area boundaries has been performed as part of reviews of engineering evaluations, licensing actions, or as part of the reviews of the NEI 04-02 Table B-1 process. The information is provided on a fire zone basis. The basis for the requirement of the fire protection system / feature is designated as follows:
    - S – Separation Criteria: Systems/Features required for Chapter 4 Separation Criteria in Section 4.2.3.
    - E – EEEE/LA Criteria: Systems/Features required for acceptability of Existing Engineering Equivalency Evaluations / NRC approved Licensing Action (i.e., Exemptions/Deviations/Safety Evaluations) (Section 2.2.7).
    - R – Risk Criteria: Systems/Features required to meet the Risk Criteria for the Performance-Based Approach (Section 4.2.4).
    - D – Defense-in-depth Criteria: Systems/Features required to maintain adequate balance of Defense-in-Depth for a Performance-Based Approach (Section 4.2.4).

Attachment W contains the results of the Fire Risk Evaluations, additional risk of recovery actions, and the change in risk on a fire area basis.

4.8.2 Plant Modifications and Items to be Completed During the Implementation Phase

Planned modifications, studies, and evaluations to comply with NFPA 805 are described in Attachment S.

The Fire PRA model represents the as-built, as-operated and maintained plant as it will be configured at the completion of the transition to NFPA 805. The Fire PRA model includes credit for the planned implementation of the modifications identified in Table S-2 of Attachment S. Following installation of modifications and the as-built installation details, additional refinements surrounding the modification may need to be incorporated into the Fire PRA model. However, these changes are not expected to be significant. See Implementation Item 13 in Table S-3 of Attachment S. No other significant plant changes are outstanding with respect to their inclusion in the Fire PRA model.

4.8.3 Supplemental Information – Other Licensee Specific Issues

There are no CNS specific issues that warrant additional treatment in this section.

5.0 REGULATORY EVALUATION

5.1 Introduction – 10 CFR 50.48

On July 16, 2004 the NRC amended 10 CFR 50.48, Fire Protection, to add a new subsection, 10 CFR 50.48(c), which establishes alternative fire protection requirements. 10 CFR 50.48 endorses, with exceptions, NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants – 2001 Edition (NFPA 805), as a voluntary alternative for demonstrating compliance with 10 CFR 50.48 Section (b), Appendix R, and Section (f), Decommissioning.

The voluntary adoption of 10 CFR 50.48(c) by CNS does not eliminate the need to comply with 10 CFR 50.48(a) and 10 CFR 50, Appendix A, GDC 3, Fire Protection. The NRC addressed the overall adequacy of the regulations during the promulgation of 10 CFR 50.48(c) (Reference FR Notice 69 FR 33536 dated June 16, 2004, ML041340086).

> *"NFPA 805 does not supersede the requirements of GDC 3, 10 CFR 50.48(a), or 10 CFR 50.48(f). Those regulatory requirements continue to apply to licensees that adopt NFPA 805. However, under NFPA 805, the means by which GDC 3 or 10 CFR 50.48(a) requirements may be met is different than under 10 CFR 50.48(b). Specifically, whereas GDC 3 refers to SSCs important to safety, NFPA 805 identifies fire protection systems and features required to meet the Chapter 1 performance criteria through the methodology in Chapter 4 of NFPA 805. Also, under NFPA 805, the 10 CFR 50.48(a)(2)(iii) requirement to limit fire damage to SSCs important to safety so that the capability to safely shut down the plant is ensured is satisfied by meeting the performance criteria in Section 1.5.1 of NFPA 805. The Section 1.5.1 criteria include provisions for ensuring that reactivity control, inventory and pressure control, decay heat removal, vital auxiliaries, and process monitoring are achieved and maintained.*
>
> *This methodology specifies a process to identify the fire protection systems and features required to achieve the nuclear safety performance criteria in Section 1.5 of NFPA 805. Once a determination has been made that a fire protection system or feature is required to achieve the performance criteria of Section 1.5, its design and qualification must meet any applicable requirements of NFPA 805, Chapter 3. Having identified the required fire protection systems and features, the licensee selects either a deterministic or performance-based approach to demonstrate that the performance criteria are satisfied. This process satisfies the GDC 3 requirement to design and locate SSCs important to safety to minimize the probability and effects of fires and explosions." (Reference FR Notice 69 FR 33536 dated June 16, 2004, ML041340086)*

The new rule provides actions that may be taken to establish compliance with 10 CFR 50.48(a), which requires each operating nuclear power plant to have a fire protection program plan that satisfies GDC 3, as well as specific requirements in that section. The transition process described in 10 CFR 50.48(c)(3)(ii) provides, in pertinent parts, that a licensee intending to adopt the new rule must, among other things, "modify the fire protection plan required by paragraph (a) of that section to reflect the licensee's decision to comply with NFPA 805." Therefore, to the extent that the

contents of the existing fire protection program plan required by 10 CFR 50.48(a) are inconsistent with NFPA 805, the fire protection program plan must be modified to achieve compliance with the requirements in NFPA 805. All other requirements of 10 CFR 50.48 (a) and GDC 3 have corresponding requirements in NFPA 805.

A comparison of the current requirements in the CNS fire protection licensing basis with the comparable requirements in Section 3 of NFPA 805 shows that the two sets of requirements are consistent in many respects. This was further clarified in FAQ 07-0032, 10 CFR 50.48(a) and GDC 3 clarification (ML081400292). The following tables provide a cross reference of fire protection regulations associated with the post-transition CNS fire protection program and applicable industry and CNS documents that address the topic.

10 CFR 50.48(a)

Table 5-1 10 CFR 50.48(a) – Applicability/Compliance Reference

	10 CFR 50.48(a) Section(s)	Applicability/Compliance Reference
(1)	Each holder of an operating license issued under this part or a combined license issued under part 52 of this chapter must have a fire protection plan that satisfies Criterion 3 of appendix A to this part. This fire protection plan must:	See below
	(i) Describe the overall fire protection program for the facility;	NFPA 805 Section 3.2 NEI 04-02 Table B-1
	(ii) Identify the various positions within the licensee's organization that are responsible for the program;	NFPA 805 Section 3.2.2 NEI 04-02 Table B-1
	(iii) State the authorities that are delegated to each of these positions to implement those responsibilities; and	NFPA 805 Section 3.2.2 NEI 04-02 Table B-1
	(iv) Outline the plans for fire protection, fire detection and suppression capability, and limitation of fire damage.	NFPA 805 Section 2.7 and Chapters 3 and 4 NEI 04-02 B-1 and B-3 Tables
(2)	The plan must also describe specific features necessary to implement the program described in paragraph (a)(1) of this section such as:	See below
	(i) Administrative controls and personnel requirements for fire prevention and manual fire suppression activities;	NFPA 805 Sections 3.3.1 and 3.4 NEI 04-02 Table B-1
	(ii) Automatic and manually operated fire detection and suppression systems; and	NFPA 805 Sections 3.5 through 3.10 and Chapter 4 NEI 04-02 B-1 and B-3 Tables
	(iii) The means to limit fire damage to structures, systems, or components important to safety so that the capability to shut down the plant safely is ensured.	NFPA 805 Section 3.3 and Chapter 4 NEI 04-02 B-3 Table
(3)	The licensee shall retain the fire protection plan and each change to the plan as a record until the Commission terminates the reactor license. The licensee shall retain each superseded revision of the procedures for 3 years from the date it was superseded.	NFPA 805 Section 2.7.1.1 requires that documentation (Analyses, as defined by NFPA 805 2.4, performed to demonstrate compliance with this standard) be maintained for the life of the plant. Duke Energy Nuclear System Directive entitled "Records Management."

Table 5-1 10 CFR 50.48(a) – Applicability/Compliance Reference	
10 CFR 50.48(a) Section(s)	**Applicability/Compliance Reference**
(4) Each applicant for a design approval, design certification, or manufacturing license under part 52 of this chapter must have a description and analysis of the fire protection design features for the standard plant necessary to demonstrate compliance with Criterion 3 of appendix A to this part.	Not applicable. CNS is licensed under 10 CFR 50.

General Design Criterion 3

Table 5-2 GDC 3 – Applicability/Compliance Reference	
GDC 3, Fire Protection, Statement	**Applicability/Compliance Reference**
Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions.	NFPA 805 Chapters 3 and 4 NEI 04-02 B-1 and B-3 Tables
Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room.	NFPA 805 Sections 3.3.2, 3.3.3, 3.3.4, 3.11.4 NEI 04-02 B-1 Table
Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety.	NFPA 805 Chapters 3 and 4 NEI 04-02 B-1 and B-3 Tables
Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components	NFPA 805 Sections 3.4 through 3.10 and 4.2.1 NEI 04-02 Table B-3

10 CFR 50.48(c)

Table 5-3 10 CFR 50.48(c) – Applicability/Compliance Reference

	10 CFR 50.48(c) Section(s)	Applicability/Compliance Reference
(1)	*Approval of incorporation by reference.* National Fire Protection Association (NFPA) Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805), which is referenced in this section, was approved for incorporation by reference by the Director of the Federal Register pursuant to 5 U.S.C. 552(a) and 1 CFR part 51.	General Information. NFPA 805 (2001 edition) is the edition used.
(2)	Exceptions, modifications, and supplementation of NFPA 805. As used in this section, references to NFPA 805 are to the 2001 Edition, with the following exceptions, modifications, and supplementation:	General Information. NFPA 805 (2001 edition) is the edition used.
	(i) *Life Safety Goal, Objectives, and Criteria.* The Life Safety Goal, Objectives, and Criteria of Chapter 1 are not endorsed.	The Life Safety Goal, Objectives, and Criteria of Chapter 1 of NFPA 805 are not part of the LAR.
	(ii) *Plant Damage/Business Interruption Goal, Objectives, and Criteria.* The Plant Damage/Business Interruption Goal, Objectives, and Criteria of Chapter 1 are not endorsed.	The Plant Damage/Business Interruption Goal, Objectives, and Criteria of Chapter 1 of NFPA 805 are not part of the LAR.
	(iii) *Use of feed-and-bleed.* In demonstrating compliance with the performance criteria of Sections 1.5.1(b) and (c), a high-pressure charging/injection pump coupled with the pressurizer power-operated relief valves (PORVs) as the sole fire-protected safe shutdown path for maintaining reactor coolant inventory, pressure control, and decay heat removal capability (i.e., feed-and-bleed) for pressurized-water reactors (PWRs) is not permitted.	Feed and bleed is not utilized as the sole fire-protected safe shutdown methodology.
	(iv) Uncertainty analysis. An uncertainty analysis performed in accordance with Section 2.7.3.5 is not required to support deterministic approach calculations.	Uncertainty analysis was not performed for deterministic methodology.
	(v) Existing cables. In lieu of installing cables meeting flame propagation tests as required by Section 3.3.5.3, a flame-retardant coating may be applied to the electric cables, or an automatic fixed fire suppression system may be installed to provide an equivalent level of protection. In addition, the italicized exception to Section 3.3.5.3 is not endorsed.	Electrical cable construction complies with a flame propagation test that was found acceptable to the NRC as documented in NEI 04-02 Table B-1.
	(vi) Water supply and distribution. The italicized exception to Section 3.6.4 is not endorsed. Licensees who wish to use the exception to Section 3.6.4 must submit a request for a license amendment in accordance with paragraph (c)(2)(vii) of this section.	CNS "Complies by Previous NRC Approval". See Attachment A.

Table 5-3 10 CFR 50.48(c) – Applicability/Compliance Reference

	10 CFR 50.48(c) Section(s)	Applicability/Compliance Reference
	(vii) Performance-based methods. Notwithstanding the prohibition in Section 3.1 against the use of performance-based methods, the fire protection program elements and minimum design requirements of Chapter 3 may be subject to the performance-based methods permitted elsewhere in the standard. Licensees who wish to use performance-based methods for these fire protection program elements and minimum design requirements shall submit a request in the form of an application for license amendment under § 50.90. The Director of the Office of Nuclear Reactor Regulation, or a designee of the Director, may approve the application if the Director or designee determines that the performance-based approach; (A) Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release; (B) Maintains safety margins; and (C) Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).	The use of performance-based methods for NFPA 805 Chapter 3 is requested. See Attachment L.
(3)	*Compliance with NFPA 805.*	See below
	(i) A licensee may maintain a fire protection program that complies with NFPA 805 as an alternative to complying with paragraph (b) of this section for plants licensed to operate before January 1, 1979, or the fire protection license conditions for plants licensed to operate after January 1, 1979. The licensee shall submit a request to comply with NFPA 805 in the form of an application for license amendment under § 50.90. The application must identify any orders and license conditions that must be revised or superseded, and contain any necessary revisions to the plant's technical specifications and the bases thereof. The Director of the Office of Nuclear Reactor Regulation, or a designee of the Director, may approve the application if the Director or designee determines that the licensee has identified orders, license conditions, and the technical specifications that must be revised or superseded, and that any necessary revisions are adequate. Any approval by the Director or the designee must be in the form of a license amendment approving the use of NFPA 805 together with any necessary revisions to the technical specifications.	The LAR was submitted in accordance with 10 CFR 50.90. The LAR included applicable license conditions, orders, technical specifications/bases that needed to be revised and/or superseded.
	(ii) The licensee shall complete its implementation of the methodology in Chapter 2 of NFPA 805 (including all required evaluations and analyses) and, upon completion, modify the fire protection plan required by paragraph (a) of this section to reflect the licensee's decision to comply with NFPA 805, before changing its fire protection program or nuclear power plant as permitted by NFPA 805.	The LAR and transition report summarize the evaluations and analyses performed in accordance with Chapter 2 of NFPA 805.
(4)	Risk-informed or performance-based alternatives to compliance with NFPA 805. A licensee may submit a request to use risk-informed or performance-based alternatives to compliance with NFPA 805. The request must be in the form of an application for license amendment under § 50.90 of this chapter. The Director of the Office of Nuclear Reactor Regulation, or designee of the Director, may approve the application if the Director or designee determines that the proposed alternatives: (i) Satisfy the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release; (ii) Maintain safety margins; and (iii) Maintain fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).	No risk-informed or performance-based alternatives to compliance with NFPA 805 (per 10 CFR 50.48(c)(4)) were utilized.

5.2 Regulatory Topics

5.2.1 License Condition Changes

The current CNS Unit 1 and Unit 2 fire protection license condition 2.C (5) is being replaced with the standard license condition based upon Regulatory Position 3.1 of RG 1.205, as shown in Attachment M.

5.2.2 Technical Specifications

CNS conducted a review of the Technical Specifications to determine which Technical Specifications are required to be revised, deleted, or superseded. CNS determined that no Technical Specifications revisions are required for the CNS adoption of the new fire protection licensing basis.

5.2.3 Orders and Exemptions

A review was conducted of the CNS docketed correspondence to determine if there were any orders or exemptions that needed to be superseded or revised. A review was also performed to ensure that compliance with the physical protection requirements, security orders, and adherence to those commitments applicable to the plant are maintained. A discussion of affected orders and exemptions is included in Attachment O.

5.3 Regulatory Evaluations

5.3.1 No Significant Hazards Consideration

A written evaluation of the significant hazards consideration of a proposed license amendment is required by 10 CFR 50.92. According to 10 CFR 50.92, a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

- Involve a significant increase in the probability or consequences of an accident previously evaluated; or
- Create the possibility of a new or different kind of accident from any accident previously evaluated; or
- Involve a significant reduction in a margin of safety.

This evaluation is contained in Attachment Q.

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. CNS has evaluated the proposed amendment and determined that it involves no significant hazards consideration.

5.3.2 Environmental Consideration

Pursuant to 10 CFR 51.22(b), an evaluation of the LAR has been performed to determine whether it meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c). That evaluation is discussed in Attachment R. The evaluation confirms that

this LAR meets the criteria set forth in 10 CFR 51.22(c)(9) for categorical exclusion from the need for an environmental impact assessment or statement.

5.4 Revision to the Updated Final Safety Analysis Report

After the approval of the LAR, in accordance with 10 CFR 50.71(e) and approved exemptions, the CNS Updated Final Safety Analysis Report (UFSAR) will be revised. The format and content will be consistent with NEI 04-02 FAQ 12-0062. See Implementation Item 2 in Table S-3 of Attachment S.

5.5 Transition Implementation Schedule

The following schedule for transitioning CNS to the new fire protection licensing basis requires NRC approval of the LAR in accordance with the following schedule:

- Implementation of new NFPA 805 fire protection program to include procedure changes, process updates, and training to affected plant personnel. This will occur within 180 days after issuance of the license amendment unless that date falls within a scheduled refueling outage. Then, implementation will occur within 60 days after startup from that scheduled refueling outage. Note that Implementation Item 13 is associated with modifications in Table S-2b and these items will be completed 180 days after modifications are complete.
- Tables S-1, S-2a and S-2b of Attachment S provide a listing of plant modifications associated with the transition to NFPA 805. Table S-1 contains the list of completed modifications associated with NFPA 805. Tables S-2a and S-2b contain the list of committed modifications associated with NFPA 805. CNS will complete implementation of the modifications in accordance with the dates provided in Tables S-2a and S-2b. Appropriate compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until modifications are complete.

6.0 REFERENCES

The following references were used in the development of the LAR. Additional references are in the NEI 04-02 Tables in the various Attachments.

1. NEI 00-01, Guidance for Post-Fire Safe Shutdown Circuit Analysis, Revision 1, January 2005.
2. NEI 00-01, Guidance for Post-Fire Safe Shutdown Circuit Analysis, Revision 2, May 2009.
3. NEI 04-02, Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c), Revision 2, April 2008.
4. NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition.
5. NRC Enforcement Policy, Policy Statement: Revision, Federal Register, Vol. 69, No. 115, June 16, 2004, pp. 33684-33685.
6. NRC Generic Letter 86-10, Implementation of Fire Protection Requirements, April 24, 1986.
7. NRC Inspection Manual IM0609 Appendix G Attachment 2, Phase 2 Significance Determination Process Template for PWR During Shutdown, February 28, 2005.
8. NRC Regulatory Issue Summary 2007-19; Communicating Clarifications of Staff Positions in RG 1.205 Concerning Issues Identified During Pilot Application of NFPA Std 805, August 20, 2007 (ML0611660105)
9. NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management.
10. NUREG/CR-6850, EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, April 2005.
11. Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis, Revision 1 – November 2002.
12. Regulatory Guide 1.200, An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities, Revision 2 – March 2009.
13. Regulatory Guide 1.205, Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants, Revision 1, December 2009.
14. Voluntary Fire Protection Requirement for Light-Water Reactors; Adoption of NFPA 805 as a Risk-Informed, Performance-Based Alternative, Final Rule, Federal Register, Vol. 69, No. 115, June 16, 2004, pp. 33536-33551.
15. Letter from Duke Energy to NRC dated February 28, 2005, Letter of Intent to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants, 2001 Edition (ML050670305)
16. Letter from NRC to Duke Energy dated June 8, 2005, NRC Response to Duke Energy's Letter of Intent to Adopt 10 CFR 50.48(c) (ML051080005)

17. Letter from Duke Energy to NRC dated June 4, 2007, CNS Letter of Intent to Start the Transition to NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants, 2001 Edition (ML072260422)

18. Letter from NRC to Duke Energy dated January 4, 2008, NRC Response to Letter of Intent to Adopt National Fire Protection Association Standard 805 for Duke Energy's CNS (ML072780045)

19. Letter from Duke Energy to NRC dated March 31, 2010, CNS Request for Extension of Enforcement Discretion and Revised Submittal Schedule for 10 CFR 50.48(c) License Amendment Request (ML100920065)

20. Letter from NRC to Duke Energy dated June 30, 2010, NRC Evaluation of the Request for an Extension of Enforcement Discretion in Accordance with the Interim Enforcement Policy for Fire Protection Issues During Transition to National Fire Protection Standard NFPA 805 (TAC Nos. ME4136 and ME4137) (ML101800534)

21. Letter from Duke Energy to NRC dated June 23, 2011, CNS Request for Extension of Enforcement Discretion and Commitment to Submittal Date for 10 CFR 50.48(c) License Amendment Request (ML11180A273)

22. Letter from NRC to Duke Energy dated July 28, 2011, Commitment to Submit a License Amendment Request to Transition to Title 10 of the Code of Federal Regulations (10 CFR), Part 50, Section 50.48(c), National Fire Protection Association Standard NFPA 805, and Request to Extend Enforcement Discretion – (TAC Nos. ME6604 and ME6605) (ML11201A207)

23. Letter from NRC to Duke Energy dated September 30, 1976, Fire Protection Evaluation

24. Letter from Duke Energy to NRC dated December, 1977, Fire Hazards Analysis

25. Letter from Duke Energy to NRC dated June, 1979, Fire Hazards Analysis revision

26. Letter from Duke Energy to NRC dated August,1981, Fire Hazards Analysis revision

27. Letter from Duke Energy to NRC dated October 23, 1981, Catawba Nuclear Station Docket Nos 50-413 and 50-414 Fire Protection Review

28. NRC Safety Evaluation Report dated February, 1983

29. Letter from Duke Energy to NRC dated April 14, 1983, Catawba Nuclear Station Docket Nos 50-413 and 50-414

30. Letter from Duke Energy to NRC dated July 5, 1983, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

31. Letter from Duke Energy to NRC dated January 17, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

32. Letter from Duke Energy to NRC dated February 2, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

33. Letter from Duke Energy to NRC dated February 10, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

34. Letter from Duke Energy to NRC dated February 20, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

35. Letter from Duke Energy to NRC dated February 29, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

36. Letter from Duke Energy to NRC dated March 14, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

37. Letter from Duke Energy to NRC dated April 9, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

38. Letter from Duke Energy to NRC dated April 11, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

39. Letter from Duke Energy to NRC dated April 25, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

40. Letter from Duke Energy to NRC dated May 8, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

41. Letter from Duke Energy to NRC dated May 11, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

42. NRC Supplemental Safety Evaluation Report No. 2, dated June, 1984

43. Letter from Duke Energy to NRC dated June 28, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

44. Letter from Duke Energy to NRC dated June 29, 1984, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

45. NRC Supplemental Safety Evaluation Report No.3, dated July, 1984

46. NRC Supplemental Safety Evaluation Report No. 4, dated December, 1984

47. Letter from Duke Energy to NRC dated May 31, 1985, Catawba Nuclear Station Docket Nos. 50-413 and 50-414

48. NRC Supplemental Safety Evaluation Report No. 5, dated February, 1986

49. Calculation CNC-1435.00-00-0065, Catawba NFPA 805 Power Block Definition, Revision 1

50. Calculation CNC-1435.00-00-0042, NFPA 805 Transition Licensing Action Review, Revision 2

51. Calculation CNC-1435.00-00-0069, NFPA 805 Transition – Radiological Release Evaluation, Revision 1

52. Calculation CNC-1435.00-00-0050, NFPA 805 Transition B-1 Table/Report, Revision 4

53. Calculation CNC-1435.00-00-0047, NFPA 805 Transition NEI 04-02 B-2 Table/Report – Nuclear Safety Capability Assessment Methodology Review, Revision 3

54. Calculation CNC-1435.00-00-0066, NFPA 805 Transition - NEI 04-02 Table B-3 – Fire Area Transition, Revision 3
55. Calculation CNC-1435.00-00-0045, NFPA-805 Transition Engineering Equivalency Evaluation Review, Revision 2
56. Calculation CNC-1435.00-00-0067, NFPA 805 Transition Risk-Informed, Performance Based Fire Risk Evaluation, Revision 2
57. Calculation CNC-1435.00-00-0068, NFPA 805 Recovery Action Feasibility Review, Revision 1
58. Calculation CNC-1435.00-00-0043, NFPA 805 Transition Expert Panel Report for Addressing Potential Catawba Multiple Spurious Operations, Revision 0
59. Calculation CNC-1435.00-00-0063, NFPA 805 Transition Non-Power Fire Area Assessments (Pinch Point Analysis), Revision 0
60. Calculation CNC-1535.00-00-0111, CNS Fire PRA (FPRA) Model Development Report, Revision 1
61. Calculation CNC-1535.00-00-0112, Fire PRA Summary Report, Revision 1
62. Calculation CNC-1535.00-00-0113, NFPA 805 FPRA Application Calculation, Revision 2
63. Calculation, CNC-1535.00-00-0110, CNS Fire Scenario Report, Revision 1
64. Calculation, CNC-1535.00-00-0156, CNS Fire PRA Input for FREs, Revision 1
65. Calculation, CNC-1535.00-00-0159, Attachment U – Internal Events PRA Quality, Revision 1
66. Calculation, CNC 1535.00-00-0160, CNS Aggregate Risk Table (NFPA 805 LAR Tables W-1), Revision 0

ATTACHMENTS

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

40 Pages Attached

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

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.1 General	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 - Section Heading, see sub-sections for any specific compliance statements.
3.2 Fire Protection Plan	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.2.1 Intent	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	Comply	A site-wide Fire Protection Program has been established and is documented in the Design Basis Specification for the Plant Fire Protection.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 1] - Design Basis Specification for the Plant Fire Protection		
3.2.2 Management Policy Direction and Responsibility.	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.	Comply	A policy document has been developed to define management authority and responsibilities and is documented in the Design Basis Specification for the Plant Fire Protection.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 1.a] - Design Basis Specification for the Plant Fire Protection		
3.2.2.1 [Management Policy on Senior Management]	3.2.2.1* The policy document shall designate the senior management position with immediate authority and responsibility for the fire protection program.	Comply	The Site Vice President is documented as the senior management position responsible for the implementation of the fire protection program.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 1.a] - Design Basis Specification for the Plant Fire Protection		
3.2.2.2 [Management Policy on Daily Administration]	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.	Comply	The Fire Protection Engineer is responsible for the daily administration and coordination of the fire protection program.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 1.a] - Design Basis Specification for the Plant Fire Protection		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.2.2.3 [Management Policy on Interfaces]	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.	Comply	The interfaces between the fire protection program and other organizations and the assignment of responsibilities for station personnel are included in various station documents. Station documentation identifies various plant positions with the authority having jurisdiction for implanting various areas of the fire protection program.
References	**Document ID**		
	CNS FP ESD Rev. 1/12/12 [Section 4] - CNS Fire Protection Program Engineering Support Document		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 1] - Design Basis Specification for the Plant Fire Protection		
	NSD-112 Rev. 11 [Section 112.4] - Fire Brigade Organization, Training & Responsibilities		
	NSD-316 Rev. 13 [Section 316.4] - Fire Protection Impairment and Surveillance		
3.2.2.4 [Management Policy on AHJ]	3.2.2.4* The policy document shall identify the appropriate AHJ for the various areas of the fire protection program.	Comply	The NRC is the Authority Having Jurisdiction (AJH) for fire protection changes requiring approval. The NRC is notified of changes to the fire protection program in accordance with NSD-320. NSD-320 screens changes to the fire protection program to determine if NRC approval is required. Implementation Item: The Design Basis Specification for the Plant Fire Protection, which is the primary fire protection program policy document, will be updated to include the statement that the NRC is the AHJ for fire protection changes requiring approval. See Implementation Item 3 in Table S-3 of Attachment S.
References	**Document ID**		
	NSD-320 Rev. 4 [Section 320.1, 320.3] - Guidance for Performing Licensing Review of Proposed Changes to the Fire Protection Program		
3.2.3 Procedures	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 - Section Heading, see sub-sections for any specific compliance statements.
3.2.3 Procedures (1)	3.2.3 (1) * Inspection, testing, and maintenance for fire protection systems and features credited by the fire protection program	Comply	Procedures have been established or implemented for inspection, testing, and maintenance of the fire protection systems and features. The Fire Protection Engineering Support Document (ESD) contains an uncontrolled list of the fire protection related inspection and maintenance procedures.
References	**Document ID**		
	CNS FP ESD Rev. 1/12/12 [Section 2.4] - CNS Fire Protection Program Engineering Support Document		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
		Submit for NRC Approval	Surveillance frequencies may be modified in accordance with the methodology in EPRI Report TR1006756, "Fire Protection Equipment Surveillance Optimization and Maintenance Guide." CNS requests formal NRC approval of this methodology. See Attachment L of the License Amendment Request for further details on the request for NRC approval of the EPRI Surveillance Frequency Optimization and Maintenance Guide. Implementation Item: Appropriate fire protection program document(s) will be updated to provide a requirement that if a plant elects to implement the methodologies in EPRI Report TR1006756, that the methodologies will be implemented in their entirety as they pertain to the fire protection systems or features being evaluated. See Implementation Item 4 in Table S-3 of Attachment S.
3.2.3 Procedures (2)	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	Comply	A fire protection impairment and surveillance procedure has been established to identify the compensatory actions implemented when fire protection features cannot perform their intended function.
References	**Document ID**		
	NSD-316 Rev. 13 - Fire Protection Impairment and Surveillance		
3.2.3 Procedures (3)	3.2.3 (3) * Reviews of fire protection program — related performance and trends	Comply	Procedures have been established for fire protection program reviews. Reviews of the Plant Fire Protection Program are conducted on a regular basis and data is collected for performance monitoring and trending. Implementation Item: The monitoring program required by NFPA 805 will include a process that monitors and trends the fire protection systems and features based on specific goals established to measure availability and reliability. See Implementation Item 5 in Table S-3 of Attachment S.
References	**Document ID**		
	CNS FP ESD Rev. 1/12/12 [Section 6.1] - CNS Fire Protection Program Engineering Support Document		
	EDM-201 Rev. 17 - Engineering Support Program		
	EDM-203 Rev. 4 - Equipment Reliability Health Monitoring, Assessing, Reporting and Action Planning		
3.2.3 Procedures (4)	3.2.3 (4) Reviews of physical plant modifications and procedure changes for impact on the fire protection program	Comply	Procedures have been established for plant modification reviews and procedure revisions for impact on the fire protection program.
References	**Document ID**		
	EDM-601 Rev. 20 [App. N] - Engineering Change Manual		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	NSD-228 Rev. 10 [App. E] - Applicability Determination		
	NSD-301 Rev. 41 [Sections 301.6.2.1.3 and 6.2.4.2] - Engineering Change Program		
	NSD-320 Rev. 4 - Guidance for Performing Licensing Review of Proposed Changes to the Fire Protection Program		
3.2.3 Procedures (5)	3.2.3 (5) Long-term maintenance and configuration of the fire protection program	Comply	Procedures have been established for the long term maintenance and configuration of the fire protection program.
References	**Document ID**		
	NSD-106 Rev. 7 - Configuration Management		
	NSD-228 Rev. 10 - Applicability Determination		
	NSD-320 Rev. 4 - Guidance for Performing Licensing Review of Proposed Changes to the Fire Protection Program		
3.2.3 Procedures (6)	3.2.3 (6) Emergency response procedures for the plant industrial fire brigade.	Comply	Emergency response procedures for the plant fire brigade have been established.
References	**Document ID**		
	Catawba Nuclear Station Site Fire Strategies -		
	NSD-112 Rev. 11 [Section 112.2] - Fire Brigade Organization, Training & Responsibilities		
	RP/0/B/5000/029 Rev. 27 - Fire Brigade Response		
3.3 Prevention	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: (1) Prevention of fires and fire spread by controls on operational activities (2) 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.	Comply	The CNS fire prevention program is described in the Design Basis Specification for the Plant Fire Protection. The Design Basis Specification for the Plant Fire Protection identifies activities for fire prevention via controls on operational activities and design controls for use of combustible materials. The objectives are implemented by various station directives and other documents as described in subsequent NFPA 805 sections.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 2] - Design Basis Specification for the Plant Fire Protection		
3.3.1 Fire Prevention for Operational Activities.	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.	Comply	Fire prevention program, activities for control of ignition sources and transient combustibles include training, inspections, and administrative controls have been established. The fire prevention objectives are implemented by various station directives and other documents as described in subsequent sections.
References	**Document ID**		
	Duke PAT Rev. 08/01/2012 - Duke Energy Plant Access Training		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	NSD-104 Rev. 33 - Materiel Condition/Housekeeping, Foreign Material Exclusion and Seismic Concerns NSD-313 Rev. 13 - Control of Flammable and Combustible Materials NSD-314 Rev. 14 - Hot Work Authorization and Portable Heater Control NSD-315 Rev. 5 - Temporary Structures NSD-316 Rev. 13 - Fire Protection Impairment and Surveillance		
3.3.1.1 General Fire Prevention Activities	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	N/A - Section Heading, see sub-sections for any specific compliance statements. Note: Duke Energy has developed multiple directives and work practices to address fire prevention. These directives include but are not limited to the programmatic elements provided in NFPA 805 Section 3.3.1.1. Upon review of the elements listed below, CNS believes that the NFPA 805 code requirements are satisfied and no additional elements were evaluated.
3.3.1.1 General Fire Prevention Activities (1)	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	Comply	The prevention of fires and fire spread are managed through administrative controls and continual training of personnel.
References	**Document ID** Duke PAT Rev. 08/01/2012 [Pages 16, 67, 116] - Duke Energy Plant Access Training NSD-313 Rev. 13 - Control of Flammable and Combustible Materials NSD-314 Rev. 14 - Hot Work Authorization and Portable Heater Control		
3.3.1.1 General Fire Prevention Activities (2)	3.3.1.1 (2) * Documented plant inspections including provisions for corrective actions for conditions where unanalyzed fire hazards are identified	Comply	Plant inspections are documented and provisions for implementing corrective actions, where unidentified fire hazards are identified, are tracked through the station's Corrective Action Process.
References	**Document ID** CNS FP ESD Rev. 1/12/12 [Section 6.2] - CNS Fire Protection Program Engineering Support Document NSD-208 Rev. 38 - Problem Investigation Process (PIP) Operations Management Procedure (OMP) 2-19 Rev. 46 - Conduct of Operator Rounds		
3.3.1.1 General Fire Prevention Activities (3)	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.	Comply	All plant modifications and changes are screened for impact on the plant fire protection program during both the design phase and the implementation phase. Administrative controls are provided in various directives.
References	**Document ID** EDM-601 Rev. 20 [Att. N] - Engineering Change Manual NSD-228 Rev. 10 - Applicability Determination		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	NSD-301 Rev. 41 - Engineering Change Program		
	NSD-320 Rev. 4 - Guidance for Performing Licensing Review of Proposed Changes to the Fire Protection Program		
3.3.1.2 Control of Combustible Materials	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	N/A - Section Heading, see sub-sections for any specific compliance statements. Note: Duke Energy has developed multiple directives and work practices to address fire prevention. These directives include but are not limited to the programmatic elements provided in NFPA 805 Section 3.3.1.2. Upon review of the elements listed below, CNS believes that the NFPA 805 code requirements are satisfied and no additional elements were evaluated.
3.3.1.2 Control of Combustible Materials (1)	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.	Comply	Wood is required to be flame retardant except where allowed by the exception to this section. Implementation Item: Revise station procedures/directives to comply with NFPA 805 Section 3.3.1.2(1). See Implementation Item 6 in Table S-3 of Attachment S.
References	**Document ID**		
	NSD-313 Rev. 13 [Section 313.5.1] - Control of Flammable and Combustible Materials		
3.3.1.2 Control of Combustible Materials (2)	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.	Comply	Specific administrative directives have been developed for the control of combustible materials which require plastic sheeting materials used in the power block shall be fire-retardant types that have passed NFPA 701, or equivalent.
References	**Document ID**		
	NSD-313 Rev. 13 [Section 313.5.1] - Control of Flammable and Combustible Materials		
3.3.1.2 Control of Combustible Materials (3)	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.	Comply	Specific administrative directives have been developed for the control of combustible materials including the removal of all unnecessary waste, debris, scrap, packaging materials, and other combustibles at the end of each shift.
References	**Document ID**		
	NSD-313 Rev. 13 [Section 313.5.1] - Control of Flammable and Combustible Materials		
3.3.1.2 Control of Combustible Materials (4)	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.	Comply	Specific administrative directives have been developed for the control of combustible materials including limits on the types and quantities of stored materials.
References	**Document ID**		
	NSD-313 Rev. 13 [Section 313.5, App. A, Suplement S.1] - Control of Flammable and Combustible Materials		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.3.1.2 Control of Combustible Materials (5)	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.	Comply	Specific administrative directives and procedures have been developed for the use and storage of flammable and combustible liquids in accordance with NFPA 30 guidance. No other NFPA standards were determined to be applicable based on the guidance in FAQ 06-0020.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.b.4] - Design Basis Specification for the Plant Fire Protection		
	Duke Energy SWP Manual Rev. 03/13 [Page 141] - Safe Work Practices 2013		
	NEWP 7.2 Rev. 1 - Storing Chemicals		
	NSD-313 Rev. 13 [Section 313.5.1] - Control of Flammable and Combustible Materials		
3.3.1.2 Control of Combustible Materials (6)	3.3.1.2 (6) * Controls on use and storage of flammable gases shall be in accordance with applicable NFPA standards.	Comply	Specific administrative directives and procedures have been developed for the use and storage of flammable gases in accordance with NFPA 55. No other NFPA standards were determined to be applicable based on the guidance in FAQ 06-0020.
References	**Document ID**		
	Duke Energy SWP Manual Rev. 03/13 [Page 21] - Safe Work Practices 2013		
	NEWP 7.2 Rev. 1 - Storing Chemicals		
	NSD-313 Rev. 13 [Section 313.5.1] - Control of Flammable and Combustible Materials		
3.3.1.3 Control of Ignition Sources	3.3.1.3 Control of Ignition Sources	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.3.1.3.1 [Control of Ignition Sources Code Requirements]	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.	Comply	Hot work is controlled through administrative directives in accordance with NFPA 51B. The directive is updated on an "as needed" basis. NFPA 241 is addressed through compliance with NFPA 51B. NFPA 241, 2000 edition, as referenced by NFPA 805, 2001 edition, Section 5.1.1, with respect to hot work, states "Responsibility for hot work operations and fire prevention precautions , including permits and fire watches, shall be in accordance with NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work."
References	**Document ID**		
	NSD-314 Rev. 14 - Hot Work Authorization and Portable Heater Control		
3.3.1.3.2 [Control of Ignition Sources on Smoking Limitations]	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.	Comply	Smoking is restricted to approved locations and other sources of ignition are controlled through administrative directives and as directed in the General Plant Access Training program.
References	**Document ID**		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	Duke PAT Rev. 08/01/2012 [Page 6] - Duke Energy Plant Access Training		
	NSD-104 Rev. 33 - Materiel Condition/Housekeeping, Foreign Material Exclusion and Seismic Concerns		
3.3.1.3.3 [Control of Ignition Sources for Leak Testing]	3.3.1.3.3 Open flames or combustion-generated smoke shall not be permitted for leak or air flow testing	Comply	Open flame or combustion-generated smoke is prohibited for use in leak and air flow testing.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 2.c.2] - Design Basis Specification for the Plant Fire Protection		
3.3.1.3.4 [Control of Ignition Sources on Portable Heaters]	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.	Comply	Portable electric heaters are controlled through administrative directives. Portable fuel-fired heaters are not permitted in the power block.
References	**Document ID**		
	NSD-314 Rev. 14 [Section 314.6] - Hot Work Authorization and Portable Heater Control		
3.3.2 Structural.	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.	Comply	Power block buildings are constructed of non-combustible materials, primarily reinforced concrete or concrete block with structural steel framing.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.2] - Design Basis Specification for the Plant Fire Protection		
3.3.3 Interior Finishes	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.	Comply	The Design Basis Specification for the Plant Fire Protection states that interior wall and structural components, thermal insulation materials and radiation shielding materials and sound proofing materials are non-combusitble. Interior finishes have a flame spread rating of 25 or less and a smoke and fuel contribution of 50 or less in its use configuration. NFPA 101 defines Class A finishes are non-combustible and are defined as those that have a flame spread index of less than or equal to 25 and a smoke developed index of less than or equal to 450. NSD-318 includes the regulatory commitments of this section to state that Service Level I, II, and IV coatings used on interior floors, walls, and ceilings in "power block" buildings are required to meet the requirements of NFPA 805, Section 3.3.3. Implementation Item: Update station documentation to indicate requirements for interior floor finishes. See Implementation Item 17 in Table S-3 of Attachment S.
References	**Document ID**		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.a.4] - Design Basis Specification for the Plant Fire Protection NSD-318 Rev. 5 [Section 318.7] - Coatings Program		
3.3.4 Insulation Materials	3.3.4 Insulation Materials. Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.	Comply	The Design Basis Specification for the Plant Fire Protection states that interior wall and structural components, thermal insulation materials and radiation shielding materials and sound proofing materials are non-combusitble. A letter from Duke to the NRC dated May 11, 1984 indicates that the insulation around ventilation ducts have a flame index rating of 25 or less, a smoke development index maximum of 100, and a fuel contribution index of 30. Any new insulation materials would require a screening determination in accordance with NSD-301, "Engineering Change Program", and EDM-601, "Engineering Directives Manual." Part of the screening process is an evaluation of the potential effects on the Fire Protection Program which would require the use of noncombustible or limited combustible materials.
References	**Document ID** 1984-05-11 Letter - H.B. Tucker Letter to Denton CNS-1465.00-00-0006 Rev. 22 [App. A., Section 4.a.4] - Design Basis Specification for the Plant Fire Protection EDM-601 Rev. 20 - Engineering Change Manual NSD-301 Rev. 41 - Engineering Change Program		
3.3.5 Electrical.	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.3.5.1 [Electrical Wiring Above Suspended Ceiling Limitations]	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.	Submit for NRC Approval	Combustibles in concealed spaces are minimized. The Design Basis Specification for the Plant Fire Protection states "Concealed spaces contain only necessary electrical wiring." Power, control, and instrumentation cable used at CNS is armored thereby meeting the requirements of this section. Fiber optic cabling, located in the Control Room suspended ceiling, is plenum rated. Wiring above some suspended ceilings may not meet this requirement. See Attachment L of the License Amendment Request for further details on the request for NRC approval for wiring above suspended ceilings. Implementation Item: Appropriate station documentation will be updated to include the requirements for installation of cable above suspended ceilings. See Implementation Item 7 in Table S -3 of Attachment S.
References	**Document ID**		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.a.6, 4.c.10] - Design Basis Specification for the Plant Fire Protection		
3.3.5.2 [Electrical Raceway Construction Limits]	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.	Comply	Cable trays are constructed of galvanized steel. All exposed conduit is hot-dipped, rigid galvanized steel or rigid aluminum. Thinned wall electrical metallic tubing (EMT) is not used for power, control, or instrumentation.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.c.1] - Design Basis Specification for the Plant Fire Protection		
	DC-3.06 Rev. 3 [Section 4.1.1] - Conduit Systems for Power Plants		
		Submit for NRC Approval	PVC conduit is permitted in embedded and buried locations. See Attachment L of the License Amendment Request for further details on the request for NRC approval for evaluation of PVC conduits.
References	**Document ID**		
	DC-3.06 Rev. 3 [Section 4.2, 4.3] - Conduit Systems for Power Plants		
3.3.5.3 [Electrical Cable Flame Propagation Limits]	3.3.5.3* Electric cable construction shall comply with a flame propagation test as acceptable to the AHJ.	Comply	The cable used at CNS, classified as either power, control or instrumentation, passed the IEEE 383-1974 Flame Test which is acceptable as outlined in FAQ 06-0022, "Acceptable Electrical Cable Construction Tests."
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.c.6] - Design Basis Specification for the Plant Fire Protection		
3.3.6 Roofs.	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.	Comply	Roofs are concrete or noncombustible metal construction. The Reactor Buildings, Auxiliary Building, Diesel Generator Buildings, and the Nuclear Service Water Pump Structure all have reinforced concrete roofs. The Turbine Building has rigid fiber glass insulation and built up roof on top a metal deck. The roof construction was designed in accordance with ASTM 446-1972.
References	**Document ID**		
	CNS-1123.00-00-0001 Rev. 0 - Galvanized Metal Roof Deck		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.a.5] - Design Basis Specification for the Plant Fire Protection		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.3.7 Bulk Flammable Gas Storage.	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.	Comply	Bulk flammable gas is not stored in structures housing systems, equipment, or components important to nuclear safety.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.b.2] - Design Basis Specification for the Plant Fire Protection NEWP 7.2 Rev. 1 [Section 3] - Storing Chemicals NSD-313 Rev. 13 [Section 313.5.1] - Control of Flammable and Combustible Materials		
3.3.7.1 [Bulk Flammable Gas Location Requirements]	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.	Comply	Bulk gas storage is located in the plant yard, in a separate detached building with each tank restrained to prevent potential damage in the event of a tank failure.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.c.2] - Design Basis Specification for the Plant Fire Protection		
		Complies with Use of EEEE	Hydrogen storage was evaluated by CNC-1435.00-00-0058 "NFPA 50A Code Conformance Review for NFPA 805 Transition". The 1999 edition of NFPA 50A was used.
References	**Document ID** CNC-1435.00-00-0058 Rev. 0 - NFPA 50A Code Conformance Review for NFPA 805 Transition		
3.3.7.2 [Bulk Flammable Gas Container Restrictions]	3.3.7.2 Outdoor high-pressure flammable gas storage containers shall be located so that the long axis is not pointed at buildings.	Comply	The outdoor high-pressure hydrogen gas storage tanks are oriented with their long axis parallel to the power block buildings.
References	**Document ID** 1983-04-14 Letter - H.B. Tucker Letter to Denton		
3.3.7.3 [Bulk Flammable Gas Cylinder Limitations]	3.3.7.3 Flammable gas storage cylinders not required for normal operation shall be isolated from the system.	Comply	Gas cylinders are isolated when not in use and controlled by various plant directives.
References	**Document ID** NEWP 7.2 Rev. 1 [Section 3] - Storing Chemicals NSD-313 Rev. 13 [Section 313.5.1] - Control of Flammable and Combustible Materials		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.3.8 Bulk Storage of Flammable and Combustible Liquids.	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 Use of EEEE	Bulk storage of flammable/combustible liquids include the Turbine Oil Transfer Tanks which were installed as part of the original plant design. The bulk oil storage was evaluated by CNC-1435.00-00-0057 "NFPA 30 Code Conformance Review for NFPA 805 Transition." The 1977 edition of NFPA 30 was used.
References	**Document ID**		
	CNC-1435.00-00-0057 Rev. 0 - NFPA 30 Code Conformance Review for NFPA 805 Transition		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 4.b.4] - Design Basis Specification for the Plant Fire Protection		
3.3.9 Transformers.	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.	Comply	The transformer oil collection basins are periodically inspected to ensure they are free of debris and perform their design function as part of the transformer wet test.
References	**Document ID**		
	PT/1/A/4400/001B Rev. 17 - Automatic Mulsifyre System Test		
	PT/2/A/4400/001B Rev. 16 - Automatic Mulsifyre System Test		
3.3.10 Hot Pipes and Surfaces.	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.	Comply	Administrative directives ensure, upon identification, the prompt correction of any oil leakage.
References	**Document ID**		
	NSD-104 Rev. 33 [Section 104.5.5] - Materiel Condition/Housekeeping, Foreign Material Exclusion and Seismic Concerns		
	NSD-413 Rev. 9 [Section 413.5.2, 413.4.7] - Fluid Leak Management Program		
3.3.11 Electrical Equipment	3.3.11 Electrical Equipment Adequate clearance, free of combustible material, shall be maintained around energized electrical equipment.	Comply	Administrative directives control combustible material near electrical equipment.
References	**Document ID**		
	NSD-313 Rev. 13 [Section 313.5.2, App. A] - Control of Flammable and Combustible Materials		
3.3.12 Reactor Coolant Pumps	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.	Comply	The reactor coolant pump oil collection systems are designed to withstand off normal conditions such as accident conditions or a safe shutdown earthquake (SSE).
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.3, Section 3.o] - Design Basis Specification for the Plant Fire Protection		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	CNS-1533.NC-00-0001 Rev. 35 - Design Basis Specification for the Reactor Coolant (NC) System		
3.3.12 Reactor Coolant Pumps (1)	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.	Comply	The Reactor Coolant Pumps are fitted with enclosures on the upper and lower oil pots as well as around the oil lift pumps. These enclosures are provided to contain any oil spill and direct the spill to the piping that goes to the drain tank. A letter from Duke to the NRC dated February 20, 1984 provided a schematic of the Reactor Coolant Pump Motors with a description of each potential leak source and the associated design feature to collect the leak.
References	**Document ID**		
	1984-02-20 Letter - H.B. Tucker Letter to Denton		
	CN-1553-01.03 Rev. 20 - Flow Diagram of Reactor Coolant System (NC)		
	CN-2553-01.03 Rev. 16 - Flow Diagram of Reactor Coolant System (NC)		
		Submit for NRC Approval	The Reactor Coolant Pump oil collection systems are designed and sized to collect and contain oil from potentially pressurized and unpressurized leakage areas in a seismic event resulting in failure of the lubrication system. See Attachment L of the License Amendment Request for further details on the request for NRC approval for evaluation of oil misting from the reactor coolant pumps/motors.
3.3.12 Reactor Coolant Pumps (2)	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.	Comply	Leakage oil is drained to a vented closed container capable of containing the maximum potential inventory.
References	**Document ID**		
	CN-1553-01.03 Rev. 20 - Flow Diagram of Reactor Coolant System (NC)		
	CN-2553-01.03 Rev. 16 - Flow Diagram of Reactor Coolant System (NC)		
	CNC-1223.03-00-0002 - RCP Motor Oil Fill Tank Data Sheet		
	CNS-1465.00-00-0006 Rev. 22 [App. A.3, Section 2.o] - Design Basis Specification for the Plant Fire Protection		
3.3.12 Reactor Coolant Pumps (3)	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.	Comply	The oil used in the Reactor Coolant Pumps has a minimum flash point of 400°F. Discussions with the system engineer identify the oil used in the pumps is Chevron GST. The oil vapors from the RCP oil collection tanks would not be exposed to temperatures near the flashpoints. Therefore, flame arrestors are not required.
References	**Document ID**		
	Material Safety Data Sheet - Chevron GST Oil		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.3.12 Reactor Coolant Pumps (4)	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.	Comply	All potentially vulnerable points on the Reactor Coolant Pumps are protected by components capable of containing the leaks. The Reactor Coolant Pumps are fitted with enclosures on the upper and lower oil pots as well as around the oil lift pumps.
References	**Document ID**		
	1984-02-20 Letter - H.B. Tucker Letter to Denton		
	CN-1553-01.03 Rev. 20 - Flow Diagram of Reactor Coolant System (NC)		
	CN-2553-01.03 Rev. 16 - Flow Diagram of Reactor Coolant System (NC)		
3.3.12 Reactor Coolant Pumps (5)	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.	Comply	The Reactor Coolant Pump drain tanks are capable of containing the maximum possible oil spill from the Reactor Coolant Pumps. The drain lines are properly sized to prevent an overflow of the basin.
References	**Document ID**		
	CNC-1223.03-00-0002 - RCP Motor Oil Fill Tank Data Sheet		
	CNS-1465.00-00-0006 Rev. 22 [App. A.3, Section 3.o] - Design Basis Specification for the Plant Fire Protection		
3.4 Industrial Fire Brigade.	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.4.1 On-Site Fire-Fighting Capability	3.4.1 On-Site Fire-Fighting Capability. All of the following requirements shall apply.	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.4.1 On-Site Fire-Fighting Capability (a)	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 previous NRC Approval	SLC 16.13.1 "Fire Brigade" states: A site Fire Brigade of at least five members shall be maintained onsite. If the fire brigade composition is not met then restore mimimum fire brigade compostion within 2 hours. SLC 16.13.4 identifies the fire brigade requirement is met by using personnel from Operations and SPOC. 3 personnel from Operations are required (including the fire brigade leader) and the other 2 personnel are from SPOC. SLC 16.13.4 "Minimum Station Staffing Requirements" identifies the same requirements as SLC 16.13.1 and states "The 2-hour remedial action for restoring minimum station staffing levels is consistent with TS 5.2.2c and 5.2.2d, which allow 2 hours to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the minimum requirements." This staffing position is documented in the Catawba Units 1 and 2 Technical Specificaitons, section 5.2.2.c which states "Shift crew composition may be less than the minimum requirement of 10 CFR 50.54(m)(2)(i) and 5.2.2.a and 5.2.2.g for a period of time

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
			not to exceed 2 hours in order to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the mnimum requirements." This reflects the current CNS fire brigade organization. This position is in accordance with FAQ 12-0063.
References	**Document ID** SLC 16.13-1 Rev. 0 - Fire Brigade SLC 16.13-4 Rev. 0 - Minimum Station Staffing Requirements Technical Specifications Rev. 253/248 [Section 5.2.2.c] - Catawba Units 1 and 2 Technical Specifications		
3.4.1 On-Site Fire-Fighting Capability (a)(1)	3.4.1 (a)(1) NFPA 600, Standard on Industrial Fire Brigades (interior structural fire fighting)	Complies with Use of EEEE	The onsite Fire Brigade is appropriately staffed, trained, and equipped and complies with NFPA 600, 2005 edition.
References	**Document ID** CNC-1435.00-00-0062 Rev. 0 - NFPA 600 Code Conformance Review for NFPA 805 Transition		
3.4.1 On-Site Fire-Fighting Capability (a)(2)	3.4.1 (a)(2) NFPA 1500, Standard on Fire Department Occupational Safety and Health Program	N/A	NFPA 1500 does not apply to CNS.
3.4.1 On-Site Fire-Fighting Capability (a)(3)	3.4.1 (a)(3) NFPA 1582, Standard on Medical Requirements for Fire Fighters and Information for Fire Department Physicians	N/A	NFPA 1582 does not apply to CNS.
3.4.1 On-Site Fire-Fighting Capability (b)	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.	Comply	The fire brigade is appropriately staffed and members are independent of other responsibilities during a fire emergency.
References	**Document ID** NSD-112 Rev. 11 [Section 112.2.7] - Fire Brigade Organization, Training & Responsibilities SLC 16.13-1 Rev. 0 - Fire Brigade SLC 16.13-4 Rev. 0 - Minimum Station Staffing Requirements		
3.4.1 On-Site Fire-Fighting Capability (c)	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 Exception: Sufficient training and knowledge shall be permitted to be provided by an operations advisor dedicated to industrial fire brigade support criteria.	Comply	Station directive dictates that during each shift the Fire Brigade Leader and a minimum of two brigade members have sufficient training and knowledge of the nuclear safety systems to understand the effects of fire and fire suppressants on the nuclear safety performance.
References	**Document ID**		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	NSD-112 Rev. 11 [Section 112.2.7] - Fire Brigade Organization, Training & Responsibilities		
3.4.1 On-Site Fire-Fighting Capability (d)	3.4.1 (d) * The industrial fire brigade shall be notified immediately upon verification of a fire.	Comply	The industrial fire brigade is notified immediately upon verification of a fire.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.2.6] - Fire Brigade Organization, Training & Responsibilities		
	RP/0/B/5000/029 Rev. 27 [Enclosure 4.1] - Fire Brigade Response		
3.4.1 On-Site Fire-Fighting Capability (e)	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 fire-fighting operations. The physical examination shall determine the ability of each member to use respiratory protection equipment.	Comply	Annual physical examinations are required to remain on the "Active" list for industrial fire brigade members. The physical examinations include the use of respiratory protection equipment.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.4] - Fire Brigade Organization, Training & Responsibilities		
3.4.2 Pre-Fire Plans.	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.	Comply	Current and detailed Fire Strategies (pre-fire plans) are available for all plant locations that contain systems or components that could impact nuclear safety performance or present a potential for radioactive releases or life safety.
References	**Document ID**		
	Catawba Nuclear Station Site Fire Strategies -		
3.4.2.1 [Pre-Fire Plan Contents]	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.	Comply	Detailed pre-fire plans are available in the Catawba Nuclear Site Fire Strategies. The Fire Strategies contain the following information: • A graphic representations of the various plant areas that depict the installed fire protection/suppression features • Equipment important to safety and other potentially affected equipment • A listing of special hazards including: Radiological, Electrical, Chemical, Physical, and Flammable Liquids Gases • Notes such as special access, special concerns, ventilation, etc Implementation Item: The Fire Strategies will be reviewed and updated to include any changes to equipment important to nuclear safety and other updates pertinent to the NFPA 805 Transition. See Implementation Item 8 in Table S-3 of Attachment S.

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
References	**Document ID** Catawba Nuclear Station Site Fire Strategies -		
3.4.2.2 [Pre-Fire Plan Updates]	3.4.2.2 Pre-fire plans shall be reviewed and updated as necessary.	Comply	The Site Fire Strategies are maintained current. Plant directives, for modification to plant features and equipment, require a review for potential impact to the Fire Strategies.
References	**Document ID** EDM-601 Rev. 20 - Engineering Change Manual NSD-301 Rev. 41 - Engineering Change Program		
3.4.2.3 [Pre-Fire Plan Locations]	3.4.2.3* Pre-fire plans shall be available in the control room and made available to the plant industrial fire brigade.	Comply	The Fire Strategies are available in the control room and to the Fire Brigade Leader in the Fire Brigade Leader's Resource Kits.
References	**Document ID** PT/0/B/4600/032 Rev. 15 - Fire Brigade Equipment Inspection/Inventory RP/0/B/5000/029 Rev. 27 - Fire Brigade Response		
3.4.2.4 [Pre-Fire Plan Coordination Needs]	3.4.2.4* Pre-fire plans shall address coordination with other plant groups during fire emergencies.	Complies with Clarification	Fire Strategies (pre-fire plans), plant directives, and fire brigade procedures address coordination with other plant groups.
References	**Document ID** Catawba Nuclear Station Site Fire Strategies - NSD-112 Rev. 11 [Section 112.2] - Fire Brigade Organization, Training & Responsibilities RP/0/B/5000/029 Rev. 27 - Fire Brigade Response		
3.4.3 Training and Drills	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 - Section Heading, see sub-sections for any specific compliance statements.
3.4.3 Training and Drills (a)(1)	3.4.3 (a) Plant Industrial Fire Brigade Training. All of the following requirements shall apply. (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 Use of EEEE	CNS Fire Brigade members receive training consistent with NFPA 600, 2005 edition. NFPA 1500 is not applicable to CNS.
References	**Document ID** CNC-1435.00-00-0062 Rev. 0 - NFPA 600 Code Conformance Review for NFPA 805 Transition NSD-112 Rev. 11 - Fire Brigade Organization, Training & Responsibilities		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.4.3 Training and Drills (a)(2)	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.	Comply	Quarterly examinations and training sessions are administered for all fire brigade personnel to remain on the "Active" list. Training includes fire fighting strategies in radiological areas.
References	**Document ID**		
	CNS Addendum 7111.0 Rev. 11 - Catawba Nuclear Station Nuclear Site Emergency Response (ER) Training Program Description		
	NSD-112 Rev. 11 [Section 112.4] - Fire Brigade Organization, Training & Responsibilities		
3.4.3 Training and Drills (a)(3)	3.4.3 (a)(3) A written program shall detail the industrial fire brigade training program.	Comply	CNS maintains a written program detailing the industrial fire brigade training program.
References	**Document ID**		
	CNS Addendum 7111.0 Rev. 11 - Catawba Nuclear Station Nuclear Site Emergency Response (ER) Training Program Description		
	NSD-112 Rev. 11 [Section 112.4] - Fire Brigade Organization, Training & Responsibilities		
3.4.3 Training and Drills (a)(4)	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.	Comply	Drill and training records for fire brigade members are maintained, including initial training, refresher training, drills, and fire brigade leader training.
References	**Document ID**		
	NSD-112 Rev. 11 - Fire Brigade Organization, Training & Responsibilities		
3.4.3 Training and Drills (b)	3.4.3 (b) Training for Non-Industrial Fire Brigade Personnel. 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.	Comply	Other non-fire brigade personnel that respond to a fire incident are informed of their responsibilities and interfaces with the fire brigade. Implementation Item: Develop formal training program for non-fire brigade personnel that respond to a fire incident. See Implementation Item 14 in Table S-3 of Attachment S.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.2] - Fire Brigade Organization, Training & Responsibilities		
3.4.3 Training and Drills (c)(1)	3.4.3 (c) * Drills. All of the following requirements shall apply. (1) Drills shall be conducted quarterly for each shift to test the response capability of the industrial fire brigade.	Comply	The fire brigade conducts quarterly drills for each shift.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.5] - Fire Brigade Organization, Training & Responsibilities		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.4.3 Training and Drills (c)(2)	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.	Comply	Drills are developed to challenge the industrial fire brigade and the responses are evaluated, critiqued, and documented.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.5] - Fire Brigade Organization, Training & Responsibilities		
3.4.3 Training and Drills (c)(3)	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.	Comply	Drills are conducted in various plant areas, especially in those areas identified to be essential to plant operation and to containing significant fire hazards.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.5] - Fire Brigade Organization, Training & Responsibilities		
3.4.3 Training and Drills (c)(4)	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.	Comply	Drill records are maintained and performance critiques are conducted which document the scenario, attendance, and performance of the fire brigade.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.5] - Fire Brigade Organization, Training & Responsibilities		
3.4.3 Training and Drills (c)(5)	3.4.3 (c)(5) A critique shall be held and documented after each drill.	Comply	Each fire drill is critiqued and the critique is documented and maintained.
References	**Document ID**		
	NSD-112 Rev. 11 [Section 112.5] - Fire Brigade Organization, Training & Responsibilities		
3.4.4 Fire-Fighting Equipment.	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.	Comply	The appropriate fire fighting equipment is located in each fire area and on the fire brigade equipment carts. Radiation Protection Technicians will respond with appropriate radiological monitoring equipment. Equipment is purchased by the Emergency Service Coordinator who ensures that the equipment complies with applicable NFPA standards.
References	**Document ID**		
	Catawba Nuclear Station Site Fire Strategies -		
	PT/0/B/4600/032 Rev. 15 - Fire Brigade Equipment Inspection/Inventory		
	RP/0/B/5000/029 Rev. 27 - Fire Brigade Response		
3.4.5 Off-Site Fire Department Interface.	N/A	N/A	

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.4.5.1 Mutual Aid Agreement.	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.	Comply	Offsite fire departments are provided a plan for interface during fires and other conditions requiring the use of the fire fighting resources through Letters of Agreement. The Letters of Agreement identify the responding organizations would be under the direct guidance of CNS personnel. In addition, the Offsite Fire Department Strategy indicates that communciation will be established with the CNS Fire Brigade Leader as the point of contact.
References	**Document ID** Catawba Emergency Plan [Appendix 5] - RP/0/B/5000/029 Rev. 27 - Fire Brigade Response		
3.4.5.2 Site-Specific Training.	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.	Comply	Annual training is specified in the Letters of Agreement with the off-site fire authorities. The training includes topics in fire protection, radiation protection, station familiarization, and station security procedures.
References	**Document ID** Addendum 7111.0 Rev. 11 - Catawba Nuclear Station Site Emergency Response (ER) Training Program Description Catawba Emergency Plan [Appendix 5] - NSD-112 Rev. 11 [Section 112.5] - Fire Brigade Organization, Training & Responsibilities		
3.4.5.3 Security and Radiation Protection.	3.4.5.3* Security and Radiation Protection. Plant security and radiation protection plans shall address off-site fire authority response.	Comply	Site documents include Security and Radiation Protection provisions for assistance to offsite fire authorities.
References	**Document ID** NSD-112 Rev. 11 [Section 112.2.9, 112.2.10] - Fire Brigade Organization, Training & Responsibilities RP/0/B/5000/029 Rev. 27 [Enclosure 3.4] - Fire Brigade Response		
3.4.6 Communications.	3.4.6* Communications. An effective emergency communications capability shall be provided for the industrial fire brigade.	Comply	Emergency communication capabilities include the telephone system, public address system, and radios.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection RP/0/B/5000/029 Rev. 27 [App. A.1, Section 4.e.3] - Fire Brigade Response		
3.5 Water Supply	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.5.1 [Water Supply Flow Code Requirements]	3.5.1 A fire protection water supply of adequate reliability, quantity, and duration shall be provided by one of the two following methods. (a) Provide a fire protection water supply of not less than two separate 300,000-gal (1,135,500-L) supplies. (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.	Comply	CNS complies via method (b). CNS determined the largest sprinkler system and hose demand for any system is 3,645 gpm. The fire flow rate for two hours is 437,400 gallons. The water supply for the fire protection system is Lake Wylie which has a capacity well in excess of this volume. Fire water supply has been calculated with the hydraulically least demanding portion of the fire main loop out of service.
References	**Document ID**		
	1983-04-14 Letter - H.B. Tucker Letter to Denton		
	CNC-1223.49-00-0003 Rev. 11 - RF/RY Auxiliary Building		
	CNC-1223.49-00-0004 Rev. 15 - Non-Safety RF/RY		
	CNC-1223.49-00-0006 Rev. 0 - Non Safety RF/RY (Fire Protection)		
	CNC-1223.49-00-0007 Rev. 1 - RF/RY Auxiliary Building		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.b] - Design Basis Specification for the Plant Fire Protection		
3.5.2 [Water Supply Tank Code Requirements]	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.	Comply	CNS does not utilize tanks for fire protection water. CNS complies via Exception 1 and draws water from Lake Wylie as the primary fire water source. The Main Fire Pumps are provided with separate suctions to Lake Wylie.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.b] - Design Basis Specification for the Plant Fire Protection		
	CNS-1599.RF-00-0001 Rev. 20 [Section 3.2.1] - Design Basis Specification for the Fire Protection System (RF/RY)		
3.5.3 [Water Supply Pump Code Requirements]	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	Complies with Use of EEEE	The Main Fire Pumps were evaluated in accordance with NFPA 20, 1978 edition. Three fire pumps are provided and each is sized to provide 100 percent of the required flow rate and pressure.

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	power source.		
References	**Document ID**		
	CNC-1435.00-00-0055 Rev. 0 - NFPA 20 Code Conformance Review for NFPA 805 Transition		
3.5.4 [Water Supply Pump Diversity and Redundancy]	3.5.4 At least one diesel engine-driven fire pump or two more seismic Category I Class IE electric motor-driven fire pumps connected to redundant Class IE emergency power buses capable of providing 100 percent of the required flow rate and pressure shall be provided.	Complies with previous NRC Approval	CNS does not utilize diesel-engine driven fire water pumps. CNS uses three electric fire pumps capable of each providing 100% of the required flow and pressure. The 1983 NRC Safety Evaluation Report states: "The water supply system consists of three fire pumps separately connected to a buried 12-in. cement-lined water main loop around the station. All three fire pumps are electrically driven, each rated 2,500 gpm at 144 psig. The three fire pumps have independent power supplies and controls. Two fire pumps are supplied by separate station diesel generators." "Based on its review, the staff concluses that the water supply system meets the guidelines of BTP CMEB 9.5-1, Item C.6.b, and is, therefore, acceptable." There have been no changes to invalidate the basis for this approval.
References	**Document ID**		
	1983-02-01 NRC Safety Evaluation Report [Section 9.5.1.7] - NRC Safety Evaluation Report		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.b.3] - Design Basis Specification for the Plant Fire Protection		
3.5.5 [Water Supply Pump Separation Requirements]	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 with previous NRC Approval	There are three fire pumps at CNS. Each fire pump has an independent power supply. The 1983 NRC Safety Evaluation Report states: "Two of the three fire pumps are located in the same bay of the intake structure and are separated by a three-hour rated fire barrier. The third pump is located in an adjacent bay." "Based on its review, the staff concludes that the water supply system meets the guidelines of BTP CMEB 9.5-1, Item C.6.b, and is, therefore, acceptable." There have been no changes that invalidate the basis for this approval.
References	**Document ID**		
	1983-02-01 NRC Safety Evaluation Report [Section 9.5.1.7] - NRC Safety Evaluation Report		
		Complies with Use of EEEE	Circuits are separated via barriers, distance, or evalauted in the referenced engineering evaluation.
References	**Document ID**		
	CNC-1435.00-00-0036 Rev. 3 [Attachment 5] - Evaluations of Changes/Deviations to the Fire Protection Program		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.5.6 [Water Supply Pump Start/Stop Requirements]	3.5.6 Fire pumps shall be provided with automatic start and manual stop only.	Comply	The Main Fire Pumps are provided with automatic start upon system pressure drop. Once actuated the Main Fire Pumps can only be shut off by the manual stop.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [Section 3.3.1.1] - Design Basis Specification for the Plant Fire Protection CNS-1599.RF-00-0001 Rev. 20 [Section 3.2.2.1.2] - Design Basis Specification for the Fire Protection System (RF/RY)		
3.5.7 [Water Supply Pump Connection Requirements]	3.5.7 Individual fire pump connections to the yard fire main loop shall be provided and separated with sectionalizing valves between connections.	Comply	Each Main Fire Pump is provided with a separate connection to the underground main fire loop. Sectional control valves are provided to isolate portions of the yard fire main.
References	**Document ID** CN-1599-01.00 Rev. 40 - Flow Diagram of Exterior Fire Protection System (RY)		
3.5.8 [Water Supply Pressure Maintenance Limitations]	3.5.8 A method of automatic pressure maintenance of the fire protection water system shall be provided independent of the fire pumps.	Comply	The fire protection system pressure is maintained by three jockey pumps that start and shut-off automatically.
References	**Document ID** CNS-1599.RF-00-0001 Rev. 20 [Section 3.2.1.1, 3.3.1.2] - Design Basis Specification for the Fire Protection System (RF/RY)		
3.5.9 [Water Supply Pump Operation Notification]	3.5.9 Means shall be provided to immediately notify the control room, or other suitable constantly attended location, of operation of fire pumps.	Comply	The Control Room(s) are automatically notified of operation of the Main Fire Pumps via control room annunciator panel indication.
References	**Document ID** CNS-1599.RF-00-0001 Rev. 20 [Section 3.5.2] - Design Basis Specification for the Fire Protection System (RF/RY) OP/1/B/6100/010 N Rev. 49 - Annunciator Response for Panel 1AD-13		
3.5.10 [Water Supply Yard Main Code Requirements]	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.	Comples with Use of EEEE	An underground fire loop is provided around the perimeter of the plant to service fire protection requirements. The underground fire water piping system was evaluated in accordance with NFPA 24, 1977 edition.
References	**Document ID** CNC-1435.00-00-0056 Rev. 0 - NFPA 24 Code Conformance Review for NFPA 805 Transition		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.5.11 [Water Supply Yard Main Maintenance Issues]	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.	Comply	Sectionalizing valves are provided to allow isolation of various sections of the fire water system for maintenance or repair. The Design Basis Specification for Fire Protection states: Each sprinkler system and manual hose station standpipe has an independent connection to the fire protection header; therefore, a single failure cannot impair both the primary and backup Fire Protection Systems outside containment. The Design Basis Specification for the Fire Protection System (RF/RY) states: The guidelines for the application of the single failure criterion are documented in [Specification CNS-1465.00-00-0001, Plant Design Basis for Systems Single Failure]. The portion of the RF/RY System protecting safety related equipment shall be designed to ensure that a single failure will not impair both the primary and backup fire suppression capability.
References	**Document ID**		
	CN-1599-01.00 Rev. 40 - Flow Diagram of Exterior Fire Protection System (RY)		
	CNC-1435.00-00-0056 Rev. 0 [Section 3.5] - NFPA 24 Code Conformance Review for NFPA 805 Transition		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.c.1] - Design Basis Specification for the Plant Fire Protection		
	CNS-1599.RF-00-0001 Rev. 20 [Section 2.2.1] - Design Basis Specification for the Fire Protection System (RF/RY)		
3.5.12 [Water Supply Compatible Thread Connections]	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.	Comply	Threads compatible with those used by the local fire fighting agencies are provided on fire hydrants, hose coupling, and standpipe risers.
References	**Document ID**		
	CNC-1435.00-00-0054 Rev. 0 [Section 4-4.4] - NFPA 14 Code Conformance Review for NFPA 805 Transition		
	CNC-1435.00-00-0056 Rev. 0 [Section 4-1.2] - NFPA 24 Code Conformance Review for NFPA 805 Transition		
3.5.13 [Water Supply Header Options]	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.	Comply	CNS licensing commitments do not require seismically designed standpipe systems. Each sprinkler and standpipe system is provided with a shutoff valve. An OS&Y control valve is normally provided for each sprinkler system. Standpipe systems are provided with shutoff valves as shown on drawing series CN-1599 and CN-2599, "Flow Diagram of Fire Protection System (RF)."
References	**Document ID**		
	CN-1599 Catawba Nuclear Station Drawing Series - Flow Diagram of Fire Protection System (RF)		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	CN-2599 Catawba Nuclear Station Drawing Series - Flow Diagram of Fire Protection System (RF)		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.c.1] - Design Basis Specification for the Plant Fire Protection		
	CNS-1599.RF-00-0001 Rev. 20 [Section 3.2.2.1] - Design Basis Specification for the Fire Protection System (RF/RY)		
3.5.14 [Water Supply Control Valve Supervision]	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.	Comply	Fire protection valves are electronically monitored in the Control Room or their position is locked or sealed in place. Procedures are in place to inspect valve positions for all valves that are locked or sealed in place.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.c.2] - Design Basis Specification for the Plant Fire Protection		
	CNS-1599.RF-00-0001 Rev. 20 [Section 3.3.2] - Design Basis Specification for the Fire Protection System (RF/RY)		
	PT/1/A/4400/001K Rev. 31 - Fire Suppression System Valve Operability Check		
	PT/1/A/4400/001M Rev. 16 - Unit 1 Fire Suppression System Containment Valve Operability		
	PT/2/A/4400/001K Rev. 13 - Fire Suppression System Valve Operability Check		
	PT/2/A/4400/001M Rev. 8 - Unit 2 Fire Suppression System Containment Valve Operability		
3.5.15 [Water Supply Hydrant Code Requirements]	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.	Comply	Hydrants are installed at a maximum of 250 ft on the yard main system. Hose houses are installed at a maximum of 1000 ft (approximately 500 feet at every other hydrant).
References	**Document ID**		
	CNC-1435.00-00-0056 Rev. 0 [Section 4-2.1, 5-1.1] - NFPA 24 Code Conformance Review for NFPA 805 Transition		
		Complies with Use of EEEE	The hose houses were evaluated for compliance in the NFPA 24 Code Conformance Review.

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.5.16 [Water Supply Dedicated Limits]	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.	Comply	CNS complies with Exception 1. The fire water (RF/RY) system provides backup for the Low Pressure Service Water (RL) pumps motor bearing coolers (three pump motors) by design. Flow is automatically aligned when the normal supply pressure drops. Flow from the RF/RY sysem to each RL pump is approximately 3 gpm. The total RF/RY flow to all three RL pumps is less than 10 gpm. This additional designed flow is within the fire water supply capacity.
References	**Document ID** CNS-1599.RF-00-0001 Rev. 20 - Design Basis Specification for the Fire Protection System (RF/RY)		
3.6 Standpipe and Hose Stations.	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.6.1 [Standpipe and Hose Station Code Requirements]	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 Use of EEEE	CNS power block areas are provided with a Class III standpipe system which was evaluated in accordance with NFPA 14, 1978 edition.
References	**Document ID** CNC-1435.00-00-0054 Rev. 0 - NFPA 14 Code Conformance Review for NFPA 805 Transition		
3.6.2 [Standpipe and Hose Station Capability Limitations]	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.	Comply	The fire water supply system can provide adequate water flow and nozzle pressure at the hose stations. Pressure reducing devices are not required as the nozzles are adjustible for pressure and the fire brigade is trained on the use of hose streams expected at the site.
References	**Document ID** CNC-1435.00-00-0054 Rev. 0 [Section 4-4.2, 5] - NFPA 14 Code Conformance Review for NFPA 805 Transition		
3.6.3 [Standpipe and Hose Station Nozzle Restrictions]	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.	Comply	The appropriate hose nozzles have been provided. CNS uses nozzles with an adjustable stream from full on straight stream to fog with a shut off capacity.

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
References	**Document ID** CNC-1435.00-00-0054 Rev. 0 [Section 4-4.2] - NFPA 14 Code Conformance Review for NFPA 805 Transition		
3.6.4 [Standpipe and Hose Station Earthquake Provisions]	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	The NRC previously approved the hose stations in regards to the NFPA 14-1976 edition which does not contain provisions for seismically designed hose stations. The 1983 SER states: "Interior manual hose stations are provided and equipped to reach any plant location with at least one effective hose stream. Each hose station is provided with a maximum of 100 ft of 1 1/2-in. hose with a spray nozzle to provide adequate coverage. The staff finds that the hose stations meet the guidelines of BTP CMEB 9.5-1, Item C.6.c, and are, therefore, acceptable. The applicant has not identified seismic design of standpipe systems, which is recommended in BTP CMEB 9.5-1, Item C.6.c (1). For plants with construction permits issued before July 30, 1976, the guidelines contained in Appendix A to BTP ASB 9.5-1 have no requirement for seismic design of standpipe systems. Therefore, this is an acceptable deviation from the guidelines of CMEB 9.5-1, Item C.6.c(1)." There have been no changes to invalidate the basis for this approval.
References	**Document ID** 1983-02-01 NRC Safety Evaluation Report [Section 9.5.1.7] - NRC Safety Evaluation Report		
3.6.5 [Standpipe and Hose Station Seismic Connection Limitations]	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	CNS does not have seismic required hose stations.
3.7 Fire Extinguishers.	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 Use of EEEE	Fire extinguishers, where provided, are in accordance with NFPA 10, 1978 edition, and meet the associated number, size, and type requirements. Distribution/location was evaluated in CNC-1435.00-000-0036.
References	**Document ID** CNC-1435.00-00-0036 Rev. 3 [Attachment 4] - Evaluations of Changes/Deviations to the Fire Protection Program CNC-1435.00-00-0051 Rev. 0 - NFPA 10 Code Conformance Review for NFPA 805 Transition		
3.8 Fire Alarm and Detection Systems.	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.8.1 Fire Alarm	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: (1) Actuation of any fire detection device (2) Actuation of any fixed fire suppression system (3) Actuation of any manual fire alarm station (4) Starting of any fire pump (5) Actuation of any fire protection supervisory device (6) Indication of alarm system trouble condition	Complies with Use of EEEE	The fire alarm and signaling system was evaluated in accordance with NFPA 72D, 1975 edition and meet the associated requirements. Signals (alarm, trouble) for detection devices, suppression system actuation, supervisory devices, and fire pump start annunicaite to a separate panel in the control room. There are no manual fire alarm stations in the power block.
References	**Document ID** CNC-1435.00-00-0059 Rev. 0 - NFPA 72 Code Conformance Review for NFPA 805 Transition		
3.8.1.1 [Fire Alarm Communication Requirements]	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.	Comply	Means to report a fire are provided including telephone and radio communication.
References	**Document ID** Duke PAT Rev. 08/01/2012 [Page 67] - Duke Energy Plant Access Training		
3.8.1.2 [Fire Alarm Prompt Notification Limits]	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 - Section Heading, see sub-sections for any specific compliance statements.
3.8.1.2 [Fire Alarm Prompt Notification Limits] (1)	3.8.1.2 (1) General site population in all occupied areas	Comply	Means are provided to notify the general site population via the PA system.
References	**Document ID** Duke PAT Rev. 08/01/2012 [Page 69] - Duke Energy Plant Access Training RP/0/B/5000/029 Rev. 27 - Fire Brigade Response		
3.8.1.2 [Fire Alarm Prompt Notification Limits] (2)	3.8.1.2 (2) Members of the industrial fire brigade and other groups supporting fire emergency response	Comply	Means are provided to notify the industrial fire brigade and other supporting groups via the PA systems and pagers.
References	**Document ID** RP/0/B/5000/029 Rev. 27 - Fire Brigade Response		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.8.1.2 [Fire Alarm Prompt Notification Limits] (3)	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	Comply	Means are provided to notify the offsite fire departments for assistance via phone (land line , selective signal, or satellite).
References	**Document ID**		
	Catawba Emergency Plan -		
	RP/0/A/5000/006 A Rev. 26 [Enclosure 4.2] - Notifications to State and Counties from the Control Room		
	RP/0/B/5000/029 Rev. 27 [Enclosure 3.4] - Fire Brigade Response		
3.8.2 Detection.	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 Use of EEEE	The fire alarm and signaling system was evaluated in accordance with NFPA 72E, 1974 edition and meet the associated requirements. See LAR Table 4-3 for required detection systems.
References	**Document ID**		
	CNC-1435.00-00-0059 Rev. 0 - NFPA 72 Code Conformance Review for NFPA 805 Transition		
3.9 Automatic and Manual Water-Based Fire Suppression Systems.	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.9.1 [Fire Suppression System Code Requirements]	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	See subsections for compliance.
3.9.1 [Fire Suppression System Code Requirements] (1)	3.9.1 (1) NFPA 13, Standard for the Installation of Sprinkler Systems	Comply	CNS is protected by automatic wet pipe sprinkler systems and preaction systems. These systems are installed in accordance with NFPA 13. See LAR Table 4-3 for required suppression systems.
References	**Document ID**		
	CNS FP ESD Rev. 1/12/12 - CNS Fire Protection Program Engineering Support Document		
	CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection		
	CNS-1599.RF-00-0001 Rev. 20 - Design Basis Specification for the Fire Protection System (RF/RY)		
3.9.1 [Fire Suppression System Code Requirements] (2)	3.9.1 (2) NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection	Comply	CNS is protected by water spray (deluge) systems. These systems are installed in accordance with NFPA 15. See LAR Table 4-3 for required suppression systems.
References	**Document ID**		
	CNS FP ESD Rev. 1/12/12 - CNS Fire Protection Program Engineering Support Document		
	CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	CNS-1599.RF-00-0001 Rev. 20 - Design Basis Specification for the Fire Protection System (RF/RY)		
3.9.1 [Fire Suppression System Code Requirements] (3)	3.9.1 (3) NFPA 750, Standard on Water Mist Fire Protection Systems	N/A	CNS does not use water mist suppresion systems.
3.9.1 [Fire Suppression System Code Requirements] (4)	3.9.1 (4) NFPA 16, Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems	N/A	CNS does not use foam-water suppresion systems.
3.9.2 [Fire Suppression System Flow Alarm]	3.9.2 Each system shall be equipped with a water flow alarm.	Complies with Clarification	Automatic water-based suppression systems are provided with a water flow alarm. Manual water-based suppression systems are not provided with water flow alarms. The manual systems will only operate upon after an operator manually opens an isolation or deluge valve. Water flow alarms are not necessary for indication of a manual system as the control room makes the decision to activate the system.
References	**Document ID**		
	CNS-1599.RF-00-0001 Rev. 20 [Section 3.2.2.1] - Design Basis Specification for the Fire Protection System (RF/RY)		
3.9.3 [Fire Suppression System Alarm Locations]	3.9.3 All alarms from fire suppression systems shall annunciate in the control room or other suitable constantly attended location.	Comply	Fire suppression systems that are equipped with alamrs annunciate in the Control Room.
References	**Document ID**		
	CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection		
	CNS-1599.RF-00-0001 Rev. 20 - Design Basis Specification for the Fire Protection System (RF/RY)		
3.9.4 [Fire Suppression System Diesel Pump Sprinkler Protection]	3.9.4 Diesel-driven fire pumps shall be protected by automatic sprinklers.	N/A	CNS does not utilize diesel driven fire water pumps.
References	**Document ID**		
	CNC-1435.00-00-0055 Rev. 0 - NFPA 20 Code Conformance Review for NFPA 805 Transition		
3.9.5 [Fire Suppression System Shutoff Controls]	3.9.5 Each system shall be equipped with an OS&Y gate valve or other approved shutoff valve.	Comply	Hose stations and sprinkler systems are equipped with approved shutoff valves except where approved by the NRC.
References	**Document ID**		
	CN-1599 Catawba Nuclear Station Drawing Series - Flow Diagram of Fire Protection System (RF)		
	CN-2599 Catawba Nuclear Station Drawing Series - Flow Diagram of Fire Protection System (RF)		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
		Complies with previous NRC Approval	With respect to valves that are not specifically UL Listed or FM Approved, the 1983 SER states: Several isolation, vent, check, or drain RF (interior fire protection system) valves located within nuclear safety-related areas, particularly within the reactor buildings, are not UL listed or Factory Mutual (FM) approved. Of the 38 RF valves located within each reactor building, 14 valves are not UL listed. These unlisted valves are constructed of stainless steel or carbon steel bodies. The sprinkler isolation valve and hose connection supply piping for each unit's auxiliary feedwater pump room also are unlisted. These valves are seismically qualifed and were utilized so that piping within these areas could be seismically designed and a pressure boundary maintained. The four RF valves (three motor operated, one vent) located within the auxiliary building for the three RF supply pipes to the reactor building also are unlisted. These valves required seismic qualification to maintain the reactor pressure boundary. Suitable seismically qualified UL-listed valves were not available. The two auxiliary building RY (exterior fire protection) supply lines from the underground loop are each provided with an electric motor-operated valve. These valves are seismically designed and, therefore, unlisted. All valves mentioned are designed to specifications outlined in ANSI/ASTM B31.1. The staff concludes that these valves will provide the same level of protection as the UL-listed valves and is, therefore, an acceptable deviation from Item C.6.c(1) of BTP CMEB 9.5-1. There have been no changes that invalidate the basis for this approval.
References	**Document ID** 1983-02-01 NRC Safety Evaluation Report [Section 9.5.1.7] - NRC Safety Evaluation Report		
3.9.6 [Fire Suppression System Valve Supervision]	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.	Comply	Valves are either electrically supervised or they are locked/sealed in place in accordance with Section 3.5.14.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.c.2] - Design Basis Specification for the Plant Fire Protection CNS-1599.RF-00-0001 Rev. 20 [Section 3.3.2] - Design Basis Specification for the Fire Protection System (RF/RY)		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
	PT/1/A/4400/001K Rev. 31 - Fire Suppression System Valve Operability Check PT/1/A/4400/001M Rev. 16 - Unit 1 Fire Suppression System Containment Valve Operability PT/2/A/4400/001K Rev. 13 - Fire Suppression System Valve Operability Check PT/2/A/4400/001M Rev. 8 - Unit 2 Fire Suppression System Containment Valve Operability		
3.10 Gaseous Fire Suppression Systems.	N/A	N/A	N/A - Section Heading, see sub-sections for any specific compliance statements.
3.10.1 [Gaseous Suppression System Code Requirements]	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	See subsections for compliance.
3.10.1 [Gaseous Suppression System Code Requirements] (1)	3.10.1 (1) NFPA 12, Standard on Carbon Dioxide Extinguishing Systems	Complies with Use of EEEE	Each of the Turbine Driven Auxiliary Feedwater Pumps (two systems), Motor Drive Auxiliary Feedwater Pumps (two systems), and the Diesel Generators (two systems) are protected by carbon dioxide extinguishing systems. The carbon dioxide extinguishing systems have been evaluated in accordance with NFPA 12, 1980 edition.
References	**Document ID** CNC-1435.00-00-0052 Rev. 1 - NFPA 12, Low Pressure Carbon Dioxide System, Code Conformance Review for NFPA 805 Transition CNC-1435.00-00-0053 Rev. 1 - NFPA 12, High Pressure Carbon Dioxide System, Code Conformance Review for NFPA 805 Transition		
3.10.1 [Gaseous Suppression System Code Requirements] (2)	3.10.1 (2) NFPA 12A, Standard on Halon 1301 Fire Extinguishing Systems	N/A	CNS does not use Halon extinguishing systems to meet Chapter 4 requirements.
3.10.1 [Gaseous Suppression System Code Requirements] (3)	3.10.1 (3) NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems	N/A	CNS does not use clean agent extinguishing systems.
3.10.2 [Gaseous Suppression System Alarm Location]	3.10.2 Operation of gaseous fire suppression systems shall annunciate and alarm in the control room or other constantly attended location identified.	Comply	The CNS carbon dioxide system actuation is alarmed locally and in the Control Room.
References	**Document ID** CNS-1599.RF-00-0001 Rev. 20 [Section 3.2.1.2, 3.2.1.3] - Design Basis Specification for the Fire Protection System (RF/RY)		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.10.3 [Gaseous Suppression System Ventilation Limitations]	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.	Comply	The design of the carbon dioxide systems takes into account the prevention of over pressurization, adequate sealing to prevent loss of agent, and the confinement of radioactive contaminants. The areas with carbon dioxide suppression systems have adequate venting in the event of overpressurization. The areas are well sealed with excess carbon dioxide calculate for leakage. There are no radiological concerns in the Diesel Generator Buildings. The Auxiliary Feedwater Pumps Rooms are located within the Auxiliary Building where contaminants would be contained.
References	**Document ID** CNC-1435.00-00-0052 Rev. 1 - NFPA 12, Low Pressure Carbon Dioxide System, Code Conformance Review for NFPA 805 Transition CNC-1435.00-00-0053 Rev. 1 - NFPA 12, High Pressure Carbon Dioxide System, Code Conformance Review for NFPA 805 Transition CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection		
3.10.4 [Gaseous Suppression System Single Failure Limits]	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	Primary gaseous fire suppression systems are not provided with backup gaseous suppression systems at CNS. Fire hose stations are available as a backup fire suppression feature.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.e] - Design Basis Specification for the Plant Fire Protection		
3.10.5 [Gaseous Suppression System Disarming Controls]	3.10.5 Provisions for locally disarming automatic gaseous suppression systems shall be secured and under strict administrative control.	Comply	Station Documentation provides provisions for disarming the carbon dioxide systems when performing maintenance or inspection work.
References	**Document ID** NSD-316 Rev. 13 - Fire Protection Impairment and Surveillance PT/1/A/4450/010A Rev. 49 - Unit 1 D/G CO2 System Test (18 Months) PT/1/A/4450/013A Rev. 44 - Unit 1 Aux FDWP CO2 System Test (18 Month) PT/2/A/4450/010A Rev. 29 - Unit 2 D/G CO2 System Test (18 Months) PT/2/A/4450/013A Rev. 32 - Unit 2 Aux FDWP CO2 System Test (18 Month) SOMP 02-01 Rev. 16 - Safety Tagging and Configuration Control		
3.10.6 [Gaseous Suppression System CO2 Limitations]	3.10.6* Total flooding carbon dioxide systems shall not be used in normally occupied areas.	Comply	Total flooding carbon dioxide systems are utilized in the Turbine Driven Auxiliary Feedwater Pump Pits and in the Diesel Generator Rooms which are not normally occupied.
References	**Document ID** Catawba Nuclear Station Site Fire Strategies - CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.10.7 [Gaseous Suppression System CO2 Warnings]	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.	Comply	Carbon dioxide extinguishing systems are provided with a pre-discharge alarm and discharge delay to permit egress of personnel. Odorizors are provided.
References	**Document ID** CN-1599-04.00 Rev. 8 - Flow Diagram of Interior Fire Protection System (RF) CN-1599-04.02 - Flow Diagram of Interior Fire Protection System (RF) CN-2599-04.00 Rev. 8 - Flow Diagram of Interior Fire Protection System (RF) CN-2599-04.02 Rev. 4 - Flow Diagram of Interior Fire Protection System (RF) CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.2] - Design Basis Specification for the Plant Fire Protection CNS-1599.RF-00-0001 Rev. 20 [Section 3.2.1.2, 3.2.1.3] - Design Basis Specification for the Fire Protection System (RF/RY) PT/1/A/4450/010A Rev. 49 - Unit 1 D/G CO2 System Test (18 Months) PT/1/A/4450/013A Rev. 44 - Unit 1 Aux FDWP CO2 System Test (18 Month) PT/2/A/4450/010A Rev. 29 - Unit 2 D/G CO2 System Test (18 Months) PT/2/A/4450/013A Rev. 32 - Unit 2 Aux FDWP CO2 System Test (18 Month)		
3.10.8 [Gaseous Suppression System CO2 Required Disarming]	3.10.8 Positive mechanical means shall be provided to lock out total flooding carbon dioxide systems during work in the protected space.	Comply	Positive mechanical means are provided to prevent the discharge of carbon dioxide during work in the protected areas.
References	**Document ID** CN-1599-04.02 - Flow Diagram of Interior Fire Protection System (RF) CN-2599-04.00 Rev. 8 - Flow Diagram of Interior Fire Protection System (RF) PT/1/A/4450/010A Rev. 49 - Unit 1 D/G CO2 System Test (18 Months) PT/1/A/4450/013A Rev. 44 - Unit 1 Aux FDWP CO2 System Test (18 Month) PT/2/A/4450/010A Rev. 29 - Unit 2 D/G CO2 System Test (18 Months) PT/2/A/4450/013A Rev. 32 - Unit 2 Aux FDWP CO2 System Test (18 Month)		
3.10.9 [Gaseous Suppression System Cooling Considerations]	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.	Comply	Equipment located in areas protected by carbon dioxide systems have been designed to account for thermal cooling upon contact with the gas.
References	**Document ID** CNS-1465.00-00-0006 Rev. 22 [App. A.1, Section 5.e] - Design Basis Specification for the Plant Fire Protection		
3.10.10 [Gaseous Suppression System Decomposition Issues]	3.10.10 Particular attention shall be given to corrosive characteristics of agent decomposition products on safety systems.	Comply	Carbon Dioxide is a noncorrosive extinguishing agent.

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
References	**Document ID** Fire Protection Handbook, Chapter 3, Section 11 - Carbon Dioxide and Application Systems		
3.11 Passive Fire Protection Features	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 - Section Heading, see sub-sections for any specific compliance statements.
3.11.1 Building Separation.	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.	Comply	Buildings in the power block are adequately separated. There are nine main buildings in the power block; the two Turbine Buildings, the Auxiliary Building, the Service Building, the two Diesel Generator Buildings, and the two Reactor Buildings and the Nuclear Service Water Pump Structure. These buildings are separated by a combination of spatial separation and qualified three-hour rated fire barriers.
References	**Document ID** CN-1209 Catawba Nuclear Station Drawing Series - Fire Protection Equipment CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection		
3.11.2 Fire Barriers.	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	Each fire area is provided with a rated fire barrier that has a specific fire-resistance rating unless otherwise evaluated as equivalent or approved by the NRC. Fire barriers are generally three-hour rated construction.
References	**Document ID** CN-1105 Drawing Series - Architectural Fire Boundary Walls CN-1209-10 Drawing Series - Fire Protection Equipment Layout and Boundary CNS-1465.00-00-0006 Rev. 22 - Design Basis Specification for the Plant Fire Protection		
		Complies with Use of EEEE	Separation between specific fire areas has been evaluated in attachments to the referenced calculation.
References	**Document ID** CNC-1435.00-00-0035 Rev. 8 - CNS Penetration Seal Database and 86-10 Evaluation CNC-1435.00-00-0036 Rev. 3 - Evaluations of Changes/Deviations to the Fire Protection Program		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
		Complies with previous NRC Approval	The NRC approved two unique fire barrier configurations. The first is the unprotected steel supporting the ceiling slabs of the Turbine Driven Auxliary Feedwater Pump pits and the second is the Reactor Building Access portals. The 7/1/1984 SER Supplement 3 states. "The 17' x17' cover of each turbine driven auxiliary feedwater pump pit is made up of seven removable 12" thick concrete slab sections and RTV silicone foam. These covers are supported by W16 x 64 horizontal structural steel members. No fire resistive coating has been applied to this steel based on the minimal in situ and potential transient combustible loading. Combustible materials consist of armor interlock cable, grease, sealite conduit, and lubricating oil. Because of the limited quantity and distribution of these materials, an uncontrolled fire could not be expected to develop sufficient duration and temperature to threaten the heavy steel members. A high pressure carbon dioxide system protects each pit providing additional assurance of barrier integrity. Photoelectric type smoke detectors are also installed in each pit providing early warning to the Control Room through the EFA system. Therefore, the staff has concluded that the absence of a fire resistive coating on the structural members is an acceptable deviation from Section C.5.a of BTP CMEB 9.5-1." The 7/1/1984 SER Supplement 3 states, "The staff evaluated the adequacy of interior walls and floor/ceiling assemblies which define fire area boundaries. During the site audit, the staff observed that the fire area boundary of the Reactor Building includes two personnel access portals of a design which is not specifically fire rated. The upper portal is enclosed with concrete walls, floor and ceiling. The lower portal is enclosed with a concrete ceiling and floor. The walls of the enclosure are constructed of minimum 3/16-inch steel plate sandwiching 8 inches of a fire rated silicone foam supported by steel channels and wide flange members. Combustible materials on either side of the portal consist primarily of armored cable, which will not significantly contribute to a fire if one should occur. Fire detection systems are provided in these areas as well. Therefore, the staff has concluded that a fire will be detected in its initial stages, before a significant temperature rise can occur. Such a fire would be well within the capability of the plant fire brigade to extinguish using manual fire fighting equipment. During the time delay between fire detection and the arrival of the brigade, the hot gases generated would rise to the ceiling, away from the portals. The ceiling area would thus act as a heat sink, preventing the portals from being significantly damaged pending

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
			fire extinguishment. Therefore, the staff has concluded that on the basis of (1) the limited fire hazard, (2) the available protection and (3) the construction of the portals, the staff has reasonable assurance that the enclosure will prevent fire and smoke propagation from one side to another." There have been no changes that invalidate the basis for these approvals.
References	**Document ID**		
	1984-07-01 NRC Safety Evaluation Report [Section 9.5.1.5 and 9.5.1.8] - Supplement 3		
3.11.3 Fire Barrier Penetrations. (1)	3.11.3* (1) NFPA 80, Standard for Fire Doors and Fire Windows	Complies with Use of EEEE	Fire doors have been evaluated in accordance with NFPA 80, 2007 edition and other engineering evaluations as referenced below.
References	**Document ID**		
	CNC-1435.00-00-0036 Rev. 3 [Attachment 12] - Evaluations of Changes/Deviations to the Fire Protection Program		
	CNC-1435.00-00-0060 Rev. 0 - NFPA 80 Code Conformance Review for NFPA 805 Transition		
		Complies with previous NRC Approval	Some doors at CNS are un-labeled and modified in order to satisfy field requirements. The 1983 SER evaluated these configurations and states the following: "Pressure doors as well as bullet- and missile-resistant doors are located in some fire boundaries. These doors have been fabricated in accordance with Underwriters Laboratories (UL) approved procedures for 3-hour-fire-rated doors. Certificates from the manufacturers are on file that verify the construction of the doors. They are not labeled because modifications necessary to satisfy leakage rates, bullet resistance, and pressure loadings are not incorporated in UL procedures. However, it is the staff's opinion that these doors will provide an equivalent level of fire protection to labeled fire doors. The staff finds use of unlabeled fire doors in the above referenced areas to be an acceptable deviation from Item C.5.a(5) of BTP CMEB 9.5-1." There have been no changes that invalidate the basis for this approval.
References	**Document ID**		
	1983-02-01 NRC Safety Evaluation Report [Section 9.5.1.5] - NRC Safety Evaluation Report		
3.11.3 Fire Barrier Penetrations. (2)	3.11.3* (2) NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems	Complies with Use of EEEE	Fire dampers have been evaluated in accordance with NFPA 90A, 1981 edition.
References	**Document ID**		
	CNC-1435.00-00-0061 Rev. 0 - NFPA 90A Code Conformance Review for NFPA 805 Transition		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.11.3 Fire Barrier Penetrations. (3)	3.11.3* (3) NFPA 101, Life Safety Code	Complies with Clarification	NFPA 101, Section 8.2.3.2.1(a) with regards to rated fire door assemblies refers to NFPA 80. NFPA 101, Section 9.2.1, with regards to rated fire dampers refers to NFPA 90A. Therefore compliance with NFPA 101 is achieves compliance with NFPA 101 via the NFPA 80 and 90A code conformance reviews.
3.11.4 Through Penetration Fire Stops. (a)	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 Use of EEEE	CNS penetration seals comply with the typical details except where identified in CNC-1435.03-00-0035, "CNS Penetration Seal Database and 86-10 Evaluations." This document analyzes non-conforming fire barrier penetration seals.
References	**Document ID**		
	CNC-1435.00-00-0035 Rev. 8 - CNS Penetration Seal Database and 86-10 Evaluation		
		Comply	CNS penetration seals comply with typical details as documented in CNS-1435.00-00-0003, "Design Specification for Mechanical and Electrical Penetration Fire, Flood, and Pressure Seals" unless otherwise evaluated as equivalent or approved by the NRC.
References	**Document ID**		
	CNS-1435.00-00-0003 Rev. 5 - Design Specification for Mechanical and Electrical Penetration Fire, Flood, and Pressure Seals		
		Complies with Previous NRC Approval	The NRC approved two unique fire barrier penetraton configurations. The first is unique HVAC penetration sealing mechanisms and the second is the Reactor Building penetrations. The 7/1/1984 SER Supplement 3 states, "In some fire rated walls and floor/ceiling assemblies, openings were provided for HVAC duct access which are larger than the ducts themselves. To support fire damper sleeves in these openings, minimum ½ inch by 7-inch steel plate was used to form a rigid frame. To provide a degree of fire resistance to the frame to assure that the assembly will not collapse under a fire exposure, a minimum thickness of 1 1/2 inches of a U.L. listed catalyzed magnesium oxychloride fireproofing was applied. The remainder of the opening was protected by a fire rated silicone foam. While this composite design of fire proofing and foam sealant has not been tested by an independent laboratory, they have successfully passed the acceptance criteria of ASTM E-119 individually as documented in the U.L. Building Materials Directory, 1983. Based on these tests, and the staff's independent evaluation of the proposed design, the staff concludes that it provides reasonable assurance that under an anticipated fire exposure the integrity of the barrier will not be affected. Therefore, the staff has concluded that the design represents an acceptable deviation from Section C.5.a of BTP CMEB 9.5-1

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
			The 7/1/1984 SER Supplement 3 states, "To facilitate penetrations of instrumentation tubing and process piping through the 3-foot-thick concrete shield wall of the Reactor Building, at least 143, 3/8-inch wall thickness, metal sleeves are installed per unit. These sleeves range in size from 12 inches to 72 inches in diameter. Spare sleeves and those used for penetrations of instrumentation tubing are sealed by welding a Schedule 100 pipe cap to the annulus side of each sleeve opening. By letter dated April 9, 1984, the applicant committed to install a 3-hour fire rated sealant material in each of these sleeves to prevent fire propagation through the penetration. The staff finds this acceptable. Process piping penetrating the shell wall ranges in size from 1 inch to 34 inches in diameter. Each of these pipes incorporates a guarded sleeve mechanical assembly designed to maintain the integrity of the Reactor Building pressure boundary. These sleeve designs are typical of those utilized where the Reactor Building includes an annulus area. The staff has evaluated the fire hazards on either side of the shell wall and, based on the large mass of each sleeve, the thickness of the penetrated wall and large embedded surface area of each sleeve, the staff concludes that fire propagation through the penetration will not occur. To facilitate penetration of cables through the shell wall of the Reactor Building, approximately 100 9-inch x 20-inch metal sleeved openings are provided per unit. To prevent fire propagation through the openings and to withstand the effects of the annulus ventilation system during leak rate testing, the applicant proposes to use a fire rated silicone foam, cured with a different catalyst, which results in a foam of greater density than that used in other fire barrier penetrations. Based on the staff's evaluation of the fire hazards on either side of the penetration and the proven ability of the lower density foam to withstand the effects of a fire, the staff concluded that the denser formula provides an equivalent level of safety and is, therefore, acceptable." There have been no changes that invalidate the basis for these approvals.
References	**Document ID**		
	1984-07-01 NRC Safety Evaluation Report [Section 9.5.1.5] - Supplement 3		

NFPA 805 Ch. 3 Reference	Requirements / Guidance	Compliance Statement	Compliance Basis
3.11.4 Through Penetration Fire Stops. (b)	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.	Comply	CNS internal conduit seals comply with the exception to this section.
References	**Document ID**		
	CNS-1435.00-00-0003 Rev. 5 [Section 13.5] - Design Specification for Mechanical and Electrical Penetration Fire, Flood, and Pressure Seals		
3.11.5 Electrical Raceway Fire Barrier Systems (ERFBS).	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 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.	N/A	CNS does not utilize any Electrical Raceway Fire Barrier Systems for Chapter 4 compliance.

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

103 Pages Attached

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.
3 Deterministic Methodology

NEI 00-01 Guidance
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. Additional information is provided in Appendix B to this document.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The subsequent B-2 sections and paragraphs from revision 0 of this calculation presented a line by line comparison of NEI 00-01, revision 1 to the deterministic methodology used by Catawba to determine if the Nuclear Safety Performance Criteria are being met for maintaining the fuel in a safe and stable conditon for all modes and plant configurations. In general, Catawba conforms to NEI 00-01, revision 1 with the few exceptions noted in the individual paragraph or section comparisons. Reg. Guide 1.205, revision 1 initially was to endorse NEI 00-01 revision 1 but the NRC subsequently revised the Reg. Guide prior to issue to endorse NEI 00-01 revision 2. A 'Gap Analysis' was performed in this calculation which documents conformance to revision 2 of NEI 00-01. Any exceptions are noted in the individual paragraph or section comparisons.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1 [A, Intro] Safe Shutdown Systems and Path Development

NEI 00-01 Guidance
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.

[Refer to hard copy of NEI 00-01 for Figure 3-1]

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Safe shutdown systems and functions are identified. Safe shutdown success paths are identified. Logic diagrams are utilized to determine if sufficient safe shutdown functions are available to achieve safe shutdown goals.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1 [B, Goals] Safe Shutdown Systems and Path Development

NEI 00-01 Guidance
The goal of post-fire safe shutdown is to assure that a 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.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Safe shutdown performance goals are translated into safe shutdown success paths and are identified and utilized to ensure safe shutdown can be achieved. Logic diagrams are used to assess safe shutdown success paths.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1 [C, Spurious Operations] Safe Shutdown Systems and Path Development

NEI 00-01 Guidance
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
- 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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Spurious operations are considered in both the selection of safe shutdown functions and systems as well as the cabling associated with the components relied upon to achieve those functions. A special subset of components considered for spurious operation involves reactor coolant pressure boundary components whose spurious operation can lead to an unacceptable loss of reactor pressure vessel / Reactor Coolant System inventory via an interfacing system loss of coolant accident. These components are defined as high/low pressure interface valves and are subject to more stringent circuit analysis. This high/low pressure interface boundary valve definition is in alignment with those in NEI 00-01, NEI-00-01 Appendix C and FAQ 06-0006 to NEI 04-02, but is limited to those components potentially subject to interfacing LOCAs in excess of makeup capability.

Section C.3 of NEI 00-01 Rev. 2 further clarifies the criterion for the determination of a high-low pressure interface valve:

"A valve whose spurious opening could result in a loss of RPV/RCS inventory and, due to the lower pressure rating on the downstream piping, an interfacing LOCA outside of Primary Containment (i.e., pipe rupture in the low pressure piping)."

Based on the above Catawba aligns with the intent of NEI 00-01 Rev. 2.

Reference
CNC-1435.00-00-0043 Rev. 0 - NFPA 805 Transition Expert Panel Report for Addressing Potential Catawba Multiple Spurious Operations

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1 Criteria / Assumptions

NEI 00-01 Guidance
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

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph. Detailed alignment discussed in subsequent reference paragraphs.

Reference

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.1 [GE BWR Paths]

NEI 00-01 Guidance
[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

Alignment Statement	Alignment Basis	Reference
Not Applicable	Catawba Nuclear Station is a PWR.	

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.	NEI 00-01 Guidance
3.1.1.2 [SRVs / LP Systems]	[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
Not Applicable

Alignment Statement	Alignment Basis	Reference
Not Applicable	Catawba Nuclear Station is a PWR.	

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.3 [Pressurizer Heaters]

NEI 00-01 Guidance
[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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Catawba does not credit pressurizer heaters for fire areas where shutdown does not use the SSF. For fire areas that require the use of the SSF, pressurizer heaters are not relied on, but one sub-bank of pressurizer heaters are powered from the SSF control panel to provide an additional method to assure subcooling is not lost and a bubble form in the reactor vessel. Due to the high desirability of pressurizer heaters to assist in pressure control, the pressurizer heaters are analyzed as required in the deterministic analysis. Steam release rates and auxiliary feedwater flow rates are controlled to prevent formation of a bubble in the reactor head for all fire scenarios.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.4 [Alternative Shutdown Capability]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Catawba utilizes a dedicated Standby Shutdown Facility for fires in areas where both trains of shutdown equipment may be damaged or the control room may have to be evacuated. The transfer of control to the SSF of the equipment credited for a SSF shutdown isolates the systems and equipment from the affects of a fire. The intent of the guidance is that dedicated cables and equipment credited for alternative shutdown is independent of the fire area of concern. Following transfer of control to the SSF, the dedicated equipment credited for a SSF shutdown meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.5 [Initial Conditions]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
The Catawba Safe Shutdown Analysis incorporates these assumptions.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.6 [Other Events in Conjunction with Fire]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
No accidents or other design basis events (i.e. loss of coolant accident, control rod misalignment accident, etc.), single failures or non-fire induced transients are considered in conjunction with the fire.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.7 [Offsite Power]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Catawba does not credit offsite power for redundant safe shutdown. Emergency diesel generators are relied upon for electrical power. Offsite power has not been analyzed or demonstrated to be free of fire damage for redundant shutdown. The cascading power supply analysis determines fire impact to credited power sources and is utilized in the analysis of fire areas for safe shutdown. This analysis ensures power is available to operate credited safe shutdown equipment. Power supply/cable failures are analyzed for effects of loss with and without offsite power. For alternate shutdown, a dedicated diesel generator is provided independent of emergency diesel generator systems that can supply the necessary electrical power for hot standby. Since Catawba does not credit offsite power, it is not required to demonstrate it is free of fire damage. Thus, Catawba meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.8 [Safety-Related Equipment]

NEI 00-01 Guidance
Post-fire safe shutdown systems and components are not required to be safety-related.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Credited safe shutdown equipment at Catawba are not always safety related. Most are safety related since their emergency functions are similar to fire safe shutdown required functions. Also, safety related components may be used and aligned to non-safety power supplies in alternate shutdown strategies. When safety components are aligned to non-safety power the swap is performed via a locked key action to fully separate the two power sources.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.9 [72 Hour Coping]

NEI 00-01 Guidance
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

Alignment Statement
Aligns with intent

Alignment Basis
NFPA 805 does not have any explicit requirements to achieve cold shutdown within 72 hours; therefore, the NFPA 805 criteria for nuclear safety performance goals have been applied to ensure the fuel is maintained safe and stable. The previous hot and cold shutdown references for equipment were retained in the SSD database.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.10 [Manual / Automatic Initiation of Systems]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
Catawba does not credit the automatic initiation of systems for safe shutdown. Systems will be manually initiated from the control room or emergency control stations. The SSF is an alternate shutdown location and when required, the standby shutdown system (SSS) will be manually initiated with the SSF as the control center for SSS operation.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance that automatic logic may be credited if the additional cables and equipment is included in the analysis; it also stated the automatic actuation due to fire damage should be evaluated. As stated above Catawba does not rely on automatic initiation but evaluated for fire-induced spurious actuation of equipment.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.1.11 [Multiple Affected Units]

NEI 00-01 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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Fire impacts at the component level have been evaluated for each unit separately and for both units collectively where required.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2 Shutdown Functions

NEI 00-01 Guidance
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 GE-NE-T43-00002-00-01-R01 entitled "Original Safe Shutdown Paths for the BWR."

Applicability
Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.1 Reactivity Control

NEI 00-01 Guidance
[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.

[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
Applicable

Alignment Statement
Aligns

Alignment Basis
For a shutdown from the control room, borated water from the FWST using charging pumps is used to maintain shutdown margin. For a SSF shutdown, borated water from the spent fuel pool via the seal injection path using the standby makeup pump is used to maintain shutdown margin. Minimum Boron concentration in the spent fuel pool and FWST has been calculated to ensure shutdown margins for the event.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.2 Pressure Control Systems

NEI 00-01 Guidance
The systems discussed in this section are examples of systems that can be used for pressure control. This does not restrict the use of other systems for this purpose. [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. [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

Alignment Statement
Aligns

Alignment Basis
For a control room shutdown, Catawba credits use of makeup/charging to control reactor coolant (NC) pressure at hot standby conditions. The pressurizer safety valves are credited for limiting RCS overpressure. For a SSF shutdown, Catawba credits use of makeup/charging to control RCS pressure at hot standby conditions. One sub-bank of pressurizer heaters are available for RCS pressure control to aid the RCS operation within prescribed pressure-temperature limits to minimize void formation within the reactor vessel and to maintain steam bubble in the pressurizer. Due to the high desirability of pressurizer heaters to assist in pressure control, the pressurizer heaters are analyzed as required in the deterministic analysis.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.3 Inventory Control

NEI 00-01 Guidance
[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.

[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
Applicable

Alignment Statement
Aligns

Alignment Basis
Reactor makeup from the control room credits normal makeup/charging using the FWST to maintain inventory. Reactor makeup from the SSF credits the standby makeup pump using the spent fuel pool to maintain inventory.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance that automatic actuation due to fire damage should be evaluated. Catawba evaluated for fire induced spurious actuation of equipment.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.4 Decay Heat Removal

NEI 00-01 Guidance
[BWR] Systems selected for the decay heat removal function(s) should be capable of: o 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.

[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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
For a control room shutdown, decay heat removal during hot standby conditions is provided by natural circulation of the reactor coolant through credited steam generators utilizing the main steam safeties and/or steam PORVs with condensate makeup using motor driven or turbine driven auxiliary feedwater pump(s) (MDCAP/TDCAP).

For an SSF shutdown, decay heat removal during hot standby conditions is provided by natural circulation through credited main steam safeties and makeup using the turbine driven auxiliary feedwater pump (TDCAP).

NFPA 805 does not have any explicit requirements to achieve cold shutdown, therefore the NFPA 805 criteria for the Nuclear Safety Performance Goals have been applied to ensure the fuel is maintained in a safe and stable condition.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.5 Process Monitoring

NEI 00-01 Guidance
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 o Diagnostic instrumentation for safe shutdown systems
- Level indication for tanks needed for safe shutdown

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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
For shutdown from the control room sufficient instrumentation channels remain available to provide all of the necessary monitoring requirements. If some monitoring parameters are found to not be available in the control room, the dedicated SSF instrumentation is available. For shutdown from the SSF, dedicated channels of instrumentation are available to provide all of the necessary monitoring requirements.

Reference
CNS-1560.SS-00-0001 Rev. 25 - Design Basis Specification for the Standby Shutdown Facility
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.6 Support Systems

NEI 00-01 Guidance
[Blank Heading - No specific guidance]

Applicability
Not Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

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 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.

[BWR] Certain plants are also designed with a 250VDC Distribution System that supplies power to Reactor Core Isolation Cooling and/or High Pressure Coolant Injection equipment.

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

Alignment Statement
Aligns

Alignment Basis
Sufficient power sources and distribution systems are available for a fire in any area. For fire areas where the SSF is the credited shutdown method, the SSF contains its own dedicated diesel generator and electrical distribution that remains free of fire damage.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.6.2 Cooling Systems [Main Section]

NEI 00-01 Guidance
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 o HVAC system cooling water

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Required cooling system components have been included in the SSEL. The cooling systems are capable of performing their design function and are not out of service or degraded at the onset of the fire. All fire areas have been shown to have sufficient cooling systems free of fire damage or SSF shutdown is used which has its own cooling systems necessary for safe shutdown.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance on the treatment of HVAC systems. This guidance included additional details on when HVAC systems are needed or if actions to open doors were acceptable alternatives to the HVAC systems. It also included additional details on considering the potential for adverse impacts to HVAC components due to direct fire affects of toxic conditions. The Catawba analysis performed considered this guidance in it's analysis.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.2.6.2 [A] Cooling Systems [HVAC]

NEI 00-01 Guidance
HVAC Systems

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
Applicable

Alignment Statement
Aligns

Alignment Basis
Required HVAC components have been included on the SSEL based on functional requirements. This includes cooling for the control room, cable room, and equipment rooms. The SSF has an independent HVAC system which provides cooling for the SSF and SSF equipment, including the diesel generator and switchgear rooms. If ventilation is lost for in plant switchgear rooms, the operators can open doors and hatches as necessary to provide ventilation and reduce room temperature for personnel access.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.3 Methodology for Shutdown System Selection

NEI 00-01 Guidance
Refer to 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:

[Refer to hard copy of NEI 00-01 for Figure 3-2]

Applicability
Applicable

Alignment Statement	Alignment Basis	Reference
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.3.1 Identify safe shutdown functions

NEI 00-01 Guidance
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) o [BWR] GE Report GE-NE-T43-00002-00-01-R02 entitled "Original Shutdown Paths for the BWR"

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Safe shutdown functions, systems and components needed to satisfy the safe shutdown performance goals were identified from available plant documentation.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.3.2 Identify Combinations of Systems that Satisfy Each Safe Shutdown Function

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
Safe shutdown functions, systems and components needed to satisfy the safe shutdown performance goals were selected using the criteria and assumptions of NEI 00-01, Sections 3.1.1 and 3.1.2. For a discussion of alignment with these two sections, see specific NEI 00-01 sections elsewhere in this document.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.3.3 Define Combinations of Systems for Each Safe Shutdown Path

NEI 00-01 Guidance
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, safe shutdown paths may be defined on a divisional basis since the availability of electrical power and other support systems must be demonstrated for each path.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Safe shutdown functions, systems and components needed to satisfy the safe shutdown performance goals were identified and placed into safe shutdown logic diagrams to show success paths.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.1.3.4 Assign Shutdown Paths to Each Combination of Systems

NEI 00-01 Guidance
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 (NEI 00-01) for an example of a table illustrating how to document the various combinations of systems for selected shutdown paths.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Safe shutdown logic diagrams were utilized to show success paths for the various safe shutdown functions. Success paths were designated for each system and performance goal. The example in NEI 00-01, Attachment 1 showed designating the equipment for three discrete safe shutdown success paths. Catawba did not assign a 'path designation' to each combination of systems or equipment, instead the logic diagrams provided numerous combinations of 'success paths' that could be used to achieve safe shutdown. Catawba then credited one combination of success paths for each fire area.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2 Safe Shutdown Equipment Selection

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance on classifying components as required for safe shutdown or important to safe shutdown as it dictates the tools available for mitigating the loss. This 'classification' is not applicable to NFPA 805 as it dictates how to evaluate for fire-induced impacts to cables and components. This 'additional guidance' appears in numerous other sections but will not be discussed further in the B-2 table.

Reference

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1 Criteria / Assumptions

NEI 00-01 Guidance
Consider the following criteria and assumptions when identifying equipment necessary to perform the required safe shutdown functions:

Applicability
Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1.1 [Primary Secondary Components]

NEI 00-01 Guidance
3.2.1.1 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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The dividing of equipment into two categories approach was used at Catawba; 'primary' components were identified and added to the SSEL, 'secondary' components (referred to as subcomponents) were grouped together with the primary components. Although some subcomponents were not individually identified (i.e., relays, fuses, hand switches, etc), the cables which connected to the subcomponents were identified and assigned to the primary component. In some instances, components were not captured by the cable selection process but were captured within the cascading interlocks analysis as pseudo-components. The effects of fire on these pseudo components was evaluated where appropriate. Catawba aligns with the above guidance except the additional category of 'pseudo' components is used.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1.2 [Fire Damage to Mechanical Components (not electrically supervised)]

NEI 00-01 Guidance
3.2.1.2 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

Alignment Statement
Aligns

Alignment Basis
Safe Shutdown analysis assumptions for post-fire integrity of mechanical components to function as pressure boundaries are used at Catawba. No damage to packing or gaskets is assumed. The analysis assumes no damage to manual valves.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance for evaluating for post-fire coefficient of friction for rising stem valves. There are no valves exposed to the fire which are required to be operated following a fire for HSB only. Therefore this additional guidance is not applicable to CNS.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1.3 [Manual Valve Positions]

NEI 00-01 Guidance
Assume that manual valves are in their normal position as shown on P&IDs or in the plant operating procedures.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Manual valves are assumed to be in their normal operating position from the operating procedures and other references (dwgs, etc.).

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1.4 [Check Valves]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
Safe Shutdown analysis for post-fire integrity of check valves uses this assumption.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1.5 [Instrument Failures]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
Instruments are assumed to fail in the worst case providing an undesirable result.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1.6 [Spurious Components]

NEI 00-01 Guidance
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

Alignment Statement
Aligns with intent

Alignment Basis
Spurious operation was considered in identification of SSEL components. RIS 2004-03 Bin 1 was considered during the analysis. Conductor-to-conductor shorts within a multiconductor cable configurations were considered for power, control, and instrumentation circuits whose fire-induced failures could prevent operation of safe shutdown equipment or through mal-operation cause a flow diversion, loss of coolant, or other scenario that could significantly impact the ability to achieve and maintain hot standby. All CNS cable conductors used for control have thermoset insulation. Some instrumentation conductors use thermoplastic cables that are armored which would preclude cable-to-cable interactions. CNS also uses MI cable in some applications. Catawba aligns with the intent of this guidance.

Reference
CNC-1435.00-00-0043 Rev. 0 - NFPA 805 Transition Expert Panel Report for Addressing Potential Catawba Multiple Spurious Operations
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.1.7 [Instrument Tubing]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
Instrument tubing has been included in the evaluation.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.2 Methodology for Equipment Selection

NEI 00-01 Guidance
Refer to 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:

[Refer to hard copy of NEI 00-01 for Figure 3-3]

Applicability
Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.2.1 Identify the System Flow Path for Each Shutdown Path

NEI 00-01 Guidance
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

Alignment Statement
Aligns with intent

Alignment Basis
P&IDs were marked up and used to determine flow and diversion paths, which were then translated into Safe Shutdown success path logic diagrams. These logic diagrams were then used to identify potential SSEL components. These P&ID drawings were not maintained as part of the safe shutdown analysis. Instead, Catawba Summary Flow diagrams were marked up and annotated to designate specific flow paths for each system. This approach meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.2.2 Identify the Equipment in Each Safe Shutdown System Flow Path Including Equipment That May Spuriously Operate and Affect System Operation

NEI 00-01 Guidance
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

Alignment Statement
Aligns with intent

Alignment Basis
P&IDs and electrical one lines were marked up to determine flow and diversion paths for safe shutdown functions and to identify potential SSEL components including components that could spurious operate and affect the desired system function of SSD equipment. Any additional SSD 'success paths' identified were defined on logic diagrams; however, the technique of designating a set number of 'safe shutdown paths' was not used. The Catawba approach of providing numerous 'success paths' meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.2.3 Develop a List of Safe Shutdown Equipment and Assign the Corresponding System and Safe Shutdown Path(s) Designation to Each.

NEI 00-01 Guidance
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

Alignment Statement
Aligns with intent

Alignment Basis
P&IDs were marked up to determine flow and diversion paths for safe shutdown functions to identify potential SSEL components. Spurious operation of these components was included in the analysis. An iterative process was utilized to arrive at the final SSEL based on additional support components identified during the cable selection process (such as electrical distribution equipment). The table listing, as identified in NEI 00-01, Attachment 3, was not utilized because the SSD database has its own data entry format, which provides the necessary equipment information. Also, equipment was not assigned a safe shutdown 'path'; rather, safe shutdown logic diagrams denote system function 'success paths'. The Catawba approach meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.2.4 Identify Equipment Information Required for the Safe Shutdown Analysis

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Plant design information on the equipment that is credited to meet safe shutdown functions was collected to the extent necessary to identify potential SSEL components including components required to be analyzed due to spurious operation concerns. An iterative process was utilized to arrive at the final SSEL based on additional support components identified during the cable selection process and review of plant design basis information. The required equipment information listed in NEI 00-01, Attachment 3 is contained within the SSD database except for 'safe shutdown path' and 'room location'. Equipment at Catawba was not assigned a 'safe shutdown path'; rather, safe shutdown logic diagrams denote system function 'success paths'. The SSD database includes fire area location for the equipment, but does not include room locations. All 'examples' of data listed are not required to perform a safe shutdown analysis. The Catawba approach meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.1 Nuclear Safety Capability System and Equipment Selection

NEI 00-01 Ref.
3.2.2.5 Identify Dependencies Between Equipment, Supporting Equipment, Safe Shutdown Systems and Safe Shutdown Paths.

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
Safe Shutdown logic diagrams were utilized to assess the dependencies of equipment and systems on the ability to achieve the safe shutdown performance goals. Cascading power supply and cascading interlock analyses were developed to support this effort. Attachment 4 of NEI 00-01 was used in this effort.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

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 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

Alignment Statement	**Alignment Basis**	**Reference**
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1 Criteria / Assumptions

NEI 00-01 Guidance
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

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1.1 [Cable Selection]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
The cables were selected using the component's electrical elementary diagram as a guide and performing a point to point review of the associated connection diagrams. During the cable selection process, a circuit fault analysis for each safe shutdown component was not initially performed. This made the initial compliance analysis bounding. Further analysis to determine the effects of a fire induced hot short, open circuit and short to ground as applicable was performed during the fire area compliance assessment task. Component interlocks affecting operation were either specifically identified, routed, and incorporated into the component's function, or alternatively, the interlock can be analyzed to show acceptability for operation in either state during analysis thus, its cabling, routing etc., is not required.

Gap Analysis: NEI 00-01 Revision 2 added section 3.3.1.1.6 which provided guidance on performing an exclusionary analysis to demonstrate a lack of potential for any impacts to post-fire safe shutdown from a component or group of components regardless of cable routing. This approach was not used at Catawba.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1.2 [Cables Affecting Multiple Components]

NEI 00-01 Guidance
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

Alignment Statement
Aligns with intent

Alignment Basis
For control logic circuits where multiple components receive signals from common control logic, the control logic was analyzed as a primary component and a pseudo component was created for the logic with cables selected accordingly. This same methodology was used for similar circuit scenarios such as common power supplies. Whereas this approach does not assign the cable to each individual component, the effects on each component due to fire damage was evaluated. This meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1.3 [Isolation Devices]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The cables were selected using the component's electrical elementary diagram as a guide. A point to point review of the associated connection diagrams and/or wire tabulations was performed to identify all associated circuits. This includes instrument loops. All circuits/cables that are electrically connected to the circuit under analysis were identified up to a credited isolation device. This meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1.4 [Identify "Not Required" Cables]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
During the cable selection process, a circuit fault analysis for each safe shutdown component was performed. Cables associated with outputs from auxiliary contacts to computer points, annunciators or motor heaters were excluded from cable selection when it was concluded that the cable failure will not impact the primary component. Motor heaters are not considered required functions. Motor heaters that use the same power as controls (e.g. MOV) were included.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1.5 [Identification of Power Supplies]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
During the cable selection process, power supplies and interlocks were identified. The cascading power supplies, pseudo-components created for power supply interlocks and the cascading interlocks all serve to identify required power supplies and their interconnections and dependencies to ensure credited safe shutdown components are supplied with electrical power.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1.6 [Auto Initiation Logic]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Automatic initiation logic was not credited for performance of safe shutdown functions. Manual operation of components from the Main Control Room, SSF or locally were identified during the fire area compliance assessment task as needed. To preclude adverse impact from automatic initiation logic circuits or control logic circuits where multiple components receive signals from common control logic, the control logic was analyzed as a primary component and a pseudo component was created for the logic with cables selected accordingly. This same methodology was used for similar circuit scenarios such as common power supplies. In this way the effects of a fire induced failure causing spurious component operation were fully evaluated. Variances From the Deterministic Requirements (VFDRs) were identified and evaluated in the Fire Risk Evaluations to assess the impact of the VFDR and any necessary recovery actions to mitigate the effects of the VFDR.

The cables were selected using the component's electrical elementary diagram as a guide and performing a point to point review of the associated connection diagrams. During the cable selection process, a circuit fault analysis for each safe shutdown component was not initially performed. This made the initial compliance analysis bounding. Further analysis to determine the effects of a fire induced hot short, open circuit and short to ground as applicable was performed during the fire area compliance assessment task. Component interlocks affecting operation were either specifically identifed, routed, and incorporated into the component's function and analyzed, or, alternatively the interlock can be analyzed to show acceptability for operation in either state during analysis and thus its cabling, routing etc. is not required. This approach analyzes automatic actuation as component interlocks.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.1.7 [Circuit Coordination]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The protective devices were reviewed to determine if adequate coordination was provided to prevent potential loss of the power sources. This review is documented in the breaker coordination calculation and was prepared for all required buses. Cables for those breakers that were not coordinated were included in the 'at power' (Safe and stable) and the Non-Power Operation (NPO) analysis. The breakers that affected safe and stable conditions that required resolution are being modified for coordination.

Reference
CNC-1381.05-00-0251 Rev. 1 - Catawba Units 1 and 2 NFPA 805 Breaker and Fuse Coordination Study (AREVA 32-9139535-000)

Comments
See Breaker Coordination modifications identified in the committed modification Table S-2 of Attachment S.

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.2 Associated Circuit Cables

NEI 00-01 Guidance
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
Applicable

Alignment Statement	Alignment Basis	Reference
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.	NEI 00-01 Guidance	
3.3.2 [A] Associated Circuit Cables - 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		
Alignment Statement	**Alignment Basis**	**Reference**
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.2 [B] Associated Circuit Cables - Common Power Source Cables

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.2 [C] Associated Circuit Cables - Common Enclosure Cables

NEI 00-01 Guidance
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
Applicable

Alignment Statement	Alignment Basis	Reference
Not Applicable	Generic paragraph - alignment described in specific sections.	

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 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:

[Refer to hard copy of NEI 00-01 for Figure 3-4]

Applicability
Applicable

Alignment Statement	**Alignment Basis**	**Reference**
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.3.1 Identify Circuits Required for the Operation of the Safe Shutdown Equipment

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
The circuits were identified utilizing the single line, elementary, and connection diagrams along with instrument loop drawings. The iterative process of figures 3-2 and 3-3 of NEI 00-01 were used to include upstream power sources. For a given safe shutdown component, all cables that had the potential to impact the function of the component were initially identified to ensure that a bounding population of cables was provided for compliance analysis. Only those cables which were adequately isolated from the component such as those associated with certain indicating lights and computer inputs were excluded.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.3.2 Identify Interlocked Circuits and Cables Whose Spurious Operation or Maloperation Could Affect Shutdown

NEI 00-01 Guidance
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 Figure 3-3) if they can impact the operation of the equipment under consideration.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
For control logic circuits where multiple components receive signals from common control logic or interlocks, the control logic was analyzed as a primary component and a pseudo component was created on the SSEL for the logic with cables selected accordingly. Pseudo-components whose associated cabling can affect another primary component based on common power were identified in the cable selection for the affected component as an interlocked primary component. The cascading power supply and cascading interlocks analyses evaluate these interlocked components. The Catawba approach of assigning cables to 'pseudo' components instead of to the equipment under consideration meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.3.3.3 Assign Cables to the Safe Shutdown Equipment

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
A coordination review was conducted for cables identified in the breaker coordination calculation. For these specific cables, the protective devices were reviewed to determine if adequate coordination was provided to prevent potential loss of a power source. This review is documented in the Breaker Coordination Calculation.

Cables associated with SSEL components were selected in accordance with Section 3.3.1 and entered into the safe shutdown database for that component. Pseudo components were used and cables were assigned to them instead of the primary equipment. The safe shutdown database also contains the direct and indirect power supplies for the safe shutdown components and any interlocks that could impact component operation. SSEL component cables are associated with interlocks and power supplies.

Where outright fault coordination did not exist, the related cabling was identified, routed and assigned a pseudo component number against the SSEL bus. During each specific fire area analysis, if these pseudo components surfaced against the SSEL bus as being required, subsequent analysis was performed utilizing source fault capabilities, cable impedance to fire area being analyzed. The results are shown to be acceptable or were captured as a conflict with subsequent resolutions. The Catawba approach meets the intent of the guidance.

Reference
CNC-1381.05-00-0251 Rev. 1 - Catawba Units 1 and 2 NFPA 805 Breaker and Fuse Coordination Study (AREVA 32-9139535-000)

Comments
The following Corrective actions are planned for resolution of the identified issues. The Catawba approach meets the intent of the guidance.

C-13-01777 - 600VAC Motor Control Centers

C-13-01779 - 480VAC MCC load breakers required specific resolution

C-13-01781 - Breakers on 125VDC buses EDE and EDF require fuses to provide coordination

C-09-05273 - Resolve KSI route and coordination issues

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5 Circuit Analysis and Evaluation

NEI 00-01 Guidance
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

Alignment Statement	**Alignment Basis**	**Reference**
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.1 Criteria / Assumptions

NEI 00-01 Guidance
Apply the following criteria/assumptions when performing fire-induced circuit failure evaluations.

Applicability
Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.1.1 [Circuit Failure Types and Impact]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
All combinations of circuit failures except intercable hot shorts are considered and evaluated to determine if spurious component actuation can occur. Intercable hot shorts were not considered due to the use of armored cable at Catawba. The armor of the cables prevent conductors from one cable shorting to conductors of another cable. In some cases, circuit analysis did not have to be performed because the entire population of cables associated with a safe shutdown component was adequately separated as required by the regulations from redundant components and cabling. Catawba meets the intent of the guidance except cable-to-cable interactions were not considered because the armor of the cables preclude hot short interactions. Additionally, cables which meet separation requirements are not postulated to fail; therefore, performing circuit analysis was not required.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance on circuit analysis, including the consideration of hot shorts that bypass the MOV protective devices (i.e. IN 92-18 damage). Catawba performed circuit analysis that evaluated this condition.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.1.2 [Circuit Contacts and Operational Modes]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
Analysis assumes that circuit contacts are positioned (i.e., open or closed) consistent in the normal mode/position of the safe shutdown equipment as shown on the schematic drawings or defined by procedure.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.1.3 [Duration of Circuit Failures]

NEI 00-01 Guidance
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

Alignment Statement
Aligns with intent

Alignment Basis
Multiple fire induced failures and multiple spurious actuations were considered to occur concurrently in accordance with the guidance provided in NEI 00-01, Section 3.5.1.5[B]. This methodology is applied at the safe shutdown component level regardless of how many components that may share a common multi conductor cable. Based on this methodology, Catawba considers any and all potential spurious actuations that may result from intractable shorting, which may occur concurrently regardless of number. The fire was not assumed to eventually clear the circuit fault. All potential hot shorts always failed the equipment and no probability was used in the deterministic analysis. Details of faults were provided but credit was not taken to clear them. This meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.1.4 [Cable Failure Configurations]

NEI 00-01 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 (NFPA 805 Section 4.2.3) are assumed to fail in their worst case configuration.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
All unprotected cables and equipment within the fire area that do not meet the separation requirements of Section III.G.2 (NFPA 805 Section 4.2.3) were assumed to fail in their worst case configuration.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.1.5 [A, Circuit Failure Risk Assessment Guidance]

NEI 00-01 Guidance
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

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

NEI 00-01 Ref.
3.5.1.5 [B, Cable Failure Modes]

NEI 00-01 Guidance
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 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.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
A. Three types of circuit failures (intra-cable hot shorts, open circuits and shorts-to-ground) were considered to occur on each conductor of each safe shutdown cable associated with a component of the required safe shutdown path in each given fire area. If a complete circuit failure analysis (e.g., interlocks) was not performed, a conservative worst-case failure was assumed with respect to the required SSD component/system.

B. Catawba has thermoplastic covering over its armored sheathing in some plant areas, but the conductor insulation is thermoset for control and power cables. Some instrumentation cabling has thermoplastic conductor insulation; however, these also have armored sheathing. Inter-cable hot shorts are not postulated.

C. No limit is placed on the number of cables damaged by the fire, however multiple spurious operation is being resolved generically by the Industry via

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

Alignment Statement	Alignment Basis	Reference
	the FAQ process for NEI 04-02. D. DC circuit control cables are included in the analysis. The Catawba circuit analysis considers up to two concurrent hot shorts within multiconductor control cables and the consequences of the spurious operations generated. In general, for Catawba circuit configurations, this bounds the case where the spurious operation requires two concurrent hot shorts of the proper polarity, i.e., plus-to-plus and minus-to-minus. In the past, proper polarity hot shorts on ungrounded DC circuits were considered only in relation to high-low pressure interface components as described in GL 86-10, question 5.3.1, and these were postulated within a multiconductor cable or as a cable-to-cable hit. Catawba does not postulate cable-to-cable hot shorts due to the utilization of armor cables. Also, Catawba has no DC components which are considered high-low pressure interfaces. E. Instrument cables are included in the analysis and associated with pseudocomponents for logic circuits. Catawba aligns with this guidance except for item B. Catawba meets the intent of the item B guidance except cable-to-cable interactions were not considered because the armor jacketing of the cables preclude hot short interactions.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2 Types of Circuit Failures

NEI 00-01 Guidance
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

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2.1 Circuit Failures Due to an Open Circuit

NEI 00-01 Guidance
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 de-energizing 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.

Figure 3.5.2-1 shows an open circuit on a grounded control circuit.

[Refer to hard copy of NEI 00-01 for Figure 3.5.2-1]

Open circuit No. 1:
An open circuit at location No. 1 will prevent operation of the subject equipment.

Open circuit No. 2:
An open circuit at location No. 2 will prevent opening/starting of the subject equipment, but will not impact the ability to close/stop the equipment.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Open circuits are analyzed as shown on the referenced figures from NEI 00-01. Current transformers (CTs) may induce secondary fires through the fire-induced opening of circuitry associated with the secondary side windings of the CT. Where such circuitry exits in a fire area or provides a common enclosure concern within a fire area, the impact of such secondary fires was properly considered. The following information is being provided to demonstrate that metering and relaying circuits have been analyzed for the potentially adverse impact of fire damage, including, but not limited to open secondary CT windings:

- Cables associated to suspect secondary CT circuits (4 KV and above) are included in the cable selection of the associated buses as part of the cable selection performed for the EIR, PRA, and NPO required equipment.
- The cable routing for these circuits and fire areas that the raceways are located in are documented.
- The cable impacts for secondary CT circuits are evaluated on a Fire Area basis.

The following additional design features were considered:

- CT circuits which do not leave the fire area which contains power supply of

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

Alignment Statement	Alignment Basis	Reference
	concern were not required to be modeled. • CT circuits associated with switchgear feeders to motors, etc. stay within the fire area of the switchgear. • Transducers were considered an isolation device and further modeling of the transducer's secondary cables were not required. • CT circuits may provide input into transformer or generator differential circuits. Any imbalance or disturbance on these circuits was considered to isolate the protected device within a few cycles. These were considered to trip the respective feeder as a source of power, however there should be only a low likelihood of a secondary fire. • CTs wired in a delta configuration, versus that of a wye configuration, are not subject to failure due to an open circuit on external cables Any imbalance or disturbance on these circuits was considered to isolate the protected device within a few cycles. These were considered to trip the respective feeder as a source of power, however not to cause a secondary fire. The results from the analysis of the secondary CT circuits were used to demonstrate whether or not the redundant systems (i.e. SSF, Train A or Train B as credited) used to achieve and maintain safe and stable conditions were impacted by the failure of the secondary CT open circuit. The results from the analysis were also used to determine whether or not redundant system (i.e. SSF, Train A or Train B as credited) cables or components were located in the areas of the CT or secondary CT circuit routing. Impact concerns were documented as VFDRs, as necessary. This analysis satisfies the criteria of NFPA 805 and the guidance provided in NEI 00-01, Revision 1. Based on this information, Catawba meets the intent of this guidance. Gap Analysis: NEI 00-01 Revision 2 added additional guidance on the open circuit of a high voltage ammeter current transformer (CT) circuit. Catawba properly considered this additional guidance in EIR 51-9183972-002 (Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2.2 Circuit Failures Due to a Short-to-Ground [General]

NEI 00-01 Guidance
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
Applicable

Alignment Statement	Alignment Basis	Reference
Aligns	Generic paragraph - alignment described in specific sections.	

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2.2 Circuit Failures Due to a Short-to-Ground [A, Grounded Circuits]

NEI 00-01 Guidance
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.
Short-to-Ground on Grounded Circuits

Typically, in the case of a grounded circuit, a short-to-ground on any part of the circuit would present a concern for tripping the circuit isolation device thereby causing a loss of control power.

Figure 3.5.2-2 illustrates how a short-to-ground fault may impact a grounded circuit.

[Refer to hard copy of NEI 00-01 Rev. 1 for Figure 3.5.2-2]

Short-to-ground No. 1:
A short-to-ground at location No. 1 will result in the control power fuse blowing and a loss of power to the control circuit. This will result an inability to operate the equipment using the control switch. Depending on the coordination characteristics between the protective device on this circuit and upstream circuits, the power supply to other circuits could be affected.

Short-to-ground No. 2:
A short-to-ground at location No. 2 will have no effect on the circuit until the close/stop control switch is closed. Should this occur, the effect would be identical to that for the short-to-ground at location No. 1 described above. Should the open/start control switch be closed prior to closing the close/stop control switch, the equipment will still be able to be opened/started.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Certain cables were excluded if all postulated fire induced faults (open circuit, hot-short or short to ground) have no adverse consequences for the component. Fire area analysis methodology assumes multiple fire induced failures. The analysis technique for short-to-ground for grounded circuits as shown in the referenced NEI 00-01 figures was utilized.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2.2 Circuit Failures Due to a Short-to-Ground [B, Ungrounded Circuits]

NEI 00-01 Guidance
Short-to-Ground on Ungrounded Circuits In the case of an ungrounded circuit, postulating only a single short-to-ground on any part of the circuit may not result in tripping the circuit isolation device. Another short-to-ground on the circuit or another circuit from the same source would need to exist to cause a loss of control power to the circuit. Figure 3.5.2-3 illustrates how a short to ground fault may impact an ungrounded circuit. [Refer to hard copy of NEI 00-01 Rev. 1 for Figure 3.5.2-3]

Short-to-ground No. 1:

A short-to-ground at location No. 1 will result in the control power fuse blowing and a loss of power to the control circuit if short-to-ground No. 3 also exists either within the same circuit or on any other circuit fed from the same power source. This will result in an inability to operate the equipment using the control switch. Depending on the coordination characteristics between the protective device on this circuit and upstream circuits, the power supply to other circuits could be affected.

Short-to-ground No. 2:

A short-to-ground at location No. 2 will have no effect on the circuit until the close/stop control switch is closed. Should this occur, the effect would be identical to that for the short-to-ground at location No. 1 described above. Should the open/start control switch be closed prior to closing the close/stop control switch, the equipment will still be able to be opened/started.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
The methodology assumes multiple fire induced failures including hot-shorts, shorts-to ground and open circuits. All postulated cable and component failures were identified utilizing the techniques of the referenced NEI 00-01 figures for ungrounded circuits.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance that this is no limit to the number of shorts-to-ground that could be caused by the fire and that these should be assume to occur simultaneously unless justification was provided. Catawba considered multiple fire induced failures, including shorts-to-ground.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2.3 Circuit Failures Due to a Hot Short [General]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Not Applicable

Alignment Basis
Generic paragraph - alignment described in specific sections.

Reference

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2.3 Circuit Failures Due to a Hot Short [A, Grounded Circuits]

NEI 00-01 Guidance
A Hot Short on Grounded Circuits

A short-to-ground is another failure mode for a grounded control circuit. A short-to-ground as described above would result in de-energizing the circuit. This would further reduce the likelihood for the circuit to change the state of the equipment either from a control switch or due to a hot short. Nevertheless, a hot short still needs to be considered. Figure 3.5.2-4 shows a typical grounded control circuit that might be used for a motor-operated valve. However, the protective devices and position indication lights that would normally be included in the control circuit for a motor-operated valve have been omitted, since these devices are not required to understand the concepts being explained in this section. In the discussion provided below, it is assumed that a single fire in a given fire area could cause any one of the hot shorts depicted. The following discussion describes how to address the impact of these individual cable faults on the operation of the equipment controlled by this circuit.

[Refer to hard copy of NEI 00-01 Rev. 1 for Figure 3.5.2-4]

Hot short No. 1:
A hot short at this location would energize the close relay and result in the undesired closure of a motor-operated valve.

Hot short No. 2:
A hot short at this location would energize the open relay and result in the undesired opening of a motor-operated valve.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Intra-cable conductor to conductor hot shorts are analyzed, but external hot shorts are not considered credible at Catawba due to the armored cable configuration. The methodology assumes multiple fire induced failures including hot-shorts if energized conductors are present in the cable. Postulated cable and component failures were identified utilizing the techniques of the referenced NEI 00-01 figures for grounded circuits. Hot shorts need not be postulated if energized conductors are not present in the cable and cable-to-cable hot shorts are not postulated between armored cables. This approach meets the intent of the guidance.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance on the treatment of MOVs per the IN 92-18 failure mode. This included consideration of location of operation of the affected valve, such as remote shutdown panel or local manual operation using the handwheel. The guidance discuss the need to perform additional analysis to ensure the valve can be operated using the handwheel and does not damage the MOV pressure boundary. The Catawba Manual Action Feasibility analysis would have considered this guidance in its analysis but there were no MOV which required recovery actions as a result of the FREs.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.2 Nuclear Safety Capability Circuit Analysis

NEI 00-01 Ref.
3.5.2.3 Circuit Failures Due to a Hot Short [B, Ungrounded Circuits]

NEI 00-01 Guidance
A Hot Short on Ungrounded Circuits

In the case of an ungrounded circuit, a single hot short may be sufficient to cause a spurious operation. A single hot short can cause a spurious operation if the hot short comes from a circuit from the positive leg of the same ungrounded source as the affected circuit.

In reviewing each of these cases, the common denominator is that in every case, the conductor in the circuit between the control switch and the start/stop coil must be involved.

Figure 3.5.2-5 depicted below shows a typical ungrounded control circuit that might be used for a motor-operated valve. However, the protective devices and position indication lights that would normally be included in the control circuit for a motor-operated valve have been omitted, since these devices are not required to understand the concepts being explained in this section.

In the discussion provided below, it is assumed that a single fire in a given fire area could cause any one of the hot shorts depicted. The discussion provided below describes how to address the impact of these cable faults on the operation of the equipment controlled by this circuit.

[Refer to hard copy of NEI 00-01 Rev. 1 for Figure 3.5.2-5]

Hot short No. 1:
A hot short at this location from the same control power source would energize the close relay and result in the undesired closure of a motor operated valve.

Hot short No. 2:
A hot short at this location from the same control power source would energize the open relay and result in the undesired opening of a motor operated valve.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
Intra-cable conductor to conductor hot shorts are analyzed, but external hot shorts are not considered credible at Catawba due to the armored cable configuration. The methodology assumes multiple fire induced failures including hot-shorts if energized conductors are present in the cable. Postulated cable and component failures were identified utilizing the techniques of the referenced NEI 00-01 figures for ungrounded circuits. Hot shorts need not be postulated if energized conductors are not present in the cable; cable-to-cable hot shorts are not postulated between armored cables. This approach meets the intent of the guidance.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.3 Nuclear Safety Equipment and Cable Location.

Nuclear Safety Equipment and Cable Location. Physical location of equipment and cables shall be identified.

NEI 00-01 Ref.
3.3.3.4 Identify Routing of Cables

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
The safe shutdown database is a relational database that contains the data from the existing Catawba cable and raceway tracking databases. The safe shutdown database also includes cable identification numbers, endpoints, drawing references and cable routing data. These data are tied to safe shutdown components and fire area location data.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

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 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

Alignment Statement
Aligns

Alignment Basis
A listing of all required cables along with associated endpoints and raceway / junction points was obtained from the safe shutdown database. A copy of the applicable Catawba layout drawings, which depict fire areas, was transposed/overlaid onto the electrical equipment layout drawings. A Cable Routing Worksheet for each cable was completed using the safe shutdown database and the route verified to assure it was contiguous and that all necessary fire areas were assigned to the route.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.3 Nuclear Safety Equipment and Cable Location.

NEI 00-01 Ref.
3.5.2.4 Circuit Failures Due to Inadequate Circuit Coordination

NEI 00-01 Guidance
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.

For the example shown in Figure 3.5.2-6, the circuit powered from load breaker 4 supplies power to a non-safe shutdown pump. This circuit is damaged by fire in the same fire area as the circuit providing power from the Train B bus to the Train B pump, which is redundant to the Train A pump.

To assure safe shutdown for a fire in this fire area, the damage to the non-safe shutdown pump powered from load breaker 4 of the Train A bus cannot impact the availability of the Train A pump, which is redundant to the Train B pump. To assure that there is no impact to this Train A pump due to the associated circuits' common power source breaker coordination issue, load breaker 4 must be fully coordinated with the feeder breaker to the Train A bus.

[Refer to hard copy of NEI 00-01 Rev. 1 for Figure 3.5.2-6]

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 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
Applicable

2.4.2.3 Nuclear Safety Equipment and Cable Location.

Alignment Statement
Aligns

Alignment Basis
A fault coordination analysis was performed. Where outright fault coordination did not exist, the related cabling was identified, routed and assigned a pseudo component number against the SSEL bus. During each specific fire area analysis, if these pseudo components surfaced against the SSEL bus as being required, subsequent analysis was performed utilizing source fault capabilities and cable impedance to fire area being analyzed. The results were shown to be acceptable or captured as a conflict with subsequent resolutions.

Gap Analysis: NEI 00-01 Revision 2 added additional guidance to ensure breaker coordination. This guidance included examples for breakers that have internal breaker tripping devices that do not required control power and breakers that required control power for tripping. The latter requires an evaluation to ensure the availability of control power. Catawba performed circuit analysis that evaluated for this condition.

Reference
CNC-1112.11-00-0031 - Unit 1 Associated Circuits Analysis For Post Fire Safe Shutdown
CNC-1112.11-00-0032 - Unit 2 Associated Circuits Analysis For Post Fire Safe Shutdown

2.4.2.3 Nuclear Safety Equipment and Cable Location.

NEI 00-01 Ref.
3.5.2.5 Circuit Failures Due to Common Enclosure Concerns

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
For Cable Protection: The cable used at Catawba is of the armored type. Tests performed have demonstrated that a fault within a cable will not propagate into an adjacent cable, even if the breaker feeding the faulted cable fails to trip. Interruption of the fault current is accomplished by the breaker feeding the associated circuit. The breaker is adequately sized to protect the cable per the standard Duke Energy design practice.

For Fault Coordination: Catawba has performed a coordination calculation and analysis of the results that includes all SSEL components and power supplies. Lack of coordination conflicts have required modifications to resolve the coordination conflicts.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

Comments
The following Corrective actions are planned for resolution of the identified issues. The Catawba approach meets the intent of the guidance.

C-13-01777 - 600VAC Motor Control Centers

C-13-01779 - 480VAC MCC load breakers required specific resolution

C-13-01781 - Breakers on 125VDC buses EDE and EDF require fuses to provide coordination

C-09-05273 - Resolve KSI route and coordination issues

2.4.2.4 Fire Area Assessment.

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.
3.4 Fire Area Assessment and Compliance Assessment

NEI 00-01 Guidance
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
Applicable

Alignment Statement	Alignment Basis	Reference
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1 Criteria / Assumptions

NEI 00-01 Guidance
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
Applicable

Alignment Statement	Alignment Basis	Reference
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.1 [Number of Postulated Fires]

NEI 00-01 Guidance
Assume only one fire in any single fire area at a time.

Applicability
Applicable

Alignment Statement
Aligns

Alignment Basis
Only one fire in a single fire area is assumed to occur.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.2 [Damage to Unprotected Equipment and Cables]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
All equipment and cabling within a given fire area are assumed damaged by the fire.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.3 [Assess Impacts to Required Components]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
The fire area analysis methodology assumes multiple fire induced failures and multiple spurious actuations based on the cables and components present in the fire area of concern. All postulated cable and component failures were identified and only those cables causing non-compliance were analyzed for circuit failure results. The credited safe shutdown success path was analyzed so that mitigating strategies could be developed and documented in the fire area compliance assessment. These analyses are tracked in the SSD database.

Reference
AR1, Areva NP Inc. - Appendix R Analysis Database Management System (ARTRAK), Version 2.0

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.4 [Manual Actions]

NEI 00-01 Guidance
Use manual actions where appropriate to achieve and maintain post-fire safe shutdown conditions in accordance with NRC requirements.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The least impacted safe shutdown success path was analyzed and Variances from the Deterministic Requirements (VFDRs) were identified. Mitigating strategies to address the VFDRs in a performance based Fire Risk Evaluation were developed and documented. One of the potential mitigating strategies is procedural action (recovery action) to mitigate the operational effects from fire damage.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

Comments
Manual actions may be justified under the performance-based requirements of NFPA 805 Section 4.2.4.

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.5 [Repairs]

NEI 00-01 Guidance
Where appropriate to achieve and maintain cold shutdown within 72 hours, use repairs to equipment required in support of post fire shutdown.

Applicability
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
NFPA 805 does not have explicit requirements to achieve cold shutdown within 72 hours. Catawba maintains the fuel in a safe and stable condition for all modes of operation. The 'At Power' safe shutdown analysis postulates a single fire occurring at 100% power and provides the listing of conflicts that may impact the assured success path to meet a particular nuclear safety performance goal. The 'At Power' safe and stable strategy includes entry into hot standby (Mode 3) and stops prior to the point of manually initiating a cooldown. Safe and stable conditions at HSB may continue long term with several activities in place. The least impacted safe shutdown success path was analyzed for 'At Power' conditions and variances from the deterministic requirements of NFPA 805, Section 4.2.3 (VFDRs) were identified. Mitigating strategies to address VFDRs were developed and documented in Fire Risk Evaluations (FREs). Recovery actions may be prescribed by a FRE to restore a nuclear performance goal given they are feasible and reliable.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.6 [Assess Compliance with Deterministic Criteria]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The least impacted safe shutdown success path was analyzed and Variances from the Deterministic Requirements (VFDRs) were identified. Mitigating strategies to address the VFDRs in a performance based Fire Risk Evaluation were developed and documented. The methods described above are options to satisfy the deterministic criteria to preclude identification of VFDRs.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.7 [Consider Additional Equipment]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The least impacted safe shutdown success path was analyzed and Variances from the Deterministic Requirements (VFDRs) were identified. Mitigating strategies to address the VFDRs in a performance based Fire Risk Evaluation were developed and documented. Selection of the least impacted safe shutdown path incorporates the philosophy of additional equipment that can be credited.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.1.8 [Consider Instrument Tubing Effects]

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
An evaluation of instrument tubing has been performed for Catawba. The evaluation treated the tubing like cabling and associated it with the instrument. The underlying assumption being that the fire impact to an instrument's reading would be adverse and an alternate instrument would be required to fulfill the nuclear safety performance function. However, for the containment instrument tubing there are no significant ignition sources in the vicinity of the pressurizer instrumentation or there is adequate separation between channels. Therefore in all cases at least one channel would provide indication.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.2 Methodology for Fire Area Assessment

NEI 00-01 Guidance
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:

[Refer to hard copy of NEI 00-01 for Figure 3-5]

Applicability
Applicable

Alignment Statement	Alignment Basis	Reference
Not Applicable	Generic paragraph - alignment described in specific sections.	

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.2.1 Identify the Affected Equipment by Fire Area

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
The SSD database provides a listing of the safe shutdown equipment and cables by fire area.

Reference
AR1, Areva NP Inc. - Appendix R Analysis Database Management System (ARTRAK), Version 2.0
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.2.2 Determine the Shutdown Paths Least Impacted By a Fire in Each Fire Area

NEI 00-01 Guidance
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 maloperation 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
Applicable

Alignment Statement
Aligns

Alignment Basis
The least impacted safe shutdown success path was analyzed. Safe shutdown logic diagrams were then highlighted to show the credited safe shutdown paths for a given fire area. The Safe Shutdown Equipment List documents required positions for each mode, as needed. Potential spurious impact of non -credited equipment is evaluated by their inclusion in the fire area compliance analysis. Variances from the Deterministic Requirements (VFDRs) were identified. Mitigating strategies to address the VFDRs in a performance based Fire Risk Evaluation were developed and documented.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.2.3 Determine Safe Shutdown Equipment Impacts

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
The fire area analysis methodology selected a safe shutdown path based on cables/components in a fire area being analyzed. For this path, multiple fire induced failures and multiple spurious actuations were analyzed. All postulated safe shutdown cable and component failures for the assured path were identified and a resolution provided at the cable or component level (i.e manual actions, modification proposed, etc.).

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.4.2.4 Develop a Compliance Strategy or Disposition to Mitigate the Effects Due to Fire Damage to Each Required Component or Cable

NEI 00-01 Guidance
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. o Provide a procedural action in accordance with regulatory requirements.
- Perform a cold shutdown repair in accordance with regulatory requirements. o 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
Applicable

Alignment Statement
Aligns with intent

Alignment Basis
The safe shutdown success paths were analyzed and potential impacts identified . These potential impacts were resolved by specifying one or more of the options listed above such that the least impacted safe shutdown success path could be identified. Variances from the Deterministic Requirements (VFDRs) were identified. Mitigating strategies to address the VFDRs in a performance based Fire Risk Evaluation were developed and documented. Credit for transitioning EEEEs and licensing actions was taken wherever possible and procedural (recovery) action specified as a last resort.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
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

NEI 00-01 Guidance
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

Alignment Statement
Aligns

Alignment Basis
Compliance assessment disposition codes and their descriptions (i.e., resolution of component made inoperable by the fire) are a part of the SSD database. Components which were only affected by a power supply loss were dispositioned only if the component was in the credited success path and the failure resulted in an undesired position for safe shutdown. Similarly, affected components that were not in the assured safe shutdown path or affected the safe shutdown path were not dispositioned. The cumulative effect of the actions relied upon to mitigate the effects of a fire in the area have been evaluated.

Reference
EIR 51-9183972-002 Rev. 2 - Catawba Nuclear Station Units 1 & 2 NFPA-805 Transition - Deterministic Safe Shutdown Analysis

2.4.2.4 Fire Area Assessment.

NEI 00-01 Ref.
3.5.1.5 [C, Likelihood of Undesired Consequences]

NEI 00-01 Guidance
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
Applicable

Alignment Statement
Aligns

Alignment Basis
Treatment of multiple spurious actuations has been performed in accordance with FAQ 07-0038, consistent with RG 1.205. Multiple fire induced failures and multiple spurious actuations were identified via safe shutdown analysis, generic list of MSOs, self-assessments, PRA insights, and operating experience. An expert panel evaluated consequences of the damaged associated circuits with respect to maintaining the nuclear safety performance criteria. Any impacts determined to adversely affect nuclear safety performance criteria for the 'At Power' analysis were reconciled by the RI-PB process.

Reference
CNC-1435.00-00-0043 Rev. 0 - NFPA 805 Transition Expert Panel Report for Addressing Potential Catawba Multiple Spurious Operations

C. NEI 04-02 Table B-3 – Fire Area Transition

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3) 597 Pages

Table C-2 – NFPA 805 Required Fire Protection Systems and Features 27 Pages

624 Pages Attached

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 01 (U1) - ND & NS Pump Room El 522 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
01	ND Pump Rm 1B El 522
02	ND Pump Rm 1A El 522
03	NS Pump Rm 1B El 522
04	NS Pump Rm 1A El 522
05	ND Pump Rm 2B El 522
06	ND Pump Rm 2A El 522
07	NS Pump Rm 2B El 522
08	NS Pump Rm 2A El 522
212	U0 AB FW Recirc Pump Rm El 522

Fire Area ID:	01 (U1) - ND & NS Pump Room El 522 (Common)	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF)	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity Control by injecting water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolating the reactor coolant system and makeup via the seal injection flow path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/G B and C. Main feedwater is isolated.	
5. Process Monitoring Function	Process monitoring is available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	01 (U1) - ND & NS Pump Room El 522 (Common)	**Previously Approved Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Licensing Action

07. Deviation from Item C.6.c of BTP CMEB 9.5-1 related to standpipe protection in the annulus and pipe tunnel.

Licensing Basis

During the site audit, the NRC observed that manual firefighting capability was deficient throughout the various elevations of the annulus. In addition, the existing hose stations in Fire Area 1 are not capable of reaching all areas of the pipe tunnel.

By letter dated January 17 and February 10, 1984, CNS committed to install an automatic sprinkler system having branch lines on elevations 561 feet, 604 feet and 664 feet. In addition to the automatic sprinklers, CNS committed to install additional line-type heat detectors on six levels of the annulus, located at every other level. CNS also committed to provide additional fire hose, stored in the fire brigade equipment storage area for use in fighting a fire in the pipe tunnel. On the basis of this commitment, the NRC concluded that the fire protection provided for the annulus and pipe tunnel provides an acceptable deviation from Section C.6.c of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Fire Area ID: 01 (U1) - ND & NS Pump Room El 522 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
01	ND Pump Rm 1B El 522	None	None	R	ND pump room walls: R
02	ND Pump Rm 1A El 522	None	None	R	ND pump room walls: R
03	NS Pump Rm 1B El 522	None	None	None	None
04	NS Pump Rm 1A El 522	None	None	None	None
05	ND Pump Rm 2B El 522	None	None	R	ND pump room walls: R
06	ND Pump Rm 2A El 522	None	None	R	ND pump room walls: R
07	NS Pump Rm 2B El 522	None	None	None	None
08	NS Pump Rm 2A El 522	None	None	None	None
212	U0 AB FW Recirc Pump Rm El 522	None	None	None	None

Title Fire Risk Evaluation for Fire Area 01 (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

The interior, non-fire area boundary, 3 hour rated walls enclosing the individual residual heat removal pump rooms within the fire area are credited to limit the zone of influence, but no automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	01 (U1) - ND & NS Pump Room El 522 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	1 (U1)-VFDR-20
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0876 - Standby Makeup Pump to Containment Equipment Sump 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 01 (U2) - ND & NS Pump Room El 522 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
01	ND Pump Rm 1B El 522
02	ND Pump Rm 1A El 522
03	NS Pump Rm 1B El 522
04	NS Pump Rm 1A El 522
05	ND Pump Rm 2B El 522
06	ND Pump Rm 2A El 522
07	NS Pump Rm 2B El 522
08	NS Pump Rm 2A El 522
212	U0 AB FW Recirc Pump Rm El 522

Fire Area ID: 01 (U2) - ND & NS Pump Room El 522 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolating the reactor coolant system and makeup via the seal injection flow path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by the turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/G B and C. Main feedwater is isolated.	
5. Process Monitoring function	Process monitoring is available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	01 (U2) - ND & NS Pump Room El 522 (Common)	**Previously Approved Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Licensing Action

07. Deviation from Item C.6.c of BTP CMEB 9.5-1 related to standpipe protection in the annulus and pipe tunnel.

Licensing Basis

During the site audit, the NRC observed that manual firefighting capability was deficient throughout the various elevations of the annulus. In addition, the existing hose stations in Fire Area 1 are not capable of reaching all areas of the pipe tunnel.

By letter dated January 17 and February 10, 1984, CNS committed to install an automatic sprinkler system having branch lines on elevations 561 feet, 604 feet and 664 feet. In addition to the automatic sprinklers, CNS committed to install additional line-type heat detectors on six levels of the annulus, located at every other level. CNS also committed to provide additional fire hose, stored in the fire brigade equipment storage area for use in fighting a fire in the pipe tunnel. On the basis of this commitment, the NRC concluded that the fire protection provided for the annulus and pipe tunnel provides an acceptable deviation from Section C.6.c of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Fire Area ID: 01 (U2) - ND & NS Pump Room El 522 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
01	ND Pump Rm 1B El 522	None	None	R	ND pump room walls: R
02	ND Pump Rm 1A El 522	None	None	R	ND pump room walls: R
03	NS Pump Rm 1B El 522	None	None	None	None
04	NS Pump Rm 1A El 522	None	None	None	None
05	ND Pump Rm 2B El 522	None	None	R	ND pump room walls: R
06	ND Pump Rm 2A El 522	None	None	R	ND pump room walls: R
07	NS Pump Rm 2B El 522	None	None	None	None
08	NS Pump Rm 2A El 522	None	None	None	None
212	U0 AB FW Recirc Pump Rm El 522	None	None	None	None

Title Fire Risk Evaluation for Fire Area 01 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

The interior, non-fire area boundary, 3 hour rated walls enclosing the individual residual heat removal pump rooms within the fire area are credited to limit the zone of influence, but no automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	01 (U2) - ND & NS Pump Room El 522 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	1 (U2)-VFDR-20
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0876 - Standby Makeup Pump to Containment Equipment Sump 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	02 - Unit 2 CA Pump Room El 543	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
19GEN	Unit 2 CA Pump Room El 543

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 02 - Unit 2 CA Pump Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/G B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	02 - Unit 2 CA Pump Room EI 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 03 Fire Penetration Evaluation for AFW Pump Ceiling Penetrations with Seal Material Beyond the Barrier Plane

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the large blockouts within the Unit 1 and 2 Auxiliary Feedwater Pump Room hatch covers that contain seal material that is not located within the barrier plane and are not bounded by typical details per DPC 1435.00-00-0006.

The evaluation determined that penetrations C-AX-217-F-026, C-AX-217-F-029, C-AX-260-F-027, and C-AX-260-F-028 are not considered qualified for a 3-hour F and T rating. However they are considered acceptable for the fire hazards present and acceptable based on the following:

- Seal sidewalls perpendicular to the ceiling surface are protected from direct flame impingement by either a vertical wall barrier or a steel member.
- Penetration sides protected by a wall are considered to perform in a manner consistent with the fire tested configurations of detail M-6 per DPC 1435.00-00-0006.
- Seal sidewall is considered equivalent to locating the seal within the barrier plane because it is protected by concrete construction.

Fire Area ID: 02 - Unit 2 CA Pump Room El 543 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers: • C-AX-217-W-008, -013, -014, -021, -025, -028, -029 • C-AX-228-W-028, -029, -030, • C-AX-260-W-049, -050, -053, -068, -074 • D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107 • D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063 • F-AX-348-W-085, -097, -114, -115 • F-AX-354A-W-035, -036, -039, -040, -044 • F-AX-354-W-021, -027, -028, -032, -033 • H-AX-515-W-013 • H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094 • J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010 • J-AX-518-W-001, -002, -005, -006, -008 • J-AX-533-W-001, -002 The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following: • Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited. • Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response. • The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Fire Area ID: 02 - Unit 2 CA Pump Room El 543 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers

Revision 4

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,
- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Fire Area ID: 02 - Unit 2 CA Pump Room El 543

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19GEN	Unit 2 CA Pump Room El 543	E, R	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R Transient Control: D

Title Fire Risk Evaluation for Fire Area 02

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-08/rx-yr for delta LERF. The delta risk results for delta CDF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 1.67E-07

Δ LERF Units: [2] 5.91E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-08/rx-yr for delta LERF and the delta risk results for CDF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

The CO2 system was credited in preventing room burnout due to HGL formation. Automatic and manual suppression is credited in screening this fire area from development of MCA scenarios. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient and hotwork fires are a contributor to risk in the fire area, therefore it is recommended for DID to make the area within coordinates AA-BB/62-63 an exclusion area. Present hot work controls are sufficient and no enhancements are required.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) was evaluated for additional risk in this fire area with a related VFDR. The risk of the associated operator action did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

No Risk enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	02 - Unit 2 CA Pump Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	2-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C, which is normally open and throttled for HSB, is affected by cable failures which may cause maloperation of the solenoid, action may be taken to manually fail the valve open from the Control Room via controllers. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	2-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B, which is normally open and throttled for HSB, is affected by cable failures which may cause maloperation of the solenoid, action may be taken to manually fail the valve open from the Control Room via controllers. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	2-VFDR-04
VFDR	Condenser Cooling Water to Turbine Auxiliary Feedwater Suction, which is normally closed and open for HSB, is affected by HEMYC wrapped cable failures (2 CA 673, 2 CA 693, and 2 CA 875). Suction from Hotwell remains available. Suction from circ water shows cables that are wrapped with HEMYC. Once opened, will not fail shut but controls will fault due to cable failures. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0174 - Condenser Cooling Water to Turbine Auxiliary Feedwater Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	02 - Unit 2 CA Pump Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	2-VFDR-05
VFDR	Condenser Cooling Water to Turbine Auxiliary Feedwater Suction, which is normally closed and open for HSB, is affected by HEMYC wrapped cable failures (2 CA 674, 2 CA 694, and 2 CA 875). Suction from Hotwell remains available. Suction from circ water shows cables that are wrapped with HEMYC. Once opened, will not fail shut but controls will fault due to cable failures. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0175 - Condenser Cooling Water to Turbine Auxiliary Feedwater Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	2-VFDR-08
VFDR	Non Coordinated Loads fed from 2EPEMXEMXS, which is normally available and available for HSB, is affected by coordination concern for 2EPEMXEMXS. Cables 2*WL 561 and 2*WL 790 are routed in a raceway that is wrapped with a HEMYC fire barrier (see CN -2891-01.01). Failure of either of these cables will cause a loss of motive (2*WL 561) and control (2*WL 790) power. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPEMXEMXS-NCL - Non Coordinated Loads fed from 2EPEMXEMXS
Disposition	VFDR deterministically resolved by modification

VFDR ID	2-VFDR-09
VFDR	Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	02 - Unit 2 CA Pump Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	2-VFDR-10
VFDR	Pressurizer Heater Group 2B, which is normally cycled and off for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	2-VFDR-18
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by spurious cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area) before closure can be accomplished. Also, all PORVs can spuriously open due to cable failures prior to the swapping of the SSF disconnect plugs. The PORVs will fail closed once the SSF disconnects are pulled. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	2-VFDR-19
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by spurious cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area) before closure can be accomplished. Also, all PORVs can spuriously open due to cable failures prior to the swapping of the SSF disconnect plugs. The PORVs will fail closed once the SSF disconnects are pulled. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	02 - Unit 2 CA Pump Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	2-VFDR-20
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by spurious cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area) before closure can be accomplished. Also, all PORVs can spuriously open due to cable failures prior to the swapping of the SSF disconnect plugs. The PORVs will fail closed once the SSF disconnects are pulled. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	2-VFDR-21
VFDR	Auxiliary Feedwater Pump Turbine Steam Stop Valve, which is normally open and open for HSB, is affected by cable hits that could spuriously open/close valve. The cables required for control from the SSF (SDSP2 Breaker 2) are all fire wrapped with HEMYC. (2*CA 743, 2*CA 760, 2*CA 761, 2*CA 762, 2*CA 763, 2*CA 770, 2*CA 795). These cables could spuriously open/close the valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SA VA0145 - Auxiliary Feedwater Pump Turbine Steam Stop Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	2-VFDR-23
VFDR	Auxiliary Feedwater Pump Turbine Sump Pump 2A, which is normally cycled and cycled for HSB, is affected by a coordination concern for 2EPEMXEMXSA. Cables 2*WL 561 and 2*WL 790 are routed in a raceway that is wrapped with a HEMYC fire barrier (see CN -2891-01.01). Failure of either of these cables will cause a loss of motive (2*WL 561) and control (2*WL 790) power. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2WL PUATS - Auxiliary Feedwater Pump Turbine Sump Pump 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	03 - Unit 1 CA Pump Room El 543	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	**Description**
9GEN	Unit 1 CA Pump Rm Gen Area El 543

Fire Area ID:	03 - Unit 1 CA Pump Room El 543	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/G B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	03 - Unit 1 CA Pump Room El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 03 Fire Penetration Evaluation for AFW Pump Ceiling Penetrations with Seal Material Beyond the Barrier Plane

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the large blockouts within the Unit 1 and 2 Auxiliary Feedwater Pump Room hatch covers that contain seal material that is not located within the barrier plane and are not bounded by typical details per DPC 1435.00-00-0006.

The evaluation determined that penetrations C-AX-217-F-026, C-AX-217-F-029, C-AX-260-F-027, and C-AX-260-F-028 are not considered qualified for a 3-hour F and T rating. However they are considered acceptable for the fire hazards present and acceptable based on the following:

- Seal sidewalls perpendicular to the ceiling surface are protected from direct flame impingement by either a vertical wall barrier or a steel member.
- Penetration sides protected by a wall are considered to perform in a manner consistent with the fire tested configurations of detail M-6 per DPC 1435.00-00-0006.
- Seal sidewall is considered equivalent to locating the seal within the barrier plane because it is protected by concrete construction.

Fire Area ID: 03 - Unit 1 CA Pump Room El 543 — **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	03 - Unit 1 CA Pump Room El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers

Revision 4

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,
- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 03 - Unit 1 CA Pump Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9GEN	Unit 1 CA Pump Rm Gen Area El 543	E, R	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R Transient Control: D

Title
Fire Risk Evaluation for Fire Area 03

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-08/rx-yr for delta LERF. The delta risk results for delta CDF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF
Units: [1] 2.08E-07

Δ LERF
Units: [1] 6.60E-09

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-08/rx-yr for delta LERF and the delta risk results for CDF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

The CO2 system was credited in preventing room burnout due to HGL formation. Automatic and manual suppression is credited in screening this fire area from development of MCA scenarios. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient and hot-work fires are a contributor to risk in the fire area, therefore make the area within coordinates AA-BB/51-52 a transient exclusion area. Present hot work controls are sufficient and no enhancements are required.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) was evaluated for additional risk in this fire area with a related VFDR. The risk of the associated operator action did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

No Risk enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	03 - Unit 1 CA Pump Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	3-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C, which is normally open and throttled for HSB, is affected by cable failures which may cause maloperation of the solenoid. Action may be taken to manually fail the valve open from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	3-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B, which is normally open and throttled for HSB, is affected by cable failures may cause maloperation of the solenoid. Action may be taken to manually fail the valve open from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	3-VFDR-04
VFDR	Condenser Cooling Water to Turbine Auxiliary Feedwater Suction, which is normally closed and open for HSB, is affected by cable hits which may cause loss of control. Once opened, valve will not fail shut but controls will fault. Cables required for operation from the SSF are shown as HEMYC wrapped (1 CA 673). Suction from Hotwell remains available. Suction from circ water shows cables that are wrapped with HEMYC. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0174 - Condenser Cooling Water to Turbine Auxiliary Feedwater Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	03 - Unit 1 CA Pump Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	3-VFDR-05
VFDR	Condenser Cooling Water to Turbine Auxiliary Feedwater Suction, which is normally closed and open for HSB, is affected by cable hits which may cause loss of control. Once opened, valve will not fail shut but controls will fault. Cables required for operation from the SSF are shown as HEMYC wrapped (1 CA 674). Suction from Hotwell remains available. Suction from circ water shows cables that are wrapped with HEMYC. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0175 - Condenser Cooling Water to Turbine Auxiliary Feedwater Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	3-VFDR-07
VFDR	Non-Coordinated Loads fed from 1EPEMXEMXS, which is normally available and available for HSB, is affected by a coordination concern for 1EPEMXEMSE due to cable hits for 1WL PUATS (1*WL 561) routed through Fire Area 3. However, the raceway containing the cable is covered with the HEMYC wrap fire barrier. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPEMXEMXS-NCL - Non-Coordinated Loads fed from 1EPEMXEMXS
Disposition	VFDR deterministically resolved by modification

VFDR ID	3-VFDR-08
VFDR	Pressurizer Heater Group 1A, which is normally cycled and off for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 03 - Unit 1 CA Pump Room El 543 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	3-VFDR-09
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	3-VFDR-18
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area). PORV can spuriously open due to cable failures prior to the pulling of the SSF disconnect plugs. The PORVs will fail closed once the SSF disconnects are pulled. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0032B - Pressurizer PORV, which is normally closed and closed for HSB
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	3-VFDR-19
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area). PORV can spuriously open due to cable failures prior to the pulling of the SSF disconnect plugs. The PORVs will fail closed once the SSF disconnects are pulled. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	03 - Unit 1 CA Pump Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	3-VFDR-20
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area). PORV can spuriously open due to cable failures prior to the pulling of the SSF disconnect plugs. The PORVs will fail closed once the SSF disconnects are pulled. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	3-VFDR-37
VFDR	Auxiliary Feedwater Pump Turbine Steam Stop Valve, which is normally open and open for HSB, is affected by cable hits which may cause the valve to spuriously open or close. The cables required for control from the SSF (SDSP1 Breaker 2) are all fire wrapped with HEMYC. (1*CA 743, 1*CA 760, 1*CA 761, 1*CA 762, 1*CA 763, 1*CA 770, 1*CA 795). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SA VA0145 - Auxiliary Feedwater Pump Turbine Steam Stop Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	3-VFDR-38
VFDR	Turbine Driven Auxiliary Feedwater Pump Sump Pump 1A, which is normally cycled and cycled for HSB, is affected by failure of either 1*WL 561 or 1*WL 790 which will cause a loss of motive (1*WL 561) or control (1*WL 790) power. These cables are routed in a raceway that is wrapped with a HEMYC fire barrier. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1WL PUATS - Turbine Driven Auxiliary Feedwater Pump Sump Pump 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
10	U1 AB Mech Pen Rm El 543
11	U1 AB SE Corridor El 543
12	U1 PD Pump Rm El 543
13	NI Pump Rm 1B El 543
14	NI Pump Rm 1A El 543
15	NV Pump Rm 1B El 543
16	NV Pump Rm 1A El 543
17	U1 AB Open Area El 543
18	U1 AB Cable Shaft Area El 543
185	U2 AB Rm 203, 205, 205A, 206A, 206B, 207 & 209A El 543
20	U2 AB Mech Pen Rm El 543
21	U2 AB NE Corridor El 543
22	U2 PD Pump Rm El 543
23	NI Pump Rm 2B El 543
24	NI Pump Rm 2A El 543
25	NV Pump Rm 2B El 543
26	NV Pump Rm 2A El 543
27	U2 AB Open Area El 543
28	U2 AB Cable Shaft Area El 543
31	U1 AB Mech Pen Rm West El 560
32	U1 AB Mech Pen Rm East El 560
43	U2 AB Mech Pen Rm West El 560
44	U2 AB Mech Pen Rm East El 560

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF)	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/G B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 04 Fire Protection Evaluation for Floor Blockout Penetrations with a Free Area in Excess of 9 sqft. and Structural Framing Spans Exceeding 42 in. without a Cross Member Framing

Revision 1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the following floor blockouts regarding the framing support provided for the Silicone Foam free areas exceeding 9 sqft. that are not bounded by typical details per DPC 1435.00-00-0006:

- H-AX-517A-F-001
- H-AX-517A-F-002
- H-AX-517B-F-001
- H-AX-517B-F-002
- H-AX-517B-F-003
- K-AX-653-F-001

- K-AX-653-F-032
- K-AX-653-F-003
- J-AX-650A-F-001

The evaluation determined that the Unit 1 and 2 Exterior Doghouse penetrations (J-AX-650A-F-001) are qualified for a 3-hour F and T rating. The remaining penetrations above are considered adequate for the area fire hazards based on the following:

- Detection available in fire areas of concern.
- Area hose stations and fire extinguishers.
- Fire brigade response.
- Seal and framing configurations for the penetrations are considered adequate.
- Seal integrity is not anticipated to be compromised by fire exposure.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 12 Fire Protection Evaluation for Penetrants with Nonstandard Seal Configurations
Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to evaluate the adequacy of the following penetrations, which are located in NRC committed 3-hour fire barriers, regarding non-standard seal configurations not bounded by typical details per DPC 1435.00-00-0006:

- D-AX-354A-W-052 through D-AX-354A-W-056
- D-AX-354A-W-095, D-AX-354A-W-096

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- No combustibles are present in the proximity of the penetration and barrier interface.
- Penetration types are non-combustible.
- Penetrations are located in covered pipe trenches not subject to direct flame impingement.
- Pipe trenches contain limited combustibles.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
10	U1 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
11	U1 AB SE Corridor El 543	None	None	None	None
12	U1 PD Pump Rm El 543	None	None	None	None
13	NI Pump Rm 1B El 543	None	None	None	None
14	NI Pump Rm 1A El 543	None	None	None	None
15	NV Pump Rm 1B El 543	None	None	R	Fire rated pump room walls: R
16	NV Pump Rm 1A El 543	None	None	R	Fire rated pump room walls: R
17	U1 AB Open Area El 543	None	None	None	None
18	U1 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
185	U2 AB Rm 203, 205, 205A, 206A, 206B, 207 & 209A El 543	None	None	None	None
20	U2 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
21	U2 AB NE Corridor El 543	None	None	None	None
22	U2 PD Pump Rm El 543	None	None	None	None
23	NI Pump Rm 2B El 543	None	None	None	None
24	NI Pump Rm 2A El 543	None	None	None	None
25	NV Pump Rm 2B El 543	None	None	R	Fire rated pump room walls: R
26	NV Pump Rm 2A El 543	None	None	R	Fire rated pump room walls: R
27	U2 AB Open Area El 543	None	None	None	None
28	U2 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
31	U1 AB Mech Pen Rm West El 560	None	None	None	None
32	U1 AB Mech Pen Rm East El 560	None	None	None	None
43	U2 AB Mech Pen Rm West El 560	None	None	None	None
44	U2 AB Mech Pen Rm East El 560	None	None	None	None

Title Fire Risk Evaluation for Fire Area 04 (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 2.20E-09

Δ LERF Units: [1] 3.56E-11

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

The interior, non-fire area boundary, 3 hour rated walls enclosing the individual charging pump rooms within the fire area are credited to limit the zone of

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

influence for a pump fire. Manual suppression was credited in HGL evaluations for FZ 10 and 20. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenarios analyzed are not significant sources of risk in this area and do not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) was evaluated for additional risk in this fire area with a related VFDR. The risk of the associated operator action did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended. Valves CA-48 and CA-52 are located in Fire Area 4; thus valves CA-50A and CA-54B will be throttled instead.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained

All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	4 (U1)-VFDR-01
VFDR	Auxiliary Feedwater Pump #1 to S/G 1D, which is normally open and throttled for HSB, is affected by cable failures which may cause the valve to fail to operate on demand. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0036 - Auxiliary Feedwater Pump #1 to S/G 1D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U1)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C
Disposition	Recovery Action(s) for 1CA VA0050A required to satisfy DID criteria

VFDR ID	4 (U1)-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B
Disposition	Recovery Action(s) for 1CA VA0054B required to satisfy DID criteria

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	4 (U1)-VFDR-21
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NI 557 and 1*NI 587. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0010B - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U1)-VFDR-26
VFDR	Charging Line Containment Isolation, which is normally open and not utilized for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NV 506. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U1)-VFDR-27
VFDR	Charging Line Containment Isolation, which is normally open and not utilized for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NV 545. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	4 (U1)-VFDR-28
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0876 - Standby Makeup Pump to Containment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	4 (U1)-VFDR-31
VFDR	Solenoid operated valve providing floor drain sump D discharge to RHR and containment spray sump, which is normally closed and open for HSB, is affected by the cable, valves and switches located in the fire area that may cause spurious operation or failure to operate. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1WL VA0847 - Solenoid operated valve providing floor drain sump D discharge to RHR and containment spray sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U1)-VFDR-32
VFDR	Solenoid operated valve providing floor drain sump D discharge to turbine building sump, which is normally open and closed for HSB, is affected by the cable, valves and switches located in the fire area that may cause spurious operation or failure to operate. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1WL VA0848 - Solenoid operated valve providing floor drain sump D discharge to turbine building sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
10	U1 AB Mech Pen Rm El 543
11	U1 AB SE Corridor El 543
12	U1 PD Pump Rm El 543
13	NI Pump Rm 1B El 543
14	NI Pump Rm 1A El 543
15	NV Pump Rm 1B El 543
16	NV Pump Rm 1A El 543
17	U1 AB Open Area El 543
18	U1 AB Cable Shaft Area El 543
185	U2 AB Rm 203, 205, 205A, 206A, 206B, 207 & 209A El 543
20	U2 AB Mech Pen Rm El 543
21	U2 AB NE Corridor El 543
22	U2 PD Pump Rm El 543
23	NI Pump Rm 2B El 543
24	NI Pump Rm 2A El 543
25	NV Pump Rm 2B El 543
26	NV Pump Rm 2A El 543
27	U2 AB Open Area El 543
28	U2 AB Cable Shaft Area El 543
31	U1 AB Mech Pen Rm West El 560
32	U1 AB Mech Pen Rm East El 560
43	U2 AB Mech Pen Rm West El 560
44	U2 AB Mech Pen Rm East El 560

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF)	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/G B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 04 Fire Protection Evaluation for Floor Blockout Penetrations with a Free Area in Excess of 9 sqft. and Structural Framing Spans Exceeding 42 in. without a Cross Member Framing

Revision 1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the following floor blockouts regarding the framing support provided for the Silicone Foam free areas exceeding 9 sqft. that are not bounded by typical details per DPC 1435.00-00-0006:

- H-AX-517A-F-001
- H-AX-517A-F-002
- H-AX-517B-F-001
- H-AX-517B-F-002
- H-AX-517B-F-003
- K-AX-653-F-001

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- K-AX-653-F-032
- K-AX-653-F-003
- J-AX-650A-F-001

The evaluation determined that the Unit 1 and 2 Exterior Doghouse penetrations (J-AX-650A-F-001) are qualified for a 3-hour F and T rating. The remaining penetrations above are considered adequate for the area fire hazards based on the following:

- Detection available in fire areas of concern.
- Area hose stations and fire extinguishers.
- Fire brigade response.
- Seal and framing configurations for the penetrations are considered adequate.
- Seal integrity is not anticipated to be compromised by fire exposure.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 12 Fire Protection Evaluation for Penetrants with Nonstandard Seal Configurations

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to evaluate the adequacy of the following penetrations, which are located in NRC committed 3-hour fire barriers, regarding non-standard seal configurations not bounded by typical details per DPC 1435.00-00-0006:

- D-AX-354A-W-052 through D-AX-354A-W-056
- D-AX-354A-W-095, D-AX-354A-W-096

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- No combustibles are present in the proximity of the penetration and barrier interface.
- Penetration types are non-combustible.
- Penetrations are located in covered pipe trenches not subject to direct flame impingement.
- Pipe trenches contain limited combustibles.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
10	U1 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
11	U1 AB SE Corridor El 543	None	None	None	None
12	U1 PD Pump Rm El 543	None	None	None	None
13	NI Pump Rm 1B El 543	None	None	None	None
14	NI Pump Rm 1A El 543	None	None	None	None
15	NV Pump Rm 1B El 543	None	None	R	Fire rated pump room walls: R
16	NV Pump Rm 1A El 543	None	None	R	Fire rated pump room walls: R
17	U1 AB Open Area El 543	None	None	None	None
18	U1 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
185	U2 AB Rm 203, 205, 205A, 206A, 206B, 207 & 209A El 543	None	None	None	None
20	U2 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
21	U2 AB NE Corridor El 543	None	None	None	None
22	U2 PD Pump Rm El 543	None	None	None	None
23	NI Pump Rm 2B El 543	None	None	None	None
24	NI Pump Rm 2A El 543	None	None	None	None
25	NV Pump Rm 2B El 543	None	None	R	Fire rated pump room walls: R
26	NV Pump Rm 2A El 543	None	None	R	Fire rated pump room walls: R
27	U2 AB Open Area El 543	None	None	None	None
28	U2 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
31	U1 AB Mech Pen Rm West El 560	None	None	None	None
32	U1 AB Mech Pen Rm East El 560	None	None	None	None
43	U2 AB Mech Pen Rm West El 560	None	None	None	None
44	U2 AB Mech Pen Rm East El 560	None	None	None	None

Title Fire Risk Evaluation for Fire Area 04 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 2.07E-10

Δ LERF Units: [2] 2.70E-12

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

The interior, non-fire area boundary, 3 hour rated walls enclosing the individual charging pump rooms within the fire area are credited to limit the zone of

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

influence for a pump fire. Manual suppression was credited in HGL evaluations for FZ 10 and 20. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) was evaluated for additional risk in this fire area with a related VFDR. The risk of the associated operator action did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended. Valves CA-48 and CA-52 are located in Fire Area 4; thus valves CA-50A and CA-54B will be throttled instead.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained

All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	4 (U2)-VFDR-01
VFDR	Auxiliary Feedwater Pump #2 to S/G 2D, which is normally open and throttled for HSB, is affected by cable failures which may cause the valve to fail to operate on demand. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0036 - Auxiliary Feedwater Pump #2 to S/G 2D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U2)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C, which is normally open and throttled for HSB, is affected by being located in the fire area which may cause the valve to not fail as required. It would normally fail open on transfer to the SSS. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C
Disposition	Recovery Action(s) for 2CA VA0050A required to satisfy DID criteria

VFDR ID	4 (U2)-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B, which is normally open and throttled for HSB, is affected by being located in the fire area which may cause the valve to not fail as required. It would normally fail open on transfer to the SSS. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B
Disposition	Recovery Action(s) for 2CA VA0054B required to satisfy DID criteria

VFDR ID	4 (U2)-VFDR-24
VFDR	NV PMP C/L INJ ISOL, which is normally closed and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 2*NI 557 and 2*NI 587. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0010B - NV PMP C/L INJ ISOL
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	4 (U2)-VFDR-35
VFDR	Charging Line Containment Isolation, which is normally open and not utilized for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 2*NV 506. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U2)-VFDR-36
VFDR	Charging Line Containment Isolation, which is normally open and not utilized for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 2*NV 545. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U2)-VFDR-37
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0876 - Standby Makeup Pump to Containment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	4 (U2)-VFDR-40
VFDR	Solenoid operated valve providing floor drain sump C discharge to RHR and Containment Spray sump, which is normally closed and open for HSB, is affected by the cable, valves and switches located in the fire area that may cause spurious operation or failure to operate. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2WL VA0847 - Solenoid operated valve providing floor drain sump C discharge to RHR and Containment Spray sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	4 (U2)-VFDR-41
VFDR	Solenoid operated valve providing floor drain sump C discharge to turbine building sump, which is normally open and closed for HSB, is affected by the cable, valves and switches located in the fire area that may cause spurious operation or failure to operate. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2WL VA0848 - Solenoid operated valve providing floor drain sump C discharge to turbine building sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 05 - Unit 2 Electrical Pen Room El 560 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
42	U2 AB Elect Pen Rm El 560

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 05 - Unit 2 Electrical Pen Room El 560 — **Performance Goals**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	05 - Unit 2 Electrical Pen Room El 560	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	05 - Unit 2 Electrical Pen Room EI 560	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

- Areas adjacent to walls have smoke detection.
- Fire and smoke would be obstructed from propagating.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 05 - Unit 2 Electrical Pen Room El 560
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
42	U2 AB Elect Pen Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 05

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 3.18E-07

Δ LERF Units: [2] 3.08E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF but within RG 1.174 acceptance limits.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	05 - Unit 2 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	5-VFDR-01
VFDR	Auxiliary Feedwater Pump 2A Flow to S/G 2B, which is normally open and throttled for HSB, is affected by a cable hit (2 CA 726) which may fail valve open. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0056 - Auxiliary Feedwater Pump 2A Flow to S/G 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	5-VFDR-02
VFDR	Auxiliary Feedwater Pump 2A to S/G 2A, which is normally open and throttled for HSB, is affected by a cable hit (2 CA 727) which may fail valve open. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0060 - Auxiliary Feedwater Pump 2A to S/G 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	5-VFDR-04
VFDR	2A Auxiliary Feedwater Pump Discharge to 2A S/G, which is normally open and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 2*CA 559 that may cause valve to spuriously open or close. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0062A - 2A Auxiliary Feedwater Pump Discharge to 2A S/G
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-05
VFDR	Pressurizer PORV Block Valve, which is normally open and closed for HSB, is affected by cable hits on 2*ATC 515, 2*ATC 539, 2*ATC 667, 2*NC 579, 2*NC 583, 2*NC 586, 2*NC 814, 2*NC 815 and 2*NC 816 and loss of power prevent block valve operation. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0031B - Pressurizer PORV Block Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	05 - Unit 2 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	5-VFDR-06
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits on 2*ATC 623, 2*NC 760, 2*NC 821, 2*NC 830, 2*NC 836, 2*NC 956 and 2*NV 818 may cause spurious operation of PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-07
VFDR	Pressurizer PORV block valve, which is normally open and open for HSB, is affected by cable hits on 2*ATC 515, 2*ATC 539, 2*ATC 667, 2*NC 579, 2*NC 583, 2*NC 586, 2*NC 814, 2*NC 815 and 2*NC 816 and loss of power prevent block valve operation. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0035B - Pressurizer PORV block valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-08
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits on 2*ATC 623, 2*NC 760, 2*NC 821, 2*NC 830, 2*NC 836, 2*NC 956 and 2*NV 818 may cause spurious operation of PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-09
VFDR	2B Containment Spray Pump, which is normally off and off for HSB, is affected by cable hits on 2NS PUB (2*NS 549, 2*RN 660) along with an SSPS permissive which may spuriously start the pump. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS PUB - 2B Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	05 - Unit 2 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	5-VFDR-10
VFDR	Containment Spray Pump 2B Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by a loss of power. Valve will remain open resulting in possible diversion of FWST to the containment. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0003B - Containment Spray Pump 2B Suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-11
VFDR	Containment Spray Header 2B Containment Isolation, which is normally closed and closed for HSB, is affected by a cable hit (2*NS 561) may spuriously open valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0012B - Containment Spray Header 2B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-12
VFDR	Containment Spray Header 2B Containment Isolation, which is normally closed and closed for HSB, is affected by a cable hit (2*NS 561) may spuriously open valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0015B - Containment Spray Header 2B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-13
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by a cable hit (2*NV 638) may spuriously open valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0122B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	05 - Unit 2 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	5-VFDR-14
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by a cable hit (2*NV 638) may spuriously open valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0123B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	5-VFDR-15
VFDR	2A and 2B Chemical and Volume Control Pumps recirculation, which is normally open and open for HSB, is affected by a cable hit (2*RN 665) may spuriously close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0202B - 2A and 2B Chemical and Volume Control Pumps recirculation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-16
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a potential loss of instrument air (IA not credited). 2NV VA0294 fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	05 - Unit 2 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	5-VFDR-17
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by various cable hits which may spuriously operate valve. 2NV VA0309 fails open on loss of air, this may require manually operating manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-19
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by spurious SSPS and various cable hits (2*CA 611, 2*NV 534, 2*NV 545) which may spuriously close valve and open SI valves. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-20
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	5-VFDR-21
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by cable hits (2*SV 633, 2*SV 639), loss of IA and limited supply of nitrogen which will require manual operation after 8 hours. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	05 - Unit 2 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	5-VFDR-22
VFDR	2A S/G PORV isolation, which is normally open and cycled for HSB, is affected by a potential IN 92-18 concern due to spurious operation the S/G PORV block valve due to failure of cable 2*SV 662 that may cause the valve to open or close. Cable hits may spuriously open the PORV, and prevent closing the block valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0027A - 2A S/G PORV isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 06 - Unit 1 Electrical Pen Room El 560 **Fire Area Definition**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
30	U1 AB Elect Pen Rm El 560

Fire Area ID: 06 - Unit 1 Electrical Pen Room El 560

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks with manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	06 - Unit 1 Electrical Pen Room El 560	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	06 - Unit 1 Electrical Pen Room El 560	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

- Areas adjacent to walls have smoke detection.
- Fire and smoke would be obstructed from propagating.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 06 - Unit 1 Electrical Pen Room El 560
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
30	U1 AB Elect Pen Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title
Fire Risk Evaluation for Fire Area 06

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF
Units: [1] 5.82E-07

Δ LERF
Units: [1] 6.51E-08

DID Maintained
A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF but within RG 1.174 acceptance limits.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	06 - Unit 1 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 6-VFDR-04

VFDR Auxiliary Feedwater Pump 1A to S/G 1A, which is normally open and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*CA 559 that may spuriously open or close valve. If valve closes and cannot be re-opened, S/G 1A would be isolated from auxiliary feedwater flow, leaving only S/G 1B available for decay heat removal cooldown. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1CA VA0062A - Auxiliary Feedwater Pump 1A to S/G 1A

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 6-VFDR-05

VFDR Residual Heat Removal Pump 1B Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by cable failure and loss of power to 1FW VA0055B which then cannot be shut from the MCR. Failure of at least 2 out of 4 FWST Level Indications may cause a FWST Low Level signal which will open 1NI-184B and cause a diversion path from the FWST to the containment sump. 1FW-55B fails as is (normally open) on a loss of power. Valves 1NI-184B or 1FW-55B are required to be closed to maintain FWST supply. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1FW VA0055B - Residual Heat Removal Pump 1B Suction from Borated Water Storage Tank

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 6-VFDR-08

VFDR Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by multiple cable hits (1*ATC 515, 1*ATC 539, 1*ATC 667, 1*NC 579, 1*NC 583, 1*NC 586, 1*NC 814, 1*NC 815 and 1*NC 816) which may spuriously open PORV and prevent closing PORV isolation. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC VA0031B - Pressurizer PORV Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	06 - Unit 1 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	6-VFDR-09
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by multiple cable hits (1*ATC 623, 1*NC 760, 1*NC 821, 1*NC 830, 1*NC 836, 1*NC 956 and 1*NV 818)) which may spuriously open PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-10
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by multiple cable hits (1*ATC 515, 1*ATC 539, 1*ATC 667, 1*NC 579, 1*NC 583, 1*NC 586, 1*NC 814, 1*NC 815 and 1*NC 816) which may spuriously open PORV and prevent closing PORV isolation. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-11
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by multiple cable hits (1*ATC 623, 1*NC 760, 1*NC 821, 1*NC 830, 1*NC 836, 1*NC 956 and 1*NV 818) which may spuriously open PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-12
VFDR	Residual Heat Removal Pump 1B Containment Sump Suction, which is normally closed and not utilized for HSB, is affected by cable hits which may cause spurious operation of the valve resulting in possible diversion of the FWST to the containment. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0184B - Residual Heat Removal Pump 1B Containment Sump Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	06 - Unit 1 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	6-VFDR-13
VFDR	1B Containment Spray Pump, which is normally off and off for HSB, is affected by cable hits on 1*ATC 979, 1*NS 549 along with SSPS permissive may spuriously start NS pump. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS PUB - 1B Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-14
VFDR	Containment Spray Pump 1B Suction from FWST Isolation, which is normally open and closed for HSB, is affected by cable hits causing spurious operation of the valve concurrent with the Containment Spray Pump A starting and NS-29A or NS-32A opening may drain the FWST to the containment via the spray header. However, if NS-20A, NS-18A and NI-185A are open then the FWST may drain to the containment sump. This path has been determined not to fail. This will only result in a loss of power and the closed valves in the path will not inadvertently open (MSO). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0003B - Containment Spray Pump 1B Suction from FWST Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-15
VFDR	Containment Spray Header 1B Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits causing spurious operation of the valve concurrent with the Containment Spray Pump A starting and NS-29A or NS-32A opening may drain the FWST to the containment via the spray header. However, if NS-20A, NS-18A and NI-185A are open then the FWST may drain to the containment sump. This path has been determined not to fail. This will only result in a loss of power and the closed valves in the path will not inadvertently open (MSO). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0012B - Containment Spray Header 1B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	06 - Unit 1 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	6-VFDR-16
VFDR	Containment Spray Header 1B Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits causing spurious operation of the valve concurrent with the Containment Spray Pump A starting and NS-29A or NS-32A opening may drain the FWST to the containment via the spray header. However, if NS-20A, NS-18A and NI-185A are open then the FWST may drain to the containment sump. This path has been determined not to fail. This will only result in a loss of power and the closed valves in the path will not inadvertently open (MSO). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0015B - Containment Spray Header 1B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-17
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by cable hits that impact both excess flow letdown isolation valves. Downstream isolation valves have interlock hits and may open. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0122B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	6-VFDR-18
VFDR	1A and 1B chemical and volume control pumps recirculation, which is normally open and open for HSB, is affected by a cable hit on 1*RN 665 which can cause spurious closure of this valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0202B - 1A and 1B chemical and volume control pumps recirculation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	06 - Unit 1 Electrical Pen Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	6-VFDR-19
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a cable hit on 1 NV 1010, a loss of power, and a loss of IA which may cause valve to fail open. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Controller
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	6-VFDR-20
VFDR	Seal Water Injection Flow Control, which is normally open and throttled for HSB, is affected by failure of valve NV-309 resulting in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0309 - Seal Water Injection Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-22
VFDR	Charging Line Containment Isolation, which is normally open and not utilized for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NV 545 that may open or close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 06 - Unit 1 Electrical Pen Room El 560 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	6-VFDR-24
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by a loss of instrument air or a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-25
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by cable hits which may spuriously open the PORV, and prevent closing the block valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	6-VFDR-26
VFDR	1A S/G PORV isolation, which is normally open and cycled for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*SV 662 that may open or close valve. Cable hits may spuriously open the PORV, and prevent closing the block valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0027A - 1A S/G PORV isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
41	U2 AB B-SWGR Rm El 560

Fire Area ID: 07 - Unit 2 4160V Essential SWGR Room El 560 — **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual cotnrol of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 07 - Unit 2 4160V Essential SWGR Room El 560 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

- Areas adjacent to walls have smoke detection.
- Fire and smoke would be obstructed from propagating.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers
Revision	4
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,

- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Fire Area ID: 07 - Unit 2 4160V Essential SWGR Room El 560
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
41	U2 AB B-SWGR Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 07

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta CDF and delta LERF risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 1.02E-07

Δ LERF Units: [2] 2.86E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria for delta CDF and LERF, but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely brigade response.

The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	7-VFDR-02
VFDR	Non Coordinated Loads fed from 2EPLDCEDD, which is normally available and available for HSB, is affected by cable hits causing power loss. Failure may cause FWST low level signal which will open 2NI VA0184B resulting in a diversion path to the containment sump. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPLDCEDD-NCL - Non Coordinated Loads fed from 2EPLDCEDD
Disposition	VFDR deterministically resolved by modification

VFDR ID	7-VFDR-03
VFDR	Non Coordinated Loads fed from 2EPLDCEDF, which is normally available and available for HSB, is affected by cable hits causing power loss. Failure may cause FWST low level signal which will open 2NI VA0184B resulting in a diversion path to the containment sump. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPLDCEDF-NCL - Non Coordinated Loads fed from 2EPLDCEDF
Disposition	VFDR deterministically resolved by modification

VFDR ID	7-VFDR-04
VFDR	Borated Water Storage Tank Level Ch #3, which is normally available and available for HSB, is affected by cable failure of 2*FW 564. Failure may cause FWST low level signal which could result in a diversion path to the containment sump. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2FW P 5120 - Borated Water Storage Tank Level Ch #3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-05
VFDR	Borated Water Storage Tank Level Ch #4, which is normally available and available for HSB, is affected by cable failure of 2*FW 565. Failure may cause FWST low level signal which could result in a diversion path to the containment sump. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2FW P 5130 - Borated Water Storage Tank Level Ch #4
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	7-VFDR-06
VFDR	2B Residual Heat Removal suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by a possible power loss due to cable hits that result in this valve failing as is (normally open). Valve is required closed to maintain FWST inventory. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2FW VA0055B - 2B Residual Heat Removal suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action
VFDR ID	7-VFDR-07
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by a cable hit (2*NC 814) which prevents closing 2NC VA0031B. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action
VFDR ID	7-VFDR-08
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by a cable hit (2*NC 956) which could spuriously open 2NC VA0032B. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action
VFDR ID	7-VFDR-09
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by a cable hit (2*NC 814) which prevents closing 2NC VA0035B. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	7-VFDR-10
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by a cable hit (2*NC 956) which could spuriously open 2NC VA0036B. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-11
VFDR	2B RHR Pump, which is normally off and off for HSB, is affected by cable hits that may spuriously start the pump. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ND PUB - 2B RHR Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-12
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by cable hits along with a spurious SSPS and power loss which prevents closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0010B - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	7-VFDR-13
VFDR	Residual Heat Removal Pump 2A Containment Sump Suction, which is normally closed and not utilized for HSB, is affected by cable hits on FWST level instruments may cause a low level signal which will open 2NI VA0184B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0184B - Residual Heat Removal Pump 2A Containment Sump Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	7-VFDR-14
VFDR	2B Containment Spray Pump, which is normally off and off for HSB, is affected by multiple cable hits on 2NS PUB can cause a spurious start of this pump. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS PUB - 2B Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-15
VFDR	Containment Spray Pump 2B Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by multiple cable hits on 2NS PUB can cause a spurious start of the pump. Cable hit on 2*NS 529 or in panel 2CPCC2 could produce a hot short and spuriously open valves 2NS VA0012B, 2NS VA0015B (powered from 2EPEMXEMXJ) which can cause inadvertent operation of the Containment Spray. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0003B - Containment Spray Pump 2B Suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-16
VFDR	Containment Spray Pump 2B Header Containment Isolation, which is normally closed and closed for HSB, is affected by multiple cable hits on 2NS PUB can cause a spurious start of the pump. Cable hit on 2*NS 529 or in panel 2CPCC2 could produce a hot short and spuriously open valves 2NS VA0012B, 2NS VA0015B (powered from 2EPEMXEMXJ) which can cause inadvertent operation of the Containment Spray. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0012B - Containment Spray Pump 2B Header Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	7-VFDR-17
VFDR	Containment Spray Pump 2B Header Containment Isolation, which is normally closed and closed for HSB, is affected by multiple cable hits on 2NS PUB can cause a spurious start of this pump. The pump is fed from 2EPCSWETB which is located in FA07. Cable hit on 2*NS 529 or in panel 2CPCC2 could produce a hot short and spuriously open valves 2NS VA0012B, 2NS VA0015B (powered from 2EPEMXEMXJ) which can cause inadvertent operation of the Containment Spray. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0015B - Containment Spray Pump 2B Header Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-18
VFDR	2B Residual Heat Removal Pump to Containment Spray Header, which is normally closed and not utilized for HSB, is affected by cable hits that may spuriously start the pump. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0038B - 2B Residual Heat Removal Pump to Containment Spray Header
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-19
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by power loss and loss of IA which prevents throttling valve. 2NV VA0294 fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	07 - Unit 2 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	7-VFDR-20
VFDR	Seal Water Injection Flow Control, which is normally open and throttled for HSB, is affected by a potential loss of air (IA not creidted). 2 NV VA0309 fails open on loss of air, this may require manually operating manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0309 - Seal Water Injection Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-23
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by cables 2*ATC 577 and 2*NV 545 which have a possible IN 92-18 concerns. SSPS closes and prevents opening of valve. This valve may need to be manually operated. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-24
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air that may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	7-VFDR-25
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air that may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 08 - Unit 1 4160V Essential SWGR Room El 560 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
29	U1 AB B-SWGR Rm El 560

Fire Area ID:	08 - Unit 1 4160V Essential SWGR Room El 560	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 08 - Unit 1 4160V Essential SWGR Room El 560 — **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Fire Area ID:	08 - Unit 1 4160V Essential SWGR Room EI 560	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

- Areas adjacent to walls have smoke detection.
- Fire and smoke would be obstructed from propagating.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers

Revision 4

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,

- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Fire Area ID:	08 - Unit 1 4160V Essential SWGR Room El 560
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
29	U1 AB B-SWGR Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title
Fire Risk Evaluation for Fire Area 08

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta CDF risk results are within the screening acceptance criteria of 1E-07/rx-yr. The delta LERF risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF
Units: [1] 3.00E-08

Δ LERF
Units: [1] 1.59E-08

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF. The delta risk results for LERF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID: 08 - Unit 1 4160V Essential SWGR Room El 560 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	8-VFDR-01
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by a cable hit to 1*NC 814 which prevents closing the valve. Other cable hits could spuriously open PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-02
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by a cable hit to 1*NC 956 which could spuriously open 1NC VA0032B. Cable hit to 1*NC 814 prevents closing the block valve. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-03
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by a cable hit to 1*NC 814 which prevents closing 1NC VA0035B. Other cable hits could spuriously open PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-04
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by a cable hit to 1*NC 956 could spuriously open 1NC VA0032B and 1NC VA0036B. Cable hit to 1*NC 814 prevents closing 1NC VA0031B and 1NC VA0035B. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	08 - Unit 1 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	8-VFDR-05
VFDR	1B Residual Heat Removal Pump, which is normally off and off for HSB, is affected by various cable hits which causes a spurious start of the ND pump. With spurious operation of valve 1NS VA0038B, this may provide a flow diversion path from FWST to containment spray. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ND PUB - 1B Residual Heat Removal Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-06
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by cable failures, SSPS and power loss that prevent opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0010B - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	8-VFDR-07
VFDR	1B Containment Spray Pump, which is normally off and off for HSB, is affected by multiple cable hits on 1NS PUB which can cause a spurious start of this pump. With spurious operation of valves 1NS VA0012B, 1NS VA0015B (powered from 1EPEMXEMXJ), this can cause inadvertent operation of the Containment Spray. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS PUB - 1B Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	08 - Unit 1 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	8-VFDR-08
VFDR	Containment Spray Pump 1B Suction from FWST Isolation, which is normally open and closed for HSB, is affected by a potential loss of power to 1NS VA003B powered from 1EPEMXEMXJ (1*EPE510, 546, 547 and 560) which is fed from 1EPELXELXD (located in Fire Area 8). This can cause a diversion of FWST inventory to the containment via the containment spray header if the spray pump spuriously starts. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0003B - Containment Spray Pump 1B Suction from FWST Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-09
VFDR	Containment Spray Header 1B Containment Isolation, which is normally closed and closed for HSB, is affected by multiple cable hits on 1NS PUB could cause a spurious start of the pump. Cable hit on 1*NS 529 or in panel 1CPCC2 could produce a hot short and spuriously open valve 1NS VA0012B, 1NS VA0015B (powered from 1EPEMXEMXJ) which can cause inadvertent operation of the Containment Spray. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0012B - Containment Spray Header 1B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-10
VFDR	Containment Spray Header 1B Containment Isolation, which is normally closed and closed for HSB, is affected by multiple cable hits on 1NS PUB could cause a spurious start of the pump. Cable hit on 1*NS 529 or in panel 1CPCC2 could produce a hot short and spuriously open valve 1NS VA0012B, 1NS VA0015B (powered from 1EPEMXEMXJ) which can cause inadvertent operation of the Containment Spray. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0015B - Containment Spray Header 1B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 08 - Unit 1 4160V Essential SWGR Room El 560 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	8-VFDR-11
VFDR	1B Residual Heat Removal Pump to Containment Spray header, which is normally closed and closed for HSB, is affected by cable hits which could cause spurious operation of valve 1NS VA0038B. Other hits could cause a spurious start of the ND pump that would provide a flow diversion path from FWST to containment spray. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0038B - 1B Residual Heat Removal Pump to Containment Spray header
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-12
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	8-VFDR-13
VFDR	Seal Water Injection Flow Control, which is normally open and throttled for HSB, is affected by cable hits, loss of power and IA failure which can fail valve open. Failure of valve NV-309 would result in the need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0309 - Seal Water Injection Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	08 - Unit 1 4160V Essential SWGR Room El 560	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	8-VFDR-15
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*ATC 577 or 1*NV 545 that may open or close valve. This valve may need to be manually operated. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-17
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by possible loss of instrument air or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	8-VFDR-18
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by possible loss of instrument air or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	09 - Unit 2 Battery Room El 554	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
214	U2 AB Aux Cntrl Batt Rm 2CBA & 2CBB El 554
28A	U2 AB South Cable Shaft El 543
49	Vital Batt Rm 2EBA & 2EBB El 554
50	Vital Batt Rm 2EBC & 2EBD El 554
51	U2 AB Batt Rm El 554
69A	U2 AB South Cable Shaft El 574

Fire Area ID: 09 - Unit 2 Battery Room El 554 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	09 - Unit 2 Battery Room El 554	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 12 Fire Protection Evaluation for Penetrants with Nonstandard Seal Configurations

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	09 - Unit 2 Battery Room El 554	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the calculation was to evaluate the adequacy of the following penetrations, which are located in NRC committed 3-hour fire barriers, regarding non-standard seal configurations not bounded by typical details per DPC 1435.00-00-0006:

- D-AX-354A-W-052 through D-AX-354A-W-056
- D-AX-354A-W-095, D-AX-354A-W-096

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- No combustibles are present in the proximity of the penetration and barrier interface.
- Penetration types are non-combustible.
- Penetrations are located in covered pipe trenches not subject to direct flame impingement.
- Pipe trenches contain limited combustibles.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 09 - Unit 2 Battery Room El 554
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
214	U2 AB Aux Cntrl Batt Rm 2CBA & 2CBB El 554	None	R	None	Detection System, Installed: R
28A	U2 AB South Cable Shaft El 543	None	R	None	Detection System, Installed: R
49	Vital Batt Rm 2EBA & 2EBB El 554	None	R	None	Detection System, Installed: R
50	Vital Batt Rm 2EBC & 2EBD El 554	None	R	None	Detection System, Installed: R
51	U2 AB Batt Rm El 554	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
69A	U2 AB South Cable Shaft El 574	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 09

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 5.77E-07

Δ LERF Units: [2] 7.27E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria for delta CDF and LERF, but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

No Risk or DID enhancements or modifications are required for this fire area to satisfy Risk or DID criteria.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through the Unit 2 S/Gs (via 2CA-48 and/or 2CA-52) was evaluated for additional risk in this fire area with a related VFDR. The recovery action made a significant contribution to risk in this fire area and was identified as being required for risk; the additional risk was determined to be bounded by the VFDR delta risk. The action to throttle CA flow through the Unit 1 S/Gs (via 1CA-48 and/or 1CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the Unit 1 auxiliary feedwater flow control valves is recommended. Also, due to the contribution to risk of the reactor coolant pump variances, a DID recovery action is recommended to locally trip the Unit 2 reactor coolant pumps in the turbine building.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	09 - Unit 2 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	9-VFDR-02
VFDR	120 VAC Power Panelboard SKXP, which is normally energized and energized for HSB, is affected by cables related to 2EXABIKSI and 0ETLPLSKXP that are routed though Fire Area 9, which credits the SSF as the assured safe shutdown train in the event of a fire. This is a breaker coordination issue, also. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	0ETLPLSKXP - 120 VAC Power Panelboard SKXP
Disposition	VFDR deterministically resolved by modification

VFDR ID	9-VFDR-25
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C, which is normally open and throttled for HSB, is affected by cable hits and SSF control limitations. To control S/G level and prevent overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 2CA-52 and 2CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C
Disposition	Recovery Action(s) required to satisfy risk criteria

VFDR ID	9-VFDR-27
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B, which is normally open and throttled for HSB, is affected by cable hits and SSF control limitations. To control S/G level and prevent overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 2CA-52 and 2CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B
Disposition	Recovery Action(s) required to satisfy risk criteria

Fire Area ID:	09 - Unit 2 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	9-VFDR-28
VFDR	Auxiliary Feedwater Turbine Driven Pump discharge to 2B S/G, which is normally open and open for HSB, is affected by cable hits and SSF control limitations. To control S/G level and prevent overfill, operate 2CA-54B per procedure AP/0/A/5500/045. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0054B - Auxiliary Feedwater Turbine Driven Pump discharge to 2B S/G
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	9-VFDR-38
VFDR	Pressurizer Heater Group 2A, which is normally cycled and off for HSB, is affected by power and cable hits that may result in Backup Pressurizer Heater Groups 2A and 2B not able to be de-energized from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	9-VFDR-39
VFDR	Pressurizer Heater Group 2B, which is normally cycled and off for HSB, is affected by power and cable hits that may result in Backup Pressurizer Heater Groups 2A and 2B not able to be de-energized from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	9-VFDR-47
VFDR	2A Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUA - 2A Reactor Coolant Pump
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID:	09 - Unit 2 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	9-VFDR-48
VFDR	2B Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUB - 2B Reactor Coolant Pump
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	9-VFDR-49
VFDR	2C Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUC - 2C Reactor Coolant Pump
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	9-VFDR-50
VFDR	2D Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUD - 2D Reactor Coolant Pump
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	9-VFDR-51
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures and possible loss of power (loss of offsite power and safety diesels not credited for this area) which could prevent closing valve. Pressurizer PORV may open due to cable failures. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	09 - Unit 2 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	9-VFDR-52
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits which can open the PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	9-VFDR-53
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures and possible loss of power (loss of offsite power and safety diesels not credited for this area) which could prevent closing valve. Pressurizer PORV may open due to cable failures. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	9-VFDR-54
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits which can open the PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	9-VFDR-65
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0876 - Standby Makeup Pump to Containment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 10 - Unit 1 Battery Room El 554 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
18A	U1 AB North Cable Shaft El 543
213	U1 AB Aux Cntrl Batt Rm 1CBA & 1CBB El 554
37	Vital Batt Rm 1EBA & 1EBB El 554
38	Vital Batt Rm 1EBC & 1EBD El 554
39	U1 Batt Rm El 554
60A	U1 AB North Cable Shaft El 574

Fire Area ID: 10 - Unit 1 Battery Room El 554 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	10 - Unit 1 Battery Room El 554	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID: CNC-1435.00-00-0035, Attachment 04 Fire Protection Evaluation for Floor Blockout Penetrations with a Free Area in Excess of 9 sqft. and Structural Framing Spans Exceeding 42 in. without a Cross Member Framing

Revision: 1

Inactive: No

Functionally Equivalent: No

Adequate for the Hazard: Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the following floor blockouts regarding the framing support provided for the Silicone Foam free areas exceeding 9 sqft. that are not bounded by typical details per DPC 1435.00-00-0006:

- H-AX-517A-F-001
- H-AX-517A-F-002
- H-AX-517B-F-001
- H-AX-517B-F-002
- H-AX-517B-F-003
- K-AX-653-F-001
- K-AX-653-F-032
- K-AX-653-F-003
- J-AX-650A-F-001

The evaluation determined that the Unit 1 and 2 Exterior Doghouse penetrations (J-AX-650A-F-001) are qualified for a 3-hour F and T rating. The remaining penetrations above are considered adequate for the area fire hazards based on the following:

- Detection available in fire areas of concern.
- Area hose stations and fire extinguishers.
- Fire brigade response.
- Seal and framing configurations for the penetrations are considered adequate.
- Seal integrity is not anticipated to be compromised by fire exposure.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID: CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive: No

Functionally Equivalent: No

Adequate for the Hazard: Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,

Fire Area ID: 10 - Unit 1 Battery Room El 554 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 15 Fire Protection Evaluation for OZ Gedney Plug Seal Located Beyond the Barrier Plane
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to evaluate the adequacy of the following penetrations that utilize OZ Gedney Plug Seals regarding seal configurations that do not conform to typical detail M-8 per DPC 1435.00-00-0006, which requires the plug to be located in the barrier plane:

- H-AX-517-W-098, -099, -100, -102, -103

The evaluation determined that the penetrations will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- The Type CFSF Gedney Plug utilized is an approved sealing device capable of achieving a 3-hour F rating.
- No combustibles are present in proximity to the penetrations in a manner that would result in a fire on the unexposed side as a result of heat transmission through the penetrations.
- The ability to achieve and maintain safe shutdown is not compromised.

Fire Area ID:	10 - Unit 1 Battery Room El 554	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 10 - Unit 1 Battery Room El 554
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
18A	U1 AB North Cable Shaft El 543	None	R	None	Detection System, Installed: R
213	U1 AB Aux Cntrl Batt Rm 1CBA & 1CBB El 554	None	R	None	Detection System, Installed: R
37	Vital Batt Rm 1EBA & 1EBB El 554	None	R	None	Detection System, Installed: R
38	Vital Batt Rm 1EBC & 1EBD El 554	None	R	None	Detection System, Installed: R
39	U1 Batt Rm El 554	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
60A	U1 AB North Cable Shaft El 574	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 10

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [1] 5.09E-07

Δ LERF Units: [1] 5.68E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria for delta CDF and LERF, but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

No Risk or DID enhancements or modifications are required for this fire area.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through the Unit 1 S/Gs (via 1CA-48 and/or 1CA-52) was evaluated for additional risk in this fire area with a related VFDR. The recovery action made a significant contribution to risk in this fire area and was identified as being required for risk; the additional risk was determined to be bounded by the VFDR delta risk. The action to throttle CA flow through the Unit 2 S/Gs (via 2CA-48 and/or 2CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the Unit 2 auxiliary feedwater flow control valves is recommended. Also, due to the contribution to risk of the reactor coolant pump variances, a DID recovery action is recommended to locally trip the Unit 1 reactor coolant pumps in the turbine building.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	10 - Unit 1 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	10-VFDR-01
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C, which is normally open and throttled for HSB, is affected by transfer to the SSF. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C
Disposition	Recovery Action(s) required to satisfy Risk criteria

VFDR ID	10-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B, which is normally open and throttled for HSB, is affected by transfer to the SSF. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B
Disposition	Recovery Action(s) required to satisfy Risk criteria

VFDR ID	10-VFDR-04
VFDR	Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation, which is normally open and open for HSB, is affected by cable hits which may spuriously operate the valve and prevent operation with the controls. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0054B - Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	10 - Unit 1 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	10-VFDR-08
VFDR	Pressurizer Heater Group 1A, which is normally cycled and cycled for HSB, is affected by power and cable hits which could result in the Backup Pressurizer Heater Group 1A not able to be de-energized from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	10-VFDR-09
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by power and cable hits which could result in the Backup Pressurizer Heater Group 1B not able to be de-energized from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	10-VFDR-13
VFDR	Reactor Coolant Pump 1A, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUA - Reactor Coolant Pump 1A
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	10-VFDR-14
VFDR	Reactor Coolant Pump 1B, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUB - Reactor Coolant Pump 1B
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID:	10 - Unit 1 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	10-VFDR-15
VFDR	Reactor Coolant Pump 1C, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUC - Reactor Coolant Pump 1C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	10-VFDR-16
VFDR	Reactor Coolant Pump 1D, which is normally on and off for HSB, is affected by cable and power failures which may prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUD - Reactor Coolant Pump 1D
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	10-VFDR-17
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by spurious cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area) could prevent closing valve. This would be an issue if the PORV spuriously opened before closure can be accomplished when the SSF actions are completed. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	10 - Unit 1 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	10-VFDR-18
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by spurious cable failures which may open the valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	10-VFDR-19
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by spurious cable failures and a possible loss of power (loss of offsite power and safety diesels not credited for this area) could prevent closing valve. This would be an issue if the PORV spuriously opened before closure can be accomplished when the SSF actions are completed. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	10-VFDR-20
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by spurious cable failures which may open the valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	10-VFDR-29
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0876 - Residual Heat Removal to Pressurizer Spray Outside Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	10 - Unit 1 Battery Room El 554	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	10-VFDR-36
VFDR	Pressurizer Heater Group 2B, which is normally cycled and cycled for HSB, is affected by interlock cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance -based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 11 (U1) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
184	U1 AB Rm 331 & 332 El 560
186	U2 AB Rm 301, 302, 305 & 307 El 560
1AB-2	U1 AB General Area El 560 (Filter Bunker Rooms)
33	U1 AB SE Corridor El 560
34	U1 AB Open Area & KC Pumps El 560
35	MCC Rm 1EMXJ & 1EMXB El 560
36	U1 AB Cable Tray Access Rm El 560
45	U2 AB NE Corridor El 560
46	U2 AB Open Area & KC Pumps El 560
47	MCC Rm 2EMXJ & 2EMXB El 560
48	U2 AB Cable Tray Access Rm El 560

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 11 (U1) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	11 (U1) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044

Fire Area ID:	11 (U1) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Fire Area ID: 11 (U1) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
184	U1 AB Rm 331 & 332 El 560	None	None	None	None
186	U2 AB Rm 301, 302, 305 & 307 El 560	None	None	None	None
1AB-2	U1 AB General Area El 560 (Filter Bunker Rooms)	None	None	None	None
33	U1 AB SE Corridor El 560	None	None	None	None
34	U1 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
35	MCC Rm 1EMXJ & 1EMXB El 560	None	None	None	None
36	U1 AB Cable Tray Access Rm El 560	None	None	None	None
45	U2 AB NE Corridor El 560	None	None	None	None
46	U2 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
47	MCC Rm 2EMXJ & 2EMXB El 560	None	None	None	None
48	U2 AB Cable Tray Access Rm El 560	None	None	None	None

Title
Fire Risk Evaluation for Fire Area 11 (U1)

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [1] 4.53E-09

Δ LERF
Units: [1] 1.80E-10

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic suppression was credited for severe KC pump fires, but no credit was taken for manual suppression for HGL and MCA evaluations. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID: 11 (U1) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common) **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	11 (U1)-VFDR-08
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	11 (U1)-VFDR-15
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NI 561. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	11 (U1)-VFDR-20
VFDR	Charging Line Containment Isolation, which is normally open and not utilized for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NV 545. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory and Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	11 (U1)-VFDR-21
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0876 - Standby Makeup Pump to Containment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 11 (U2) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
184	U1 AB Rm 331 & 332 El 560
186	U2 AB Rm 301, 302, 305 & 307 El 560
1AB-2	U1 AB General Area El 560 (Filter Bunker Rooms)
33	U1 AB SE Corridor El 560
34	U1 AB Open Area & KC Pumps El 560
35	MCC Rm 1EMXJ & 1EMXB El 560
36	U1 AB Cable Tray Access Rm El 560
45	U2 AB NE Corridor El 560
46	U2 AB Open Area & KC Pumps El 560
47	MCC Rm 2EMXJ & 2EMXB El 560
48	U2 AB Cable Tray Access Rm El 560

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 11 (U2) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	11 (U2) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044

Fire Area ID:	11 (U2) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Fire Area ID: 11 (U2) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
184	U1 AB Rm 331 & 332 El 560	None	None	None	None
186	U2 AB Rm 301, 302, 305 & 307 El 560	None	None	None	None
1AB-2	U1 AB General Area El 560 (Filter Bunker Rooms)	None	None	None	None
33	U1 AB SE Corridor El 560	None	None	None	None
34	U1 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
35	MCC Rm 1EMXJ & 1EMXB El 560	None	None	None	None
36	U1 AB Cable Tray Access Rm El 560	None	None	None	None
45	U2 AB NE Corridor El 560	None	None	None	None
46	U2 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
47	MCC Rm 2EMXJ & 2EMXB El 560	None	None	None	None
48	U2 AB Cable Tray Access Rm El 560	None	None	None	None

Title Fire Risk Evaluation for Fire Area 11 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 6.70E-09

Δ LERF Units: [2] 3.90E-10

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic suppression was credited for severe KC pump fires, but no credit was taken for manual suppression for HGL and MCA evaluations. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through these S/Gs (via CA-48 and/or CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	11 (U2) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	11 (U2)-VFDR-09
VFDR	Pressurizer Heater Group 2B, which is normally cycled and off for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action
VFDR ID	11 (U2)-VFDR-16
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 2*NI 561. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action
VFDR ID	11 (U2)-VFDR-22
VFDR	Charging Line Containment Isolation, which is normally open and not utilized for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 2*NV 545. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory and Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action
VFDR ID	11 (U2)-VFDR-23
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0876 - Standby Makeup Pump to Containment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 12 - Unit 2 Electrical Pen Room El 577 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
63	U2 AB Elect Pen Rm El 577

Fire Area ID: 12 - Unit 2 Electrical Pen Room El 577 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORV and block and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 12 - Unit 2 Electrical Pen Room El 577 — **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Fire Area ID:	12 - Unit 2 Electrical Pen Room EI 577 — **Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

- Areas adjacent to walls have smoke detection.
- Fire and smoke would be obstructed from propagating.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 12 - Unit 2 Electrical Pen Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
63	U2 AB Elect Pen Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title
Fire Risk Evaluation for Fire Area 12

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [2] 3.01E-08

Δ LERF
Units: [2] 5.57E-09

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited in HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-05
VFDR	Train B Related Incore Thermocouples, which is normally available and available for HSB, is affected by cable and power hits to monitoring devices. Both Hot Leg (loops A, B, C, D) and Incore Thermocouple temperature monitoring success paths are impacted. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ENATE_TRAIN_B - Train B Related Incore Thermocouples
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-06
VFDR	Nuclear Instrument Source Range Detector Channel 1 (N31), which is normally available and available for HSB, is affected by multiple power and cable hits to 2ENBDTNSDT0001. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ENBDTNSDT0001 - Nuclear Instrument Source Range Detector Channel 1 (N31)
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-07
VFDR	Nuclear Instrument Source Range Detector Channel 2 (N32), which is normally available and available for HSB, is affected by cable hits to 2ENBDTNSDT0005. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ENBDTNSDT0005 - Nuclear Instrument Source Range Detector Channel 2 (N32),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-08
VFDR	Non Coordination Loads fed from 2EPLPLEPD, which is normally available and available for HSB, is affected by 2EPD BKR # 05 not coordinated (Refer to AREVA calculation 32-9139535-000). Cable 2*IRE 761 does not coordinate for this FA. This causes loss of 2EPD and all credited loads from this bus. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPLPLEPD-NCL - Non Coordination Loads fed from 2EPLPLEPD
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-09
VFDR	Residual Heat Removal Pump 2A Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by cable hits (2*FW 563 and 2*FW 562) which can cause failure of at least 2 out of 4 FWST Level Indication that may cause a FWST Low Level signal (concurrent with a spurious SI signal) which will open 2NI-185A. There is a potential loss of power to both 2FW VA0027A and 2NI VA0185A. Partial operation of these valves and subsequent loss of power can cause a diversion path from FWST to the containment sump. 2FW-27A and 2NI-185A fail as is on a loss of power. Valves 2NI-185A or 2FW-27A are required to be closed to maintain FWST supply. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2FW VA0027A - Residual Heat Removal Pump 2A Suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-10
VFDR	Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by A train 4KV bus assumed to fail, and 2ILE-PZRHTRA has numerous cable hits. The B train electrical bus is available, with the exception of 2EPLPLEPD, which causes loss of control of 2ILE-PZRHTRB. Hits to cables 2*NC 608 and 2*NC 615 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously energize relay KE, which is designed to cut power to the 2ILE-PZRHTRB heaters on low pressurizer level. All four banks of pressurizer heaters may be unavailable. One set of pressurizer heater banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater bank B (2ILE-PZRHTRB) is credited in this Fire Area. Fuses AA-6 (1A) and AA-8 (1A) in 2EATC1 (Fire Area 5) (shown on CNEE-0211-03.09-02) can be removed to allow control room operation of 2ILE-PZRHTRB, with 2EPLPLEPD resolved. This causes loss of the low pressurizer level cutout circuit. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-11
VFDR	Pressurizer Heater Group 2B, which is normally cycled and cycled for HSB, is affected by A train 4KV bus assumed to fail, and 2ILE-PZRHTRA has numerous cable hits. The B train electrical bus is available, with the exception of 2EPLPLEPD, which causes loss of control of 2ILE-PZRHTRB. Hits to cables 2*NC 608 and 2*NC 615 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously energize relay KE, which is designed to cut power to the 2ILE-PZRHTRB heaters on low pressurizer level. All four banks of pressurizer heaters may be unavailable. One set of pressurizer heater banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater bank B (2ILE-PZRHTRB) is credited in this Fire Area. Fuses AA-6 (1A) and AA-8 (1A) in 2EATC1 (Fire Area 5) (shown on CNEE-0211-03.09-02) can be removed to allow control room operation of 2ILE-PZRHTRB, with 2EPLPLEPD resolved. This causes loss of the low pressurizer level cutout circuit. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-12
VFDR	Pressurizer Heater Group 2C, which is normally cycled and off for HSB, is affected by A train 4KV bus assumed to fail, and 2ILE-PZRHTRA has numerous cable hits. The B train electrical bus is available, with the exception of 2EPLPLEPD, which causes loss of control of 2ILE-PZRHTRB. Hits to cables 2*NC 608 and 2*NC 615 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously energize relay KE, which is designed to cut power to the 2ILE-PZRHTRB heaters on low pressurizer level. All four banks of pressurizer heaters may be unavailable. One set of pressurizer heater banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater bank B (2ILE-PZRHTRB) is credited in this Fire Area. Fuses AA-6 (1A) and AA-8 (1A) in 2EATC1 (Fire Area 5) (shown on CNEE-0211-03.09-02) can be removed to allow control room operation of 2ILE-PZRHTRB, with 2EPLPLEPD resolved. This causes loss of the low pressurizer level cutout circuit. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRC - Pressurizer Heater Group 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-15
VFDR	Pressurizer Level Ch. 2, which is normally available and available for HSB, is affected by a cable hit to cable 2*NC 615 which results in loss of the instrument. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5153 - Pressurizer Level Ch. 2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-17
VFDR	Pressurizer Level Ch. 1, which is normally available and available for HSB, is affected by cable and power hits to cable 2*NC 608 to LT, or power 2EPGPLERPA. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5164 - Pressurizer Level Ch. 1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-18
VFDR	Pressurizer Level Ch. 3, which is normally available and available for HSB, is affected by a hit to the power to 2EPGPLERPC. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5174 - Pressurizer Level Ch. 3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-23
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by multiple cable hits which may spuriously energize the PORV and prevent closing the block valve. SSF disconnects will close valve. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-24
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by spurious SSPS and power loss which will prevent closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-25
VFDR	Residual Heat Removal Pump 2A Suction from Containment Sump, which is normally closed and not utilized for HSB, is affected by cable hits that may cause a FWST Low Level signal (concurrent with a spurious SI signal) which will open 2NI-185A. There is a potential loss of power to both 2FW VA0027A and 2NI VA0185A. Partial operation of these valves and subsequent loss of power can cause a diversion path from FWST to the containment sump. 2FW-27A and 2NI-185A fail as is on a loss of power. Valves 2NI-185A or 2FW-27A are required to be closed to maintain FWST supply. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0185A - Residual Heat Removal Pump 2A Suction from Containment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 12 - Unit 2 Electrical Pen Room El 577 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	12-VFDR-26
VFDR	2A Containment Spray Pump, which is normally off and off for HSB, is affected by a cable hit on 2*NS 534 which can provide a permissive for a 2NS PUA pump start. A hot short on cable 2*ATC 853 can provide a 2NS PUA pump start, or a hot short on cable 2*RN 661 along with a 2EQB-DGLSA permissive can provide a 2NS PUA pump start. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS PUA - 2A Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-27
VFDR	Containment Spray Pump 2A suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by cable hits on 2NS PUA can cause spurious start of NS pump. Cable hits on 2NS VA0029A and 2NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 2NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0020A - Containment Spray Pump 2A suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-28
VFDR	Containment Spray Header 2A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 2NS PUA (2*NS 534 and 2*ATC 853) that can cause a spurious start of the NS pump. A hot short on 2*NS 528 or a hot short on cable 2*NS 544 along with a spurious SSPS permissive can cause spurious opening of valves 2NS VA0029A and 2NS VA0032A. There is a potential loss of power to 2NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0029A - Containment Spray Header 2A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-29
VFDR	Containment Spray Header 2A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 2NS PUA (2*NS 534 and 2*ATC 853) that can cause a spurious start of the NS pump. A hot short on 2*NS 528 or a hot short on cable 2*NS 544 along with a spurious SSPS permissive can cause spurious opening of valves 2NS VA0029A and 2NS VA0032A. There is a potential loss of power to 2NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0032A - Containment Spray Header 2A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-30
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by various cable hits that can spuriously energize and open 2NV VA0001A. SSF disconnect will close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-31
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by various cable hits that can spuriously energize and open 2NV VA0002A. SSF disconnect will close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0002A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-32
VFDR	Letdown Orifice 2B Containment Isolation, which is normally open and closed for HSB, is affected by various cable hits that can spuriously energize and open 2NV VA0010A. SSF disconnect will close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0010A - Letdown Orifice 2B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-33
VFDR	Letdown Orifice 2C Containment Isolation, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously energize and open 2NV VA0011A. SSF disconnect will close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0011A - Letdown Orifice 2C Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-34
VFDR	Letdown Orifice 2A Containment Isolation, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously energize and open 2NV VA0013A. SSF disconnect will close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0013A - Letdown Orifice 2A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-35
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air which fails valve full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-36
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by a spurious SI signal and subsequent loss of power. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	12-VFDR-37
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by a cable hit on 2*IRE 761 that may cause loss of power for 2EPD which will cause the PORV to open. Instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV, which is normally closed and cycled for HSB
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	12-VFDR-38
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by a cable hit on 2*IRE 761 that may cause loss of power for 2EPD which will cause the PORV to open. Instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV, which is normally closed and cycled for HSB
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	12 - Unit 2 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	12-VFDR-39
VFDR	SG C Steam Line Pressure CH #2, which is normally available and available for HSB, is affected by cable hits. Train A power is not credited in this Train B shutdown area. Train A indicator 2SM P 5140 is not available due to cable hits and Train A indicator 2SM P 5160 is not availabe due to Train A power not credited. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SM P 5150 - SG C Steam Line Pressure CH #2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
54	U1 AB Elect Pen Rm El 577

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID: 13 - Unit 1 Electrical Pen Room EI 577 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

• Areas adjacent to walls have smoke detection.

• Fire and smoke would be obstructed from propagating.

• Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

• Lack of potential fire ignition sources and continuity of combustibles.

• Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.

• Administrative controls for storage and use of combustible materials.

• Robust configuration of walls with embedded sheet metal boxes.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
54	U1 AB Elect Pen Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 13

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 5.07E-08

Δ LERF Units: [1] 8.50E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited in HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	13 - Unit 1 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	13-VFDR-06
VFDR	Train B Related Incore Thermocouples, which is normally available and available for HSB, is affected by cable and power hits to monitoring devices. Both Hot Leg (loops A, B, C, D) and Incore Thermocouple temperature monitoring success paths are impacted. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENATE_TRAIN_B - Train B Related Incore Thermocouples
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	13-VFDR-07
VFDR	Nuclear Instrument Source Range Detector Channel 1 (N31), which is normally available and available for HSB, is affected by power and multiple cable hits to 1ENBDTNSDT0001. Open conductors on the cable hit could receive spurious signal from the detectors. Wide range detector is available (1ENCDTNSDT0014, 1ENCP 5050). This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENBDTNSDT0001 - Nuclear Instrument Source Range Detector Channel 1 (N31),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	13-VFDR-08
VFDR	Nuclear Instrument Source Range Detector Channel 2 (N32), which is normally available and available for HSB, is affected by multiple cable hits to 1ENBDTNSDT0005. Open conductors on the cable hit could receive spurious signal from the detectors. Wide range detector is available (1ENCDTNSDT0014, 1ENCP 5050). This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENBDTNSDT0005 - Nuclear Instrument Source Range Detector Channel 2 (N32),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577 — **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	13-VFDR-09
VFDR	Non Coordinated Loads fed from 1EPLPLEPD, which is normally available and available for HSB, is affected by non-coordinated 1EPD BKR # 05. Also, cable 1*IRE 761 does not coordinate for this FA. This causes loss of 1EPD and all credited loads from this bus. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPLPLEPD-NCL - Non Coordinated Loads fed from 1EPLPLEPD
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-10
VFDR	Residual Heat Removal Pump 1A Suction from Borated Water Storage Tank, which is normally closed and closed for HSB, is affected by cable hits (2*FW 563 and 2*FW 562) which can cause failure of at least 2 out of 4 FWST Level Indication that may cause a FWST Low Level signal (concurrent with a spurious SI signal) which will open 2NI-185A. There is a potential loss of power to both 2FW VA0027A and 2NI VA0185A. Partial operation of these valves and subsequent loss of power can cause a diversion path from FWST to the containment sump. 2FW-27A and 2NI-185A fail as is on a loss of power. Valves 2NI-185A or 2FW-27A are required to be closed to maintain FWST supply. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1FW VA0027A - Residual Heat Removal Pump 1A Suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-11
VFDR	Pressurizer Heater Group 1A, which is normally cycled and cycled for HSB, is affected by A train 4KV bus assumed to fail, and 1ILE-PZRHTRA has numerous cable hits. The B train electrical bus is available, with the exception of 1EPLPLEPD, which causes loss of control of 1ILE-PZRHTRB. Hits to cables 1*NC 608 and 1*NC 615 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously energize relay KE, which is designed to cut power to the 1ILE-PZRHTRB heaters on low pressurizer level. All four banks of pressurizer heaters may be unavailable. One set of pressurizer heater banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater bank B (1ILE-PZRHTRB) is credited in this Fire Area. Fuses AA-8 (1A) and AA-6 (1A) in 1EATC1 (Fire Area 6) (shown on CNEE-0111-03.09-02) can be removed to allow control room operation of 1ILE-PZRHTRB, with 1EPLPLEPD resolved. This causes loss of the low pressurizer level cutout circuit. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	13 - Unit 1 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 13-VFDR-12

VFDR Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by A train 4KV bus assumed to fail, and 1ILE-PZRHTRA has numerous cable hits. The B train electrical bus is available, with the exception of 1EPLPLEPD, which causes loss of control of 1ILE-PZRHTRB. Hits to cables 1*NC 608 and 1*NC 615 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously energize relay KE, which is designed to cut power to the 1ILE-PZRHTRB heaters on low pressurizer level. All four banks of pressurizer heaters may be unavailable. One set of pressurizer heater banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater bank B (1ILE-PZRHTRB) is credited in this Fire Area. Fuses AA-8 (1A) and AA-6 (1A) in 1EATC1 (Fire Area 6) (shown on CNEE-0111-03.09-02) can be removed to allow control room operation of 1ILE-PZRHTRB, with 1EPLPLEPD resolved. This causes loss of the low pressurizer level cutout circuit. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1ILE-PZRHTRB - Pressurizer Heater Group 1B

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 13-VFDR-13

VFDR Pressurizer Heater Group 1C, which is normally cycled and off for HSB, is affected by A train 4KV bus assumed to fail, and 1ILE-PZRHTRA has numerous cable hits. The B train electrical bus is available, with the exception of 1EPLPLEPD, which causes loss of control of 1ILE-PZRHTRB. Hits to cables 1*NC 608 and 1*NC 615 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously energize relay KE, which is designed to cut power to the 1ILE-PZRHTRB heaters on low pressurizer level. All four banks of pressurizer heaters may be unavailable. One set of pressurizer heater banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater bank B (1ILE-PZRHTRB) is credited in this Fire Area. Fuses AA-8 (1A) and AA-6 (1A) in 1EATC1 (Fire Area 6) (shown on CNEE-0111-03.09-02) can be removed to allow control room operation of 1ILE-PZRHTRB, with 1EPLPLEPD resolved. This causes loss of the low pressurizer level cutout circuit. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1ILE-PZRHTRC - Pressurizer Heater Group 1C

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 13-VFDR-16

VFDR Pressurizer Level Ch. 2, which is normally available and available for HSB, is affected by a cable hit (1*NC 615) to the PT that could make component unavailable. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC P 5153 - Pressurizer Level Ch. 2

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 13 - Unit 1 Electrical Pen Room EI 577 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	13-VFDR-18
VFDR	Pressurizer Level Ch. 1, which is normally available and available for HSB, is affected by a power and cable hit (1*NC 608) that could make component unavailable. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5164 - Pressurizer Level Ch. 1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	13-VFDR-19
VFDR	Pressurizer Level Ch. 3, which is normally available and available for HSB, is affected by a power hit that could make component unavailable. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5174 - Pressurizer Level Ch. 3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	13-VFDR-24
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by a cable hit which may spuriously open the PORV, and prevent closing the block valve. Removing Unit 1 Train A Disconnect plug and placing it in the SSF receptacle will close PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-25
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a spurious SSPS and a power loss that prevents closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	13 - Unit 1 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	13-VFDR-26
VFDR	Residual Heat Removal Pump 1A Suction from Containment Sump, which is normally closed and not utilized for HSB, is affected by cable hits (1*FW 563 and 1*FW 562) which can cause failure of at least 2 out of 4 FWST Level Indication that may cause a FWST Low Level signal (concurrent with a spurious SI signal) which will open 1NI-185A. There is a potential loss of power to both 1FW VA0027A and 1NI VA0185A. Partial operation of these valves and subsequent loss of power can cause a diversion path from FWST to the containment sump. 1FW-27A and 1NI-185A fail as is on a loss of power. Valves 1NI-185A or 1FW-27A are required to be closed to maintain FWST supply. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0185A - Residual Heat Removal Pump 1A Suction from Containment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-27
VFDR	1A Containment Spray Pump, which is normally off and off for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. Cable 1*NS 534 can provide a permissive for a 1NS PUA pump start. A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start. A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A, or a short on cable 1*NS 544 along with a 1IPE-SSPSA permissive can provide an Open signal to both 1NS VA0029A and 1NS VA0032A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS PUA - 1A Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-28
VFDR	Containment Spray Pump 1A suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. Cable 1*NS 534 can provide a permissive for a 1NS PUA pump start. A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start. A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A, or a short on cable 1*NS 544 along with a 1IPE-SSPSA permissive can provide an Open signal to both 1NS VA0029A and 1NS VA0032A. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0020A - Containment Spray Pump 1A suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

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VFDR ID 13-VFDR-29

VFDR Containment Spray Pump 1A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. Cable 1*NS 534 can provide a permissive for a 1NS PUA pump start. A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start. A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A, or a short on cable 1*NS 544 along with a 1IPE-SSPSA permissive can provide an Open signal to both 1NS VA0029A and 1NS VA0032A. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NS VA0029A - Containment Spray Pump 1A Containment Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 13-VFDR-30

VFDR Containment Spray Pump 1A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. Cable 1*NS 534 can provide a permissive for a 1NS PUA pump start. A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start. A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A, or a short on cable 1*NS 544 along with a 1IPE-SSPSA permissive can provide an Open signal to both 1NS VA0029A and 1NS VA0032A. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NS VA0032A - Containment Spray Pump 1A Containment Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 13-VFDR-31

VFDR Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable hits that may spuriously energize and open the letdown isolations. Open Breaker 1EDE-F01J to de-energize valves 1NV-1A, 1NV-2A, 1NV-39A, 1NV-186A, and 1NV-238A. Swapping SSF disconnects will also ensure these valves are shut. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	13-VFDR-32
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable hits that may spuriously energize and open the letdown isolations. Open Breaker 1EDE-F01J to de-energize valves 1NV-1A, 1NV-2A, 1NV-39A, 1NV-186A, and 1NV-238A. Swapping SSF disconnects will also ensure these valves are shut. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0002A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-33
VFDR	Letdown Orifice 1B Outlet Containment Isolation, which is normally open and closed for HSB, is affected by cable hits which may spuriously energize and open the letdown isolations. Open Breaker 1EDE-F01J to de-energize valves 1NV-1A, 1NV-2A, 1NV-39A, 1NV-186A, and 1NV-238A. The actions required on PH-13-100 (Swapping SSF disconnects) will also ensure these valves are shut. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0010A - Letdown Orifice 1B Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-34
VFDR	Letdown Orifice 1C Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits which may spuriously energize and open the letdown isolations. Open Breaker 1EDE-F01J to de-energize valves 1NV-1A, 1NV-2A, 1NV-39A, 1NV-186A, and 1NV-238A. The actions required on PH-13-100 (Swapping SSF disconnects) will also ensure these valves are shut. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0011A - Letdown Orifice 1C Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	13 - Unit 1 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	13-VFDR-35
VFDR	Letdown Orifice 1A Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits which may spuriously energize and open the letdown isolations. Open Breaker 1EDE-F01J to de-energize valves 1NV-1A, 1NV-2A, 1NV-39A, 1NV-186A, and 1NV-238A. The actions required on PH-13-100 (Swapping SSF disconnects) will also ensure these valves are shut. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0013A - Letdown Orifice 1A Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	13-VFDR-36
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	13-VFDR-37
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by spurious SSPS which closes valve and power loss which will prevent opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	13 - Unit 1 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	13-VFDR-38
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by loss of instrument air or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-39
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by loss of instrument air or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	13-VFDR-40
VFDR	SG C Steam Line Pressure CH #2, which is normally available and available for HSB, is affected by cable hits. Train A power is not credited in this Train B shutdown area. Train A indicator 1SM P 5140 is not available due to cable hits and Train A indicator 1SM P 5160 is not availabe due to Train A power not credited. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SM P 5150 - SG C Steam Line Pressure CH #2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	13 - Unit 1 Electrical Pen Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	13-VFDR-41
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals may prevent normal control of charging flow. Valve fails open on loss of air. Failure of valve NV-309 would result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 14 - Unit 2 4160V Essential SWGR Room El 577 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
62	U2 AB A-SWGR Rm El 577

Fire Area ID: 14 - Unit 2 4160V Essential SWGR Room El 577 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 14 - Unit 2 4160V Essential SWGR Room El 577 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	14 - Unit 2 4160V Essential SWGR Room EI 577	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

- Areas adjacent to walls have smoke detection.
- Fire and smoke would be obstructed from propagating.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers

Revision 4

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,

Fire Area ID:	14 - Unit 2 4160V Essential SWGR Room El 577	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Fire Area ID: 14 - Unit 2 4160V Essential SWGR Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
62	U2 AB A-SWGR Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 14

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 9.12E-07

Δ LERF Units: [2] 6.67E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria for delta CDF and LERF, but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID: 14 - Unit 2 4160V Essential SWGR Room El 577 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	14-VFDR-03
VFDR	Residual Heat Removal Pump 2A Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by spurious operation or a loss of power and control due to the cable failures. Spurious operation of FW-27A, ND PUA, and NS-43A may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the Train A containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2FW VA0027A - Residual Heat Removal Pump 2A Suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)
VFDR ID	14-VFDR-05
VFDR	Pressurizer PORV isolation, which is normally open and closed for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 2*ATC 521 that may open or close valve. Hits may also spuriously energize (open) the PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0033A - Pressurizer PORV isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action
VFDR ID	14-VFDR-06
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by multiple cable hits that may spuriously energize (open) the PORV. They may also prevent closing the block valve. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	14 - Unit 2 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	14-VFDR-07
VFDR	2A RHR Pump, which is normally off and off for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of components FW-27A, ND PUA, and NS-43A may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the Train A containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ND PUA - 2A RHR Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-09
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a spurious SSPS and power loss prevent operating valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-10
VFDR	2A Containment Spray Pump, which is normally off and off for HSB, is affected by cable hits on 2NS PUA which can cause spurious start of NS pump. Cable hits on 2NS VA0029A, and 2NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 2NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. NS pump breaker is in the fire area. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS PUA - 2A Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	14 - Unit 2 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	14-VFDR-11
VFDR	Containment Spray Pump 2A suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by a potential loss of power. Cable hits on 2NS PUA can cause spurious start of NS pump. Cable hits on 2NS VA0029A and 2NS VA0032A can cause spurious opening of valves. This can cause a diversion of FWST inventory to the containment via the containment spray header. NS pump breaker is in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0020A - Containment Spray Pump 2A suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-12
VFDR	Containment Spray Header 2A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 2NS VA0029A and 2NS VA0032A which can cause spurious opening of valves. Cable hits on 2NS PUA can cause spurious start of NS pump. There is a potential loss of power to 2NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. NS pump breaker is in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0029A - Containment Spray Header 2A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-13
VFDR	Containment Spray Header 2A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 2NS VA0029A and 2NS VA0032A which can cause spurious opening of valves. Cable hits on 2NS PUA can cause spurious start of NS pump. There is a potential loss of power to 2NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. NS pump breaker is in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0032A - Containment Spray Header 2A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	14 - Unit 2 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	14-VFDR-14
VFDR	2A Residual Heat Removal Pump to Containment Spray Header, which is normally closed and not utilized for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of components FW-27A, ND PUA, and NS-43A may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the Train A containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NS VA0043A - 2A Residual Heat Removal Pump to Containment Spray Header
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-17
VFDR	2A Charging Pump, which is normally on and off for HSB, is affected by a spurious start signal created from cable hits on 2*ATC 1006 & 2*NV 599. AP/0/A/5500/045 contains a step to start the Train B NV pump and trip the Train A NV pump, however the power feed (2ETA BKR #12) and the 125VDC control power feed (2EDE BKR #F01C) panels are both located in FA 14. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV PUACC - 2A Charging Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-19
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable faults (2*NV 632) that may spuriously energize (keep open) 2NV VA0001A, 2A, 11A and 13A (2NV VA0010A and 2NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 2NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	14 - Unit 2 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 14-VFDR-20

VFDR Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable faults (2*NV 632) that may spuriously energize (keep open) 2NV VA0001A, 2A, 11A, and 13A (2NV VA0010A and 2NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 2NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NV VA0002A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 14-VFDR-21

VFDR Letdown Orifice 2C Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable faults (2*NV 632) may spuriously energize (keep open) 2NV VA0001A, 2A, 11A and 13A (2NV VA0010A and 2NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 2NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NV VA0011A - Letdown Orifice 2C Outlet Containment Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 14-VFDR-22

VFDR Letdown Orifice 2A Containment Isolation, which is normally closed and closed for HSB, is affected by cable faults (2*NV 632) may spuriously energize (keep open) 2NV VA0001A, 2A, 11A and 13A (2NV VA0010A and 2NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 2NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NV VA0013A - Letdown Orifice 2A Containment Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	14 - Unit 2 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	14-VFDR-23
VFDR	2A and 2B Chemical and Volume Control Pumps recirculation, which is normally open and open for HSB, is affected by hot shorts on cable 2*NV 630 that my cause spurious closure of charging mini flow recirculation path (2NV VA203A) and normal charging flow path (2NV VA0312A). Alternate charging path through 2NI VA0010B remains available. Seal injection path remains available. This failure condition may challenge the Inventory and Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0203A - 2A and 2B Chemical and Volume Control Pumps recirculation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-24
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of insturment air, power, and SSPS signals. 2NV VA0294 fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	14-VFDR-25
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, power, and SSPS signals. 2NV VA0309 fails open on loss of air which may require manually operating manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 14 - Unit 2 4160V Essential SWGR Room EI 577 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	14-VFDR-26
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by a spurious SSPS that closes and a power loss that prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-28
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by the possible loss of instrument air or a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	14-VFDR-29
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by the possible loss of instrument air or a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 15 - Unit 1 4160V Essential SWGR Room El 577 **Fire Area Definition**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
53	U1 AB A-SWGR Rm El 577

Fire Area ID: 15 - Unit 1 4160V Essential SWGR Room El 577

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 15 - Unit 1 4160V Essential SWGR Room El 577 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 08 Deletion of U1/U2, A and B Train Switchgear Room/Elect Pen Room Walls from Scope of Committed Fire Bariers (CNCE-10095)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the technical justification for removing the walls between the Essential Switchgear Rooms and their respective penetration rooms from the scope of committed fire barriers.

The evaluation concluded that the Essential Switchgear Room/Electrical Pen Room walls can be removed from the scope of the committed fire barriers based on the following:

- Areas adjacent to walls have smoke detection.
- Fire and smoke would be obstructed from propagating.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Revision	
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID	CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers
Revision	4
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room EI 577	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 15 - Unit 1 4160V Essential SWGR Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
53	U1 AB A-SWGR Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 15

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [1] 5.55E-07

Δ LERF Units: [1] 4.11E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria for delta CDF and LERF, but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-04
VFDR	Non Coordinated Loads fed from 1EPEMXEMXL, which is normally available and available for HSB, is affected by a coordination concern for 1EPEMXEMXL in Fire Area 15 due to the failure of cable 1*NC 972. Cable 1*NC 972 is fed from breaker F01C. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPEMXEMXL-NCL - Non Coordinated Loads fed from 1EPEMXEMXL
Disposition	VFDR deterministically resolved by modification

VFDR ID	15-VFDR-05
VFDR	Residual Heat Removal Pump 1A Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by spurious operation or loss of power and control due to the cable failures. Spurious operation of FW-27A, ND PUA, and NS-43A may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the Train A containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1FW VA0027A - Residual Heat Removal Pump 1A Suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	15-VFDR-07
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*ATC 521 that may open or close valve. Multiple cable hits may spuriously energize the PORV and prevent closing the block valve. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0033A - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-08
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by multiple cable hits that may spuriously energize the PORV. These cable hits may also prevent closing the block valve. The block valve cable hit (1*ATC 521) can spuriously open or close the block valve. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-09
VFDR	1A Residual Heat Removal Pump, which is normally off and off for HSB, is affected by a spurious operation or loss of power and control due to the cable failures of components FW-27A, ND PUA, and NS-43A that may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the Train A containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ND PUA - 1A Residual Heat Removal Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-11
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a spurious SSPS and power loss prevent closing the valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room EI 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-12
VFDR	1A Containment Spray Pump, which is normally off and off for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS PUA - 1A Containment Spray Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-13
VFDR	Containment Spray Pump 1A suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0020A - Containment Spray Pump 1A suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-14
VFDR	Containment Spray Header 1A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0029A - Containment Spray Header 1A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-15
VFDR	Containment Spray Header 1A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0029A and 1NS VA0032A can cause spurious opening of valves. There is a potential loss of power to 1NS VA0020A. This can cause a diversion of FWST inventory to the containment via the containment spray header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0032A - Containment Spray Header 1A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-16
VFDR	1A Residual Heat Removal Pump to Containment Spray Header, which is normally closed and as-is for HSB, is affected by a spurious operation or loss of power and control due to the cable failures of components FW-27A, ND PUA, and NS-43A may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the Train A containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0043A - 1A Residual Heat Removal Pump to Containment Spray Header
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-18
VFDR	1A Charging Pump, which is normally on and off for HSB, is affected by a spurious start signal created from cable hits on 1*ATC 1006 and 1*NV 599. The power feed (1ETA BKR #12) and the 125VDC control power feed (1EDE BKR #F01C) panels are both located in FA 15. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV PUACC - 1A Charging Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-21
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable hits that may keep valve open. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-22
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable hits that may keep valve open. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0002A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-23
VFDR	Letdown Orifice 1B Outlet Containment Isolation, which is normally open and closed for HSB, is affected by cable hits that may keep valve open. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0010A - Letdown Orifice 1B Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-24
VFDR	Letdown Orifice 1C Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits that may keep valve open. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0011A - Letdown Orifice 1C Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-25
VFDR	Letdown Orifice 1A Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits that may keep valve open. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0013A - Letdown Orifice 1A Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	15-VFDR-26
VFDR	1A and 1B chemical and volume control pumps recirculation, which is normally open and open for HSB, is affected by cable hits that may spuriously close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0203A - 1A and 1B chemical and volume control pumps recirculation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-27
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals may prevent normal control of charging flow. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-28
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals may prevent normal control of charging flow. Valve fails open on loss of air. Failure of valve NV-309 would result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-29
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by a spurious SSPS signal that closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-31
VFDR	1A Nuclear Service Water Pump, which is normally on and off for HSB, is affected by cable hits that cause spurious signal to start RN PUA and spurious operation of other A train components (1RN-3A, 1RN-28A, and 1RN-847A) which may cause drain down of the NSW pond to the lake via the A diesel. RN PUA needs to be disabled and ensuring RN PUB is running. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN PUA - 1A Nuclear Service Water Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 15 - Unit 1 4160V Essential SWGR Room El 577 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	15-VFDR-32
VFDR	Service Water P/H Pit A Isolation from Standby Nuclear Service Water Pond, which is normally closed and cycled for HSB, is affected by cable hits that cause spurious signal to start RN PUA and spurious operation of other A train components (1RN-3A, 1RN-28A, and 1RN-847A) which may cause drain down of the NSW pond to the lake via the A diesel. RN PUA needs to be disabled and ensuring RN PUB is running. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0003A - Service Water P/H Pit A Isolation from Standby Nuclear Service Water Pond
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	15-VFDR-33
VFDR	1A Nuclear Service Water Pump Discharge Isolation, which is normally open and open for HSB, is affected by cable hits that cause spurious signal to start RN PUA and spurious operation of other A train components (1RN-3A, 1RN-28A, and 1RN-847A) which may cause drain down of the NSW pond to the lake via the A diesel. RN PUA needs to be disabled and ensuring RN PUB is running. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0028A - 1A Nuclear Service Water Pump Discharge Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	15-VFDR-34
VFDR	1A D/G Heat Exchanger Return to Lake, which is normally open and cycled for HSB, is affected by cable hits that cause spurious signal to start RN PUA and spurious operation of other A train components (1RN-3A, 1RN-28A, and 1RN-847A) which may cause drain down of the NSW pond to the lake via the A diesel. RN PUA needs to be disabled and ensuring RN PUB is running. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0847A - 1A D/G Heat Exchanger Return to Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	15 - Unit 1 4160V Essential SWGR Room El 577	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	15-VFDR-35
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by possible loss of instrument air or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	15-VFDR-36
VFDR	S/G 1C PORV, which is normally closed and cycled for HSB, is affected by possible loss of instrument air or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 16 - Unit 2 Cable Room El 574 **Fire Area Definition**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
69	U2 AB Cable Rm El 574

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 16 - Unit 2 Cable Room El 574 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolating the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Let down as necessary using the reactor head vents.	
3. Pressure Control Function	Pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 16 - Unit 2 Cable Room El 574 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers: • C-AX-217-W-008, -013, -014, -021, -025, -028, -029 • C-AX-228-W-028, -029, -030, • C-AX-260-W-049, -050, -053, -068, -074 • D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107 • D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063 • F-AX-348-W-085, -097, -114, -115 • F-AX-354A-W-035, -036, -039, -040, -044 • F-AX-354-W-021, -027, -028, -032, -033 • H-AX-515-W-013 • H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094 • J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010 • J-AX-518-W-001, -002, -005, -006, -008 • J-AX-533-W-001, -002 The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following: • Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited. • Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response. • The ability to achieve and maintain safe shutdown is not compromised.
Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 06 Deletion of Control Room Floor from Scope of Committed Fire Barriers (CNCE-9584)
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Fire Area ID:	16 - Unit 2 Cable Room El 574	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to provide the technical justification for removing the Control Room floor from the scope of committed fire barriers.

The evaluation concluded that the Control Room floor can be removed from the scope of the committed fire barriers based on the following:

- Insignificant amount of combustible loading.
- Lack of ignition sources.
- Cable spreading room and main control boards are supplied with ionization smoke detectors.

Engineering Evaluation ID Revision: CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Inactive: No

Functionally Equivalent: No

Adequate for the Hazard: Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 16 - Unit 2 Cable Room El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
69	U2 AB Cable Rm El 574	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 16

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 1.27E-07

Δ LERF Units: [2] 3.06E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are above the screening acceptance criteria for delta CDF and LERF, but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient welding and cutting fires are a significant contributor to risk in this fire area. However, present hot work controls are sufficient and no enhancement is required.

No Risk or DID enhancements or modifications are required for this fire area to satisfy Risk or DID criteria.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through the Unit 2 S/Gs (via 2CA-48 and/or 2CA-52) was evaluated for additional risk in this fire area with a related VFDR. The recovery action made a significant contribution to risk in this fire area and was identified as being required for risk; the additional risk was determined to be bounded by the VFDR delta risk. The action to throttle CA flow through the Unit 1 S/Gs (via 1CA-48 and/or 1CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the Unit 1 auxiliary feedwater flow control valves is recommended. Also, due to the contribution to risk of the reactor coolant pump variances, a DID recovery action is recommended to locally trip the Unit 2 reactor coolant pumps in the turbine building.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	16 - Unit 2 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	16-VFDR-01
VFDR	Pressurizer Heater Group 1A, which is normally cycle and cycled for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	16-VFDR-07
VFDR	Auxiliary Feedwater Turbine Driven Pump flow to S/G 2C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0048 - Auxiliary Feedwater Turbine Driven Pump flow to S/G 2C
Disposition	Recovery Action(s) required to satisfy Risk criteria

VFDR ID	16-VFDR-08
VFDR	Auxiliary Feedwater Pump discharge to S/G 2C, which is normally open and open for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0050A - Auxiliary Feedwater Pump discharge to S/G 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-09
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B
Disposition	Recovery Action(s) required to satisfy Risk criteria

Fire Area ID:	16 - Unit 2 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	16-VFDR-10
VFDR	Auxiliary Feedwater Turbine Driven Pump discharge to 2B S/G, which is normally open and open for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0054B - Auxiliary Feedwater Turbine Driven Pump discharge to 2B S/G
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-15
VFDR	Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-16
VFDR	Pressurizer Heater Group 2B, which is normally cycled and off for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-17
VFDR	Pressurizer Heater Group 2C, which is normally cycled and off for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRC - Pressurizer Heater Group 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	16 - Unit 2 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	16-VFDR-18
VFDR	Pressurizer Heater Group 2D, which is normally cycled and off for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRD - Pressurizer Heater Group 2D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-25
VFDR	2A Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUA - 2A Reactor Coolant Pump
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	16-VFDR-26
VFDR	2B Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUB - 2B Reactor Coolant Pump
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID:	16 - Unit 2 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 16-VFDR-27

VFDR 2C Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC PUC - 2C Reactor Coolant Pump

Disposition Recovery Action(s) required to satisfy DID criteria

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VFDR ID 16-VFDR-28

VFDR 2D Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC PUD - 2D Reactor Coolant Pump

Disposition Recovery Action(s) required to satisfy DID criteria

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VFDR ID 16-VFDR-29

VFDR Pressurizer Power Operated Relief Valve Isolation, which is normally Open and Closed for HSB, is affected by spurious cable failures and a possible loss of power could fail valve open. PORV can spuriously open due to various cable failures. Multiple PORVs opeing could challenge makeup, due to timing of closure of valves with the SSF disconnects. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC VA0031B - Pressurizer Power Operated Relief Valve Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	16 - Unit 2 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	16-VFDR-30
VFDR	Pressurizer Power Operated Relief Valve, which is normally closed and closed for HSB, is affected by various cable failures can fail valve open. Pressurizer PORV Isolation Valve, which is normally open, could fail from spurious cable failures and a possible loss of power. Multiple PORVs opening could challenge makeup, due to timing of closure of valves with the SSF disconnects. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer Power Operated Relief Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-31
VFDR	Pressurizer Power Operated Relief Valve Isolation, which is normally open and closed for HSB, is affected by spurious cable failures and a possible loss of power could fail valve open. PORV can spuriously open due to various cable failures. Multiple PORVs opeing could challenge makeup, due to timing of closure of valves with the SSF disconnects. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0033A - Pressurizer Power Operated Relief Valve Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-32
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable failures can fail valve open. Pressurizer PORV Isolation Valve, which is normally open, could fail from spurious cable failures and a possible loss of power. Multiple PORVs opening could challenge makeup, due to timing of closure of valves with the SSF disconnects. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 16 - Unit 2 Cable Room El 574 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	16-VFDR-33
VFDR	Pressurizer Power Operated Relief Valve Isolation, which is normally open and closed for HSB, is affected by spurious cable failures and a possible loss of power could fail valve open. PORV can spuriously open due to various cable failures. Multiple PORVs opeing could challenge makeup, due to timing of closure of valves with the SSF disconnects. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0035B - Pressurizer Power Operated Relief Valve Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-34
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable failures can fail valve open. Pressurizer PORV Isolation Valve, which is normally open, could fail from spurious cable failures and a possible loss of power. Multiple PORVs opening could challenge makeup, due to timing of closure of valves with the SSF disconnects. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	16-VFDR-51
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0876 - Standby Makeup Pump to Containment Equipment Sump 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	17 - Unit 1 Cable Room El 574	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
60	U1 AB Cable Rm El 574

Fire Area ID: 17 - Unit 1 Cable Room El 574 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
60	U1 AB Cable Rm El 574

Fire Area ID:	17 - Unit 1 Cable Room El 574	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity Control by injecting water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolating the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 17 - Unit 1 Cable Room El 574 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers: • C-AX-217-W-008, -013, -014, -021, -025, -028, -029 • C-AX-228-W-028, -029, -030, • C-AX-260-W-049, -050, -053, -068, -074 • D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107 • D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063 • F-AX-348-W-085, -097, -114, -115 • F-AX-354A-W-035, -036, -039, -040, -044 • F-AX-354-W-021, -027, -028, -032, -033 • H-AX-515-W-013 • H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094 • J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010 • J-AX-518-W-001, -002, -005, -006, -008 • J-AX-533-W-001, -002 The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following: • Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited. • Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response. • The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 06 Deletion of Control Room Floor from Scope of Committed Fire Barriers (CNCE-9584)
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Fire Area ID:	17 - Unit 1 Cable Room El 574	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to provide the technical justification for removing the Control Room floor from the scope of committed fire barriers.

The evaluation concluded that the Control Room floor can be removed from the scope of the committed fire barriers based on the following:
• Insignificant amount of combustible loading.
• Lack of ignition sources.
• Cable spreading room and main control boards are supplied with ionization smoke detectors.

Engineering Evaluation ID Revision: CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Inactive: No

Functionally Equivalent: No

Adequate for the Hazard: Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:
• Lack of potential fire ignition sources and continuity of combustibles.
• Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
• Administrative controls for storage and use of combustible materials.
• Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 17 - Unit 1 Cable Room El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
60	U1 AB Cable Rm El 574	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 17

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta LERF risk results are within the screening acceptance criteria of 1E-08/rx-yr for delta LERF. The delta CDF risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [1] 1.17E-07

Δ LERF Units: [1] 6.41E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-08/rx-yr for delta LERF and the delta risk results for CDF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Manual suppression was credited for a limited number of scenarios and for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient welding and cutting fires are a significant contributor to risk in this fire area. However, present hot work controls are sufficient and no enhancement is required.

No Risk or DID enhancements or modifications are required for this fire area to satisfy Risk or DID criteria.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through the Unit 1 S/Gs (via 1CA-48 and/or 1CA-52) was evaluated for additional risk in this fire area with a related VFDR. The recovery action made a significant contribution to risk in this fire area and was identified as being required for risk; the additional risk was determined to be bounded by the VFDR delta risk. The action to throttle CA flow through the Unit 2S/Gs (via 2CA-48 and/or 2CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the Unit 2 auxiliary feedwater flow control valves is recommended. Also, due to the contribution to risk of the reactor coolant pump variances, a DID recovery action is recommended to locally trip the Unit 1 reactor coolant pumps in the turbine building.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	17 - Unit 1 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 17-VFDR-02

VFDR Auxiliary Feedwater Turbine Driven PumpFlow to S/G 1C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1CA VA0048 - Auxiliary Feedwater Turbine Driven PumpFlow to S/G 1C

Disposition Recovery Action(s) required to satisfy Risk criteria

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VFDR ID 17-VFDR-03

VFDR Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1C Isolation, which is normally open and open for HSB, is affected by cable hits that may spuriously valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1CA VA0050A - Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1C Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 17-VFDR-04

VFDR Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B

Disposition Recovery Action(s) required to satisfy Risk criteria

Fire Area ID:	17 - Unit 1 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	17-VFDR-05
VFDR	Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation, which is normally open and open for HSB, is affected by cable hits that may spuriously valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0054B - Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	17-VFDR-10
VFDR	Pressurizer Heater Group 1A, which is normally cycled and off for HSB, is affected by cable hits, and loss of power and control that may prevent de-energizing pressurizer heaters from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	17-VFDR-11
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by cable hits, and loss of power and control that may prevent de-energizing pressurizer heaters from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	17-VFDR-12
VFDR	Pressurizer Heater Group 1C, which is normally cycled and off for HSB, is affected by cable hits, and loss of power and control that may prevent de-energizing pressurizer heaters from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRC - Pressurizer Heater Group 1C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	17 - Unit 1 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	17-VFDR-13
VFDR	Pressurizer Heater Group 1D, which is normally cycled and off for HSB, is affected by cable hits, and loss of power and control that may prevent de-energizing pressurizer heaters from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRD - Pressurizer Heater Group 1D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	17-VFDR-20
VFDR	Reactor Coolant Pump 1A, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUA - Reactor Coolant Pump 1A
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	17-VFDR-21
VFDR	Reactor Coolant Pump 1B, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUB - Reactor Coolant Pump 1B
Disposition	Recovery Action(s) required to satisfy DID criteria

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	17 - Unit 1 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	17-VFDR-22
VFDR	Reactor Coolant Pump 1C, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUC - Reactor Coolant Pump 1C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	17-VFDR-23
VFDR	Reactor Coolant Pump 1D, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUD - Reactor Coolant Pump 1D
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	17-VFDR-24
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures which may open all Pressurizer PORVs. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB, is affected by spurious cable failures and a possible loss of power before closure can be accomplished. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	17 - Unit 1 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 17-VFDR-25

VFDR Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failures which may open all Pressurizer PORVs. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB, is affected by spurious cable failures and a possible loss of power before closure can be accomplished. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC VA0032B - Pressurizer PORV

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 17-VFDR-26

VFDR Unit 1 Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures which may open all Pressurizer PORVs. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB, is affected by spurious cable failures and a possible loss of power before closure can be accomplished. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC VA0033A - Unit 1 Pressurizer PORV Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 17-VFDR-27

VFDR Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failures which may open all Pressurizer PORVs. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB, is affected by spurious cable failures and a possible loss of power before closure can be accomplished. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC VA0034A - Pressurizer PORV

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	17 - Unit 1 Cable Room El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	17-VFDR-28
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures which may open all Pressurizer PORVs. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB, is affected by spurious cable failures and a possible loss of power before closure can be accomplished. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	17-VFDR-29
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failures which may open all Pressurizer PORVs. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB, is affected by spurious cable failures and a possible loss of power before closure can be accomplished. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	17-VFDR-44
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0876 - Standby Makeup Pump to Containment Equipment Sump Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
219	U1 AB Mech Pen Rm El 577
220	U2 AB Mech Pen Rm El 577
55	U1 AB SE Area El 577
56	U1 AB Above Filter Pits East El 577
57	U1 AB Above Filter Pits West El 577
58	U1 AB Area East of KC Pumps El 577
59	MCC Rm 1EMXA & 1EMXI El 577
64	U2 AB NE Area El 577
65	U2 AB Above Filter Pits East El 577
66	U2 AB Above Filter Pits West El 577
67	U2 AB Area East of KC Pumps El 577
68	MCC Rm 2EMXA & 2EMXI El 577

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF)	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate Systemor condenser circ water to S/Gs B and C. Main feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 17 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 577' and 594'
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to provide justification for the unprotected sprial stairs located at column line GG-61 and GG-53 connecting fire areas (FA's) 18 and 22. The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on: • combustible controls, • lack of in situ combustibles, • minimal ignition sources, • availability of SSS.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
219	U1 AB Mech Pen Rm El 577	None	None	None	None
220	U2 AB Mech Pen Rm El 577	None	None	None	None
55	U1 AB SE Area El 577	None	None	None	None
56	U1 AB Above Filter Pits East El 577	None	None	None	None
57	U1 AB Above Filter Pits West El 577	None	None	None	None
58	U1 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
59	MCC Rm 1EMXA & 1EMXI El 577	None	None	None	None
64	U2 AB NE Area El 577	None	None	None	None
65	U2 AB Above Filter Pits East El 577	None	None	None	None
66	U2 AB Above Filter Pits West El 577	None	None	None	None
67	U2 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
68	MCC Rm 2EMXA & 2EMXI El 577	None	None	None	None

Title Fire Risk Evaluation for Fire Area 18 (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 1.51E-08

Δ LERF Units: [1] 8.21E-10

DID Maintained A review of the risk evaluation results shows that the delta risk results for CDF and LERF are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Automatic suppression is credited for severe KC pump fires, but manual suppression was not credited in any scenario to meet the risk screening criteria. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through S/G C (via CA-48) was evaluated for additional risk in this fire area with a related VFDR. The risk of the associated operator action did not contribute significantly to risk. The action to throttle CA flow through S/G B (via CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Fire Area ID:	18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions
Safety Margin Maintained	All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	18 (U1)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	18 (U1)-VFDR-04
VFDR	Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation, which is normally open and open for HSB, is affected by cable hits may spuriously close valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0054B - Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	18 (U1)-VFDR-08
VFDR	Pressurizer Heater Group 1A, which is normally cycled and off for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	18 (U1)-VFDR-20
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NI 561. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	18 (U1)-VFDR-27
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0876 - Standby Makeup Pump to Containment Equipmemnt Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	**Description**
219	U1 AB Mech Pen Rm El 577
220	U2 AB Mech Pen Rm El 577
55	U1 AB SE Area El 577
56	U1 AB Above Filter Pits East El 577
57	U1 AB Above Filter Pits West El 577
58	U1 AB Area East of KC Pumps El 577
59	MCC Rm 1EMXA & 1EMXI El 577
64	U2 AB NE Area El 577
65	U2 AB Above Filter Pits East El 577
66	U2 AB Above Filter Pits West El 577
67	U2 AB Area East of KC Pumps El 577
68	MCC Rm 2EMXA & 2EMXI El 577

Fire Area ID:	18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	**Method of Accomplishment**	**Comments**
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF)	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 17 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 577' and 594'

Revision 0

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to provide justification for the unprotected sprial stairs located at column line GG-61 and GG-53 connecting fire areas (FA's) 18 and 22.

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:

- combustible controls,
- lack of in situ combustibles,
- minimal ignition sources,
- availability of SSS.

Fire Area ID: 18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
219	U1 AB Mech Pen Rm El 577	None	None	None	None
220	U2 AB Mech Pen Rm El 577	None	None	None	None
55	U1 AB SE Area El 577	None	None	None	None
56	U1 AB Above Filter Pits East El 577	None	None	None	None
57	U1 AB Above Filter Pits West El 577	None	None	None	None
58	U1 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
59	MCC Rm 1EMXA & 1EMXI El 577	None	None	None	None
64	U2 AB NE Area El 577	None	None	None	None
65	U2 AB Above Filter Pits East El 577	None	None	None	None
66	U2 AB Above Filter Pits West El 577	None	None	None	None
67	U2 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
68	MCC Rm 2EMXA & 2EMXI El 577	None	None	None	None

Title Fire Risk Evaluation for Fire Area 18 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 1.53E-08

Δ LERF Units: [2] 1.09E-10

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic suppression is credited for severe KC pump fires, but manual suppression was not credited in any scenario to meet the risk screening criteria. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. The action to throttle CA flow through S/G C (via CA-48) was evaluated for additional risk in this fire area with a related VFDR. The risk of the associated operator action did not contribute significantly to risk. The action to throttle CA flow through S/G B (via CA-52) did not contribute significantly to risk. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

No Risk or DID enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Fire Area ID:	18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions
Safety Margin Maintained	All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	18 (U2)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	18 (U2)-VFDR-04
VFDR	Auxiliary Feedwater Turbine Driven Pump discharge to 2B S/G, which is normally open and open for HSB, is affected by cable hits may spuriously close valve and prevent control from the control room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0054B - Auxiliary Feedwater Turbine Driven Pump discharge to 2B S/G
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	18 (U2)-VFDR-08
VFDR	Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by cable hits that can cause a heater to remain on and fail to automatically de-energize. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	18 (U2)-VFDR-20
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*NI 561. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	18 (U2)-VFDR-27
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0876 - Standby Makeup Pump to Containment Equipment Sump 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 19 - Unit 2 Electrical Pen Room El 594 **Fire Area Definition**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
79	U2 AB Elect Pen Rm El 594

Fire Area ID: 19 - Unit 2 Electrical Pen Room El 594

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unsed S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 19 - Unit 2 Electrical Pen Room El 594 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers
Revision 4

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,
- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 19 - Unit 2 Electrical Pen Room El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
79	U2 AB Elect Pen Rm El 594	None	R	E	Combustible Loading: E Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 19

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited in HGL and MCA evaluation risk screening criteria. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	19 - Unit 2 Electrical Pen Room El 594	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	19-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of insturment air and SSPS signals. 2NV VA0294 fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	19-VFDR-03
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by a spurious SSPS which closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	19-VFDR-04
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	19 - Unit 2 Electrical Pen Room El 594	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	19-VFDR-05
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 20 - Unit 1 Electrical Pen Room El 594 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
71	U1 AB Elect Pen Rm El 594

Fire Area ID: 20 - Unit 1 Electrical Pen Room El 594 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	20 - Unit 1 Electrical Pen Room El 594	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 14 Evaluation of Gaps in Concrete Hatch Covers

Revision 4

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the gaps (maximum 1 inch x 1 inch) in the six hatch openings that exist in a floor that separates redundant shutdown trains. The six hatch openings are in barriers that separate Fire Areas (FA's) 2 from 7, 3 from 8, 7 from 14, 8 from 15, 14 from 19 and 15 from 20.

The evaluation determined the hatch openings to be 'adequate for the hazard'. This is based on:

- floor area of approximately 2800 sq. ft. or greater in FA's 2, 3, 7, 8, 14, 15, 19, and 20,
- ceiling heights of 16 ft. in FA's 2, 3, 7, 8, 14, and 15,
- forced ventilation of 3000 cfm in FA's 2 and 3,
- forced ventilation of 10,400 cfm in FA's 7, 8, 14, and 15,
- limited ignition sources,
- limited in situ combustibles,
- automatic water suppression systems are not installed above hatch openings,
- existing flood control features.

Fire Area ID: 20 - Unit 1 Electrical Pen Room El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
71	U1 AB Elect Pen Rm El 594	None	R	E	Combustible Loading: E Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 20

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited in HGL and MCA evaluation risk screening criteria. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	20 - Unit 1 Electrical Pen Room El 594	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	20-VFDR-02
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals. Valve fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	20-VFDR-03
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals. Failure of valve NV-309 may result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	20-VFDR-05
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by a spuruios SSPS which closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 20 - Unit 1 Electrical Pen Room El 594 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	20-VFDR-06
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	20-VFDR-07
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	20-VFDR-08
VFDR	Seal Water Injection flow, which is normally open and open for HSB, is affected by is caused by a loss of insturment air, cable hits, loss of power, and SSPS signals. 2NV VA0309 fails open on loss of air, this may require manually operating manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0309 - Seal Water Injection flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 21 (U1) - Control Room El 594 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
72	U1 Control Rm El 594
80	U2 Control Rm El 594

Fire Area ID: 21 (U1) - Control Room El 594 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting water via the seal injection flow path using the spent fule pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolating the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main feedwater is isolated.	
5. Process Monitoring Function	Process monitoring is available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 21 (U1) - Control Room El 594 (Common) **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 06 Deletion of Control Room Floor from Scope of Committed Fire Barriers (CNCE-9584)
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the evaluation was to provide the technical justification for removing the Control Room floor from the scope of committed fire barriers. The evaluation concluded that the Control Room floor can be removed from the scope of the committed fire barriers based on the following: • Insignificant amount of combustible loading. • Lack of ignition sources. • Cable spreading room and main control boards are supplied with ionization smoke detectors.

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas. The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following: • Lack of potential fire ignition sources and continuity of combustibles. • Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer. • Administrative controls for storage and use of combustible materials. • Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 21 (U1) - Control Room El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72	U1 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
80	U2 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 21 (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [1] 1.03E-06

Δ LERF Units: [1] 3.56E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results for CDF and LERF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Manual suppression was credited in the development of control board fires and MCR abondonment scenarios. Manual suppression was also credited in HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient and hot work fire scenarios are not significant contributors to risk, therefore no change is required for the control of transient combustibles or hot work in the area.

Therefore, Risk or DID enhancements and modifications to are not required. Due to signficant risk contribution of auxiliary feedwater flow control valve variants, recovery actions for manual control of auxiliary feedwater flow are required for risk. Also, due to reactor coolant pump variants, a DID recovery action is recommended to locally trip the reactor coolant pumps in the turbine building.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	21 (U1) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U1)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C
Disposition	Recovery Action(s) required to satisfy Risk criteria

VFDR ID	21 (U1)-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1C Isolation, which is normally open and open for HSB, is affected by cable hits that may spuriously close valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0050A - Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1C Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-04
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B
Disposition	Recovery Action(s) required to satisfy Risk criteria

Fire Area ID:	21 (U1) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U1)-VFDR-05
VFDR	Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation, which is normally open and open for HSB, is affected by cable hit may cause spurious valve closure. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0054B - Auxiliary Feedwater Turbine Driven Pump Discharge to S/G 1B Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-10
VFDR	Pressurizer Heater Group 1A, which is normally cycled and off for HSB, is affected by cable hits that may energize and prevent de-energizing pressurizer heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-11
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by cable hits that may energize and prevent de-energizing pressurizer heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-12
VFDR	Pressurizer Heater Group 1C, which is normally cycled and off for HSB, is affected by cable hits, and loss of power and control that may prevent de-energizing all pressurizer heaters from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRC - Pressurizer Heater Group 1C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	21 (U1) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U1)-VFDR-13
VFDR	Pressurizer Heater Group 1D, which is normally cycled and off for HSB, is affected by cable hits, and loss of power and control that may prevent de-energizing all pressurizer heaters from the MCR. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRD - Pressurizer Heater Group 1D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-20
VFDR	Reactor Coolant Pump 1A, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUA - Reactor Coolant Pump 1A
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	21 (U1)-VFDR-21
VFDR	Reactor Coolant Pump 1B, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUB - Reactor Coolant Pump 1B
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID:	21 (U1) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U1)-VFDR-22
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable and power hits that may prevent the block valve from being closed. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-23
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable and interlock hits that could spuriously open PORV. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB may not be operaable. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-24
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable and power hits that may prevent the block valve from being closed. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0033A - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	21 (U1) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U1)-VFDR-25
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable and interlock hits that could spuriously open PORV. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB may not be operaable. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-26
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable and power hits that may prevent the block valve from being closed. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U1)-VFDR-27
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable and interlock hits that could spuriously open PORV. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB may not be operaable. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	21 (U1) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U1)-VFDR-42
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0876 - Standby Makeup Pump to Containment Equipmemnt Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	21 (U1)-VFDR-46
VFDR	Reactor Coolant Pump 1C, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUC - Reactor Coolant Pump 1C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	21 (U1)-VFDR-47
VFDR	Reactor Coolant Pump 1D, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (1NC VA0027 and 1NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUD - Reactor Coolant Pump 1D
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID: 21 (U2) - Control Room El 594 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
72	U1 Control Rm El 594
80	U2 Control Rm El 594

Fire Area ID: 21 (U2) - Control Room El 594 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolating the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main feedwater is isolated.	
5. Process Monitoring Function	Process monitoring is available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	21 (U2) - Control Room El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 06 Deletion of Control Room Floor from Scope of Committed Fire Barriers (CNCE-9584)
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the evaluation was to provide the technical justification for removing the Control Room floor from the scope of committed fire barriers. The evaluation concluded that the Control Room floor can be removed from the scope of the committed fire barriers based on the following: • Insignificant amount of combustible loading. • Lack of ignition sources. • Cable spreading room and main control boards are supplied with ionization smoke detectors.

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas. The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following: • Lack of potential fire ignition sources and continuity of combustibles. • Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer. • Administrative controls for storage and use of combustible materials. • Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 21 (U2) - Control Room El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72	U1 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
80	U2 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 21 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 1.03E-06

Δ LERF Units: [2] 3.56E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results for CDF and LERF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Manual suppression was credited in the development of control board fires and MCR abondonment scenarios. Manual suppression was also credited in HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient and hot work fire scenarios are not a significant contributor to risk in the fire area, therefore no change is required for the control of transient combustibles in the area.

Therefore, Risk and DID enhancements or modifications are not required. Due to signficant risk contribution of auxiliary feedwater flow control valve variants, recovery actions for manual control of auxiliary feedwater flow are required for risk. Also, due to reactor coolant pump variants, a DID recovery action is recommended to locally trip the reactor coolant pumps in the turbine building.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause both valves to spuriously open. Also, it may not be possible to close the isolation valve due to a possible loss of offsite power. However primary control station actions to swap the SSF disconnect plugs will cause the PORVs to fail closed and no additional actions are required for DID.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	21 (U2) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U2)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 2CA-52 and 2CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C
Disposition	Recovery Action(s) required to satisfy Risk criteria

VFDR ID	21 (U2)-VFDR-03
VFDR	Auxiliary Feedwater Pump discharge to S/G 2C, which is normally open and open for HSB, is affected by cable hits that may spuriously close valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0050A - Auxiliary Feedwater Pump discharge to S/G 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U2)-VFDR-04
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 2CA-52 and 2CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B
Disposition	Recovery Action(s) required to satisfy Risk criteria

Fire Area ID:	21 (U2) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 21 (U2)-VFDR-05

VFDR Auxiliary Feedwater Pump Turbine discharge to 2B S/G, which is normally open and open for HSB, is affected by cable hits that may spuriously close valve. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2CA VA0054B - Auxiliary Feedwater Pump Turbine discharge to 2B S/G

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 21 (U2)-VFDR-10

VFDR Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ILE-PZRHTRA - Pressurizer Heater Group 2A

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 21 (U2)-VFDR-11

VFDR Pressurizer Heater Group 2B, which is normally cycled and off for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ILE-PZRHTRB - Pressurizer Heater Group 2B

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 21 (U2)-VFDR-12

VFDR Pressurizer Heater Group 2C, which is normally cycled and off for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ILE-PZRHTRC - Pressurizer Heater Group 2C

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 21 (U2) - Control Room El 594 (Common) **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	21 (U2)-VFDR-13
VFDR	Pressurizer Heater Group 2D, which is normally cycled and off for HSB, is affected by cable, power, and interlock hits that may spuriously energize pressurizer heater. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRD - Pressurizer Heater Group 2D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U2)-VFDR-20
VFDR	Reactor Coolant Pump 2A, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUA - Reactor Coolant Pump 2A
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	21 (U2)-VFDR-21
VFDR	Reactor Coolant Pump 2B, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUB - Reactor Coolant Pump 2B
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID:	21 (U2) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U2)-VFDR-22
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures and a possible loss of power. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U2)-VFDR-23
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failure which can spuriously open the PORV. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB may not be operaable. Fail valve closed by disconnecting power at the disconnect plugs and short the solenoids by connecting the connector to the receptacle per procedure OP/0/B/6100/013. This action is required for transfer to the SSF. (Reference MSO Scenarios # 17 and 18 CNC-1435.00-00-0043). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U2)-VFDR-24
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures and a possible loss of power. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0033A - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U2)-VFDR-25
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failure which can spuriously open the PORV. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB may not be operaable. Fail valve closed by disconnecting power at the disconnect plugs and short the solenoids by connecting the connector to the receptacle per procedure OP/0/B/6100/013. This action is required for transfer to the SSF. (Reference MSO Scenarios # 17 and 18 CNC-1435.00-00-0043). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	21 (U2) - Control Room El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	21 (U2)-VFDR-26
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable failures and a possible loss of power. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U2)-VFDR-27
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable failure which can spuriously open the PORV. This would remain until the SSF plugs are switched to the SSF position. Pressurizer PORV Isolation Valve, which is normally open, required closed for HSB may not be operaable. Fail valve closed by disconnecting power at the disconnect plugs and short the solenoids by connecting the connector to the receptacle per procedure OP/0/B/6100/013. This action is required for transfer to the SSF. (Reference MSO Scenarios # 17 and 18 CNC-1435.00-00-0043). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	21 (U2)-VFDR-44
VFDR	Standby Makeup Pump to Containment Sump, which is normally closed and closed for HSB, is affected by a combination of cable and/or interlock hits that could result in FWST draindown to containment sump from one or more normally isolated flowpaths. This is postulated to cause spurious operation (opening) of NV-876 due to flooding. There are no cables for NV-876 routed in the fire area that lead directly to fire-induced mispositioning of NV-876. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0876 - Standby Makeup Pump to Containment Equipment Sump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 21 (U2) - Control Room El 594 (Common) **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	21 (U2)-VFDR-48
VFDR	Reactor Coolant Pump 2C, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUC - Reactor Coolant Pump 2C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	21 (U2)-VFDR-49
VFDR	Reactor Coolant Pump 2D, which is normally on and off for HSB, is affected by cable failures may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUD - Reactor Coolant Pump 2D
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID: 22 (U1) - Aux Bldg Gen Area El 594 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
221	U1 FB Cont Tool Storage Rm El 605
222	U1 FB Upper Cont Pal El 605
223	U2 FB Cont Tool Storage Rm El 605
224	U2 FB Upper Cont Pal El 605
73	U1 Control Rm Vent Equip Rm El 594
74	U1 AB Vent Equip Area West El 594
76	U1 AB Vent Equip Area East El 594
77	U1 AB RP Resp Issue/RIC El 594
81	U2 Control Rm Vent Equip Rm El 594
82	U2 AB Vent Equip Area West El 594
84	U2 AB Vent Equip Area East El 594
85	U2 AB HP Count Rm El 594
89A	U1 FB Access Hatch & Stairwell Areas
90A	U2 FB Access Hatch & Stairwell Areas

Fire Area ID: 22 (U1) - Aux Bldg Gen Area El 594 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring is available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	22 (U1) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 04 Fire Protection Evaluation for Floor Blockout Penetrations with a Free Area in Excess of 9 sqft. and Structural Framing Spans Exceeding 42 in. without a Cross Member Framing

Revision 1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the following floor blockouts regarding the framing support provided for the Silicone Foam free areas exceeding 9 sqft. that are not bounded by typical details per DPC 1435.00-00-0006:

- H-AX-517A-F-001
- H-AX-517A-F-002
- H-AX-517B-F-001
- H-AX-517B-F-002
- H-AX-517B-F-003
- K-AX-653-F-001
- K-AX-653-F-032
- K-AX-653-F-003
- J-AX-650A-F-001

The evaluation determined that the Unit 1 and 2 Exterior Doghouse penetrations (J-AX-650A-F-001) are qualified for a 3-hour F and T rating. The remaining penetrations above are considered adequate for the area fire hazards based on the following:

- Detection available in fire areas of concern.
- Area hose stations and fire extinguishers.
- Fire brigade response.
- Seal and framing configurations for the penetrations are considered adequate.
- Seal integrity is not anticipated to be compromised by fire exposure.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,

Fire Area ID:	22 (U1) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 17 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 577' and 594'
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to provide justification for the unprotected sprial stairs located at column line GG-61 and GG-53 connecting fire areas (FA's) 18 and 22.

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:

- combustible controls,
- lack of in situ combustibles,
- minimal ignition sources,
- availability of SSS.

Fire Area ID:	22 (U1) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 18 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 611+0' and 631+6'

Revision 0

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to provide justification for the unprotected sprial stairs between Elevation 631+6 (Fire Areas (FA) 38 and 47) and Elevation 611+0 (FA 22).

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:

- combustible controls,
- lack of in situ combustibles,
- minimal ignition sources.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 07 Deletion of Aux Bldg Roof at U1/U2 VP Supply Rooms and YN Pump Bldg from Scope of Committed Fire Barriers (CNCE-9646)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to provide the technical justification for removing the areas/rooms of the Auxiliary Building roof including the Unit 1 VP Supply Room, Unit 2 VP Supply Room, and the YN System Pump Building from the scope of committed fire barriers.

The evaluation concluded that these areas can be removed from the scope of the committed fire barriers based on the following:

- Insignificant combustible loading.
- Lack of ignition sources.
- No significant fire hazard exists at the specified locations.
- Areas contain non-safety related equipment.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Fire Area ID:	22 (U1) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 11 Evaluation of Cryo Ice Machine Bldg on Aux Bldg Roof (NSM CN-50419)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to review NSM CN-50419 for the fire protection concerns of using a steel plate in the Auxiliary Building Roof to separate the Auxiliary Building from the Cryo Ice Making Machine Room.

The evaluation determined that the Cryo Ice Making Machine Room does not present a significant unprotected fire hazard to the Auxiliary Building even with the steel plate access doors removed based on the following:

- Flame spread rating of the roof and wall insulation.
- Metal wall sandwich construction.
- No significant combustibles or fire hazards located on the Auxiliary Building Roof near the Cryo Ice Machine.
- No impact on the assured shutdown method or removal of decay heat.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 22 (U1) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
221	U1 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
222	U1 FB Upper Cont Pal El 605	None	None	None	None
223	U2 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
224	U2 FB Upper Cont Pal El 605	None	None	None	None
73	U1 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E
74	U1 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E
76	U1 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
77	U1 AB RP Resp Issue/RIC El 594	None	None	None	None
81	U2 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E
82	U2 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E
84	U2 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
85	U2 AB HP Count Rm El 594	None	None	None	None
89A	U1 FB Access Hatch & Stairwell Areas	None	None	None	None
90A	U2 FB Access Hatch & Stairwell Areas	None	None	None	None

Title Fire Risk Evaluation for Fire Area 22 (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. Since there are no direct hits in this fire area, the VFDR delta risk was insignificant. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

Risk or DID enhancements and modifications are not required for this fire area.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	22 (U1) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions
	Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.
Safety Margin Maintained	All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	22 (U1) - Aux Bldg Gen Area El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	22 (U1)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	22 (U1)-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B, which is normally open and throttled for HSB, is affected by transfer to the SSF causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. Operate CAPT as required per procedure OP/0/B/6100/013. Manually throttle open 1CA-52 and 1CA-48 per procedure AP/0/A/5500/045 or OP/0/B/6100/013. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 1B
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	22 (U1)-VFDR-05
VFDR	Non Coordinated Loads fed from 1EPLPLEPA, which is normally available and available for HSB, is affected by non-coordinated cables cause loss of ability to close Main Feedwater Isolation Valves, Main Feedwater Control Valves, Main Feedwater Control Bypass Valves from the MCR and cause loss of power to1ILE-PZRHTRA, and other KC, NC, ND, NV, NW, and SV equipment. A HSB action may be required to clear cable faults on non-coordinated loads to restore power to 1EPLPLEPA. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPLPLEPA-NCL - Non Coordinated Loads fed from 1EPLPLEPA
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 22 (U2) - Aux Bldg Gen Area El 594 (Common) **Fire Area Definition**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
221	U1 FB Cont Tool Storage Rm El 605
222	U1 FB Upper Cont Pal El 605
223	U2 FB Cont Tool Storage Rm El 605
224	U2 FB Upper Cont Pal El 605
73	U1 Control Rm Vent Equip Rm El 594
74	U1 AB Vent Equip Area West El 594
76	U1 AB Vent Equip Area East El 594
77	U1 AB RP Resp Issue/RIC El 594
81	U2 Control Rm Vent Equip Rm El 594
82	U2 AB Vent Equip Area West El 594
84	U2 AB Vent Equip Area East El 594
85	U2 AB HP Count Rm El 594
89A	U1 FB Access Hatch & Stairwell Areas
90A	U2 FB Access Hatch & Stairwell Areas

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 22 (U2) - Aux Bldg Gen Area El 594 (Common) **Performance Goals**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Standby Shutdown Facility (SSF).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Reactivity control by injecting borated water via the seal injection flow path using the spent fuel pool with the Standby Makeup Pump from the SSF.	
2. Inventory Control Function	Inventory control is provided by isolation of the reactor coolant system and makeup via the seal injection path from the spent fuel pool using the Standby Makeup Pump with control from the SSF. Letdown as necessary using the reactor head vents.	
3. Pressure Control Function	Reactor pressure control is provided by isolating the reactor coolant system and makeup with spent fuel pool water and the Standby Makeup Pump. One sub-bank of "D" pressurizer heaters to maintain a steam bubble in the pressurizer. Pressurizer code safeties remain available.	
4. Decay Heat Removal Function	Decay heat removal from the SSF using natural circulation and main steam safeties. S/G feed by turbine driven auxiliary feedwater pump using the Condensate System or condenser circ water to S/Gs B and C. Main Feedwater is isolated.	
5. Process Monitoring Function	Process monitoring is available in the SSF.	
6. Vital Auxiliaries	Essential electrical power, auxiliaries and HVAC is available from or in the SSF.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	22 (U2) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 04 Fire Protection Evaluation for Floor Blockout Penetrations with a Free Area in Excess of 9 sqft. and Structural Framing Spans Exceeding 42 in. without a Cross Member Framing

Revision 1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the following floor blockouts regarding the framing support provided for the Silicone Foam free areas exceeding 9 sqft. that are not bounded by typical details per DPC 1435.00-00-0006:

- H-AX-517A-F-001
- H-AX-517A-F-002
- H-AX-517B-F-001
- H-AX-517B-F-002
- H-AX-517B-F-003
- K-AX-653-F-001
- K-AX-653-F-032
- K-AX-653-F-003
- J-AX-650A-F-001

The evaluation determined that the Unit 1 and 2 Exterior Doghouse penetrations (J-AX-650A-F-001) are qualified for a 3-hour F and T rating. The remaining penetrations above are considered adequate for the area fire hazards based on the following:

- Detection available in fire areas of concern.
- Area hose stations and fire extinguishers.
- Fire brigade response.
- Seal and framing configurations for the penetrations are considered adequate.
- Seal integrity is not anticipated to be compromised by fire exposure.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,

Fire Area ID:	22 (U2) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 17 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 577' and 594'
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to provide justification for the unprotected sprial stairs located at column line GG-61 and GG-53 connecting fire areas (FA's) 18 and 22.

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:

- combustible controls,
- lack of in situ combustibles,
- minimal ignition sources,
- availability of SSS.

Fire Area ID:	22 (U2) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 18 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 611+0' and 631+6'

Revision 0

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to provide justification for the unprotected sprial stairs between Elevation 631+6 (Fire Areas (FA) 38 and 47) and Elevation 611+0 (FA 22).

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:

- combustible controls,
- lack of in situ combustibles,
- minimal ignition sources.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 07 Deletion of Aux Bldg Roof at U1/U2 VP Supply Rooms and YN Pump Bldg from Scope of Committed Fire Barriers (CNCE-9646)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to provide the technical justification for removing the areas/rooms of the Auxiliary Building roof including the Unit 1 VP Supply Room, Unit 2 VP Supply Room, and the YN System Pump Building from the scope of committed fire barriers.

The evaluation concluded that these areas can be removed from the scope of the committed fire barriers based on the following:

- Insignificant combustible loading.
- Lack of ignition sources.
- No significant fire hazard exists at the specified locations.
- Areas contain non-safety related equipment.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Fire Area ID:	22 (U2) - Aux Bldg Gen Area El 594 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 11 Evaluation of Cryo Ice Machine Bldg on Aux Bldg Roof (NSM CN-50419)

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to review NSM CN-50419 for the fire protection concerns of using a steel plate in the Auxiliary Building Roof to separate the Auxiliary Building from the Cryo Ice Making Machine Room.

The evaluation determined that the Cryo Ice Making Machine Room does not present a significant unprotected fire hazard to the Auxiliary Building even with the steel plate access doors removed based on the following:

- Flame spread rating of the roof and wall insulation.
- Metal wall sandwich construction.
- No significant combustibles or fire hazards located on the Auxiliary Building Roof near the Cryo Ice Machine.
- No impact on the assured shutdown method or removal of decay heat.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 22 (U2) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
221	U1 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
222	U1 FB Upper Cont Pal El 605	None	None	None	None
223	U2 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
224	U2 FB Upper Cont Pal El 605	None	None	None	None
73	U1 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E
74	U1 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E
76	U1 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
77	U1 AB RP Resp Issue/RIC El 594	None	None	None	None
81	U2 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E
82	U2 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E
84	U2 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
85	U2 AB HP Count Rm El 594	None	None	None	None
89A	U1 FB Access Hatch & Stairwell Areas	None	None	None	None
90A	U2 FB Access Hatch & Stairwell Areas	None	None	None	None

Title Fire Risk Evaluation for Fire Area 22 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Primary control station actions to activate the SSF will cause the auxiliary feedwater flow control valves to fail open. The valves for S/Gs B and C are required to be throttled to prevent overfilling the steam generators. Since there are no direct hits in this fire area, the VFDR delta risk was insignificant. However, a DID recovery action to manually operate the auxiliary feedwater flow control valves is recommended.

Risk or DID enhancements and modifications are not required for this fire area.

Fire Area ID:	22 (U2) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions
	Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.
Safety Margin Maintained	All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	22 (U2) - Aux Bldg Gen Area El 594 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	22 (U2)-VFDR-02
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C, which is normally open and throttled for HSB, is affected by operation from the SSS causes S/G throttle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0048 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2C
Disposition	Recovery Action(s) required to satisfy DID criteria

VFDR ID	22 (U2)-VFDR-03
VFDR	Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B, which is normally open and throttled for HSB, is affected by operation from the SSS causes S/G trhottle valves to fail full open which requires actions to control CAPT and throttle valves to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0052 - Auxiliary Feedwater Turbine Driven Pump Flow to S/G 2B
Disposition	Recovery Action(s) required to satisfy DID criteria

Fire Area ID:	23 - Unit 2 Fuel Storage Area El 605	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	**Description**
90	U2 FB Fuel Pool Area El 605

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 23 - Unit 2 Fuel Storage Area El 605 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via the normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 23 - Unit 2 Fuel Storage Area El 605
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
90	U2 FB Fuel Pool Area El 605	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 23

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for Risk in the HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	23 - Unit 2 Fuel Storage Area El 605	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	23-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	23-VFDR-02
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	23-VFDR-03
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 24 - Unit 1 Fuel Storage Area El 605 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
89	U1 FB Fuel Pool Area El 605

Fire Area ID:	24 - Unit 1 Fuel Storage Area El 605	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via the normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 24 - Unit 1 Fuel Storage Area El 605
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
89	U1 FB Fuel Pool Area El 605	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 24

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for Risk in the HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	24 - Unit 1 Fuel Storage Area El 605	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	24-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	24-VFDR-02
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	24-VFDR-03
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 25 - Diesel Generator Bldg 1A El 556 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
DG1A	DG1A El 556

Fire Area ID: 25 - Diesel Generator Bldg 1A El 556

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 25 - Diesel Generator Bldg 1A El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG1A	DG1A El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

Title Fire Risk Evaluation for Fire Area 25

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic CO2 actuation was credited for Risk for severe DG fire scenarios. Manual suppression was not credited for the HGL and MCA evaluations. Transient fires are not a contributor to risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	25 - Diesel Generator Bldg 1A El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	25-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	25-VFDR-02
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	25-VFDR-03
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 26 - Diesel Generator Bldg 1B El 556 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
DG1B	DG1B El 556

Fire Area ID: 26 - Diesel Generator Bldg 1B El 556 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the main control room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 26 - Diesel Generator Bldg 1B El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG1B	DG1B El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

Title Fire Risk Evaluation for Fire Area 26

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic CO2 actuation was credited for Risk for severe DG fire scenarios. Manual suppression was not credited for the HGL and MCA evaluations. Transient fires are not a contributor to risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 26 - Diesel Generator Bldg 1B El 556 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	26-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	26-VFDR-04
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	26-VFDR-05
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 27 - Diesel Generator Bldg 2A El 556 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
DG2A	DG2A El 556

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 27 - Diesel Generator Bldg 2A El 556 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual cotnrol of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 27 - Diesel Generator Bldg 2A El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG2A	DG2A El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

Title Fire Risk Evaluation for Fire Area 27

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic CO2 actuation was credited for Risk for severe DG fire scenarios. Manual suppression was not credited for the HGL and MCA evaluations. Transient fires are not a contributor to risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	27 - Diesel Generator Bldg 2A El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	27-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	27-VFDR-02
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	27-VFDR-03
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 28 - Diesel Generator Bldg 2B El 556 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
DG2B	DG2B El 556

Fire Area ID: 28 - Diesel Generator Bldg 2B El 556 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the main control room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 28 - Diesel Generator Bldg 2B El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG2B	DG2B El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

Title Fire Risk Evaluation for Fire Area 28

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic CO2 actuation was credited for Risk for severe DG fire scenarios. Manual suppression was not credited for the HGL and MCA evaluations. Transient fires are not a contributor to risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	28 - Diesel Generator Bldg 2B El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	28-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	28-VFDR-04
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	28-VFDR-05
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	29 (U1) - Train A RN Pump Structure EI 600 (Common)	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	**Description**
226	RN Pump House A Side

Fire Area ID: 29 (U1) - Train A RN Pump Structure El 600 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 2 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the large bore pipe penetration, K-NSWPS-662-W-020, which was added per Engineering Change CD00091. The new large bore opening is installed in the committed fire boundary wall that separates the A and B train of the Nuclear Service Water (RN) Pump Structure (NSWPS). The penetration does not conform to the penetration seal limitations of typical detail of M-2 from DPC 1435.00-00-0006.

The evaluation determined that the large bore penetration K-NSWPS-662-W-020 is acceptable and was based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure and limited combustibles.
- Continuity of combustibles and area separation.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.

• Ability to achieve and maintain safe shutdown is not compromised.

Fire Area ID: 29 (U1) - Train A RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
226	RN Pump House A Side	None	None	E	Combustible Loading: E

Title
Fire Risk Evaluation for Fire Area 29 (U1)

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [1] 0.00E+00

Δ LERF
Units: [1] 0.00E+00

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	29 (U1) - Train A RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	29 (U1)-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	29 (U1)-VFDR-02
VFDR	Service Water P/H Pit A Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0002B - Service Water P/H Pit A Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	29 (U1)-VFDR-03
VFDR	Service Water P/H Pit B Isolation from Standby Nuclear Service Water Pond, which is normally closed and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0004B - Service Water P/H Pit B Isolation from Standby Nuclear Service Water Pond
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	29 (U1) - Train A RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	29 (U1)-VFDR-04
VFDR	Service Water P/H Pit B Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0006B - Service Water P/H Pit B Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	29 (U1)-VFDR-05
VFDR	Station Nuclear Service Water Discharge to RL System, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0843B - Station Nuclear Service Water Discharge to RL System
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	29 (U1)-VFDR-06
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	29 (U1) - Train A RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	29 (U1)-VFDR-07
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 29 (U2) - Train A RN Pump Structure El 600 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
226	RN Pump House A Side

Fire Area ID: 29 (U2) - Train A RN Pump Structure El 600 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	29 (U2) - Train A RN Pump Structure El 600 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 2 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the large bore pipe penetration, K-NSWPS-662-W-020, which was added per Engineering Change CD00091. The new large bore opening is installed in the committed fire boundary wall that separates the A and B train of the Nuclear Service Water (RN) Pump Structure (NSWPS). The penetration does not conform to the penetration seal limitations of typical detail of M-2 from DPC 1435.00-00-0006.

The evaluation determined that the large bore penetration K-NSWPS-662-W-020 is acceptable and was based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure and limited combustibles.
- Continuity of combustibles and area separation.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.

Fire Area ID:	29 (U2) - Train A RN Pump Structure El 600 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

• Ability to achieve and maintain safe shutdown is not compromised.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 29 (U2) - Train A RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
226	RN Pump House A Side	None	None	E	Combustible Loading: E

Title Fire Risk Evaluation for Fire Area 29 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	29 (U2) - Train A RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	29 (U2)-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	29 (U2)-VFDR-02
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	29 (U2)-VFDR-03
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	29 (U2)-VFDR-04
VFDR	Service Water P/H Pit A Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0002B - Service Water P/H Pit A Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	29 (U2) - Train A RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	29 (U2)-VFDR-05
VFDR	Service Water P/H Pit B Isolation from Standby Nuclear Service Water Pond, which is normally closed and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0004B - Service Water P/H Pit B Isolation from Standby Nuclear Service Water Pond
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	29 (U2)-VFDR-06
VFDR	Service Water P/H Pit B Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0006B - Service Water P/H Pit B Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	29 (U2)-VFDR-07
VFDR	Station Nuclear Service Water Discharge to RL System, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 505, 1*RN 506, and 2*RN 506 (and Valve 1RN VA0002B), which are located in the fire area. These failures can cause spurious operation of 1RN VA0002B and loss of control power to 1RN VA0006B, 4B, and 843B. These are train B components in a Fire Area where Train B is the credited success path for shutdown. 1RN VA0002B is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0843B - Station Nuclear Service Water Discharge to RL System
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 30 (U1) - Train B RN Pump Structure El 600 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
225	RN Pump House B Side

Fire Area ID: 30 (U1) - Train B RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 30 (U1) - Train B RN Pump Structure El 600 (Common) — **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

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Engineering Evaluation ID Revision: CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive: No

Functionally Equivalent: No

Adequate for the Hazard: Yes

Summary: The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision: CNC-1435.00-00-0035, Attachment 02, Rev. 2 Fire Protection Evaluation for Large Bore Pipes

Inactive: No

Functionally Equivalent: No

Adequate for the Hazard: Yes

Summary: The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the large bore pipe penetration, K-NSWPS-662-W-020, which was added per Engineering Change CD00091. The new large bore opening is installed in the committed fire boundary wall that separates the A and B train of the Nuclear Service Water (RN) Pump Structure (NSWPS). The penetration does not conform to the penetration seal limitations of typical detail of M-2 from DPC 1435.00-00-0006.

The evaluation determined that the large bore penetration K-NSWPS-662-W-020 is acceptable and was based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure and limited combustibles.
- Continuity of combustibles and area separation.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.

• Ability to achieve and maintain safe shutdown is not compromised.

Fire Area ID: 30 (U1) - Train B RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
225	RN Pump House B Side	None	None	E	Combustible Loading: E

Title Fire Risk Evaluation for Fire Area 30 (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID: 30 (U1) - Train B RN Pump Structure El 600 (Common) **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	30 (U1)-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	30 (U1)-VFDR-02
VFDR	Service Water P/H Pit A Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0001A - Service Water P/H Pit A Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	30 (U1)-VFDR-03
VFDR	Service Water P/H Pit A Isolation from Standby Nuclear Service Water Pond, which is normally closed and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0003A - Service Water P/H Pit A Isolation from Standby Nuclear Service Water Pond
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	30 (U1) - Train B RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	30 (U1)-VFDR-04
VFDR	Service Water P/H Pit B Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0005A - Service Water P/H Pit B Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	30 (U1)-VFDR-05
VFDR	Service Water Header A Return to Standby Nuclear Service Water Pond, which is normally closed and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0063A - Service Water Header A Return to Standby Nuclear Service Water Pond
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	30 (U1)-VFDR-07
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	30 (U1) - Train B RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	30 (U1)-VFDR-08
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 30 (U2) - Train B RN Pump Structure El 600 (Common) **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
225	RN Pump House B Side

Fire Area ID: 30 (U2) - Train B RN Pump Structure El 600 (Common) **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	30 (U2) - Train B RN Pump Structure El 600 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006: • B-AX-217-W-002, B-AX-260-W-001 • C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023 • C-AX-260-F-026, C-AX-260-W-005 • F-AX-348-W-088 • J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001 The evaluation determined that the large bore penetrations are acceptable based on the following: • Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated). • Low probability of fire exposure. • Limited combustibles. • Fire brigade response. • Unexposed side temperatures will not result in auto-ignition of combustible materials. • Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 02, Rev. 2 Fire Protection Evaluation for Large Bore Pipes
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the large bore pipe penetration, K-NSWPS-662-W-020, which was added per Engineering Change CD00091. The new large bore opening is installed in the committed fire boundary wall that separates the A and B train of the Nuclear Service Water (RN) Pump Structure (NSWPS). The penetration does not conform to the penetration seal limitations of typical detail of M-2 from DPC 1435.00-00-0006. The evaluation determined that the large bore penetration K-NSWPS-662-W-020 is acceptable and was based on the following: • Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated). • Low probability of fire exposure and limited combustibles. • Continuity of combustibles and area separation. • Unexposed side temperatures will not result in auto-ignition of combustible materials.

Fire Area ID:	30 (U2) - Train B RN Pump Structure El 600 (Common)	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

• Ability to achieve and maintain safe shutdown is not compromised.

Fire Area ID: 30 (U2) - Train B RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
225	RN Pump House B Side	None	None	E	Combustible Loading: E

Title Fire Risk Evaluation for Fire Area 30 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	30 (U2) - Train B RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	30 (U2)-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	30 (U2)-VFDR-04
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	30 (U2)-VFDR-05
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	30 (U2)-VFDR-06
VFDR	Service Water P/H Pit A Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0001A - Service Water P/H Pit A Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	30 (U2) - Train B RN Pump Structure El 600 (Common)	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	30 (U2)-VFDR-07
VFDR	Service Water P/H Pit A Isolation from Standby Nuclear Service Water Pond, which is normally closed and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0003A - Service Water P/H Pit A Isolation from Standby Nuclear Service Water Pond
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	30 (U2)-VFDR-08
VFDR	Service Water P/H Pit B Isolation from Lake, which is normally open and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0005A - Service Water P/H Pit B Isolation from Lake
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	30 (U2)-VFDR-09
VFDR	Service Water Header A Return to Standby Nuclear Service Water Pond, which is normally closed and cycled for HSB, is affected by failure of cables 1*RN 511, 1*RN 512, and 2*RN 512 (and Valve 1RN VA0005A), which are located in the fire area. These failures can cause spurious operation of 1RN VA0005A and loss of power to 1RN VA0001A, 3A, and 63A. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. These are train A components in a Train B Fire Area. 1RN VA0005A is required to be shut to prevent draining of the pond to the lake. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1RN VA0063A - Service Water Header A Return to Standby Nuclear Service Water Pond
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 31 - Unit 2 Train A Aux Shutdown Panel El 543 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
19ASPA	U2 Train A Aux Shutdown Pnl El 543

Fire Area ID: 31 - Unit 2 Train A Aux Shutdown Panel El 543 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	31 - Unit 2 Train A Aux Shutdown Panel EI 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 31 - Unit 2 Train A Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19ASPA	U2 Train A Aux Shutdown Pnl El 543	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 31

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 2.70E-08

Δ LERF Units: [2] 3.00E-10

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	31 - Unit 2 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	31-VFDR-01
VFDR	Pressurizer Power Operated Relief Isolation Valve, which is normally open and closed for HSB, is affected by cable hits on 2*NV 820, 2*NV 827, and 2*ND 589 could spuriously open 2NC VA0034A. These cables also enter the ASPA and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 2*NC 817, 2*NC 819, and 2*NI 830 prevent closing 2NC VA0033A (These cables also enter ASPA). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0033A - Pressurizer Power Operated Relief Isolation Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	31-VFDR-02
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits on 2*NV 820, 2*NV 827, and 2*ND 589 could spuriously open 2NC VA0034A. These cables also enter the ASPA and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 2*NC 817, 2*NC 819, and 2*NI 830 prevent closing 2NC VA0033A (These cables also enter ASPA). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	31-VFDR-03
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by hot shorts on cable 2*NV 630 and at ASPA which may cause spurious closure of charging mini flow recirculation path (2NV VA203A) and normal charging flow path (2NV VA0312A). Alternate charging path through 2NI VA0010B remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	31 - Unit 2 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	31-VFDR-04
VFDR	2A Charging Pump, which is normally on and off for HSB, is affected by cable hits that may cause charging pump to run and charging flow through 2NI VA0009A and 10B. This is an MSO concern of overwhelming relief capacity. Control of 2NV PUACC and A train DG may be lost due to loss of the load sequencer power and diesel start circuitry. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV PUACC - 2A Charging Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	31-VFDR-05
VFDR	Charging Pumps A & B Recirc Isolation, which is normally open and open for HSB, is affected by hot shorts on cable 2*NV 630 and at ASPA my cause spurious closure of charging mini flow recirculation path (2NV VA203A) and normal charging flow path 2NV VA0312A). Alternate charging path through 2NI VA0010B remains available. Seal injection path remains available. This is to re-establish normal charging flowpath to support cooldown. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0203A - Charging Pumps A & B Recirc Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	31-VFDR-06
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	31 - Unit 2 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	31-VFDR-07
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by hot shorts on cable 2*NV 630 and at ASPA my cause spurious closure of charging mini flow recirculation path (2NV VA203A) and normal charging flow path 2NV VA0312A). Alternate charging path through 2NI VA0010B remains available. Seal injection path remains available. This is to re-establish normal charging flowpath to support cooldown. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	31-VFDR-08
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	31-VFDR-09
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	31 - Unit 2 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	31-VFDR-10
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals may prevent normal control of charging flow. Valve fails open on loss of air. Failure of valve NV-309 would result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 32 - Unit 1 Train A Aux Shutdown Panel El 543 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
9ASPA	U1 Train A Aux Shutdown Pnl El 543

Fire Area ID: 32 - Unit 1 Train A Aux Shutdown Panel El 543 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	32 - Unit 1 Train A Aux Shutdown Panel El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1
Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls
Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	32 - Unit 1 Train A Aux Shutdown Panel El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 32 - Unit 1 Train A Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9ASPA	U1 Train A Aux Shutdown Pnl El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 32

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 2.40E-08

Δ LERF Units: [1] 4.00E-10

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	32 - Unit 1 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	32-VFDR-01
VFDR	Unit 1 Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cables 1*NV 820, 1*NV 827, 1*NC 954, and 1*ND 589 could spuriously open 1NC VA0034A. These cables also enter the ASPA and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 1*NC 817, 1*NC 819, and 1*NI 830 prevent closing 1NC VA0033A (These cables also enter ASPA). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0033A - Unit 1 Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	32-VFDR-02
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cables 1*NV 820, 1*NV 827, 1*NC 954, and 1*ND 589 could spuriously open 1NC VA0034A. These cables also enter the ASPA and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 1*NC 817, 1*NC 819, and 1*NI 830 prevent closing 1NC VA0033A (These cables also enter ASPA). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	32-VFDR-03
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by hot shorts on cable 1*NV 630 and at ASPA may cause spurious closure of charging miniflow recirc path (1NV VA203A) and normal charging flow path (1NV VA0312A). Alternate charging path through 1NI VA0010B remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	32 - Unit 1 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	32-VFDR-04
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable faults (and internal faults in ASPA) that may spuriously energize (keep open) 1NV VA0001A, 2A, 11A, and 13A (1NV VA0010A and 1NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 1NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	32-VFDR-05
VFDR	Letdown Orifice 1C Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable faults (and internal faults in ASPA) that may spuriously energize (keep open) 1NV VA0001A, 2A, 11A, and 13A (1NV VA0010A and 1NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 1NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0011A - Letdown Orifice 1C Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	32-VFDR-06
VFDR	Letdown Orifice 1A Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable faults (and internal faults in ASPA) that may spuriously energize (keep open) 1NV VA0001A, 2A, 11A, and 13A (1NV VA0010A and 1NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 1NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0013A - Letdown Orifice 1A Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	32 - Unit 1 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	32-VFDR-07
VFDR	Charging Pumps A & B Recirc Isolation, which is normally open and open for HSB, is affected by hot shorts on cable 1*NV 630 and at ASPA may cause spurious closure of charging miniflow recirc path (1NV VA203A) and normal charging flow path (1NV VA0312A). Alternate charging path through 1NI VA0010B remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0203A - Charging Pumps A & B Recirc Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	32-VFDR-08
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	32-VFDR-09
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by hot shorts on cable 1*NV 630 and at ASPA may cause spurious closure of charging miniflow recirc path (1NV VA203A) and normal charging flow path (1NV VA0312A). Alternate charging path through 1NI VA0010B remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	32 - Unit 1 Train A Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	32-VFDR-10
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	32-VFDR-11
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	32-VFDR-12
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals may prevent normal control of charging flow. Valve fails open on loss of air. Failure of valve NV-309 would result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 33 - Unit 2 Train B Aux Shutdown Panel El 543 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
19ASPB	U2 Train B Aux Shutdown Pnl El 543

Fire Area ID: 33 - Unit 2 Train B Aux Shutdown Panel El 543 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 33 - Unit 2 Train B Aux Shutdown Panel EI 543 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID: 33 - Unit 2 Train B Aux Shutdown Panel El 543 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 33 - Unit 2 Train B Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19ASPB	U2 Train B Aux Shutdown Pnl El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Title Fire Risk Evaluation for Fire Area 33

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 4.10E-08

Δ LERF Units: [2] 2.80E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	33 - Unit 2 Train B Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	33-VFDR-01
VFDR	Pressurizer Power Operated Relief Isolation Valve, which is normally open and closed for HSB, is affected by cables 2*NV 821, 2*NV 836, 2*NC 956, and 2*NV 818 could spuriously open 2NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 2*NC 814, 2*NC 815, and 2*NC 816 prevent closing 2NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0031B - Pressurizer Power Operated Relief Isolation Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	33-VFDR-02
VFDR	Pressurizer Power Operated Relief Valve, which is normally closed and closed for HSB, is affected by cables 2*NV 821, 2*NV 836, 2*NC 956, and 2*NV 818 could spuriously open 2NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 2*NC 814, 2*NC 815, and 2*NC 816 prevent closing 2NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer Power Operated Relief Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	33-VFDR-03
VFDR	Pressurizer Power Operated Relief Isolation Valve, which is normally open and closed for HSB, is affected by cables 2*NV 821, 2*NV 836, 2*NC 956, and 2*NV 818 could spuriously open 2NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 2*NC 814, 2*NC 815, and 2*NC 816 prevent closing 2NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0035B - Pressurizer Power Operated Relief Isolation Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	33 - Unit 2 Train B Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	33-VFDR-04
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cables 2*NV 821, 2*NV 836, 2*NC 956, and 2*NV 818 could spuriously open 2NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 2*NC 814, 2*NC 815, and 2*NC 816 prevent closing 2NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	33-VFDR-05
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by SSPS and power loss prevent closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0010B - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	33-VFDR-06
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by cable fault (2*NV 638) (and internal faults in ASPB) may spuriously energize (keep open) 2NV VA0122B, 123B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0122B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 33 - Unit 2 Train B Aux Shutdown Panel EI 543 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	33-VFDR-07
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by cable fault (2*NV 638) (and internal faults in ASPB) may spuriously energize (keep open) 2NV VA0122B, 123B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0123B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	33-VFDR-09
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	33-VFDR-11
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by hot short to 2*RN 665 can spuriously close valve (2NV VA0202B), and normal charging mini flow recirc path 2NV VA0314B. Alternate charging path through 2NI VA0009A remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	33 - Unit 2 Train B Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	33-VFDR-12
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	33-VFDR-13
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	33-VFDR-14
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals may prevent normal control of charging flow. Valve fails open on loss of air. Failure of valve NV-309 would result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0309 - Seal Water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	34 - Unit 1 Train B Aux Shutdown Panel El 543	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	**Description**
9ASPB	U1 Train B Aux Shutdown Pnl El 543

Fire Area ID: 34 - Unit 1 Train B Aux Shutdown Panel El 543 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to preent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 34 - Unit 1 Train B Aux Shutdown Panel EI 543 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	34 - Unit 1 Train B Aux Shutdown Panel El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 34 - Unit 1 Train B Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9ASPB	U1 Train B Aux Shutdown Pnl El 543	None	R	E	Combustible Loading: E Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 34

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 6.20E-08

Δ LERF Units: [1] 5.00E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	34 - Unit 1 Train B Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	34-VFDR-01
VFDR	Auxiliary Feedwater Pump 1A Flow to S/G 1A, which is normally open and throttled for HSB, is affected by failure of cable 1*CA 727 may prevent throttling of flow for this valve (Fails full flow). Flow control to S/G B remains available. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0060 - Auxiliary Feedwater Pump 1A Flow to S/G 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	34-VFDR-02
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cables 1*NC 821, 1*NV 836, 1*NC 956, and 1*NV 818 could spuriously open 1NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 1*NC 814, 1*NC 815, and 1*NC 816 prevent closing 1NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	34-VFDR-03
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cables 1*NC 821, 1*NV 836, 1*NC 956, and 1*NV 818 could spuriously open 1NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 1*NC 814, 1*NC 815, and 1*NC 816 prevent closing 1NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	34 - Unit 1 Train B Aux Shutdown Panel EI 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	34-VFDR-04
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cables 1*NC 821, 1*NV 836, 1*NC 956, and 1*NV 818 could spuriously open 1NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 1*NC 814, 1*NC 815, and 1*NC 816 prevent closing 1NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	34-VFDR-05
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cables 1*NC 821, 1*NV 836, 1*NC 956, and 1*NV 818 could spuriously open 1NC VA0032B and 36B. These cables also enter the ASPB and could spuriously energize the pressurizer PORV from these cables or other sources. Cables 1*NC 814, 1*NC 815, and 1*NC 816 prevent closing 1NC VA0031B and 35B (These cables also enter ASPB). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	34-VFDR-06
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by cable hits on 1*RN 665 and at ASPB that can cause spurious closure of charging mini flow recirc path (1NV VA202B) and normal charging flow path 1NV VA0314B). Alternate charging path through 1NI VA009A remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0010B - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	34 - Unit 1 Train B Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	34-VFDR-07
VFDR	1B Charging Pump, which is normally on and off for HSB, is affected by cable hits that may cause both charging pumps to run and charging flow through 1NI VA0009A and 10B. This is an MSO concern of overwhelming relief capacity. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV PUBCC - 1B Charging Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	34-VFDR-08
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by cable fault (1*NV 638) (and internal faults in ASPB) that may spuriously energize (keep open) 1NV VA0122B, 123B. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0122B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	34-VFDR-09
VFDR	Charging Pumps A & B Recirc Isolation, which is normally open and open for HSB, is affected by hot shorts on cable 1*RN 665 and at ASPB may cause spurious closure of charging miniflow recirc path (1NV VA202B) and normal charging flow path 1NV VA0314B). Alternate charging path through 1NI VA0009A remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0202B - Charging Pumps A & B Recirc Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	34 - Unit 1 Train B Aux Shutdown Panel EI 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	34-VFDR-10
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	34-VFDR-11
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by cable hits on 1*RN 665 and at ASPB that can cause spurious closure of charging mini flow recirc path (1NV VA202B) and normal charging flow path 1NV VA0314B). Alternate charging path through 1NI VA009A remains available. Seal injection path remains available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	34-VFDR-12
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	34 - Unit 1 Train B Aux Shutdown Panel El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	34-VFDR-13
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	34-VFDR-14
VFDR	Seal Water Injection Flow, which is normally open and open for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals may prevent normal control of charging flow. Valve fails open on loss of air. Failure of valve NV-309 would result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0309 - Seal water Injection Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 35 (U1) - Control Room Tagout Area El 594 **Fire Area Definition**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
72A	Control Rm Tagout Area El 594

Fire Area ID: 35 (U1) - Control Room Tagout Area El 594 — **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B NC PORVS and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Femoval Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A or B train feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 35 (U1) - Control Room Tagout Area El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72A	Control Rm Tagout Area El 594	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 35 (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 35 (U1) - Control Room Tagout Area El 594 — **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	35 (U1)-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals. Valve fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	35 (U1)-VFDR-02
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	35 (U1)-VFDR-03
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	35 (U1) - Control Room Tagout Area El 594	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	35 (U1)-VFDR-04
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	35 (U1)-VFDR-05
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 35 (U2) - Control Room Tagout Area El 594 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
72A	Control Rm Tagout Area El 594

Fire Area ID: 35 (U2) - Control Room Tagout Area El 594 — **Performance Goals**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A or B train feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 35 (U2) - Control Room Tagout Area El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72A	Control Rm Tagout Area El 594	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 35 (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	35 (U2) - Control Room Tagout Area El 594	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	35 (U2)-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	35 (U2)-VFDR-02
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	35 (U2)-VFDR-03
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	35 (U2)-VFDR-04
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	35 (U2) - Control Room Tagout Area El 594	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	35 (U2)-VFDR-05
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
19TDPNL	U2 CA Pump Turbine Pnl El 543

Fire Area ID: 36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19TDPNL	U2 CA Pump Turbine Pnl El 543	None	R	E	Combustible Loading: E Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 36

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID: 36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	36-VFDR-01
VFDR	Auxiliary Feedwater Pump 2B Flow to S/G 2D, which is normally open and throttled for HSB, is affected by cable hits that may cause valve to fail open. Valve is required to be cycled to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0040 - Auxiliary Feedwater Pump 2B Flow to S/G 2D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	36-VFDR-02
VFDR	Auxiliary Feedwater Pump 2B Flow to S/G 2C, which is normally open and throttled for HSB, is affected by cable hits that may cause valve to fail open. Valve is required to be cycled to prevent S/G overfill. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0044 - Auxiliary Feedwater Pump 2B Flow to S/G 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	36-VFDR-03
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by SSPS and power loss prevent closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	36-VFDR-05
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	36-VFDR-06
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS closes prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	36-VFDR-08
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	36-VFDR-09
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
9TDPNL	U1 CA Pump Turbine Pnl El 543

Fire Area ID: 37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Fire Area ID:	37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9TDPNL	U1 CA Pump Turbine Pnl El 543	None	R	E	Combustible Loading: E Detection System, Installed: R

Title
Fire Risk Evaluation for Fire Area 37

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [1] 0.00E+00

Δ LERF
Units: [1] 0.00E+00

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	37-VFDR-01
VFDR	Auxiliary Feedwater Pump 1B Flow to S/G 1D, which is normally open and throttled for HSB, is affected by cable hits that may cause valve to fail open. Valve is required to be cycled to prevent S/G overfill. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0040 - Auxiliary Feedwater Pump 1B Flow to S/G 1D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	37-VFDR-02
VFDR	Auxiliary Feedwater Pump 1B Flow to S/G 1C, which is normally open and throttled for HSB, is affected by cable hits that may cause valve to fail open. Valve is required to be cycled to prevent S/G overfill. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0044 - Auxiliary Feedwater Pump 1B Flow to S/G 1C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	37-VFDR-04
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	37-VFDR-05
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS closes prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	37-VFDR-07
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	37-VFDR-08
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 38 - Unit 1 Fuel Storage Area HVAC Room El 631 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
129	U1 FB HVAC Rm El 631

Fire Area ID:	38 - Unit 1 Fuel Storage Area HVAC Room El 631	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A or B train feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	38 - Unit 1 Fuel Storage Area HVAC Room El 631	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 18 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 611+0' and 631+6'
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to provide justification for the unprotected sprial stairs between Elevation 631+6 (Fire Areas (FA) 38 and 47) and Elevation 611+0 (FA 22). The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on: • combustible controls, • lack of in situ combustibles, • minimal ignition sources.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 38 - Unit 1 Fuel Storage Area HVAC Room El 631
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
129	U1 FB HVAC Rm El 631	None	R	E	Combustible Loading: E Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 38

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	38 - Unit 1 Fuel Storage Area HVAC Room El 631	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	38-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	38-VFDR-02
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	38-VFDR-03
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	38 - Unit 1 Fuel Storage Area HVAC Room El 631	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	38-VFDR-04
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	38-VFDR-05
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 39 - Unit 2 Turbine Driven CA Pump Pit El 543 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
19TDPIT	U2 TDCA Pump Pit El 543

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 39 - Unit 2 Turbine Driven CA Pump Pit El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	39 - Unit 2 Turbine Driven CA Pump Pit El 543	**Previously Approved Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Licensing Action

13. Deviation from Section C.5.a of BTP CMEB 9.5-1 regarding unprotected structural steel over the turbine driven auxiliary feedwater pump pit.

Licensing Basis

The NRC's fire protection site audit was conducted between November 1 and November 4, 1983. As a result of the audit, the NRC identified concerns pertaining to various commitments and the degree of compliance with Branch Technical Position APCSB (CMEB) 9.5-1. By letter dated May 11, 1984, Duke Energy requested a deviation regarding the unprotected structural steel over the turbine driven auxiliary feedwater pump pit.

The NRC approved the deviation based on the following information:

- Limited quantities of material consisting of armor interlock cable, grease, sealite conduit, and lubricating oil. Because of the limited quantity and distribution of these materials, an uncontrolled fire would not be expected to develop sufficient duration and temperature to threaten the heavy steel members.
- A high pressure carbon dioxide system protects each pit providing additional assurance of barrier integrity.
- Photoelectric type smoke detectors are also installed in each pit providing early warning to the Control Room through the EFA system.

Therefore, the NRC concluded that the absence of a fire resistive coating on the structural steel members is an acceptable deviation from Section C.5.a of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Fire Area ID: 39 - Unit 2 Turbine Driven CA Pump Pit El 543 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

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Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 03 Fire Penetration Evaluation for AFW Pump Ceiling Penetrations with Seal Material Beyond the Barrier Plane

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to evaluate the adequacy of the large blockouts within the Unit 1 and 2 Auxiliary Feedwater Pump Room hatch covers that contain seal material that is not located within the barrier plane and are not bounded by typical details per DPC 1435.00-00-0006.

The evaluation determined that penetrations C-AX-217-F-026, C-AX-217-F-029, C-AX-260-F-027, and C-AX-260-F-028 are not considered qualified for a 3-hour F and T rating. However they are considered acceptable for the fire hazards present and acceptable based on the following:

- Seal sidewalls perpendicular to the ceiling surface are protected from direct flame impingement by either a vertical wall barrier or a steel member.
- Penetration sides protected by a wall are considered to perform in a manner consistent with the fire tested configurations of detail M-6 per DPC 1435.00-00-0006.
- Seal sidewall is considered equivalent to locating the seal within the barrier plane because it is protected by concrete construction.

Fire Area ID: 39 - Unit 2 Turbine Driven CA Pump Pit El 543 — **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision: CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive: No

Functionally Equivalent: No

Adequate for the Hazard: Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Fire Area ID: 39 - Unit 2 Turbine Driven CA Pump Pit El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19TDPIT	U2 TDCA Pump Pit El 543	E, R	E, R	E	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R

Title Fire Risk Evaluation for Fire Area 39

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic (CO2) and manual suppression was credited for MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	39 - Unit 2 Turbine Driven CA Pump Pit El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	39-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of air causing valve to fail full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	39-VFDR-02
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	39-VFDR-03
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	40 - Unit 1 Turbine Driven CA Pump Pit El 543	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
9TDPIT	U1 TDCA Pump Pit El 543

Fire Area ID: 40 - Unit 1 Turbine Driven CA Pump Pit El 543

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary Feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	40 - Unit 1 Turbine Driven CA Pump Pit El 543 **Previously Approved Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Licensing Action

13. Deviation from Section C.5.a of BTP CMEB 9.5-1 regarding unprotected structural steel over the turbine driven auxiliary feedwater pump pit.

Licensing Basis

The NRC's fire protection site audit was conducted between November 1 and November 4, 1983. As a result of the audit, the NRC identified concerns pertaining to various commitments and the degree of compliance with Branch Technical Position APCSB (CMEB) 9.5-1. By letter dated May 11, 1984, Duke Energy requested a deviation regarding the unprotected structural steel over the turbine driven auxiliary feedwater pump pit.

The NRC approved the deviation based on the following information:

- Limited quantities of material consisting of armor interlock cable, grease, sealite conduit, and lubricating oil. Because of the limited quantity and distribution of these materials, an uncontrolled fire would not be expected to develop sufficient duration and temperature to threaten the heavy steel members.
- A high pressure carbon dioxide system protects each pit providing additional assurance of barrier integrity.
- Photoelectric type smoke detectors are also installed in each pit providing early warning to the Control Room through the EFA system.

Therefore, the NRC concluded that the absence of a fire resistive coating on the structural steel members is an acceptable deviation from Section C.5.a of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Fire Area ID:	40 - Unit 1 Turbine Driven CA Pump Pit El 543	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 03 Fire Penetration Evaluation for AFW Pump Ceiling Penetrations with Seal Material Beyond the Barrier Plane

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the large blockouts within the Unit 1 and 2 Auxiliary Feedwater Pump Room hatch covers that contain seal material that is not located within the barrier plane and are not bounded by typical details per DPC 1435.00-00-0006.

The evaluation determined that penetrations C-AX-217-F-026, C-AX-217-F-029, C-AX-260-F-027, and C-AX-260-F-028 are not considered qualified for a 3-hour F and T rating. However they are considered acceptable for the fire hazards present and acceptable based on the following:

- Seal sidewalls perpendicular to the ceiling surface are protected from direct flame impingement by either a vertical wall barrier or a steel member.
- Penetration sides protected by a wall are considered to perform in a manner consistent with the fire tested configurations of detail M-6 per DPC 1435.00-00-0006.
- Seal sidewall is considered equivalent to locating the seal within the barrier plane because it is protected by concrete construction.

Fire Area ID: 40 - Unit 1 Turbine Driven CA Pump Pit El 543 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,
- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 40 - Unit 1 Turbine Driven CA Pump Pit El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9TDPIT	U1 TDCA Pump Pit El 543	E, R	E, R	E	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R

Title
Fire Risk Evaluation for Fire Area 40

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [1] 5.87E-08

Δ LERF
Units: [1] 6.70E-10

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Automatic (CO2) and manual suppression was credited for MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

Transient fires are not a contributor to risk in the fire area, therefore no change is required for the control of transient combustibles or control of ignition sources (Hot Work).

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	40 - Unit 1 Turbine Driven CA Pump Pit El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	40-VFDR-01
VFDR	Unit 1 Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by cable hits may cause spurious opening of PORV (1*NC 820 or 1*ND 589) and prevent closing the block valve (1*NC 819). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0033A - Unit 1 Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	40-VFDR-02
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits may cause spurious opening of PORV (1*NC 820 or 1*ND 589) and prevent closing the block valve (1*NC 819). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	40-VFDR-03
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of air causing valve to fail full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	40-VFDR-04
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	40 - Unit 1 Turbine Driven CA Pump Pit El 543	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	40-VFDR-05
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	41 - DG1A Sequencer Tunnel El 556	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
215	DG1A Seq Tunnel El 556

Fire Area ID:	41 - DG1A Sequencer Tunnel El 556	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 41 - DG1A Sequencer Tunnel El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
215	DG1A Seq Tunnel El 556	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 41

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 1.10E-09

Δ LERF Units: [1] 5.10E-12

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	41 - DG1A Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	41-VFDR-01
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by a hot short within 1TBOX0522 or cable 1*NC 955 that can cause spurious energization and opening of the Pressurizer PORV. This failure condition may challenge the Inventory and Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	41-VFDR-02
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by SSPS and power loss prevent closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	41-VFDR-03
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	41 - DG1A Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	41-VFDR-04
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS closes and loss of power prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	41-VFDR-05
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	41-VFDR-06
VFDR	S/G 1C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - S/G 1C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 42 - DG1B Sequencer Tunnel El 556 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
216	DG1B Seq Tunnel El 556

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 42 - DG1B Sequencer Tunnel El 556 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 42 - DG1B Sequencer Tunnel El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
216	DG1B Seq Tunnel El 556	None	R	None	Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 42

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 8.00E-11

Δ LERF Units: [1] 6.00E-12

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	42 - DG1B Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	42-VFDR-01
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits on 1*NC 956 and 957 (1*NC 956 cable internal hot short or in 1TBOX0523) can spuriously open PORVs. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	42-VFDR-02
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable hits on 1*NC 956 and 957 (1*NC 956 cable internal hot short or in 1TBOX0523) can spuriously open PORVs. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	42-VFDR-03
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by SSPS and power loss which prevents closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0010B - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	42-VFDR-04
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	42 - DG1B Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	42-VFDR-05
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS closes and loss of power which prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	42-VFDR-06
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	42-VFDR-07
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 43 - DG2A Sequencer Tunnel El 556 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
217	DG2A Seq Tunnel El 556

Fire Area ID: 43 - DG2A Sequencer Tunnel El 556 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manul control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 43 - DG2A Sequencer Tunnel El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
217	DG2A Seq Tunnel El 556	None	R	None	Detection System, Installed: R

Title
Fire Risk Evaluation for Fire Area 43

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [2] 1.87E-08

Δ LERF
Units: [2] 2.05E-10

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	43 - DG2A Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	43-VFDR-01
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by hot short within 2TBOX0522 or cable 2*NC 955 can cause spurious energization and opening of the Pressurizer PORV. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	43-VFDR-02
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by SSPS and power loss which prevents closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	43-VFDR-03
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	43-VFDR-04
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS closes and loss of power which prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	43 - DG2A Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	43-VFDR-05
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	43-VFDR-06
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	44 - DG2B Sequencer Tunnel El 556	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	**Description**
218	DG2B Seq Tunnel El 556

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 44 - DG2B Sequencer Tunnel El 556 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A train feeding S/Gs A and B. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 44 - DG2B Sequencer Tunnel El 556

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
218	DG2B Seq Tunnel El 556	None	R	None	Detection System, Installed: R

Title
Fire Risk Evaluation for Fire Area 44

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [2] 3.20E-09

Δ LERF
Units: [2] 6.00E-11

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	44 - DG2B Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	44-VFDR-01
VFDR	Pressurizer Power Operated Relief Valve, which is normally closed and closed for HSB, is affected by cable faults on 2*NC 956 and 957 (2*NC 956 cable internal hot short or in 2TBOX0523) can spuriously open PORVs. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer Power Operated Relief Valve
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	44-VFDR-02
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by cable faults on 2*NC 956 and 957 (2*NC 956 cable internal hot short or in 2TBOX0523) can spuriously open PORVs. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	44-VFDR-03
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by SSPS and power loss which prevents closing valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0010B - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	44-VFDR-04
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	44 - DG2B Sequencer Tunnel El 556	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	44-VFDR-05
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS closes and loss of power which prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	44-VFDR-06
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	44-VFDR-07
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574 — **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
18B	U1 AB South Cable Shaft El 543
39A	U1 AB South Cable Shaft El 554
60B	U1 AB South Cable Shaft El 574
60C	U1 AB Cable Room Corridor El 574

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injecting borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and the main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feedwater is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from B train is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574 — **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers: • C-AX-217-W-008, -013, -014, -021, -025, -028, -029 • C-AX-228-W-028, -029, -030, • C-AX-260-W-049, -050, -053, -068, -074 • D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107 • D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063 • F-AX-348-W-085, -097, -114, -115 • F-AX-354A-W-035, -036, -039, -040, -044 • F-AX-354-W-021, -027, -028, -032, -033 • H-AX-515-W-013 • H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094 • J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010 • J-AX-518-W-001, -002, -005, -006, -008 • J-AX-533-W-001, -002 The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following: • Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited. • Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response. • The ability to achieve and maintain safe shutdown is not compromised.
Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 15 Fire Protection Evaluation for OZ Gedney Plug Seal Located Beyond the Barrier Plane
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574 **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Summary

The purpose of the calculation was to evaluate the adequacy of the following penetrations that utilize OZ Gedney Plug Seals regarding seal configurations that do not conform to typical detail M-8 per DPC 1435.00-00-0006, which requires the plug to be located in the barrier plane:

- H-AX-517-W-098, -099, -100, -102, -103

The evaluation determined that the penetrations will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- The Type CFSF Gedney Plug utilized is an approved sealing device capable of achieving a 3-hour F rating.
- No combustibles are present in proximity to the penetrations in a manner that would result in a fire on the unexposed side as a result of heat transmission through the penetrations.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 06 Deletion of Control Room Floor from Scope of Committed Fire Barriers (CNCE-9584)
Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to provide the technical justification for removing the Control Room floor from the scope of committed fire barriers.

The evaluation concluded that the Control Room floor can be removed from the scope of the committed fire barriers based on the following:

- Insignificant amount of combustible loading.
- Lack of ignition sources.
- Cable spreading room and main control boards are supplied with ionization smoke detectors.

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 09 Evaluation of Establishing the Single Point Acces (SPA) Vestibule as a Committed Fire Barrier (CNCE-61506)
Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to evaluate proposed modifications to the vestibule between the Auxiliary and Service buildings in order to qualify it as a NRC committed fire boundary. The proposed configuration of the vestibule has not been fire tested to demonstrate that it is qualified as a 3-hour fire barrier.

The evaluation determined the vestibule located on the Service Building side that encompasses the personnel access door will perform its intended function of preventing fire spread from the non-safety areas in the Service Building Corridor into the safety related Auxiliary Building areas based on the following:

- Walls and the personnel access door of the vestibule are qualified 3-hour fire rated assemblies.
- The roof of the vestibule will have gypsum wall board above the metal deck.
- Low combustible loading.
- Administrative and procedural controls in place for hot work ignition sources and storage of combustible materials.

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
18B	U1 AB South Cable Shaft El 543	None	R	D	Detection System, Installed: R Transient Control: D
39A	U1 AB South Cable Shaft El 554	None	R	D	Detection System, Installed: R Transient Control: D
60B	U1 AB South Cable Shaft El 574	E	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Transient Control: D Water Suppression, Installed Fixed Sprinkler: E
60C	U1 AB Cable Room Corridor El 574	None	R	D	Detection System, Installed: R Transient Control: D

Title Fire Risk Evaluation for Fire Area 45

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [1] 1.89E-06

Δ LERF Units: [1] 3.09E-07

DID Maintained A review of the risk evaluation results shows that the delta risk results for CDF and LERF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is a significant contributor to risk in the fire area, therefore change is required for the control of transient combustibles to designate the area between columns DD-EE/55-56, including the cable shaft, as an exclusion area.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk enhancements, risk or DID modifications or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574 — **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	45-VFDR-03
VFDR	Nuclear Instrumentation Source Range Detector Channel 1 (N31), which is normally available and available for HSB, is affected by Reactor Neutron Monitoring not being available due to power and cable hits to 1(2)ENBDTNSDT0001, and cable hits to 1(2)ENBDTNSDT0005. Wide range detector is available (1(2) ENCDTNSDT0014, 1(2)ENCP 5050). Both source range channels may receive a spurious source range block signal. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENBDTNSDT0001 - Nuclear Instrumentation Source Range Detector Channel 1 (N31),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-04
VFDR	Nuclear Instrumentation Source Range Detector Channel 2 (N32), which is normally available and available for HSB, is affected by Reactor Neutron Monitoring not being available due to power and cable hits to 1(2)ENBDTNSDT0001, and cable hits to 1(2)ENBDTNSDT0005. Wide range detector is available (1(2) ENCDTNSDT0014, 1(2)ENCP 5050). Both source range channels may receive a spurious source range block signal. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENBDTNSDT0005 - Nuclear Instrumentation Source Range Detector Channel 2 (N32),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-06
VFDR	Non Coordinated Loads fed from 1EPEMXEMXB, which is normally available and available for HSB, is affected by breaker 1EMXB-F08A is not coordinated. Cable 1 EHM 598 coordinates 8.5 ft from Jct Pt 5913 (prior to Jct Pt 5912). This causes loss of 1EPEMXEMXB and all credited loads from this MCC. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPEMXEMXB-NCL - Non Coordinated Loads fed from 1EPEMXEMXB
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 45-VFDR-07

VFDR Borated Water Storage Tank Level Channel #1, which is normally available and available for HSB, is affected by failure of at least 2 out of 4 FWST Level Indication and LOCA signal may cause a FWST Low Level signal which will open 1NI-184B and 1NI-185A 1FW P 5000 has loss of power and cable hits, 1FW P 5010 has cable hits on all power, and 1FW P 5010 has a loss fo power. Opening of 1NI-185A valve will cause a diversion path from FWST to the containment sump. 1FW-27A may fail as is (normally open) on a loss of power. The A train valves mispositioning may cause loss of FWST inventory which is required for makeup. Valves 1NI-184B or 1FW-55B are required to be closed and will swapover as required and will not divert FWST inventory. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1FW P 5000 - Borated Water Storage Tank Level Channel #1

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 45-VFDR-08

VFDR Borated Water Storage Tank Level Channel #2, which is normally available and available for HSB, is affected by failure of at least 2 out of 4 FWST Level Indication and LOCA signal may cause a FWST Low Level signal which will open 1NI-184B and 1NI-185A 1FW P 5000 has loss of power and cable hits, 1FW P 5010 has cable hits on all power, and 1FW P 5010 has a loss fo power. Opening of 1NI-185A valve will cause a diversion path from FWST to the containment sump. 1FW-27A may fail as is (normally open) on a loss of power. The A train valves mispositioning may cause loss of FWST inventory which is required for makeup. Valves 1NI-184B or 1FW-55B are required to be closed and will swapover as required and will not divert FWST inventory. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1FW P 5010 - Borated Water Storage Tank Level Channel #2

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 45-VFDR-09

VFDR Borated Water Storage Tank Level Channel #3, which is normally available and available for HSB, is affected by failure of at least 2 out of 4 FWST Level Indication and LOCA signal may cause a FWST Low Level signal which will open 1NI-184B and 1NI-185A 1FW P 5000 has loss of power and cable hits, 1FW P 5010 has cable hits on all power, and 1FW P 5010 has a loss fo power. Opening of 1NI-185A valve will cause a diversion path from FWST to the containment sump. 1FW-27A may fail as is (normally open) on a loss of power. The A train valves mispositioning may cause loss of FWST inventory which is required for makeup. Valves 1NI-184B or 1FW-55B are required to be closed and will swapover as required and will not divert FWST inventory. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1FW P 5120 - Borated Water Storage Tank Level Channel #3

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	45-VFDR-10
VFDR	Residual Heat Removal Pump 1A Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of FW-27A (1*FW 502, 1*NI 563, 1NI* 682) which may cause a diversion of FWST to the ND system. A combination of the failure of FW-27A and spurious operation of NI-185A may provide a diversion flowpath for FWST to the containment sump. There is also IN 92-18 concerns for FW-27A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1FW VA0027A - Residual Heat Removal Pump 1A Suction from Borated Water Storage Tank
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-14
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by spurious cable hits which can cause a loss of power and control. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-15
VFDR	Pressurizer Level Ch. 2, which is normally available and available for HSB, is affected by Train A and B, Pressurizer Level Monitoring not being available due to cable and power hits to monitoring devices. 1NC P5153 (INCLT5150) is not available due to cable (1*NC 615) and power hits. 1NC P5164 (INCLT5160) is not available due to cable (1*NC 608) and power hits while 1NC P5174 (1NCLT5170) is not available due to power hits. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5153 - Pressurizer Level Ch. 2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-16
VFDR	Pressurizer Level Ch. 1, which is normally Available and Available for HSB, is affected by Train A and B, Pressurizer Level Monitoring not being available due to cable and power hits to monitoring devices. 1NC P5153 (INCLT5150) is not available due to cable (1*NC 615) and power hits. 1NC P5164 (INCLT5160) is not available due to cable (1*NC 608) and power hits while 1NC P5174 (1NCLT5170) is not available due to power hits. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5164 - Pressurizer Level Ch. 1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-17
VFDR	Pressurizer Level Ch. 3, which is normally Available and Available for HSB, is affected by Train A and B, Pressurizer Level Monitoring not being available due to cable and power hits to monitoring devices. 1NC P5153 (INCLT5150) is not available due to cable (1*NC 615) and power hits. 1NC P5164 (INCLT5160) is not available due to cable (1*NC 608) and power hits while 1NC P5174 (1NCLT5170) is not available due to power hits. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5174 - Pressurizer Level Ch. 3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-18
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by a hot short within cable 1*ATC 670 causes spurious opening of the PORV. Loss of power and short on cable 1*ATC 640 can prevent closing of the PORV block valve. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0033A - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 45-VFDR-19

VFDR Pressurizer PORV, which is normally closed and closed for HSB, is affected by a hot short within cable 1*ATC 670 causes spurious opening of the PORV. Loss of power and short on cable 1*ATC 640 can prevent closing of the PORV block valve. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC VA0034A - Pressurizer PORV

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 45-VFDR-20

VFDR 1A Residual Heat Removal Pump, which is normally off and not utilized for HSB, is affected by a spurious operation or loss of power and control due to the cable failures of components FW-27A, ND PUA, and NS-43A that may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the Train A containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1ND PUA - 1A Residual Heat Removal Pump

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 45-VFDR-22

VFDR Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by the flowpath through the normal charging may be lost due to spurious SSPS, and cable hits on 1NV VA0312A. Cable hits on 1NI VA0009A may open the valve and prevent closing the valve to return the normal charging flowpath to service. This is a concern with going solid, and long term control of the plant. Charging flowpath is assured through 1NI VA0010B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NI VA0009A - Charging Pump Cold Leg Injection Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-23
VFDR	Safety Injection Pump 1A Suction, which is normally open and closed for HSB, is affected by multiple cable hot shorts to NI Pump (1NI PUA) cause a spurious start. 1NI VA0103A and 1NI VA0121A have hot shorts and these may spurious operate; and have IN-92-18 concerns. 1NI VA0100B has the breaker open and power removed. 1NV PUACC may also receive a start signal. This has the potential to overwhelm the pressuirzer relief capacity and affect seal cooling flow This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0103A - Safety Injection Pump 1A Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-24
VFDR	1A Safety Injection Pump to Hot Lets B&C, which is normally closed and closed for HSB, is affected by multiple cable hot shorts to NI Pump (1NI PUA) cause a spurious start. 1NI VA0103A and 1NI VA0121A have hot shorts and these may spurious operate; and have IN-92-18 concerns. 1NI VA0100B has the breaker open and power removed. 1NV PUACC may also receive a start signal. This has the potential to overwhelm the pressuirzer relief capacity and affect seal cooling flow. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0121A - 1A Safety Injection Pump to Hot Lets B&C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-25
VFDR	Residual Heat Removal Pump 1A Containment Sump Suction, which is normally closed and not utilized for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of valves NS-18A, NS-20A, and NI-185A may cause a diversion flowpath for FWST to the containment sump. This will cause a loss of FWST inventory and loss of primary makeup. Also, the valve is affected by a potential IN 92-18 concern due to spurious operation from failure of cables 1*ATC528, 1*NI 563 and1*NI 563 that may open or close valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NI VA0185A - Residual Heat Removal Pump 1A Containment Sump Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 45-VFDR-29

VFDR 1A Containment Spray Pump, which is normally off and off for HSB, is affected by cable hits on 1NS PUA that can cause spurious start of NS pump. Cable hits on 1NS VA0020A, 1NS VA0029A, and 1NS VA0032A can cause spurious opening of valves. This can cause a diversion of FWST inventory to the containment via the containment spray header. A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start. A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A. A hot short on cable 1*NS 518 can provide an Open signal to 1NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NS PUA - 1A Containment Spray Pump

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 45-VFDR-30

VFDR NS PUMP A SUCT FROM CONT SUMP, which is normally closed and not utilized for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of valves NS-18A, NS-20A, and NI-185A may cause a diversion flowpath for FWST to the containment sump. This will cause a loss of FWST inventory and loss of primary makeup. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NS VA0018A - NS PUMP A SUCT FROM CONT SUMP

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 45-VFDR-32

VFDR Containment Spray Pump 1A suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by cable hits on 1NS VA0020A, 1NS VA0029A, and 1NS VA0032A can cause spurious opening of valves. Cable hits on 1NS PUA can cause spurious start of NS pump. This can cause a diversion of FWST inventory to the containment via the containment spray header. A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start. A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A.A hot short on cable 1*NS 518 can provide an Open signal to 1NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NS VA0020A - Containment Spray Pump 1A suction from Borated Water Storage Tank

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-33
VFDR	Containment Spray Header 1A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 1NS VA0020A, 1NS VA0029A, and 1NS VA0032A can cause spurious opening of valves. Cable hits on 1NS PUA can cause spurious start of NS pump. This can cause a diversion of FWST inventory to the containment via the containment spray header.A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start.A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A.A hot short on cable 1*NS 518 can provide an Open signal to 1NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0029A - Containment Spray Header 1A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-34
VFDR	Containment Spray Header 1A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 1NS VA0020A, 1NS VA0029A, and 1NS VA0032A can cause spurious opening of valves. Cable hits on 1NS PUA can cause spurious start of NS pump. This can cause a diversion of FWST inventory to the containment via the containment spray header.A hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start.A hot short on cable 1*NS 528 can provide an Open signal to both 1NS VA0029A and 1NS VA0032A.A hot short on cable 1*NS 518 can provide an Open signal to 1NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0032A - Containment Spray Header 1A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-35
VFDR	1A Residual Heat Removal Pump to Containment Spray Header, which is normally closed and closed for HSB, is affected by a hot short on cable 1*ATC 853 can provide a 1NS PUA pump start, or a hot short on cable 1*RN 661 along with a 1EQB-DGLSA permissive can provide a 1NS PUA pump start. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NS VA0043A - 1A Residual Heat Removal Pump to Containment Spray Header
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	45-VFDR-36
VFDR	1A Charging Pump, which is normally on and off for HSB, is affected by a spurious operation due to cable hits. This may overwhelm PORV capability since NI pump also gets spurious start. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV PUACC - 1A Charging Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-39
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable hits that cause spurious operation of valve and prevent letdown isolation. Alternate valve for letdown path isolation is NV-15B (MSO issue, also). Pressure relief of letdown line via NV-14 to the PRT available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-40
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable hits that cause spurious operation of valve and prevent letdown isolation. Alternate valve for letdown path isolation is NV-15B (MSO issue, also). Pressure relief of letdown line via NV-14 to the PRT available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0002A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-41
VFDR	Letdown Orifice 1B Outlet Containment Isolation, which is normally open and closed for HSB, is affected by cable hits that cause spurious operation of valve and prevent letdown isolation. Alternate valve for letdown path isolation is NV-15B (MSO issue, also). Pressure relief of letdown line via NV-14 to the PRT available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0010A - Letdown Orifice 1B Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-42
VFDR	Letdown Orifice 1C Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits that cause spurious operation of valve and prevent letdown isolation. Alternate valve for letdown path isolation is NV-15B (MSO issue, also). Pressure relief of letdown line via NV-14 to the PRT available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0011A - Letdown Orifice 1C Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-43
VFDR	Letdown Orifice 1A Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits that cause spurious operation of valve and prevent letdown isolation. Alternate valve for letdown path isolation is NV-15B (MSO issue, also). Pressure relief of letdown line via NV-14 to the PRT available. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0013A - Letdown Orifice 1A Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-44
VFDR	VCT Outlet Isolation, which is normally open and cycled for HSB, is affected by cable hits that prevent auto swapover from VCT to FWST and provide inaccurate indication of level so operators will not be aware there is a problem. This can cause damage to the charging pump. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0188A - VCT Outlet Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-45
VFDR	VCT Outlet Isolation, which is normally open and cycled for HSB, is affected by cable hits that prevent auto swapover from VCT to FWST and provide inaccurate indication of level so operators will not be aware there is a problem. This can cause damage to the charging pump. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0189B - VCT Outlet Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-46
VFDR	Charging Pumps A & B Recirc Isolation, which is normally open and open for HSB, is affected by spurious cable hits may close 1NV VA0203A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0203A - Charging Pumps A & B Recirc Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-47
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by valve failing open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 45-VFDR-48

VFDR Seal Water Injection Flow Control, which is normally open and open for HSB, is affected by valve failing open on loss of air and cable hits. Failure of valve NV-309 may result in need to operate manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NV VA0309 - Seal Water Injection Flow Control

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 45-VFDR-49

VFDR Charging Line Containment Isolation, which is normally open and open for HSB, is affected by the flowpath through the normal charging may be lost due to spurious SSPS, and cable hits on 1NV VA0312A. Cable hits on 1NI VA0009A may open the valve and prevent closing the valve to return the normal charging flowpath to service. This is a concern with going solid, and long term control of the plant. Charging flowpath is assured through 1NI VA0010B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NV VA0312A - Charging Line Containment Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 45-VFDR-51

VFDR SG C Steam Line Pressure CH #1, which is normally available and available for HSB, is affected by Train A and B Steam Generator 1C Pressure Monitoring not being available due to cable and power hits to monitoring devices. 1SM P 5150 is not available due to cable hits (1*SM 657). 1SM P 5140 is not available due to cable (1*SM 656) and power hits while 1SM P 5160 is not available due to power hits. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1SM P 5140 - SG C Steam Line Pressure CH #1

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-52
VFDR	SG C Steam Line Pressure CH #2, which is normally available and available for HSB, is affected by Train A and B Steam Generator 1C Pressure Monitoring not being available due to cable and power hits to monitoring devices. 1SM P 5150 is not available due to cable hits (1*SM 657). 1SM P 5140 is not available due to cable (1*SM 656) and power hits while 1SM P 5160 is not available due to power hits. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SM P 5150 - SG C Steam Line Pressure CH #2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-53
VFDR	SG C Steam Line Pressure CH #3, which is normally available and available for HSB, is affected by Train A and B Steam Generator 1C Pressure Monitoring not being available due to cable and power hits to monitoring devices. 1SM P 5150 is not available due to cable hits (1*SM 657). 1SM P 5140 is not available due to cable (1*SM 656) and power hits while 1SM P 5160 is not available due to power hits. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SM P 5160 - SG C Steam Line Pressure CH #3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-54
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-55
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	45-VFDR-58
VFDR	Nuclear Instrumentation Source Range Detector Channel 1 (N31), which is normally available and available for HSB, is affected by Reactor Neutron Monitoring not being available due to power and cable hits to 1(2)ENBDTNSDT0001, and cable hits to 1(2)ENBDTNSDT0005. Wide range detector is available (1(2) ENCDTNSDT0014, 1(2)ENCP 5050). Both source range channels may receive a spurious source range block signal. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ENBDTNSDT0001 - Nuclear Instrumentation Source Range Detector Channel 1 (N31),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-59
VFDR	Nuclear Instrumentation Source Range Detector Channel 2 (N32), which is normally Available and Available for HSB, is affected by Reactor Neutron Monitoring not being available due to power and cable hits to 1(2)ENBDTNSDT0001, and cable hits to 1(2)ENBDTNSDT0005. Wide range detector is available (1(2) ENCDTNSDT0014, 1(2)ENCP 5050). Both source range channels may receive a spurious source range block signal. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ENBDTNSDT0005 - Nuclear Instrumentation Source Range Detector Channel 2 (N32),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	45 - Unit 1 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	45-VFDR-60
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-61
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	45-VFDR-62
VFDR	Control Foom Area Filter Inlet, which is normally open and open for HSB, is affected by both 1VC VA0006A and 2VC VA0006A experiencing cable hits (1*ATC1004 and 1*VC 541) that could spuriously close valves and create IN 92-18 concerns. Also, it may be affected by a potential IN 92-18 concern due to spurious operation from failure of cable 1*VC 543 that may open or close valve. Control room make up supply not available. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2VC VA0006A - Control Room Area Filter Inlet
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 46 - Unit 2 Cable Room Corridor El 574 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
28B	U2 AB North Cable Shaft El 543
51A	U2 AB North Cable Shaft El 554
69B	U2 AB North Cable Shaft El 574
69C	U2 AB Cable Room Corridor El 574

Fire Area ID: 46 - Unit 2 Cable Room Corridor El 574 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 04 Fire Protection Evaluation for Floor Blockout Penetrations with a Free Area in Excess of 9 sqft. and Structural Framing Spans Exceeding 42 in. without a Cross Member Framing

Revision 1

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the following floor blockouts regarding the framing support provided for the Silicone Foam free areas exceeding 9 sqft. that are not bounded by typical details per DPC 1435.00-00-0006:

- H-AX-517A-F-001
- H-AX-517A-F-002
- H-AX-517B-F-001
- H-AX-517B-F-002
- H-AX-517B-F-003
- K-AX-653-F-001
- K-AX-653-F-032
- K-AX-653-F-003
- J-AX-650A-F-001

The evaluation determined that the Unit 1 and 2 Exterior Doghouse penetrations (J-AX-650A-F-001) are qualified for a 3-hour F and T rating. The remaining penetrations above are considered adequate for the area fire hazards based on the following:

- Detection available in fire areas of concern.
- Area hose stations and fire extinguishers.
- Fire brigade response.
- Seal and framing configurations for the penetrations are considered adequate.
- Seal integrity is not anticipated to be compromised by fire exposure.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 10 Fire Protection Evaluation for Penetrations that Do Not Conform to the Overlap Criteria of Typical Detail M-1

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the calculation was to evaluate the adequacy of multiple penetrations regarding seal configuration that do not conform to the build out criteria of typical penetration seal detail M-1 from DPC 1435.00-00-0006. The penetrations below are in NRC committed 3-hour fire barriers:

- C-AX-217-W-008, -013, -014, -021, -025, -028, -029
- C-AX-228-W-028, -029, -030,

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

- C-AX-260-W-049, -050, -053, -068, -074
- D-AX-354A-W-033, -035, -058 through -064, -067, -070 through -078, -081, -083 through -092, -104, -105, -107
- D-AX-354-W-024, -025, -026, -027, -029 through -036, -041 through -063
- F-AX-348-W-085, -097, -114, -115
- F-AX-354A-W-035, -036, -039, -040, -044
- F-AX-354-W-021, -027, -028, -032, -033
- H-AX-515-W-013
- H-AX-517-W-003, -018 through -028, -042 through -052, -054 through -057, -062, -064, -065, -066, -069, -070, -071, -073, -075, -076, -083, -087, -088, -091, -094
- J-AX-513-W-028, -029, -030, J-AX-515-W-005, -009, -010
- J-AX-518-W-001, -002, -005, -006, -008
- J-AX-533-W-001, -002

The evaluation determined that the penetrations identified above will adequately protect against fire propagation for a 3-hour duration. However, unexposed side temperatures may exceed CNS limitations, which is acceptable based on the following:

- Acceptable for the Category 1 (penetrations with only mechanical penetrations) and Category 3 (penetrations with obstructions that impact seal overlap beyond the opening sidewall) mechanical penetrations since combustibles near the penetrations of concern are limited.
- Acceptable for the Category 2 (penetrations with mechanical and/or electrical penetrations) electrical penetrations based on the area fire hazards, considering fire protection features (detection, hose stations, fire extinguishers) and fire brigade response.
- The ability to achieve and maintain safe shutdown is not compromised.

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 06 Deletion of Control Room Floor from Scope of Committed Fire Barriers (CNCE-9584)
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the evaluation was to provide the technical justification for removing the Control Room floor from the scope of committed fire barriers.

The evaluation concluded that the Control Room floor can be removed from the scope of the committed fire barriers based on the following:

- Insignificant amount of combustible loading.
- Lack of ignition sources.
- Cable spreading room and main control boards are supplied with ionization smoke detectors.

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID CNC-1435.00-00-0036, Attachment 10 Evaluation of Embedded Metal Junction Boxes in Block Walls

Revision

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the fire barrier analysis of the fire boundary walls that have embedded sheet metal boxes. The analytical method of this calculation was to evaluate the potential in situ and transient fire hazards in fire areas adjacent to the subject walls to determine if the existing configuration is robust enough to prevent fire spread between adjacent fire areas.

The evaluation determined that the walls with embedded sheet metal boxes are capable of providing adequate fire resistance based on the following:

- Lack of potential fire ignition sources and continuity of combustibles.
- Location of embedded boxes which would prevent the boxes from being immersed in a fire plume or hot gas layer.
- Administrative controls for storage and use of combustible materials.
- Robust configuration of walls with embedded sheet metal boxes.

Fire Area ID: 46 - Unit 2 Cable Room Corridor El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
28B	U2 AB North Cable Shaft El 543	None	R	D	Detection System, Installed: R Transient Control: D
51A	U2 AB North Cable Shaft El 554	None	R	D	Detection System, Installed: R Transient Control: D
69B	U2 AB North Cable Shaft El 574	E	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Transient Control: D Water Suppression, Installed Fixed Sprinkler: E
69C	U2 AB Cable Room Corridor El 574	None	R	D	Detection System, Installed: R Transient Control: D

Title Fire Risk Evaluation for Fire Area 46

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Δ CDF Units: [2] 1.77E-06

Δ LERF Units: [2] 2.99E-07

DID Maintained A review of the risk evaluation results shows that the delta risk results for CDF and LERF are above the screening acceptance criteria but within RG 1.174 acceptance limits.

Manual suppression was credited for HGL and MCA evaluations. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is a significant contributor to risk in the fire area, therefore change is required for the control of transient combustibles to designate the area between columns DD-EE/58-59, including the cable shaft, as an exclusion area.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk enhancements, risk or DID modifications or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 46-VFDR-03

VFDR Nuclear Instrumentation Source Range Detector Channel 1 (N31), which is normally available and available for HSB, is affected by Reactor Neutron Monitoring not being available due to power and cable hits to 2ENBDTNSDT0001, and cable hits to 2ENBDTNSDT0005. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ENBDTNSDT0001 - Nuclear Instrumentation Source Range Detector Channel 1 (N31),

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 46-VFDR-04

VFDR Nuclear Instrumentation Source Range Detector Channel 2 (N32), which is normally Available and Available for HSB, is affected by Reactor Neutron Monitoring not being available due to power and cable hits to 2ENBDTNSDT0001, and cable hits to 2ENBDTNSDT0005. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ENBDTNSDT0005 - Nuclear Instrumentation Source Range Detector Channel 2 (N32)

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 46-VFDR-07

VFDR Borated Water Storage Tank Level Channel #1, which is normally available and available for HSB, is affected by failure of at least 2 out of 4 FWST Level Indication and, with a spurious LOCA signal, will cause a FWST Low Level signal which will open 2NI-184B and 2NI-185A. 2FW P 5000 has loss of power and cable hits, 2FW P 5010 has cable hits on all power and controls, and 2FW P 5020 has a loss of power. Opening of 2NI-185A valve will cause a diversion path from FWST to the containment sump. 2FW-27A may fail as is (normally open) on a loss of power. The A train valves mispositioning may cause loss of FWST inventory which is required for makeup. Valves 2NI-184B or 2FW-55B are required to be closed and will swapover as required and will not divert FWST inventory. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2FW P 5000 - Borated Water Storage Tank Level Channel #1

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 46-VFDR-08

VFDR Borated Water Storage Tank Level Channel #2, which is normally available and available for HSB, is affected by failure of at least 2 out of 4 FWST Level Indication and, with a spurious LOCA signal, will cause a FWST Low Level signal which will open 2NI-184B and 2NI-185A. 2FW P 5000 has loss of power and cable hits, 2FW P 5010 has cable hits on all power and controls, and 2FW P 5020 has a loss of power. Opening of 2NI-185A valve will cause a diversion path from FWST to the containment sump. 2FW-27A may fail as is (normally open) on a loss of power. The A train valves mispositioning may cause loss of FWST inventory which is required for makeup. Valves 2NI-184B or 2FW-55B are required to be closed and will swapover as required and will not divert FWST inventory. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2FW P 5010 - Borated Water Storage Tank Level Channel #2

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 46-VFDR-09

VFDR Borated Water Storage Tank Level Channel #3, which is normally available and available for HSB, is affected by failure of at least 2 out of 4 FWST Level Indication and, with a spurious LOCA signal, will cause a FWST Low Level signal which will open 2NI-184B and 2NI-185A. 2FW P 5000 has loss of power and cable hits, 2FW P 5010 has cable hits on all power and controls, and 2FW P 5020 has a loss of power. Opening of 2NI-185A valve will cause a diversion path from FWST to the containment sump. 2FW-27A may fail as is (normally open) on a loss of power. The A train valves mispositioning may cause loss of FWST inventory which is required for makeup. Valves 2NI-184B or 2FW-55B are required to be closed and will swapover as required and will not divert FWST inventory. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2FW P 5120 - Borated Water Storage Tank Level Channel #3

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 46-VFDR-10

VFDR Residual Heat Removal Pump 2A Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by spurious operation or a loss of power and control due to the cable failures. The failure of FW-27A combined with the spurious operation of valve NI-185A may provide a diversion flowpath for FWST to the containment sump. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2FW VA0027A - Residual Heat Removal Pump 2A Suction from Borated Water Storage Tank

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 46 - Unit 2 Cable Room Corridor El 574 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	46-VFDR-13
VFDR	Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by no ability to operate pressurizer heater 2A or 2B in auto due to cable and control power hits. All pressurizer heaters can be tripped from the control board. Pressurizer Heater 2A has control and power cable hits (2*ATC 664, 2*EPE 555, 2 ILE 654, 2*ILE 656 & 2*NR 577) resulting in the loss of manual and auto control to the heater. Pressurizer Heater 2B has a power cable hit (2 ETC 530) resulting in the loss of manual control; auto control has various cable hits.Unit 2 Pressurizer pressure and level signal cables (2*NC608 and 2*NC615) are hit and cause loss of input to the Process Control System. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-14
VFDR	Pressurizer Heater Group 2B, which is normally cycled and cycled for HSB, is affected by no ability to operate pressurizer heater 2A or 2B in auto due to cable and control power hits. All pressurizer heaters can be tripped from the control board. Pressurizer Heater 2A has control and power cable hits (2*ATC 664, 2*EPE 555, 2 ILE 654, 2*ILE 656 & 2*NR 577) resulting in the loss of manual and auto control to the heater. Pressurizer Heater 2B has a power cable hit (2 ETC 530) resulting in the loss of manual control; auto control has various cable hits.Unit 2 Pressurizer pressure and level signal cables (2*NC608 and 2*NC615) are hit and cause loss of input to the Process Control System. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-15
VFDR	Pressurizer Level CH. 2, which is normally Available and Available for HSB, is affected by Train A and B, Pressurizer Level Monitoring not being available due to cable and power hits to monitoring devices. 2NC P5153 (2NCLT5150) is not available due to cable (2*NC 615) and power hits. 2NC P5164 (2NCLT5160) is not available due to cable (2*NC 608) and power hits while 2NC P5174 (2NCLT5170) is not available due to power hits. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5153 - Pressurizer Level CH. 2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 46-VFDR-17

VFDR Pressurizer Level CH. 1, which is normally Available and Available for HSB, is affected by Train A and B, Pressurizer Level Monitoring not being available due to cable and power hits to monitoring devices. 2NC P5153 (2NCLT5150) is not available due to cable (2*NC 615) and power hits. 2NC P5164 (2NCLT5160) is not available due to cable (2*NC 608) and power hits while 2NC P5174 (2NCLT5170) is not available due to power hits. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC P 5164 - Pressurizer Level CH. 1

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 46-VFDR-18

VFDR Pressurizer Level CH. 3, which is normally Available and Available for HSB, is affected by Train A and B, Pressurizer Level Monitoring not being available due to cable and power hits to monitoring devices. 2NC P5153 (2NCLT5150) is not available due to cable (2*NC 615) and power hits. 2NC P5164 (2NCLT5160) is not available due to cable (2*NC 608) and power hits while 2NC P5174 (2NCLT5170) is not available due to power hits. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC P 5174 - Pressurizer Level CH. 3

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 46-VFDR-19

VFDR Pressurizer Power Operated Relief Isolation Valve, which is normally open and closed for HSB, is affected by a hot short within cable 2*ATC 677 causes spurious opening of the PORV. Loss of power can prevent closing of the PORV block valve (2NCVA0033A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC VA0033A - Pressurizer Power Operated Relief Isolation Valve

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: 46 - Unit 2 Cable Room Corridor El 574 — **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	46-VFDR-20
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by a hot short within cable 2*ATC 677 causes spurious opening of the PORV. Loss of power can prevent closing of the PORV block valve (2NCVA0033A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-21
VFDR	2A Residual Heat Removal Pump, which is normally off and not utilized for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of components FW-27A, ND PUA, and NS-43A may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the Train A ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ND PUA - 2A Residual Heat Removal Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-23
VFDR	Charging Pump Cold Leg Injection Isolation, which is normally closed and open for HSB, is affected by the flowpath through the normal charging may be lost due to spurious SSPS, and cable hits on 2NV VA0312A. Cable hits on 2NI VA0009A may open the valve and prevent closing the valve to return the normal charging flowpath to service. This is a concern with going solid, and long term control of the plant. Charging flowpath is assured through 2NI VA0010B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0009A - Charging Pump Cold Leg Injection Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	46-VFDR-24
VFDR	2A Safety Injection Pump Suction, which is normally open and closed for HSB, is affected by multiple cable hot shorts that may cause spurious operation and IN -92-18 concerns. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0103A - 2A Safety Injection Pump Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	46-VFDR-25
VFDR	2A Safety Injection Pump to Hot Legs B&C, which is normally closed and closed for HSB, is affected by multiple cable hot shorts that may cause spurious operation and IN-92-18 concerns. This has the potential to overwhelm the pressuirzer relief capacity and affect seal cooling flow. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0121A - 2A Safety Injection Pump to Hot Legs B&C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	46-VFDR-26
VFDR	Residual Heat Removal Pump 2A Containment Sump Suction, which is normally closed and not utilized for HSB, is affected by spurious operation (2*NI 564) that may provide a diversion flowpath for FWST to the containment sump if FW-27A also fails open. Also, there is a potential IN 92-18 concern due to spurious operation from failure of cable 2*NI 564. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NI VA0185A - Residual Heat Removal Pump 2A Containment Sump Suction
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 46 - Unit 2 Cable Room Corridor El 574 — **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

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VFDR ID 46-VFDR-30

VFDR 2A Containment Spray Pump, which is normally off and off for HSB, is affected by cable hits on 2NS PUA can cause spurious start of NS pump. Cable hits on 2NS VA0020A, 2NS VA0029A, and 2NS VA0032A can cause spurious opening of valves. This can cause a diversion of FWST inventory to the containment via the containment spray header.A hot short on cable 2*ATC 853 can provide a 2NS PUA pump start, or a hot short on cable 2*RN 661 along with a 2EQB-DGLSA permissive can provide a 2NS PUA pump start.A hot short on cable 2*NS 528 can provide an Open signal to both 2NS VA0029A and 2NS VA0032A.A hot short on cable 2*NS 518 can provide an Open signal to 2NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NS PUA - 2A Containment Spray Pump

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 46-VFDR-31

VFDR Containment Spray Pump A Suction from Containment Sump, which is normally closed and not utilized for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of valves NS-18A, NS-20A, and NI-185A may cause a diversion flowpath for FWST to the containment sump. This will cause a loss of FWST inventory and loss of primary makeup. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NS VA0018A - Containment Spray Pump A Suction from Containment Sump

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 46-VFDR-33

VFDR Containment Spray Pump 2A Suction from Borated Water Storage Tank, which is normally open and closed for HSB, is affected by cable hits on 2NS VA0020A, 2NS VA0029A, and 2NS VA0032A can cause spurious opening of valves. Cable hits on 2NS PUA can cause spurious start of NS pump. This can cause a diversion of FWST inventory to the containment via the containment spray header.A hot short on cable 2*ATC 853 can provide a 2NS PUA pump start, or a hot short on cable 2*RN 661 along with a 2EQB-DGLSA permissive can provide a 2NS PUA pump start. A hot short on cable 2*NS 528 can provide an Open signal to both 2NS VA0029A and 2NS VA0032A.A hot short on cable 2*NS 518 can provide an Open signal to 2NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NS VA0020A - Containment Spray Pump 2A Suction from Borated Water Storage Tank

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 46-VFDR-34

VFDR Containment Spray Header 2A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 2NS VA0020A, 2NS VA0029A, and 2NS VA0032A can cause spurious opening of valves. Cable hits on 2NS PUA can cause spurious start of NS pump. This can cause a diversion of FWST inventory to the containment via the containment spray header.A hot short on cable 2*ATC 853 can provide a 2NS PUA pump start, or a hot short on cable 2*RN 661 along with a 2EQB-DGLSA permissive can provide a 2NS PUA pump start. A hot short on cable 2*NS 528 can provide an Open signal to both 2NS VA0029A and 2NS VA0032A.A hot short on cable 2*NS 518 can provide an Open signal to 2NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NS VA0029A - Containment Spray Header 2A Containment Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 46-VFDR-35

VFDR Containment Spray Header 2A Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits on 2NS VA0020A, 2NS VA0029A, and 2NS VA0032A can cause spurious opening of valves. Cable hits on 2NS PUA can cause spurious start of NS pump. This can cause a diversion of FWST inventory to the containment via the containment spray header.A hot short on cable 2*ATC 853 can provide a 2NS PUA pump start, or a hot short on cable 2*RN 661 along with a 2EQB-DGLSA permissive can provide a 2NS PUA pump start. A hot short on cable 2*NS 528 can provide an Open signal to both 2NS VA0029A and 2NS VA0032A.A hot short on cable 2*NS 518 can provide an Open signal to 2NS VA0020A. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NS VA0032A - Containment Spray Header 2A Containment Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 46-VFDR-36

VFDR 2A Residual Heat Removal Pump to Containment Spray Header, which is normally closed and not utilized for HSB, is affected by spurious operation or a loss of power and control due to the cable failures of components FW-27A, ND PUA, and NS-43A may cause a diversion of FWST to the containment sump. A combination of FW-27A being open, the spurious start of the Train A ND pump (due to interlock and/or cable failure), and spurious opening of the ND auxiliary containment spray valve could cause inadvertent FWST depletion to the containment sump via the containment spray ring. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NS VA0043A - 2A Residual Heat Removal Pump to Containment Spray Header

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	46-VFDR-37
VFDR	2A Charging Pump, which is normally on and on for HSB, is affected by multiple cable shorts which may start pump 2NV PUACC. This has the potential to overwhelm the pressuirzer relief capacity and affect seal cooling flow. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV PUACC - 2A Charging Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-38
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable faults (and internal faults in ASPA) that may spuriously energize (keep open) 2NV VA0001A, 2A, 11A, and 13A (2NV VA0010A and 2NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 2NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-39
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable faults (and internal faults in ASPA) that may spuriously energize (keep open) 2NV VA0001A, 2A, 11A, and 13A (2NV VA0010A and 2NV VA0015B will close on demand). Letdown header over pressure relief path to the PRT will be via 2NV VA0014. KC cooling to the letdown heat exchanger may be lost due to SSPS isolation of non essential KC header. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0002A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	46-VFDR-40
VFDR	Charging Pumps A & B Recirc Isolation, which is normally open and open for HSB, is affected by spurious cable hits may close 1NV VA0203A. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0203A - Charging Pumps A & B Recirc Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-41
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by valve failing open on loss of air and cable hits. 2NV VA0294 fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	46-VFDR-42
VFDR	Seal Water Injection flow, which is normally open and open for HSB, is affected by 2NV VA0309 failing open on loss of air, which may require manually operating manual valve NV-308 and possibly manual bypass valve NV-311. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0309 - Seal Water Injection flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	46-VFDR-43
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by the flowpath through the normal charging may be lost due to spurious SSPS, and cable hits on 2NV VA0312A. Cable hits on 2NI VA0009A may open the valve and prevent closing the valve to return the normal charging flowpath to service. This is a concern with going solid, and long term control of the plant.Charging flowpath is assured through 2NI VA0010B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	46-VFDR-44
VFDR	SG C Steam Line Pressure CH #1, which is normally Available and Available for HSB, is affected by Train A and B Steam Generator C Pressure Monitoring not being available due to cable and power hits to monitoring devices. 2SM P 5150 is not available due to cable hits. 2SM P 5140 is not availabe due to cable and power hits while 2SM P 5160 is not availabe due to power hits. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SM P 5140 - SG C Steam Line Pressure CH #1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	46-VFDR-45
VFDR	SG C Steam Line Pressure CH #2, which is normally Available and Available for HSB, is affected by Train A and B Steam Generator C Pressure Monitoring not being available due to cable and power hits to monitoring devices. 2SM P 5150 is not available due to cable hits. 2SM P 5140 is not availabe due to cable and power hits while 2SM P 5160 is not availabe due to power hits. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SM P 5150 - SG C Steam Line Pressure CH #2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	46-VFDR-46
VFDR	SG C Steam Line Pressure CH #3, which is normally Available and Available for HSB, is affected by Train A and B Steam Generator C Pressure Monitoring not being available due to cable and power hits to monitoring devices. 2SM P 5150 is not available due to cable hits. 2SM P 5140 is not availabe due to cable and power hits while 2SM P 5160 is not availabe due to power hits. Pressure monitoring is available on Steam Generator D. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SM P 5160 - SG C Steam Line Pressure CH #3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	46-VFDR-47
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-48
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	46 - Unit 2 Cable Room Corridor El 574	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	46-VFDR-49
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	46-VFDR-50
VFDR	S/G 1C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: 47 - Unit 2 Fuel Storage Area HVAC Room El 631 **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
183	U2 FB HVAC Rm El 631

Fire Area ID: 47 - Unit 2 Fuel Storage Area HVAC Room El 631 **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A or B feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	47 - Unit 2 Fuel Storage Area HVAC Room El 631	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 18 Fire Protection Evaluation For Unprotected Spiral Stairs Located at Col. GG-61 and GG-53 Connecting Elevations 611+0' and 631+6'
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to provide justification for the unprotected sprial stairs between Elevation 631+6 (Fire Areas (FA) 38 and 47) and Elevation 611+0 (FA 22). The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on: • combustible controls, • lack of in situ combustibles, • minimal ignition sources.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 47 - Unit 2 Fuel Storage Area HVAC Room El 631
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
183	U2 FB HVAC Rm El 631	None	R	E	Combustible Loading: E Detection System, Installed: R

Title Fire Risk Evaluation for Fire Area 47

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

Manual suppression was credited for HGL and MCA evaluations, although MCA is not directly applicable since this fire area contains very few credited cables and screened from further scenario refinement. Therefore, installed detection is required for risk to assure timely fire brigade response.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID: 47 - Unit 2 Fuel Storage Area HVAC Room El 631 **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	47-VFDR-04
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals. 2NV VA0294 fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	47-VFDR-07
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	47-VFDR-08
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	47 - Unit 2 Fuel Storage Area HVAC Room El 631	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	47-VFDR-09
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	47-VFDR-10
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 48 - Unit 2 Inner Doghouse **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
2INTDH	U2 Inner DH

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	48 - Unit 2 Inner Doghouse	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A combination of A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A and B train feeding S/Gs A and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A and B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A and B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	48 - Unit 2 Inner Doghouse	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 48 - Unit 2 Inner Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
2INTDH	U2 Inner DH	None	None	E	Combustible Loading: E

Title Fire Risk Evaluation for Fire Area 48

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is the only contributor to risk in this area, but the delta risk is very low. Therefore, no change is recommended for DID in the control of transient combustibles in the area.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	48 - Unit 2 Inner Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	48-VFDR-01
VFDR	2B S/G Blowdown Containment Isolation (Inside), which is normally open and closed for HSB, is affected by non Coordinated load 2EMXS breaker F04A, cable 2*CA881 causes loss of power to affected SSD loads. A train S/G blow down valves (2BB VA0060A and 2BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G.Cable hits on 2BB VA0021B, 2BB VA0061B, 2BB VA00149B, and 2BB VA0150B can cause spurious operation and loss of power/control. Excessive cool down concern B train valves have cable hits and are in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0019A - 2B S/G Blowdown Containment Isolation (Inside),
Disposition	VFDR deterministically resolved by modification

VFDR ID	48-VFDR-02
VFDR	2B S/G Blowdown Containment Isolation (Outside), which is normally open and closed for HSB, is affected by non Coordinated load 2EMXS breaker F04A, cable 2*CA881 causes loss of power to affected SSD loads. A train S/G blow down valves (2BB VA0060A and 2BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G.Cable hits on 2BB VA0021B, 2BB VA0061B, 2BB VA00149B, and 2BB VA0150B can cause spurious operation and loss of power/control. Excessive cool down concern B train valves have cable hits and are in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0021B - 2B S/G Blowdown Containment Isolation (Outside)
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	48-VFDR-03
VFDR	2C S/G Blowdown Containment Isolation (Inside), which is normally open and closed for HSB, is affected by non Coordinated load 2EMXS breaker F04A, cable 2*CA881 causes loss of power to affected SSD loads. A train S/G blow down valves (2BB VA0060A and 2BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G.Cable hits on 2BB VA0021B, 2BB VA0061B, 2BB VA00149B, and 2BB VA0150B can cause spurious operation and loss of power/control. Excessive cool down concern B train valves have cable hits and are in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0060A - 2C S/G Blowdown Containment Isolation (Inside)
Disposition	VFDR deterministically resolved by modification

Fire Area ID: 48 - Unit 2 Inner Doghouse — **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	48-VFDR-04
VFDR	2C S/G Blowdown Containment Isolation (Outside), which is normally open and closed for HSB, is affected by non Coordinated load 2EMXS breaker F04A, cable 2*CA881 causes loss of power to affected SSD loads. A train S/G blow down valves (2BB VA0060A and 2BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G.Cable hits on 2BB VA0021B, 2BB VA0061B, 2BB VA00149B, and 2BB VA0150B can cause spurious operation and loss of power/control. Excessive cool down concern B train valves have cable hits and are in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0061B - 2C S/G Blowdown Containment Isolation (Outside)
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	48-VFDR-05
VFDR	2C S/G Blowdown Containment Isolation Bypass, which is normally closed and closed for HSB, is affected by non Coordinated load 2EMXS breaker F04A, cable 2*CA881 causes loss of power to affected SSD loads. A train S/G blow down valves (2BB VA0060A and 2BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G.Cable hits on 2BB VA0021B, 2BB VA0061B, 2BB VA00149B, and 2BB VA0150B can cause spurious operation and loss of power/control. Excessive cool down concern B train valves have cable hits and are in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0149B - 2C S/G Blowdown Containment Isolation Bypass
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	48-VFDR-06
VFDR	2B S/G Blowdown Containment Isolation Bypass, which is normally closed and closed for HSB, is affected by non Coordinated load 2EMXS breaker F04A, cable 2*CA881 causes loss of power to affected SSD loads. A train S/G blow down valves (2BB VA0060A and 2BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G.Cable hits on 2BB VA0021B, 2BB VA0061B, 2BB VA00149B, and 2BB VA0150B can cause spurious operation and loss of power/control. Excessive cool down concern B train valves have cable hits and are in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0150B - 2B S/G Blowdown Containment Isolation Bypass
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	48 - Unit 2 Inner Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	48-VFDR-07
VFDR	Non-Coordinated Loads fed from 2EPEMXEMXS, which is normally Available and Available for HSB, is affected by non Coordinated load 2EMXS breaker F04A, cable 2*CA881 causes loss of power to affected SSD loads. A train S/G blow down valves (2BB VA0060A and 2BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G. Cable hits on 2BB VA0021B, 2BB VA0061B, 2BB VA00149B, and 2BB VA0150B can cause spurious operation and loss of power/control. Excessive cool down concern B train valves have cable hits and are in the fire area. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPEMXEMXS-NCL - Non-Coordinated Loads fed from 2EPEMXEMXS
Disposition	VFDR deterministically resolved by modification

VFDR ID	48-VFDR-08
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of air causing valve to fail full open. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	48-VFDR-11
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	48 - Unit 2 Inner Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	48-VFDR-12
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 49 - Unit 1 Inner Doghouse **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
1INTDH	U1 Inner DH

Fire Area ID:	49 - Unit 1 Inner Doghouse	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A combination of A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolation. Auxiliary feedwater is supplied by A and B train feeding S/Gs A and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A and B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A and B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: 49 - Unit 1 Inner Doghouse **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision	CNC-1435.00-00-0035, Attachment 02, Rev. 0 Fire Protection Evaluation for Large Bore Pipes
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes

Summary

The purpose of the calculation was to evaluate the adequacy of the penetration seal configuration for the following large bore pipe penetrations that exceed the maximum diameter size allowed by the design detail provided by DPC 1435.00-00-0006:

- B-AX-217-W-002, B-AX-260-W-001
- C-AX-200-W-031, C-AX-217-W-001, C-AX-258-W-023
- C-AX-260-F-026, C-AX-260-W-005
- F-AX-348-W-088
- J-AX-655-F-008, J-AX-658B-F-007, J-NSWPS-662-W-001

The evaluation determined that the large bore penetrations are acceptable based on the following:

- Penetrations will prohibit the propagation of flame through the seal for a 3-hr. fire duration (F-rated).
- Low probability of fire exposure.
- Limited combustibles.
- Fire brigade response.
- Unexposed side temperatures will not result in auto-ignition of combustible materials.
- Ability to achieve and maintain safe shutdown is not compromised.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 49 - Unit 1 Inner Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
1INTDH	U1 Inner DH	None	None	E	Combustible Loading: E

Title Fire Risk Evaluation for Fire Area 49

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta DCF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is the only contributor to risk in this area, but the delta risk is very low. Therefore, no change is recommended for DID in the control of transient combustibles in the area.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	49 - Unit 1 Inner Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	49-VFDR-01
VFDR	1B S/G Blowdown Containment Isolation (Inside), which is normally open and closed for HSB, is affected by non Coordinated load 1EMXS breaker F04A, cable 1*CA910 causes loss of power to affected SSD loads. A train S/G blow down valves (1BB VA0060A and 1BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G (excessive cool down concern B train valves have cable hits and are in the fire area).Open affected breaker and re-energize bus to close the affected valves. An alternate is evaluate location of cable versus fire sources. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1BB VA0019A - 1B S/G Blowdown Containment Isolation (Inside),
Disposition	VFDR deterministically resolved by modification

VFDR ID	49-VFDR-02
VFDR	1B S/G Blowdown Containment Isolation (Outside), which is normally open and closed for HSB, is affected by non Coordinated load 1EMXS breaker F04A, cable 1*CA910 causes loss of power to affected SSD loads. A train S/G blow down valves (1BB VA0060A and 1BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G (excessive cool down concern B train valves have cable hits and are in the fire area). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1BB VA0021B - 1B S/G Blowdown Containment Isolation (Outside),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	49-VFDR-03
VFDR	1C S/G Blowdown Containment Isolation (Inside), which is normally open and closed for HSB, is affected by non Coordinated load 1EMXS breaker F04A, cable 1*CA910 causes loss of power to affected SSD loads. A train S/G blow down valves (1BB VA0060A and 1BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G (excessive cool down concern B train valves have cable hits and are in the fire area).Open affected breaker and re-energize bus to close the affected valves. An alternate is evaluate location of cable versus fire sources. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1BB VA0060A - 1C S/G Blowdown Containment Isolation (Inside),
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	49 - Unit 1 Inner Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID 49-VFDR-04

VFDR 1C S/G Blowdown Containment Isolation (Outside), which is normally open and closed for HSB, is affected by non Coordinated load 1EMXS breaker F04A, cable 1*CA910 causes loss of power to affected SSD loads. A train S/G blow down valves (1BB VA0060A and 1BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G (excessive cool down concern B train valves have cable hits and are in the fire area).Open affected breaker and re -energize bus to close the affected valves. An alternate is evaluate location of cable versus fire sources. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1BB VA0061B - 1C S/G Blowdown Containment Isolation (Outside),

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 49-VFDR-05

VFDR 1C S/G Blowdown Containment Isolation Bypass, which is normally closed and closed for HSB, is affected by non Coordinated load 1EMXS breaker F04A, cable 1*CA910 causes loss of power to affected SSD loads. A train S/G blow down valves (1BB VA0060A and 1BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G (excessive cool down concern B train valves have cable hits and are in the fire area).Open affected breaker and re -energize bus to close the affected valves. An alternate is evaluate location of cable versus fire sources. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1BB VA0149B - 1C S/G Blowdown Containment Isolation Bypass

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID 49-VFDR-06

VFDR 1B S/G Blowdown Containment Isolation Bypass, which is normally closed and closed for HSB, is affected by non Coordinated load 1EMXS breaker F04A, cable 1*CA910 causes loss of power to affected SSD loads. A train S/G blow down valves (1BB VA0060A and 1BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G (excessive cool down concern B train valves have cable hits and are in the fire area).Open affected breaker and re -energize bus to close the affected valves. An alternate is evaluate location of cable versus fire sources. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1BB VA0150B - 1B S/G Blowdown Containment Isolation Bypass

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	49 - Unit 1 Inner Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	49-VFDR-07
VFDR	Auxiliary Feedwater Pump 1A Suction from Nuclear Service Water Isolation, which is normally closed and open for HSB, is affected by breaker in 1EMXI R01A is not coordinated (Refer to AREVA Coordination calculation 32-9139535-000). Cable 1*SM 675 does not coordinate. This causes loss of 1EPEMXEMXI and all credited loads from this bus.This causes loss of power to 1CA VA0015A (RN to A CA pump, Upper surge tank and condenser (requires breaking Vacuum) remain available. This affects feed to S/G A, S/G D remains available.This causes loss of power to 1EPLBCECC (125 VDC inverter feeding 1EDC), the battery will be available for two hours before there is a loss of DC supply. 1CA VA0060 will fail open on loss of power. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0015A - Auxiliary Feedwater Pump 1A Suction from Nuclear Service Water Isolation
Disposition	VFDR deterministically resolved by modification

VFDR ID	49-VFDR-08
VFDR	Auxiliary Feedwater Pump 1A Flow to S/G 1A, which is normally open and throttled for HSB, is affected by breaker in 1EMXI R01A is not coordinated (Refer to AREVA Coordination calculation 32-9139535-000). Cable 1*SM 675 does not coordinate. This causes loss of 1EPEMXEMXI and all credited loads from this bus.This causes loss of power to 1CA VA0015A (RN to A CA pump, Upper surge tank and condenser (requires breaking Vacuum) remain available. This affects feed to S/G A, S/G D remains available.This causes loss of power to 1EPLBCECC (125 VDC inverter feeding 1EDC), the battery will be available for two hours before there is a loss of DC supply. 1CA VA0060 will fail open on loss of power. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1CA VA0060 - Auxiliary Feedwater Pump 1A Flow to S/G 1A
Disposition	VFDR deterministically resolved by modification

VFDR ID	49-VFDR-09
VFDR	Non-Coordinated Loads fed from 1EPEMXEMXI, which is normally available and available for HSB, is affected by breaker in 1EMXI R01A is not coordinated (Refer to AREVA Coordination calculation 32-9139535-000). Cable 1*SM 675 does not coordinate. This causes loss of 1EPEMXEMXI and all credited loads from this bus.This causes loss of power to 1CA VA0015A (RN to A CA pump, Upper surge tank and condenser (requires breaking Vacuum) remain available. This affects feed to S/G A, S/G D remains available.This causes loss of power to 1EPLBCECC (125 VDC inverter feeding 1EDC), the battery will be available for two hours before there is a loss of DC supply. 1CA VA0060 will fail open on loss of power. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPEMXEMXI-NCL - Non-Coordinated Loads fed from 1EPEMXEMXI
Disposition	VFDR deterministically resolved by modification

Fire Area ID: 49 - Unit 1 Inner Doghouse **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID 49-VFDR-10

VFDR Non-Coordinated Loads fed from 1EPEMXEMXS, which is normally Available and Available for HSB, is affected by non Coordinated load 1EMXS breaker F04A, cable 1*CA910 causes loss of power to affected SSD loads. A train S/G blow down valves (1BB VA0060A and 1BB VA0019A) are credited in this scenario and are not available for isolation of B and C S/G (excessive cool down concern B train valves have cable hits and are in the fire area).Open affected breaker and re-energize bus to close the affected valves. An alternative is to evaluate location of cable versus fire sources. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1EPEMXEMXS-NCL - Non-Coordinated Loads fed from 1EPEMXEMXS

Disposition VFDR deterministically resolved by modification

VFDR ID 49-VFDR-11

VFDR 1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID 49-VFDR-12

VFDR S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1SV VA0001 - S/G 1D PORV

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	49 - Unit 1 Inner Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	49-VFDR-13
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	50 - Unit 2 Outer Doghouse	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
2EXTDH	U2 Outer DH

Fire Area ID: 50 - Unit 2 Outer Doghouse **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A combination of A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/G s are isolated. Auxiliary feedwater is supplied by A and B train feeding S/Gs B and C. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A and B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A and B auxiliary sustems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 50 - Unit 2 Outer Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
2EXTDH	U2 Outer DH	None	None	None	None

Title Fire Risk Evaluation for Fire Area 50

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta DCF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is the only contributor to risk in this area, but the risk is very low. Therfore, no change is recommended for the control of transient combustibles in the area.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	50 - Unit 2 Outer Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	50-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of air causing valve to fail full open. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	50-VFDR-02
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	50-VFDR-03
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 51 - Unit 1 Outer Doghouse **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
1EXTDH	U1 Outer DH

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 51 - Unit 1 Outer Doghouse **Performance Goals**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A combination of A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/G s are isolated. Auxiliary feedwater is supplied by A and B train feeding S/Gs B and C. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A and B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A and B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: 51 - Unit 1 Outer Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
1EXTDH	U1 Outer DH	None	None	None	None

Title Fire Risk Evaluation for Fire Area 51

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenario analyzed is the only contributor to risk in this area, but the risk is very low. Therefore, no change is recommended for the control of transient combustibles in the area.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	51 - Unit 1 Outer Doghouse	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	51-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	51-VFDR-02
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	51-VFDR-03
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: ASB - Auxiliary Service Building **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description
127	HP Hot Lab and Vent Equip
75	HP Cold Lab
78	Hot Machine Shop
83	HP Lab - AA Rm
86	Laundry
87	Storage/Compactor Area
88	Clothing Storage
HMS1	Hot Machine Ship Area
HPL1	Health Physics Lab Area

Fire Area ID: ASB - Auxiliary Service Building
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A or B train feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: ASB - Auxiliary Service Building
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
127	HP Hot Lab and Vent Equip	None	None	None	None
75	HP Cold Lab	None	None	None	None
78	Hot Machine Shop	None	None	None	None
83	HP Lab - AA Rm	None	None	None	None
86	Laundry	None	None	None	None
87	Storage/Compactor Area	None	None	None	None
88	Clothing Storage	None	None	None	None
HMS1	Hot Machine Ship Area	None	None	None	None
HPL1	Health Physics Lab Area	None	None	None	None

Title	Not Required - Deterministic Fire Area
Risk Summary	N/A
Δ CDF	Units: [1] N/A [2] N/A
Δ LERF	Units: [1] N/A [2] N/A
DID Maintained	
Safety Margin Maintained	

Fire Area ID:	RB1 - Unit 1 Reactor Building	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
1RB-1	Unit 1 RB Annulus.
1RB-2	Unit 1 Containment - Outside Shield Wall below El 591-2 1/2
1RB-3	Unit 1 Containment - Inside Shield Wall

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: RB1 - Unit 1 Reactor Building **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A and/or B train charging pump via available normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A and/or B train charging pump and available normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A combination of A and/or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A and/or B train feeding S/Gs A, B, C or D, whichever two S/Gs are available. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A and B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A and B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: RB1 - Unit 1 Reactor Building **Previously Approved Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Licensing Action 01. Commitment to utilize metallic sheathed MI cable as a radiant energy shield in containment per Section III.G.2 of Appendix R to 10 CFR 50

Licensing Basis In the April 9, 1984 letter to the NRC, Duke committed to utilize metallic sheathed MI cable as a radiant energy shield in containment where incore thermocouple cabling is not separated by more than 20 feet free of intervening combustible materials.

This is acceptable based on the following:

o Meets criteria of BTP CMEB Section 9.5-1, C.7.a - redundant shutdown-related systems within the annulus should be protected by separation of a noncombustible radiant energy shield (one of three possible compliance methods).

o Mineral insulation is a radiant energy shield.

The 07/01/1984 Supplement 3 to the Safety Evaluation Report captured the commitment(s) from the above correspondence. On this basis, the staff concluded that the commitment to utilize metallic sheathed MI cable was acceptable.

The bases for acceptability remains valid.

Licensing Action 07. Deviation from Item C.6.c of BTP CMEB 9.5-1 related to standpipe protection in the annulus and pipe tunnel.

Licensing Basis During the site audit, the NRC observed that manual firefighting capability was deficient throughout the various elevations of the annulus. In addition, the existing hose stations in Fire Area 1 are not capable of reaching all areas of the pipe tunnel.

By letter dated January 17 and February 10, 1984, CNS committed to install an automatic sprinkler system having branch lines on elevations 561 feet, 604 feet and 664 feet. In addition to the automatic sprinklers, CNS committed to install additional line-type heat detectors on six levels of the annulus, located at every other level. CNS also committed to provide additional fire hose, stored in the fire brigade equipment storage area for use in fighting a fire in the pipe tunnel. On the basis of this commitment, the NRC concluded that the fire protection provided for the annulus and pipe tunnel provides an acceptable deviation from Section C.6.c of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Licensing Action 18. Protection of penetrations of fire area boundaries in the Reactor Building

Licensing Basis The NRC's fire protection site audit was conducted between November 1 and November 4, 1983. The staff also expressed a number of concerns pertaining to previous applicant commitments and the degree of compliance with NRC's fire protection criteria. By letters dated April 9, 1984, Duke Energy provided additional information on the reactor building penetrations. In SSER #3 dated July 1984, the NRC evaluated the fire protection ability of the various reactor building penetrations. The NRC evaluations considered the following:

• The adequacy of interior walls and floor/ceiling assemblies which define fire area boundaries

• Two personnel access portals

• Instrumentation tubing and process piping

• Process piping penetrating the shell wall ranging in size from 1 inch to 34 inches in diameter.

• Penetration of cables through the shell wall of the Reactor Building

Fire Area ID:	RB1 - Unit 1 Reactor Building	**Previously Approved Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

When evaluating the penetrations the NRC also considered the following:

• Materials of construction

• Thickness of the penetration

• Fire resistant material utilized

• Available fire detection

• Type and amount of combustible material

• Fire hazards present on either side of the penetrations

The NRC found them acceptable.

The bases for acceptability remains valid.

Fire Area ID: RB1 - Unit 1 Reactor Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
1RB-1	Unit 1 RB Annulus.	E	E, D	E	Combustible Loading: E Detection System, Installed: E D Water Suppression, 1-Annulus: E
1RB-2	Unit 1 Containment - Outside Shield Wall below El 591-2 1/2	None	E, D	E	Combustible Loading: E Detection System, Installed: E D
1RB-3	Unit 1 Containment - Inside Shield Wall	None	E, D	R, D	Detection System, Installed: E D MI Cable: D RCP oil collection system: R

Title Fire Risk Evaluation for Fire Area RB1

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 3.60E-08

Δ LERF Units: [1] 1.00E-08

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and at the screening acceptance criteria of 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited for HGL and MCA evaluations. Credit for the oil collection system on the reactor coolant pumps was taken in the development of the oil fire scenarios. Detection and the MI cable installed on incore thermocouples are credited for DID.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-02
VFDR	1D S/G Blowdown Containment Isolation - Inside, which is normally open and closed for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 1BB VA0008A and 1BB VA0056A, as well as possible IN 92-18 concerns (cable 1*BB 523 or 1*BB 570 for 1BB VA0008A, and cable 1*BB 524 or 1*BB 570 for 1BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1BB VA0008A - 1D S/G Blowdown Containment Isolation - Inside
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-03
VFDR	1D S/G Blowdown Containment Isolation - Outside, which is normally open and closed for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1BB VA0010B - 1D S/G Blowdown Containment Isolation - Outside
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-05
VFDR	1A S/G Blowdown Containment Isolation - Inside, which is normally open and closed for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 1BB VA0008A and 1BB VA0056A, as well as possible IN 92-18 concerns (cable 1*BB 523 or 1*BB 570 for 1BB VA0008A, and cable 1*BB 524 or 1*BB 570 for 1BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1BB VA0056A - 1A S/G Blowdown Containment Isolation - Inside
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-06
VFDR	1A S/G Blowdown Containment Isolation - Outside, which is normally open and closed for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1BB VA0057B - 1A S/G Blowdown Containment Isolation - Outside
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-07
VFDR	Nuclear Instrument Source Range Detector Channel 1 (N31), which is normally available and available for HSB, is affected by both source range ex-core neutron detectors and wide range ex-core neutron detectors and related cables are in fire area RB1 for both A train and B train. Required separation between trains may exist, but can not be verified from analysis using cable routing drawings.Either one wide range or one source range ex-core neutron detector can be verified to have 20 foot separation from the other three. (This does not provide for BOTH one wide range and one source range detector.) The exception to this 20 foot separation is for the following locations:1) Fire zone 1RB-2, from 45AZ to 63AZ near penetrations, 2) Fire zone 1RB-1, around 45AZ and 140AZ near penetrations, 3) Fire zone 1RB-3, where detectors are around the reactor to where cables exit the reactor vessel shielding to the first conduit/raceway, locations are not shown. Routing can not be verified. Neutron detectors also provide a signal to 1NV VA0188A and 1NV VA0189B. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.2
Component(s)	1ENBDTNSDT0001 - Nuclear Instrument Source Range Detector Channel 1 (N31),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-08
VFDR	Nuclear Instrument Source Range Detector Channel 2 (N32), which is normally available and available for HSB, is affected by both source range and wide range detector cables for both Train A and B are in the same fire area. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENBDTNSDT0005 - Nuclear Instrument Source Range Detector Channel 2 (N32),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-09
VFDR	Neutron Flux Detector Assembly Train A, which is normally available and available for HSB, is affected by both source range ex-core neutron detectors and wide range ex-core neutron detectors and related cables are in fire area RB1 for both A train and B train. Required separation between trains may exist, but can not be verified from analysis using cable routing drawings, including CN-1918-01.01 and CN-1910-01.01, where cables appear to be in close proximity. Either one wide range or one source range ex-core neutron detector can be verified to have 20 foot separation from the other three. (This does not provide for BOTH one wide range and one source range detector.) The exception to this 20 foot separation is for the following locations: 1) Fire zone 1RB-2, from 45AZ to 63AZ near penetrations, 2) Fire zone 1RB-1, around 45AZ and 140AZ near penetrations, 3) Fire zone 1RB-3, where detectors are around the reactor to where cables exit the reactor vebssel shielding to the first conduit/raceway, locations are not shown. Routing can not be verified. Neutron detectors also provide a signal to 1NV VA0188A and 1NV VA0189B. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENCDTNSDT0013 - Neutron Flux Detector Assembly Train A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-10
VFDR	Neutron Flux Detector Assembly Train B, which is normally available and available for HSB, is affected by both source range ex-core neutron detectors and wide range ex-core neutron detectors and related cables are in fire area RB1 for both A train and B train. Required separation between trains may exist, but can not be verified from analysis using cable routing drawings, including CN-1918-01.01 and CN-1910-01.01, where cables appear to be in close proximity. Either one wide range or one source range ex-core neutron detector can be verified to have 20 foot separation from the other three. (This does not provide for BOTH one wide range and one source range detector.) The exception to this 20 foot separation is for the following locations: 1) Fire zone 1RB-2, from 45AZ to 63AZ near penetrations, 2) Fire zone 1RB-1, around 45AZ and 140AZ near penetrations, 3) Fire zone 1RB-3, where detectors are around the reactor to where cables exit the reactor vessel shielding to the first conduit/raceway, locations are not shown. Routing can not be verified. Neutron detectors also provide a signal to 1NV VA0188A and 1NV VA0189B. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ENCDTNSDT0014 - Neutron Flux Detector Assembly Train B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-11
VFDR	Non Coordinated Loads fed from 1EPEMXEMXL, which is normally available and available for HSB, is affected by non-coordinated breakers that cause loss of power to all blowdown valves and loss of ability to isolate blowdown. This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPEMXEMXL-NCL - Non Coordinated Loads fed from 1EPEMXEMXL
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-12
VFDR	Non Coordinated Loads fed from 1EPEMXEMXS, which is normally available and available for HSB, is affected by non-coordinated breakers that cause loss of power to all blowdown valves and loss of ability to isolate blowdown. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPEMXEMXS-NCL - Non Coordinated Loads fed from 1EPEMXEMXS
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-13
VFDR	Non Coordinated Loads fed from 1EPLDCEDE, which is normally available and available for HSB, is affected by non coordinated load (1EDE F01J, cable 1*NV 833 between 1EDE and 1TBOX0001) causes loss of power to 1EPLDCEDE, causing loss of control power to numerous A train components, including switchgear 1ETA. Also, non coordinated load (1EDF F01J, cable 1*NV 834 between 1EDF and 1TBOX0002) causes loss of power to 1EPLDCEDF, causing loss of control power to numerous B train components, including switchgear 1ETB. Either 1EPLDCEDE or 1EPLDCEDF is required to be energized for SSD.Both of these cables are routed through fire area RB1, however analysis of the cable routing locations shows that sufficient (20 ft.) separation exists so that one train of power will exist for a fire in any location in fire area RB1, with one exception: The area of concern is in Fire zone 1RB-1 (Annulus) from approximately 5AZ to 60AZ. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPLDCEDE-NCL - Non Coordinated Loads fed from 1EPLDCEDE
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-14
VFDR	Non Coordinated Loads fed from 1EPLDCEDF, which is normally available and available for HSB, is affected by non coordinated load (1EDE F01J, cable 1*NV 833 between 1EDE and 1TBOX0001) causes loss of power to 1EPLDCEDE, causing loss of control power to numerous A train components, including switchgear 1ETA. Also, non coordinated load (1EDF F01J, cable 1*NV 834 between 1EDF and 1TBOX0002) causes loss of power to 1EPLDCEDF, causing loss of control power to numerous B train components, including switchgear 1ETB. Either 1EPLDCEDE or 1EPLDCEDF is required to be energized for SSD.Both of these cables are routed through fire area RB1, however analysis of the cable routing locations shows that sufficient (20 ft.) separation exists so that one train of power will exist for a fire in any location in fire area RB1, with one exception: The area of concern is in Fire zone 1RB-1 (Annulus) from approximately 5AZ to 60AZ. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1EPLDCEDF-NCL - Non Coordinated Loads fed from 1EPLDCEDF
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID RB1-VFDR-15

VFDR Pressurizer Heater Group 1A, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB1 and have cable hits that may prevent energizing them. Hits to cables 1*NC 608, 1*NC 613, 1*NC 615 and 1*NC 620 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 1ILE-PZRHTRA and 1ILE-PZRHTRB are in close proximity . This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1ILE-PZRHTRA - Pressurizer Heater Group 1A

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID RB1-VFDR-16

VFDR Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB1 and have cable hits that may prevent energizing them. Hits to cables 1*NC 608, 1*NC 613, 1*NC 615 and 1*NC 620 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 1ILE-PZRHTRA and 1ILE-PZRHTRB are in close proximity . This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1ILE-PZRHTRB - Pressurizer Heater Group 1B

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID RB1-VFDR-17

VFDR Reactor Coolant Loop B Hot Leg Wide Range Pressure, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB1.NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB1 for all three channels. These sensing lines appear to be in close proximity in the annulus.NC Loop Hot Leg pressure indication sensing lines for 1NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 1NC PT5171 have adequate separation, per the current design analysis. Therefore either 1NC PT5140 or 1NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB1, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC P 5120 - Reactor Coolant Loop B Hot Leg Wide Range Pressure

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID RB1-VFDR-19

VFDR Reactor Coolant Loop B Hot Leg Wide Range Pressure, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB1. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB1 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 1NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 1NC PT5171 have adequate separation, per the current design analysis. Therefore either 1NC PT5140 or 1NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB1, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC P 5140 - Reactor Coolant Loop B Hot Leg Wide Range Pressure

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID RB1-VFDR-20

VFDR Pressurizer Pressure Ch. 2, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB1. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB1 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 1NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 1NC PT5171 have adequate separation, per the current design analysis. Therefore either 1NC PT5140 or 1NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB1, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC P 5150 - Pressurizer Pressure Ch. 2

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-21
VFDR	Pressurizer Level Ch. 2, which is normally available and available for HSB, is affected by the following. One set of pressurizer heaters banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB1 and have cable hits that may prevent energizing them. Hits to cables 1*NC 608, 1*NC 613, 1*NC 615 and 1*NC 620 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 1ILE-PZRHTRA and 1ILE-PZRHTRB are in close proximity . This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5153 - Pressurizer Level Ch. 2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-23
VFDR	Pressurizer Pressure Ch. 1, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB1. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB1 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 1NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 1NC PT5171 have adequate separation, per the current design analysis. Therefore either 1NC PT5140 or 1NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB1, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5161 - Pressurizer Pressure Ch. 1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB1-VFDR-24
VFDR	Pressurizer Level Ch. 1, which is normally available and available for HSB, is affected by the following. One set of pressurizer heaters banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB1 and have cable hits that may prevent energizing them. Hits to cables 1*NC 608, 1*NC 613, 1*NC 615 and 1*NC 620 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 1ILE-PZRHTRA and 1ILE-PZRHTRB are in close proximity . This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5164 - Pressurizer Level Ch. 1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-25
VFDR	Pressurizer Pressure Ch. 3, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB1. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB1 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 1NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 1NC PT5171 have adequate separation, per the current design analysis. Therefore either 1NC PT5140 or 1NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB1, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5170 - Pressurizer Pressure Ch. 3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB1-VFDR-26
VFDR	Pressurizer Pressure Ch. 4, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB1. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB1 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 1NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 1NC PT5171 have adequate separation, per the current design analysis. Therefore either 1NC PT5140 or 1NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB1, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5171 - Pressurizer Pressure Ch. 4
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID RB1-VFDR-27

VFDR Pressurizer Level Ch. 3, which is normally available and available for HSB, is affected by the following. One set of pressurizer heaters banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB1 and have cable hits that may prevent energizing them. Hits to cables 1*NC 608, 1*NC 613, 1*NC 615 and 1*NC 620 could cause the loss of two pressurizer level indications (1NC P 5153 and 1NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 1ILE-PZRHTRA and 1ILE-PZRHTRB are in close proximity . This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC P 5174 - Pressurizer Level Ch. 3

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID RB1-VFDR-28

VFDR Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by various cable hits that can prevent closing the PORV block valve. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 1TBOX0001 and 1TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC VA0031B - Pressurizer PORV Isolation

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID RB1-VFDR-29

VFDR Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously open pressurizer PORV. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 1TBOX0001 and 1TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC VA0032B - Pressurizer PORV

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-30
VFDR	Unit 1 Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by various cable hits that can prevent closing the PORV block valve. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 1TBOX0001 and 1TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0033A - Unit 1 Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB1-VFDR-31
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously open pressurizer PORV. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 1TBOX0001 and 1TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB1-VFDR-32
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by various cable hits that can prevent closing the PORV block valve. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 1TBOX0001 and 1TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-33
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously open pressurizer PORV. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 1TBOX0001 and 1TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0036B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB1-VFDR-34
VFDR	Unit 1 Reactor Head Vent Block Valve, which is normally closed and cycled for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0250A - Unit 1 Reactor Head Vent Block Valve
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-35
VFDR	Unit 1 Reactor Head Vent, which is normally closed and cycled for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0251B - Unit 1 Reactor Head Vent
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-36
VFDR	Unit 1 Reactor Head Vent, which is normally closed and cycled for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0252B - Unit 1 Reactor Head Vent
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-37
VFDR	Unit 1 Reactor Head Vent, which is normally closed and cycled for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC VA0253A - Unit 1 Reactor Head Vent
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-38
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by cable hits that may spuriously open or prevent closure of letdown valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-39
VFDR	Letdown Orifice 1B Outlet Containment Isolation, which is normally open and closed for HSB, is affected by cable hits that may spuriously open or prevent closure of letdown valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0010A - Letdown Orifice 1B Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB1-VFDR-40
VFDR	Letdown Orifice 1C Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits that may spuriously open or prevent closure of letdown valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0011A - Letdown Orifice 1C Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-41
VFDR	Letdown Orifice 1A Outlet Containment Isolation, which is normally closed and closed for HSB, is affected by cable hits that may spuriously open or prevent closure of letdown valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0013A - Letdown Orifice 1A Outlet Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-42
VFDR	Letdown Containment Isolation, which is normally open and closed for HSB, is affected by cable hits that may spuriously open or prevent closure of letdown valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0015B - Letdown Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-43
VFDR	Charging Supply to Loop A Isolation, which is normally open and not utilized for HSB, is affected by various control cable hot shorts that can spuriously close 1NV VA0032B. Other contol cable hot shorts can spuriously close (or prevent opening) 1NV VA0039A. One of the two valves is required open to return the normal charging flowpath. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0032B - Charging Supply to Loop A Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-44
VFDR	Charging Supply to Loop D Isolation, which is normally closed and open for HSB, is affected by control cable hot shorts that can spuriously close (or prevent opening) 1NV VA0039A. Various control cable hot shorts can spuriously close 1NV VA0032B. One of the two valves is required open to return the normal charging flowpath. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0039A - Charging Supply to Loop D Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-45
VFDR	Reactor Coolant Pumps Seal Return Containment Isolation, which is normally open and closed for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0089A - Reactor Coolant Pumps Seal Return Containment Isolation
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-46
VFDR	Reactor Coolant Pumps Seal Return Containment Isolation, which is normally open and closed for HSB, is affected by non coordinated loads (1EMXL F09A, cable 1*NI 540; 1EMXL F11B, cable 1*VX 530; and 1EMXL F12C, cable 1*NV 530) cause loss of power to 1EPEMXEMXL. This causes loss of power to 1BB VA0010B, 1BB VA0057B and 1NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 1EPEMXEMXS. This causes loss of power to 1BB VA0008A, 1BB VA0056A and 1NV VA0089A and other A Train loads. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0091B - Reactor Coolant Pumps Seal Return Containment Isolation
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB1-VFDR-47
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by cable hits that may spuriously open excess letdown valves. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0122B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-48
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by cable hits that may spuriously open excess letdown valves. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0123B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-49
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-50
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS which closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-51
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS which closes and prevents opening valve. Also, a potential IN 92-18 concern due to spurious operation from failure of cable 1*NV 545. Cable has hot conductor which could cause a hot short to open or close valve, bypassing torque switches. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-53
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)
VFDR ID	RB1-VFDR-54
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)
VFDR ID	RB1-VFDR-55
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)
VFDR ID	RB1-VFDR-56
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB1 - Unit 1 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB1-VFDR-57
VFDR	KC Heat Exchanger A Inlet Flow, which is normally available and available for HSB, is affected by Train A KC Hx A Inlet flow not being available due to cable hits to 1KC P 5530. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1KC P 5530 - KC Heat Exchanger A Inlet Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB1-VFDR-58
VFDR	KC Heat Exchanger B Inlet Flow, which is normally available and available for HSB, is affected by Train B KC Hx B Inlet flow not being available due to cable hits to 1KC P 5540. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1KC P 5540 - KC Heat Exchanger B Inlet Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: RB2 - Unit 2 Reactor Building **Fire Area Definition**

Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
2RB-1	U2 RB Annulus
2RB-2	Unit 2 Containment - Outside Shield Wall below El 591-2 1/2
2RB-3	Unit 2 Containment - Inside Shield Wall

Fire Area ID:	RB2 - Unit 2 Reactor Building	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A and/or B train charging pump via available normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A and/or B train charging pump and available normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A combination of A and/or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by A and/or B train feeding S/Gs A, B, C or D, whichever two S/Gs are available. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A and B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A and B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: RB2 - Unit 2 Reactor Building **Previously Approved Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Licensing Action

01. Commitment to utilize metallic sheathed MI cable as a radiant energy shield in containment per Section III.G.2 of Appendix R to 10 CFR 50

Licensing Basis

In the April 9, 1984 letter to the NRC, Duke committed to utilize metallic sheathed MI cable as a radiant energy shield in containment where incore thermocouple cabling is not separated by more than 20 feet free of intervening combustible materials.

This is acceptable based on the following:

o Meets criteria of BTP CMEB Section 9.5-1, C.7.a - redundant shutdown-related systems within the annulus should be protected by separation of a noncombustible radiant energy shield (one of three possible compliance methods).

o Mineral insulation is a radiant energy shield.

The 07/01/1984 Supplement 3 to the Safety Evaluation Report captured the commitment(s) from the above correspondence. On this basis, the staff concluded that the commitment to utilize metallic sheathed MI cable was acceptable.

The bases for acceptability remains valid.

Licensing Action

07. Deviation from Item C.6.c of BTP CMEB 9.5-1 related to standpipe protection in the annulus and pipe tunnel.

Licensing Basis

During the site audit, the NRC observed that manual firefighting capability was deficient throughout the various elevations of the annulus. In addition, the existing hose stations in Fire Area 1 are not capable of reaching all areas of the pipe tunnel.

By letter dated January 17 and February 10, 1984, CNS committed to install an automatic sprinkler system having branch lines on elevations 561 feet, 604 feet and 664 feet. In addition to the automatic sprinklers, CNS committed to install additional line-type heat detectors on six levels of the annulus, located at every other level. CNS also committed to provide additional fire hose, stored in the fire brigade equipment storage area for use in fighting a fire in the pipe tunnel. On the basis of this commitment, the NRC concluded that the fire protection provided for the annulus and pipe tunnel provides an acceptable deviation from Section C.6.c of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Licensing Action

18. Protection of penetrations of fire area boundaries in the Reactor Building

Licensing Basis

The NRC's fire protection site audit was conducted between November 1 and November 4, 1983. The staff also expressed a number of concerns pertaining to previous applicant commitments and the degree of compliance with NRC's fire protection criteria. By letters dated April 9, 1984, Duke Energy provided additional information on the reactor building penetrations. In SSER #3 dated July 1984, the NRC evaluated the fire protection ability of the various reactor building penetrations. The NRC evaluations considered the following:

• The adequacy of interior walls and floor/ceiling assemblies which define fire area boundaries

• Two personnel access portals

• Instrumentation tubing and process piping

• Process piping penetrating the shell wall ranging in size from 1 inch to 34 inches in diameter.

• Penetration of cables through the shell wall of the Reactor Building

When evaluating the penetrations the NRC also considered the following:

• Materials of construction

• Thickness of the penetration

• Fire resistant material utilized

• Available fire detection

• Type and amount of combustible material

• Fire hazards present on either side of the penetrations

The NRC found them acceptable.

The bases for acceptability remains valid.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: RB2 - Unit 2 Reactor Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
2RB-1	U2 RB Annulus	E	E, D	E	Combustible Loading: E Detection System, Installed: E D Water Suppression, 2-Annulus: E
2RB-2	Unit 2 Containment - Outside Shield Wall below El 591-2 1/2	None	E, D	E	Combustible Loading: E Detection System, Installed: E D
2RB-3	Unit 2 Containment - Inside Shield Wall	None	E, D	R, D	Detection System, Installed: E D MI Cable: D RCP oil collection system: R

Title Fire Risk Evaluation for Fire Area RB2

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 5.62E-08

Δ LERF Units: [2] 4.65E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited for HGL and MCA evaluations. Credit for the oil collection system on the reactor coolant pumps was taken in the development of the oil fire scenarios. Detection and the MI cable installed on incore thermocouples is credited for DID.

The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

The Pressurizer (NC) PORV and Pressurizer (NC) PORV isolation valves have cables in this fire area which could cause the PORV to spuriously open and prevent the isolation valves from closing. Other means of injection are available for inventory control from the credited safe shutdown train, no actions are required for DID.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-02
VFDR	S/G 2D Blowdown Containment Isolation - Inside, which is normally open and closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads.Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0008A - S/G 2D Blowdown Containment Isolation - Inside
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-03
VFDR	S/G 2D Blowdown Containment Isolation - Outside, which is normally open and closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0010B - S/G 2D Blowdown Containment Isolation - Outside
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-05
VFDR	S/G 2A Blowdown Containment Isolation - Inside, which is normally Open and closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0056A - S/G 2A Blowdown Containment Isolation - Inside
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-06
VFDR	S/G 2A Blowdown Containment Isolation - Outside, which is normally open and closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2BB VA0057B - S/G 2A Blowdown Containment Isolation - Outside
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-07
VFDR	Auxiliary Feedwater Pump 2B Suction from Nuclear Service Water Isolation, which is normally closed and open for HSB, is affected by the following. Valve 2CA VA0018B could fail to open when required, due to a hit on either cable 2*CA 512 or 2*CA 551, if a fire occurs in fire zone 2RB-1 (annulus) between 89AZ and 235AZ near the 565 ft elevation. This would prevent Auxiliary Feedwater flow to 2C and 2D steam generators from the 2CA PUB (motor driven pump) or the 2CA PUTD (turbine driven pump). A non coordinated load (2EMXC F01B, cable 2*NI 516, routed from 10AZ to 83AZ in 2RB-1) causes loss of power to 2EPEMXEMXC. This causes loss of power to 2RN VA0250A, which would prevent Auxiliary Feedwater flow to 2A and 2B steam generators, when required, from the 2CA PUA (motor driven pump) or the 2CA PUTD (turbine driven pump). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2CA VA0018B - Auxiliary Feedwater Pump 2B Suction from Nuclear Service Water Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB2-VFDR-08
VFDR	Nuclear Instrument Source Range Detector Channel 1 (N31), which is normally available and available for HSB, is affected by both source range ex-core neutron detectors and wide range ex-core neutron detectors and related cables are in fire area RB2 for both A train and B train. Required separation between trains may exist, but can not be verified from analysis using cable routing drawings, including CN-2918-01.01 and CN-2910-01.01, where cables appear to be in close proximity. AP/2/A/5500/016 (Malfunction of Nuclear Instrumentation System), Case I, covers the proper response to loss of source range indication. Refer also to the discussion of source range monitors in Section 3.2.5.5 of CNS-1435.00-00-0002.Either one wide range or one source range ex-core neutron detector can be verified to have 20 foot separation from the other three. (This does not provide for BOTH one wide range and one source range detector.) The exception to this 20 foot separation is for the following locations: 1) Fire zone 2RB-1, from 45AZ to 60AZ near penetrations 2) Fire zone 2RB-3, where detectors are around the reactor to where cables exit the reactor vessel shielding to the first conduit/raceway, locations are not shown. Neutron detectors also provide a signal to 2NV VA0188A and 2NV VA0189B. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ENBDTNSDT0001 - Nuclear Instrument Source Range Detector Channel 1 (N31),
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: RB2 - Unit 2 Reactor Building **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID RB2-VFDR-09

VFDR Nuclear Instrument Source Range Detector Channel 2 (N32), which is normally available and available for HSB, is affected by both source range ex-core neutron detectors and wide range ex-core neutron detectors and related cables are in fire area RB2 for both A train and B train. Required separation between trains may exist, but can not be verified from analysis using cable routing drawings, including CN-2918-01.01 and CN-2910-01.01, where cables appear to be in close proximity. AP/2/A/5500/016 (Malfunction of Nuclear Instrumentation System), Case I, covers the proper response to loss of source range indication. Refer also to the discussion of source range monitors in Section 3.2.5.5 of CNS-1435.00-00-0002.Either one wide range or one source range ex-core neutron detector can be verified to have 20 foot separation from the other three. (This does not provide for BOTH one wide range and one source range detector.) The exception to this 20 foot separation is for the following locations: 1) Fire zone 2RB-1, from 45AZ to 60AZ near penetrations 2) Fire zone 2RB-3, where detectors are around the reactor to where cables exit the reactor vessel shielding to the first conduit/raceway, locations are not shown. Neutron detectors also provide a signal to 2NV VA0188A and 2NV VA0189B. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ENBDTNSDT0005 - Nuclear Instrument Source Range Detector Channel 2 (N32),

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID RB2-VFDR-10

VFDR Neutron Flux Detector Assembly Train A, which is normally available and available for HSB, is affected by both source range ex-core neutron detectors and wide range ex-core neutron detectors and related cables are in fire area RB2 for both A train and B train. Required separation between trains may exist, but can not be verified from analysis using cable routing drawings, including CN-2918-01.01 and CN-2910-01.01, where cables appear to be in close proximity. AP/2/A/5500/016 (Malfunction of Nuclear Instrumentation System), Case I, covers the proper response to loss of source range indication. Refer also to the discussion of source range monitors in Section 3.2.5.5 of CNS-1435.00-00-0002.Either one wide range or one source range ex-core neutron detector can be verified to have 20 foot separation from the other three. (This does not provide for BOTH one wide range and one source range detector.) The exception to this 20 foot separation is for the following locations: 1) Fire zone 2RB-1, from 45AZ to 60AZ near penetrations 2) Fire zone 2RB-3, where detectors are around the reactor to where cables exit the reactor vessel shielding to the first conduit/raceway, locations are not shown. Neutron detectors also provide a signal to 2NV VA0188A and 2NV VA0189B. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ENCDTNSDT0013 - Neutron Flux Detector Assembly Train A

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID RB2-VFDR-11

VFDR Neutron Flux Detector Assembly Train B, which is normally available and available for HSB, is affected by both source range ex-core neutron detectors and wide range ex-core neutron detectors and related cables are in fire area RB2 for both A train and B train. Required separation between trains may exist, but can not be verified from analysis using cable routing drawings, including CN-2918-01.01 and CN-2910-01.01, where cables appear to be in close proximity. AP/2/A/5500/016 (Malfunction of Nuclear Instrumentation System), Case I, covers the proper response to loss of source range indication. Refer also to the discussion of source range monitors in Section 3.2.5.5 of CNS-1435.00-00-0002.Either one wide range or one source range ex-core neutron detector can be verified to have 20 foot separation from the other three. (This does not provide for BOTH one wide range and one source range detector.) The exception to this 20 foot separation is for the following locations: 1) Fire zone 2RB-1, from 45AZ to 60AZ near penetrations 2) Fire zone 2RB-3, where detectors are around the reactor to where cables exit the reactor vessel shielding to the first conduit/raceway, locations are not shown. Neutron detectors also provide a signal to 2NV VA0188A and 2NV VA0189B. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ENCDTNSDT0014 - Neutron Flux Detector Assembly Train B

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID RB2-VFDR-12

VFDR Non Coordinated Loads fed from 2EPEMXEMXC, which is normally available and available for HSB, is affected by the following. Valve 2CA VA0018B could fail to open when required, due to a hit on either cable 2*CA 512 or 2*CA 551, if a fire occurs in fire zone 2RB-1 (annulus) between 89AZand 235AZ near the 565 ft elevation. This would prevent Auxiliary Feedwater flow to 2C and 2D steam generators from the 2CA PUB (motor driven pump) or the 2CA PUTD (turbine driven pump).A non coordinated load (2EMXC F01B, cable 2*NI 516, routed from 10F to 83F in 2RB-1) causes loss of power to 2EPEMXEMXC. This causes loss of power to 2RN VA0250A, which would prevent Auxiliary Feedwater flow to 2A and 2B steam generators, when required, from the 2CA PUA (motor driven pump) or the 2CA PUTD (turbine driven pump). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2EPEMXEMXC-NCL - Non Coordinated Loads fed from 2EPEMXEMXC

Disposition VFDR deterministically resolved by modification

VFDR ID RB2-VFDR-13

VFDR Non Coordinated Loads fed from 2EPEMXEMXL, which is normally available and available for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2EPEMXEMXL-NCL - Non Coordinated Loads fed from 2EPEMXEMXL

Disposition VFDR deterministically resolved by modification

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-14
VFDR	Non Coordinated Loads fed from 2EPEMXEMXS, which is normally available and available for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPEMXEMXS-NCL - Non Coordinated Loads fed from 2EPEMXEMXS
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-15
VFDR	Non Coordinated Loads fed from 2EPLDCEDE, which is normally available and available for HSB, is affected by non coordinated load (2EDE F01J, cable 2*NV 833 between 2EDE and 2TBOX0001) causes loss of power to 2EPLDCEDE, causing loss of control power to numerous A train components, including switchgear 2ETA. Also, non coordinated load (2EDF F01J, cable 2*NV 834 between 2EDF and 2TBOX0002) causes loss of power to 2EPLDCEDF, causing loss of control power to numerous B train components, including switchgear 2ETB. Either 2EPLDCEDE or 2EPLDCEDF is required to be energized for SSD.Both of these cables are routed through fire area RB2, however analysis of the cable routing locations shows that sufficient (20 ft.) separation exists so that one train of power will exist for a fire in any location in fire area RB2, with one exception: The area of concern is in Fire zone 2RB-1 (Annulus) from approximately 5F to 60F. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPLDCEDE-NCL - Non Coordinated Loads fed from 2EPLDCEDE
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-16
VFDR	Non Coordinated Loads fed from 2EPLDCEDF, which is normally available and available for HSB, is affected by non coordinated load (2EDE F01J, cable 2*NV 833 between 2EDE and 2TBOX0001) causes loss of power to 2EPLDCEDE, causing loss of control power to numerous A train components, including switchgear 2ETA. Also, non coordinated load (2EDF F01J, cable 2*NV 834 between 2EDF and 2TBOX0002) causes loss of power to 2EPLDCEDF, causing loss of control power to numerous B train components, including switchgear 2ETB. Either 2EPLDCEDE or 2EPLDCEDF is required to be energized for SSD.Both of these cables are routed through fire area RB2, however analysis of the cable routing locations shows that sufficient (20 ft.) separation exists so that one train of power will exist for a fire in any location in fire area RB2, with one exception: The area of concern is in Fire zone 2RB-1 (Annulus) from approximately 5F to 60F. This failure condition may challenge the Vital Auxiliary Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2EPLDCEDF-NCL - Non Coordinated Loads fed from 2EPLDCEDF
Disposition	VFDR deterministically resolved by modification

Fire Area ID: RB2 - Unit 2 Reactor Building **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID RB2-VFDR-17

VFDR Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB2 and have cable hits that may prevent energizing them. Hits to cables 2*NC 608, 2*NC 613, 2*NC 615 and 2*NC 620 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 2ILE-PZRHTRA and 2ILE-PZRHTRB are in close proximity and require review to determine if either can be credited. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ILE-PZRHTRA - Pressurizer Heater Group 2A

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID RB2-VFDR-18

VFDR Pressurizer Heater Group 2B, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB2 and have cable hits that may prevent energizing them. Hits to cables 2*NC 608, 2*NC 613, 2*NC 615 and 2*NC 620 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 2ILE-PZRHTRA and 2ILE-PZRHTRB are in close proximity and require review to determine if either can be credited. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2ILE-PZRHTRB - Pressurizer Heater Group 2B

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID RB2-VFDR-19

VFDR Reactor Coolant Loop B Hot Leg Wide Range Pressure, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB2. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB2 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 2NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 2NC PT5171 have adequate separation, per the current design analysis. Therefore either 2NC PT5140 or 2NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB2, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC P 5120 - Reactor Coolant Loop B Hot Leg Wide Range Pressure

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-21
VFDR	Reactor Coolant Loop C Hot Leg Wide Range Pressure, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB2. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB2 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 2NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 2NC PT5171 have adequate separation, per the current design analysis. Therefore either 2NC PT5140 or 2NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB2, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5140 - Reactor Coolant Loop C Hot Leg Wide Range Pressure
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-22
VFDR	Pressurizer Pressure Ch. 2, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB2. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB2 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 2NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 2NC PT5171 have adequate separation, per the current design analysis. Therefore either 2NC PT5140 or 2NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB2, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5150 - Pressurizer Pressure Ch. 2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-23
VFDR	Pressurizer Level Ch. 2, which is normally available and available for HSB, is affected by the following. One set of pressurizer heaters banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB2 and have cable hits that may prevent energizing them. Hits to cables 2*NC 608, 2*NC 613, 2*NC 615 and 2*NC 620 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 2ILE-PZRHTRA and 2ILE-PZRHTRB are in close proximity and require review to determine if either can be credited. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5153 - Pressurizer Level Ch. 2
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-25
VFDR	Pressurizer Pressure Ch. 1, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB2. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB2 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 2NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 2NC PT5171 have adequate separation, per the current design analysis. Therefore either 2NC PT5140 or 2NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB2, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5161 - Pressurizer Pressure Ch. 1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB2-VFDR-26
VFDR	Pressurizer Level Ch. 1, which is normally available and available for HSB, is affected by the following. One set of pressurizer heaters banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB2 and have cable hits that may prevent energizing them. Hits to cables 2*NC 608, 2*NC 613, 2*NC 615 and 2*NC 620 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 2ILE-PZRHTRA and 2ILE-PZRHTRB are in close proximity and require review to determine if either can be credited. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5164 - Pressurizer Level Ch. 1
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-27
VFDR	Pressurizer Pressure Ch. 3, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB2. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB2 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 2NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 2NC PT5171 have adequate separation, per the current design analysis. Therefore either 2NC PT5140 or 2NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB2, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5170 - Pressurizer Pressure Ch. 3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB2-VFDR-28
VFDR	Pressurizer Pressure Ch. 4, which is normally available and available for HSB, is affected by the following. All four channels of pressurizer pressure indication cables, transmitters and sensing lines are located in close proximity in fire area RB2. NC Loop Hot Leg Wide Range Pressure indication sensing lines are in fire area RB2 for all three channels. These sensing lines appear to be in close proximity in the annulus. NC Loop Hot Leg pressure indication sensing lines for 2NC PT5140 and pressurizer pressure indication cables, transmitters and sensing lines for 2NC PT5171 have adequate separation, per the current design analysis. Therefore either 2NC PT5140 or 2NC PT5171 will survive any scenario.With nominal NC pressure at 2235 PSIG, a fire in the vicinity of the NC Loop Hot Leg pressure sensing lines or pressurizer pressure sensing lines could cause oscillations during the early stages, but would not cause significant deviation of indication after the initial heating. Per CNS-1435.00-00-0002, Section 3.2.5.5, the assured method of achieving safe shutdown and verifying natural circulation cooldown is the use of reactor coolant system pressure instrumentation along with incore thermocouples. (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) Cables for the incore thermocouples are also located in fire area RB2, but according to CNS-1435.00-00-0002, Section 3.2.5.5, these cables are mineral insulated and qualify as a radiant energy shield. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5171 - Pressurizer Pressure Ch. 4
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-29
VFDR	Pressurizer Level Ch. 3, which is normally available and available for HSB, is affected by the following. One set of pressurizer heaters banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Both banks of pressurizer heaters are in fire area RB2 and have cable hits that may prevent energizing them. Hits to cables 2*NC 608, 2*NC 613, 2*NC 615 and 2*NC 620 could cause the loss of two pressurizer level indications (2NC P 5153 and 2NC P 5164) and/or spuriously operate relays KB and KE, which are designed to cut power to the heaters on low pressurizer level. Other possible cable hits are to the power cables connecting the power panels to the heaters. Cables, sensing lines and level transmitters required for operation of pressurizer heater banks 2ILE-PZRHTRA and 2ILE-PZRHTRB are in close proximity and require review to determine if either can be credited. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5174 - Pressurizer Level Ch. 3
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-30
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by various cable hits that can prevent closing the PORV block valve. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 2TBOX0001 and 2TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0031B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB2-VFDR-31
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable hits can spuriously open pressurizer PORV. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 2TBOX0001 and 2TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0032B - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: RB2 - Unit 2 Reactor Building — **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

VFDR ID	RB2-VFDR-32
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by various cable hits that can prevent closing the PORV block valve. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 2TBOX0001 and 2TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0033A - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB2-VFDR-33
VFDR	Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable hits can spuriously open pressurizer PORV. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 2TBOX0001 and 2TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0034A - Pressurizer PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB2-VFDR-34
VFDR	Pressurizer PORV Isolation, which is normally open and closed for HSB, is affected by various cable hits that can prevent closing the PORV block valve. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 2TBOX0001 and 2TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0035B - Pressurizer PORV Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID: RB2 - Unit 2 Reactor Building **VFDRs**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

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VFDR ID RB2-VFDR-35

VFDR Pressurizer PORV, which is normally closed and closed for HSB, is affected by various cable hits can spuriously open pressurizer PORV. All the pressurizer PORV and PORV block valve cables are in close proximity in the pressurizer enclosure and other portions of their route. Fire at 2TBOX0001 and 2TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC VA0036B - Pressurizer PORV

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID RB2-VFDR-36

VFDR Reactor Head Vent Block Valve, which is normally closed and cycled for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC VA0250A - Reactor Head Vent Block Valve

Disposition VFDR deterministically resolved by modification

VFDR ID RB2-VFDR-37

VFDR Reactor Vessel Head Vent, which is normally closed and Closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 2NC VA0251B - Reactor Vessel Head Vent

Disposition VFDR deterministically resolved by modification

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-38
VFDR	Reactor Head Vent Block Valve, which is normally closed and closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0252B - Reactor Head Vent Block Valve
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-39
VFDR	Reactor Vessel Head Vent, which is normally closed and cycled for HSB, is affected by all pressurizer PORV and PORV block valve cables in close proximity in the pressurizer enclosure and other portions of their route. Fire at 2TBOX0001 and 2TBOX0002 and containment penetrations can cause PORV spurious operation, from PORV or other equipment cables. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC VA0253A - Reactor Vessel Head Vent
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-40
VFDR	Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation, which is normally open and closed for HSB, is affected by various cable hits that can spuriously open or prevent closure of 2NV VA0001A, or the other Letdown valves. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0001A - Reactor Coolant Letdown to Regenerative Heat Exchanger Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-41
VFDR	Letdown Orifice 2B Containment Isolation, which is normally open and closed for HSB, is affected by various cable hits that can spuriously open or prevent closure of 2NV VA0010A, or the other Letdown valves. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0010A - Letdown Orifice 2B Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	RB2-VFDR-42
VFDR	Letdown Orifice 2C Containment Isolation, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously open or prevent closure of 2NV VA0011A, or the other Letdown valves. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0011A - Letdown Orifice 2C Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-43
VFDR	Letdown Orifice 2A Containment Isolation, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously open or prevent closure of 2NV VA0013A, or the other Letdown valves. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0013A - Letdown Orifice 2A Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-44
VFDR	Charging Supply to Loop A Isolation, which is normally open and open for HSB, is affected by various control cable hot shorts that can spuriously close 2NV VA0032B. Other contol cable hot shorts can spuriously close (or prevent opening) 2NV VA0039A. One of the two valves is required open to return the normal charging flowpath. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0032B - Charging Supply to Loop A Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-45
VFDR	Charging Supply to Loop D Isolation, which is normally closed and open for HSB, is affected by contol cable hot shorts that can spuriously close (or prevent opening) 2NV VA0039A. Various control cable hot shorts can also spuriously close 2NV VA0032B. Other One of the two valves is required open to return the normal charging flowpath. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0039A - Charging Supply to Loop D Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-46
VFDR	Reactor Coolant Pumps Seal Return Containment Isolation, which is normally open and closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0089A - Reactor Coolant Pumps Seal Return Containment Isolation
Disposition	VFDR deterministically resolved by modification

VFDR ID	RB2-VFDR-47
VFDR	Reactor Coolant Pumps Seal Return Containment Isolation, which is normally open and closed for HSB, is affected by a non coordinated load (2EMXL F11B, cable 2*VX 530) causes loss of power to 2EPEMXEMXL. This causes loss of power to 2BB VA0010B, 2BB VA0057B, 2NV VA0091B and other B Train loads. Also, non coordinated loads cause loss of power to 2EPEMXEMXS. This causes loss of power to 2BB VA0008A, 0056A, 2NV VA0089A, and other A Train loads. Also, cable hits could cause loss of power to, or spurious operation of 2BB VA0008A or 2BB VA0056A, as well as possible IN 92-18 concerns (cable 2*BB 523 or 2*BB 570 for 2BB VA0008A, and cable 2*BB 524 or 2*BB 570 for 2BB VA0056A). This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0091B - Reactor Coolant Pumps Seal Return Containment Isolation
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-48
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously open 2NV VA0122B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0122B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-49
VFDR	Loop C to excess letdown heat exchanger isolation, which is normally closed and closed for HSB, is affected by various cable hits that can spuriously open 2NV VA0123B. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0123B - Loop C to excess letdown heat exchanger isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-50
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by a loss of insturment air, cable hits, loss of power, and SSPS signals. 2NV VA0294 fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-51
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS which closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-52
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS which closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0314B - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-53
VFDR	Nuclear Service Water Header 2A to Auxiliary Feedwater Pump Suction Isolation, which is normally closed and open for HSB, is affected by the following. Valve 2CA VA0018B could fail to open when required, due to a hit on either cable 2*CA 512 or 2*CA 551, if a fire occurs in fire zone 2RB-1 (annulus) between 89AZ and 235AZ near the 565 ft elevation. This would prevent Auxiliary Feedwater flow to 2C and 2D steam generators from the 2CA PUB (motor driven pump) or the 2CA PUTD (turbine driven pump). A non coordinated load (2EMXC F01B, cable 2*NI 516, routed from 10AZ to 83AZ in 2RB-1) causes loss of power to 2EPEMXEMXC. This causes loss of power to 2RN VA0250A, which would prevent Auxiliary Feedwater flow to 2A and 2B steam generators, when required, from the 2CA PUA (motor driven pump) or the 2CA PUTD (turbine driven pump). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2RN VA0250A - Nuclear Service Water Header 2A to Auxiliary Feedwater Pump Suction Isolation
Disposition	VFDR deterministically resolved by modification

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-54
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-55
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-56
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-57
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	RB2 - Unit 2 Reactor Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	RB2-VFDR-58
VFDR	KC Heat Exchanger A Inlet Flow, which is normally available and available for HSB, is affected by Train A KC Hx A Inlet flow not being available due to cable hits to 2KC P 5530. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2KC P 5530 - KC Heat Exchanger A Inlet Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	RB2-VFDR-59
VFDR	KC Heat Exchanger B Inlet Flow, which is normally available and available for HSB, is affected by Train B KC Hx B Inlet flow not being available due to cable hits to 2KC P 5540. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2KC P 5540 - KC Heat Exchanger B Inlet Flow
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: SRV (U1) - Service Building **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
100	SB KR Equip Area El 568
101	SB RF Jockey Pumps & Tank El 568
102	SB U1 250 VDC Battery Rm El 568
103	SB U1 Aux Elect Boiler El 568
104	SB Lube Oil Storage Rm El 568 (no longer used for oil storage)
105	SB U2 250 VDC Battery Rm El 568
106	SB U2 Aux Elect Boiler El 568
116	SB Tech Support Centre El 594
117	SB Blackout SWGR Rm El 594
118	SB RR Bay Tool Rm El 594
119	SB U1 Aux Elect Boiler El 594
120	SB U2 Aux Elect Boiler El 594
121	SB RR Bay Tool Rm QA Holding Area El 594
122	SB RR Bay Tool Rm Office El 594
205	SB OAC Computer Rm Flr U1 Side
206	SB OAC Computer Rm Flr U2 Side
207	SB OAC Computer Rm Ceiling and OPS Kittchen
208	RP/SAC Customer Service El 594
209	SB HVAC Equip Rm El 594
210	SB RP/DRC Office El 594
227	SB Security Comp Rm El 594
40	U1 SB Elect Equip Rm El 554
52	U2 SB Elect Equip Rm El 554
61	U1 SB Cable Spreading Rm El 574
70	U2 SB Cable Spreading Rm El 574
99	SB Air Equip Area El 568
SRV-1	SB General Area El 568
SRV-2	SB General Area El 594

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SRV (U1) - Service Building **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: SRV (U1) - Service Building **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

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Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 19 Fire Protection Evaluation for Unit 1 Turbine Building - Service Building HDPE Pipe Penetrations
Revision 0

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to provide justification for the unrated high density polyethylene piping (HDPE) penetration assembly in a 3-hour fire rated barrier located at column line 1N-18 on elevation 568' separating fire areas (FA's) Unit 1 Turbine Building (TB1) and Service Building (SRV).

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:
- combustible controls,
- limited in situ combustibles,
- minimal ignition sources.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 20 Fire Protection Evaluation for Unit 2 Turbine Building - Service Building HDPE Pipe Penetrations
Revision 0

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to provide justification for two unrated high density polyethylene piping (HDPE) penetrations in a 3-hour fire rated barrier located at column line 2N-19 (TB2 side) on elevation 568' separating fire areas (FA's) Unit 2 Turbine Building (TB2) and Service Building (SRV).

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:
- combustible controls,
- limited in situ combustibles,
- minimal ignition sources.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SRV (U1) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
100	SB KR Equip Area El 568	None	None	None	None
101	SB RF Jockey Pumps & Tank El 568	None	None	None	None
102	SB U1 250 VDC Battery Rm El 568	None	None	None	None
103	SB U1 Aux Elect Boiler El 568	None	None	None	None
104	SB Lube Oil Storage Rm El 568 (no longer used for oil storage)	None	None	None	None
105	SB U2 250 VDC Battery Rm El 568	None	None	None	None
106	SB U2 Aux Elect Boiler El 568	None	None	None	None
116	SB Tech Support Centre El 594	None	None	None	None
117	SB Blackout SWGR Rm El 594	None	None	None	None
118	SB RR Bay Tool Rm El 594	None	None	None	None
119	SB U1 Aux Elect Boiler El 594	None	None	None	None
120	SB U2 Aux Elect Boiler El 594	None	None	None	None
121	SB RR Bay Tool Rm QA Holding Area El 594	None	None	None	None
122	SB RR Bay Tool Rm Office El 594	None	None	None	None
205	SB OAC Computer Rm Flr U1 Side	None	None	None	None
206	SB OAC Computer Rm Flr U2 Side	None	None	None	None
207	SB OAC Computer Rm Ceiling and OPS Kittchen	None	None	None	None
208	RP/SAC Customer Service El 594	None	None	None	None
209	SB HVAC Equip Rm El 594	None	None	None	None
210	SB RP/DRC Office El 594	None	None	None	None
227	SB Security Comp Rm El 594	None	None	None	None
40	U1 SB Elect Equip Rm El 554	None	None	None	None
52	U2 SB Elect Equip Rm El 554	None	None	None	None
61	U1 SB Cable Spreading Rm El 574	None	None	None	None
70	U2 SB Cable Spreading Rm El 574	None	None	None	None
99	SB Air Equip Area El 568	None	None	None	None
SRV-1	SB General Area El 568	None	None	E	Combustible Loading: E

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SRV (U1) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
SRV-2	SB General Area El 594	None	None	None	None

Title
Fire Risk Evaluation for Fire Area SRV (U1)

Risk Summary
All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF
Units: [1] 7.82E-08

Δ LERF
Units: [1] 4.96E-09

DID Maintained
A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited for HGL and MCA evaluations. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID recovery actions, enhancements or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained
All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	SRV (U1) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U1)-VFDR-26
VFDR	Pressurizer Heater Group 1A, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heater banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 1ILE-PZRHTRC and 1ILE-PZRHTRD are required to be off.All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 1ILE-PZRHTRA or 1ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U1)-VFDR-27
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heater banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 1ILE-PZRHTRC and 1ILE-PZRHTRD are required to be off.All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 1ILE-PZRHTRA or 1ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U1)-VFDR-28
VFDR	Pressurizer Heater Group 1C, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heater banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 1ILE-PZRHTRC and 1ILE-PZRHTRD are required to be off.All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 1ILE-PZRHTRA or 1ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRC - Pressurizer Heater Group 1C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	SRV (U1) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID SRV (U1)-VFDR-29

VFDR Pressurizer Heater Group 1D, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heater banks (either 1ILE-PZRHTRA or 1ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 1ILE-PZRHTRC and 1ILE-PZRHTRD are required to be off.All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 1ILE-PZRHTRA or 1ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1ILE-PZRHTRD - Pressurizer Heater Group 1D

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID SRV (U1)-VFDR-30

VFDR Reactor Coolant Pump 1A, which is normally on and off for HSB, is affected by cable failures that may spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. Also, normal DC control power may be lost. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC PUA - Reactor Coolant Pump 1A

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

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VFDR ID SRV (U1)-VFDR-31

VFDR Reactor Coolant Pump 1B, which is normally on and off for HSB, is affected by cable failures that may spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. Also, normal DC control power may be lost. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.

Component(s) 1NC PUB - Reactor Coolant Pump 1B

Disposition Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	SRV (U1) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U1)-VFDR-32
VFDR	Reactor Coolant Pump 1C, which is normally on and off for HSB, is affected by cable failures that may spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. Also, normal DC control power may be lost. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUC - Reactor Coolant Pump 1C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U1)-VFDR-33
VFDR	Reactor Coolant Pump 1D, which is normally on and off for HSB, is affected by cable failures that may spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. Also, normal DC control power may be lost. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC PUD - Reactor Coolant Pump 1D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U1)-VFDR-34
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	SRV (U1) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U1)-VFDR-35
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS which closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	SRV (U1)-VFDR-37
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U1)-VFDR-38
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U1)-VFDR-39
VFDR	Pressurizer Pressure Ch. 4, which is normally available and available for HSB, is affected by cable hits to both Train B pressurizer pressure indicators. Train B indicator 1NC P 5171 is credited following a fire in this area. The other Train B indicator, 1NC P 5150, is also affected by cable hits in this fire area. This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NC P 5171 - Pressurizer Pressure Ch. 4
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SRV (U2) - Service Building **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
100	SB KR Equip Area El 568
101	SB RF Jockey Pumps & Tank El 568
102	SB U1 250 VDC Battery Rm El 568
103	SB U1 Aux Elect Boiler El 568
104	SB Lube Oil Storage Rm El 568 (no longer used for oil storage)
105	SB U2 250 VDC Battery Rm El 568
106	SB U2 Aux Elect Boiler El 568
116	SB Tech Support Centre El 594
117	SB Blackout SWGR Rm El 594
118	SB RR Bay Tool Rm El 594
119	SB U1 Aux Elect Boiler El 594
120	SB U2 Aux Elect Boiler El 594
121	SB RR Bay Tool Rm QA Holding Area El 594
122	SB RR Bay Tool Rm Office El 594
205	SB OAC Computer Rm Flr U1 Side
206	SB OAC Computer Rm Flr U2 Side
207	SB OAC Computer Rm Ceiling and OPS Kittchen
208	RP/SAC Customer Service El 594
209	SB HVAC Equip Rm El 594
210	SB RP/DRC Office El 594
227	SB Security Comp Rm El 594
40	U1 SB Elect Equip Rm El 554
52	U2 SB Elect Equip Rm El 554
61	U1 SB Cable Spreading Rm El 574
70	U2 SB Cable Spreading Rm El 574
99	SB Air Equip Area El 568
SRV-1	SB General Area El 568
SRV-2	SB General Area El 594

Fire Area ID:	SRV (U2) - Service Building	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HAB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by B train feeding S/Gs C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: SRV (U2) - Service Building **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 19 Fire Protection Evaluation for Unit 1 Turbine Building - Service Building HDPE Pipe Penetrations
Revision 0

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to provide justification for the unrated high density polyethylene piping (HDPE) penetration assembly in a 3-hour fire rated barrier located at column line 1N-18 on elevation 568' separating fire areas (FA's) Unit 1 Turbine Building (TB1) and Service Building (SRV).

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:
- combustible controls,
- limited in situ combustibles,
- minimal ignition sources.

Engineering Evaluation ID CNC-1435.00-00-0035, Attachment 20 Fire Protection Evaluation for Unit 2 Turbine Building - Service Building HDPE Pipe Penetrations
Revision 0

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary The purpose of the calculation was to provide justification for two unrated high density polyethylene piping (HDPE) penetrations in a 3-hour fire rated barrier located at column line 2N-19 (TB2 side) on elevation 568' separating fire areas (FA's) Unit 2 Turbine Building (TB2) and Service Building (SRV).

The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on:
- combustible controls,
- limited in situ combustibles,
- minimal ignition sources.

Fire Area ID: SRV (U2) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
100	SB KR Equip Area El 568	None	None	None	None
101	SB RF Jockey Pumps & Tank El 568	None	None	None	None
102	SB U1 250 VDC Battery Rm El 568	None	None	None	None
103	SB U1 Aux Elect Boiler El 568	None	None	None	None
104	SB Lube Oil Storage Rm El 568 (no longer used for oil storage)	None	None	None	None
105	SB U2 250 VDC Battery Rm El 568	None	None	None	None
106	SB U2 Aux Elect Boiler El 568	None	None	None	None
116	SB Tech Support Centre El 594	None	None	None	None
117	SB Blackout SWGR Rm El 594	None	None	None	None
118	SB RR Bay Tool Rm El 594	None	None	None	None
119	SB U1 Aux Elect Boiler El 594	None	None	None	None
120	SB U2 Aux Elect Boiler El 594	None	None	None	None
121	SB RR Bay Tool Rm QA Holding Area El 594	None	None	None	None
122	SB RR Bay Tool Rm Office El 594	None	None	None	None
205	SB OAC Computer Rm Flr U1 Side	None	None	None	None
206	SB OAC Computer Rm Flr U2 Side	None	None	None	None
207	SB OAC Computer Rm Ceiling and OPS Kittchen	None	None	None	None
208	RP/SAC Customer Service El 594	None	None	None	None
209	SB HVAC Equip Rm El 594	None	None	None	None
210	SB RP/DRC Office El 594	None	None	None	None
227	SB Security Comp Rm El 594	None	None	None	None
40	U1 SB Elect Equip Rm El 554	None	None	None	None
52	U2 SB Elect Equip Rm El 554	None	None	None	None
61	U1 SB Cable Spreading Rm El 574	None	None	None	None
70	U2 SB Cable Spreading Rm El 574	None	None	None	None
99	SB Air Equip Area El 568	None	None	None	None
SRV-1	SB General Area El 568	None	None	E	Combustible Loading: E

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SRV (U2) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
SRV-2	SB General Area El 594	None	None	None	None

Title Fire Risk Evaluation for Fire Area SRV (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 7.35E-08

Δ LERF Units: [2] 3.94E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fire scenarios analyzed are not a significant source of risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID recovery actions, enhancements, or modifications are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	SRV (U2) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U2)-VFDR-27
VFDR	Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heater banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 2ILE-PZRHTRC and 2ILE-PZRHTRD are required to be off. All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 2ILE-PZRHTRA or 2ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U2)-VFDR-28
VFDR	Pressurizer Heater Group 2B, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heater banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 2ILE-PZRHTRC and 2ILE-PZRHTRD are required to be off. All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 2ILE-PZRHTRA or 2ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Preserizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U2)-VFDR-29
VFDR	Pressurizer Heater Group 2C, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heater banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 2ILE-PZRHTRC and 2ILE-PZRHTRD are required to be off. All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 2ILE-PZRHTRA or 2ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRC - Pressurizer Heater Group 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	SRV (U2) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U2)-VFDR-30
VFDR	Pressurizer Heater Group 2D, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heater banks (either 2ILE-PZRHTRA or 2ILE-PZRHTRB) is required to maintain hot standby (prevent solid plant operations). Pressurizer heater banks 2ILE-PZRHTRC and 2ILE-PZRHTRD are required to be off. All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both trains of 4160 VAC Blackout Switchgear and associated transformers and load centers are in the Fire Area and are assumed to fail, preventing energizing or controlling the 2ILE-PZRHTRA or 2ILE-PZRHTRB heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRD - Pressurizer Heater Group 2D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U2)-VFDR-34
VFDR	Pressurizer Pressure Ch. 4, which is normally available and available for HSB, is affected by the following. Pressurizer Pressure indication is unavailable. Natural circulation can be verified using Reactor Coolant Hot Leg Wide Range Pressure indication (2NC P 5140) along with Incore Thermocouples (2ENATE_TRAIN_B) per CNS-1435.00-00-0002, Section 3.2.5.5 (assured method). (The use of alternate instrumentation to verify natural circulation cooldown is identified as an acceptable deviation in the CNS Safety Evaluation report.) This failure condition may challenge the Process Monitoring Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC P 5171 - Pressurizer Pressure Ch. 4
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U2)-VFDR-35
VFDR	2A Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUA - 2A Reactor Coolant Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	SRV (U2) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U2)-VFDR-36
VFDR	2B Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUB - 2B Reactor Coolant Pump
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	SRV (U2)-VFDR-37
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by valve failing open on loss of air and cable hits. Charging is assured through NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	SRV (U2)-VFDR-38
VFDR	Charging Line Containment Isolation, which is normally open and open for HSB, is affected by SSPS which closes and prevents opening valve. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0312A - Charging Line Containment Isolation
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	SRV (U2) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U2)-VFDR-40
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	SRV (U2)-VFDR-41
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	SRV (U2)-VFDR-42
VFDR	2C Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUC - Reactor Coolant Pump 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	SRV (U2) - Service Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	SRV (U2)-VFDR-43
VFDR	2D Reactor Coolant Pump, which is normally on and off for HSB, is affected by cable failures that may spuriously open or keep open the Pressurizer Spray valves (2NC VA0027 and 2NC VA0029). Cable failures may also spuriously start or prevent the trip of the Reactor Coolant Pumps from the Control Room. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NC PUD - Reactor Coolant Pump 2D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SSF (U1) - Standby Shutdown Facility **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description
201	SSF Battery Rm & Control Rm
202	SSF Diesel Rm
203	SSF Elect Equip Rm
204	SSF HVAC Rm

Fire Area ID: SSF (U1) - Standby Shutdown Facility
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A or B feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SSF (U1) - Standby Shutdown Facility
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
201	SSF Battery Rm & Control Rm	None	None	None	None
202	SSF Diesel Rm	None	None	None	None
203	SSF Elect Equip Rm	None	None	None	None
204	SSF HVAC Rm	None	None	None	None

Title Not Required - Deterministic Fire Area

Risk Summary

Δ CDF Units: [1] N/A

Δ LERF Units: [1] N/A

DID Maintained

Safety Margin Maintained

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SSF (U2) - Standby Shutdown Facility **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description
201	SSF Battery Rm & Control Rm
202	SSF Diesel Rm
203	SSF Elect Equip Rm
204	SSF HVAC Rm

Fire Area ID:	SSF (U2) - Standby Shutdown Facility	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.3.2 Deterministic Approach	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A or B feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: SSF (U2) - Standby Shutdown Facility
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
201	SSF Battery Rm & Control Rm	None	None	None	None
202	SSF Diesel Rm	None	None	None	None
203	SSF Elect Equip Rm	None	None	None	None
204	SSF HVAC Rm	None	None	None	None

Title Not Required - Deterministic Fire Area

Risk Summary

Δ CDF Units: [2] N/A

Δ LERF Units: [2] N/A

DID Maintained

Safety Margin Maintained

Fire Area ID: TB1 - Unit 1 Turbine Building **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
107	U1 TB Main Turbine Oil Tank El 594
108	U1 TB CF Pumps El 594
109	SWGR Rm 1TC & 1TD El 594
110	SWGR Rm 1TA & 1TB El 594
1TB-1	U1 TB General Area El 568
1TB-2	U1 TB General Area El 594
1TB-3	U1 TB General Area El 619
91	U1 TB Turbine Oil Trans Tank El 568
92	U1 TB Transducer Rm El 568
93	U1 TB Hydrogen Seal Oil System El 568
94	U1 TB MCC Area El 568

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: TB1 - Unit 1 Turbine Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goals

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A or B feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: TB1 - Unit 1 Turbine Building **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 19 Fire Protection Evaluation for Unit 1 Turbine Building - Service Building HDPE Pipe Penetrations
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to provide justification for the unrated high density polyethylene piping (HDPE) penetration assembly in a 3-hour fire rated barrier located at column line 1N-18 on elevation 568' separating fire areas (FA's) Unit 1 Turbine Building (TB1) and Service Building (SRV). The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on: • combustible controls, • limited in situ combustibles, • minimal ignition sources.

Engineering Evaluation ID	CNC-1435.00-00-0070 Catawba NFPA 805 Turbine Building Oil Hazard Evaluation
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to document the automatic suppression systems not required to support Fire PRA assumptions regarding large oil hazard and structural collapse. The systems evaluated protect the Main Turbine Oil Tank, Turbine Oil Piping, Turbine Oil Transfer Tank, Lube Oil Purifier area, Main Feedwater Pumps, EHC area, and the Hydrogen Seal Oil area. The evaluation determined that the Main Turbine Oil Piping, Main Feedwater Pumps, and the Hydrogen Seal Oil areas present sufficient risk that the automatic suppression systems protecting these areas will be required to limit the potential for structural collapse. The evaluation also determined the Main Turbine Oil Tank(s), Turbine Oil Transfer (Storage) Tank(s), EHC Area(s), and Lube Oil Purifier Area (s) do not present a potential in which a fire would result in structural steel failure and/or collapse and, therefore, the automatic fire suppression systems protecting these areas are not required. This is based on: • the Main Turbine Oil Tank(s), Turbine Oil Transfer (Storage) Tank(s) are contained with a fire rated enclosure not impacting building structural steel, • the EHC Area(s) hazards are mitigated by the double-dikes, and the use of Fyrquel EHC fluid, • the Lube Oil Purifier Area(s) hazards are mitigated by the non-continuous and attended use of the equipment, skid incorporated diking, and the floor drain/trench system which routes potential spilled oil away from the building structural steel.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: TB1 - Unit 1 Turbine Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
107	U1 TB Main Turbine Oil Tank El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
108	U1 TB CF Pumps El 594	D	None	None	Water Suppression, Installed Spray: D
109	SWGR Rm 1TC & 1TD El 594	None	None	None	None
110	SWGR Rm 1TA & 1TB El 594	None	None	None	None
1TB-1	U1 TB General Area El 568	D	None	E	Combustible Loading: E Dike: E Floor Drain/Trench: E Water Suppression, Installed Spray-MT oil piping: D
1TB-2	U1 TB General Area El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
1TB-3	U1 TB General Area El 619	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
91	U1 TB Turbine Oil Trans Tank El 568	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
92	U1 TB Transducer Rm El 568	None	None	None	None
93	U1 TB Hydrogen Seal Oil System El 568	D	None	None	Water Suppression, Installed Spray: D
94	U1 TB MCC Area El 568	None	None	None	None

Title Fire Risk Evaluation for Fire Area TB1

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 2.60E-08

Δ LERF Units: [1] 1.10E-09

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. However, fixed suppression systems provide further assurance that the fire affects remain local to the hazard and are recommended for DID. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	TB1 - Unit 1 Turbine Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	TB1-VFDR-15
VFDR	Pressurizer Heater Group 1A, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRA - Pressurizer Heater Group 1A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	TB1-VFDR-16
VFDR	Pressurizer Heater Group 1B, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRB - Pressurizer Heater Group 1B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	TB1-VFDR-17
VFDR	Pressurizer Heater Group 1C, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRC - Pressurizer Heater Group 1C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	TB1 - Unit 1 Turbine Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	TB1-VFDR-18
VFDR	Pressurizer Heater Group 1D, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1ILE-PZRHTRD - Pressurizer Heater Group 1D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	TB1-VFDR-19
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	TB1-VFDR-20
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID:	TB1 - Unit 1 Turbine Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	TB1-VFDR-21
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	TB1-VFDR-24
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	TB1-VFDR-25
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - S/G 1C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	TB2 - Unit 2 Turbine Building	**Fire Area Definition**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Fire Zone ID	Description
111	U2 TB Main Turbine Oil Tank El 594
112	U2 TB CF Pumps El 594
113	SWGR Rm 2TC & 2TD El 594
114	SWGR Rm 2TA & 2TB El 594
2TB-1	U2 TB General Area El 568
2TB-2	U2 TB General Area El 594
2TB-3	U2 TB General Area El 619
95	U2 TB Turbine Oil Trans Tank El 568
96	U2 TB Transducer Rm El 568
97	U2 TB Hydrogen Seal Oil System El 568
98	U2 TB MCC Area El 568

Fire Area ID: TB2 - Unit 2 Turbine Building **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B train NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A or B feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: TB2 - Unit 2 Turbine Building **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

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Engineering Evaluation ID	CNC-1435.00-00-0035, Attachment 20 Fire Protection Evaluation for Unit 2 Turbine Building - Service Building HDPE Pipe Penetrations
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to provide justification for two unrated high density polyethylene piping (HDPE) penetrations in a 3-hour fire rated barrier located at column line 2N-19 (TB2 side) on elevation 568' separating fire areas (FA's) Unit 2 Turbine Building (TB2) and Service Building (SRV). The evaluation determined the portions of the barrier containing the stairs to be 'adequate for the hazard'. This is based on: • combustible controls, • limited in situ combustibles, • minimal ignition sources.

Engineering Evaluation ID	CNC-1435.00-00-0070 Catawba NFPA 805 Turbine Building Oil Hazard Evaluation
Revision	0
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the calculation was to document the automatic suppression systems not required to support Fire PRA assumptions regarding large oil hazard and structural collapse. The systems evaluated protect the Main Turbine Oil Tank, Turbine Oil Piping, Turbine Oil Transfer Tank, Lube Oil Purifier area, Main Feedwater Pumps, EHC area, and the Hydrogen Seal Oil area. The evaluation determined that the Main Turbine Oil Piping, Main Feedwater Pumps, and the Hydrogen Seal Oil areas present sufficient risk that the automatic suppression systems protecting these areas will be required to limit the potential for structural collapse. The evaluation also determined the Main Turbine Oil Tank(s), Turbine Oil Transfer (Storage) Tank(s), EHC Area(s), and Lube Oil Purifier Area (s) do not present a potential in which a fire would result in structural steel failure and/or collapse and, therefore, the automatic fire suppression systems protecting these areas are not required. This is based on: • the Main Turbine Oil Tank(s), Turbine Oil Transfer (Storage) Tank(s) are contained with a fire rated enclosure not impacting building structural steel, • the EHC Area(s) hazards are mitigated by the double-dikes, and the use of Fyrquel EHC fluid, • the Lube Oil Purifier Area(s) hazards are mitigated by the non-continuous and attended use of the equipment, skid incorporated diking, and the floor drain/trench system which routes potential spilled oil away from the building structural steel.

Fire Area ID: TB2 - Unit 2 Turbine Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
111	U2 TB Main Turbine Oil Tank El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
112	U2 TB CF Pumps El 594	D	None	None	Water Suppression, Installed Spray: D
113	SWGR Rm 2TC & 2TD El 594	None	None	None	None
114	SWGR Rm 2TA & 2TB El 594	None	None	None	None
2TB-1	U2 TB General Area El 568	D	None	E	Combustible Loading: E Dike: E Floor Drain/Trench: E Water Suppression, Installed Spray-MT oil piping: D
2TB-2	U2 TB General Area El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
2TB-3	U2 TB General Area El 619	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
95	U2 TB Turbine Oil Trans Tank El 568	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
96	U2 TB Transducer Rm El 568	None	None	None	None
97	U2 TB Hydrogen Seal Oil System El 568	D	None	None	Water Suppression, Installed Spray: D
98	U2 TB MCC Area El 568	None	None	None	None

Title Fire Risk Evaluation for Fire Area TB2

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 6.80E-11

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. However, fixed suppression systems provide further assurance that the fire affects remain local to the hazard and are recommended for DID. The transient fire scenario analyzed is not a significant source of risk in this area and does not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	TB2 - Unit 2 Turbine Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	TB2-VFDR-16
VFDR	Pressurizer Heater Group 2A, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRA - Pressurizer Heater Group 2A
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	TB2-VFDR-17
VFDR	Pressurizer Heater Group 2B, which is normally cycled and cycled for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRB - Pressurizer Heater Group 2B
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	TB2-VFDR-18
VFDR	Pressurizer Heater Group 2C, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRC - Pressurizer Heater Group 2C
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

Fire Area ID:	TB2 - Unit 2 Turbine Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	TB2-VFDR-19
VFDR	Pressurizer Heater Group 2D, which is normally cycled and off for HSB, is affected by the following. One set of pressurizer heaters is required to maintain hot standby (prevent solid plant operations). All banks of pressurizer heaters have cable hits that may energize or deenergize them. Both 4KV buses (both trains) have cable hits preventing energizing the heaters. This failure condition may challenge the Pressure Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a separation issue. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2ILE-PZRHTRD - Pressurizer Heater Group 2D
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action

VFDR ID	TB2-VFDR-20
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	TB2-VFDR-21
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	TB2 - Unit 2 Turbine Building	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	TB2-VFDR-22
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	TB2-VFDR-23
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - S/G 2D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	TB2-VFDR-24
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID: YRD (U1) - Yard Area **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
YRD	Yard Area

Fire Area ID:	YRD (U1) - Yard Area	**Performance Goals**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B NC PORVs and blocks and manual control fo heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A or B feeding S/Gs A and B or C and D. Main feed flow is stopoped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID:	YRD (U1) - Yard Area	**Engineering Evaluations**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

Engineering Evaluation ID Revision CNC-1435.00-00-0036, Attachment 05 Deletion of HEMYC Cable Wrap on "B" Main Fire Pump Power Cable (CNCE-8772)

Inactive No

Functionally Equivalent No

Adequate for the Hazard Yes

Summary

The purpose of the evaluation was to document the technical justification for removing the cable wrap on the "B" Main Fire Pump Power Cable from the scope of committed fire barriers.

This study concluded that the fire rated cable wrap for the Main Fire Pump B power cable can be deleted from the committed fire rated barrier program based on the following:

- There are no combustible materials below the Low Pressure Service Water (RL) intake Structure. Therefore, a fire beneath the RL intake Structure in the area of the B RY Pump power cables is not a credible event.
- The Main Fire Pumps are not required as part of the Post Fire Safe Shutdown program.
- The B RY Pump power cable fire barrier does not protect nuclear safety related equipment.

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: YRD (U1) - Yard Area
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
YRD	Yard Area	None	None	E	Combustible Loading: E

Title Fire Risk Evaluation for Fire Area YRD (U1)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [1] 0.00E+00

Δ LERF Units: [1] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. The transient fires are not a source of risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	YRD (U1) - Yard Area	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	YRD (U1)-VFDR-01
VFDR	1A &1B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by loss of instrument air, which is not credited. Valve fails open on loss of air. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1NV VA0294 - 1A &1B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	YRD (U1)-VFDR-02
VFDR	S/G 1D PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0001 - S/G 1D PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	YRD (U1)-VFDR-03
VFDR	1C S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0007 - 1C S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	YRD (U1) - Yard Area	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	YRD (U1)-VFDR-04
VFDR	S/G 1B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0013 - S/G 1B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	YRD (U1)-VFDR-05
VFDR	S/G 1A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	1SV VA0019 - S/G 1A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: YRD (U2) - Yard Area **Fire Area Definition**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description
YRD	Yard Area

Fire Area ID: YRD (U2) - Yard Area **Performance Goals**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Performance Goal	Method of Accomplishment	Comments
0. Plant Shutdown Location	Shutdown to HSB from the Main Control Room (MCR).	
1. Reactivity Control Function	Manual reactor trip from the MCR. Shutdown margin maintained from the MCR by injection of borated water from the FWST using A or B train charging pump via normal charging flow path or seal injection flow path.	
2. Inventory Control Function	Inventory control from the MCR is maintained by isolating the reactor coolant system and using A or B train charging pump and normal charging flow path or seal injection flow path. Borated water from the FWST. Letdown is available.	
3. Pressure Control Function	Reactor pressure control from the MCR using pressurizer code safeties. A or B NC PORVs and blocks and manual control of heaters with NC system isolation assures pressure control.	
4. Decay Heat Removal Function	Natural circulation of reactor coolant and main steam safeties. S/Gs are isolated. Auxiliary feedwater is supplied by train A or B feeding S/Gs A and B or C and D. Main feed flow is stopped and auxiliary feed to unused S/Gs is controlled to prevent overfill.	
5. Process Monitoring Function	Process monitoring from train A or B is provided in the Main Control Room.	
6. Vital Auxiliaries	Normal train A or B auxiliary systems are used. This includes nuclear service water, component cooling water, switchgear, HVAC and diesel generators.	

Fire Suppression Activities Effect on Nuclear Safety Performance Criteria

Safe and stable conditions can mostly be achieved and maintained utilizing equipment and cables outside of the area of fire suppression activity. Flooding of the suppression areas and discharge of suppression water to adjacent compartments is controlled and will not jeopardize achievement of safe and stable conditions.

Fire Area ID: YRD (U2) - Yard Area **Engineering Evaluations**
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Engineering Evaluation ID Revision	CNC-1435.00-00-0036, Attachment 05 Deletion of HEMYC Cable Wrap on "B" Main Fire Pump Power Cable (CNCE-8772)
Inactive	No
Functionally Equivalent	No
Adequate for the Hazard	Yes
Summary	The purpose of the evaluation was to document the technical justification for removing the cable wrap on the "B" Main Fire Pump Power Cable from the scope of committed fire barriers.

This study concluded that the fire rated cable wrap for the Main Fire Pump B power cable can be deleted from the committed fire rated barrier program based on the following:

- There are no combustible materials below the Low Pressure Service Water (RL) intake Structure. Therefore, a fire beneath the RL intake Structure in the area of the B RY Pump power cables is not a credible event.
- The Main Fire Pumps are not required as part of the Post Fire Safe Shutdown program.
- The B RY Pump power cable fire barrier does not protect nuclear safety related equipment.

Attachment C

Table C-1 – NFPA 805 Ch 4 Compliance (NEI 04-02 Table B-3)

Fire Area ID: YRD (U2) - Yard Area
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
YRD	Yard Area	None	None	E	Combustible Loading: E

Title Fire Risk Evaluation for Fire Area YRD (U2)

Risk Summary All scenario CCDPs and CLERPs are less than 1.0 ensuring that the acceptance criteria is not solely met based on low fire ignition frequency. The delta risk results are within the screening acceptance criteria of 1E-07/rx-yr and 1E-08/rx-yr for delta CDF and delta LERF, respectively.

Δ CDF Units: [2] 0.00E+00

Δ LERF Units: [2] 0.00E+00

DID Maintained A review of the risk evaluation results shows that the delta risk results are within the screening acceptance criteria of 1E-07/rx-yr for delta CDF and 1E-08/rx-yr for delta LERF.

No automatic or manual suppression was credited in any scenario to meet the risk screening criteria. Transient fires are not a source of risk in this area and do not require any improvement to existing controls.

Therefore, no Risk or DID enhancements, modifications, or recovery actions are required for this fire area.

Based on the adequacy of fire protection systems and features in the area, the ability to meet nuclear safety performance criteria is ensured.

Safety Margin Maintained All analyses and assessment have been performed utilizing accepted techniques and industry accepted standards. In addition, safety analysis acceptance criteria in the licensing basis (e.g., FSAR, supporting analyses) have been considered and provides sufficient margin to account for analysis and data uncertainty. As such, the Safety Margins are maintained.

Fire Area ID:	YRD (U2) - Yard Area	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	YRD (U2)-VFDR-01
VFDR	2A & 2B Charging Pumps Discharge Flow Control, which is normally throttled and throttled for HSB, is affected by failing full open. Charging is assured through NI VA0009A or NI VA0010B and seal injection. Throttling of NV VA0295 may be used to prevent going solid. This failure condition may challenge the Inventory Control Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2NV VA0294 - 2A & 2B Charging Pumps Discharge Flow Control
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	YRD (U2)-VFDR-02
VFDR	2D S/G PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0001 - 2D S/G PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	YRD (U2)-VFDR-03
VFDR	S/G 2C PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0007 - S/G 2C PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

VFDR ID	YRD (U2)-VFDR-04
VFDR	S/G 2B PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0013 - S/G 2B PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Fire Area ID:	YRD (U2) - Yard Area	**VFDRs**
Compliance Basis:	NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions	

VFDR ID	YRD (U2)-VFDR-05
VFDR	S/G 2A PORV, which is normally closed and cycled for HSB, is affected by instrument air which may be lost or it may get a spurious SSPS signal. Valve can be operated from the Control Room (using Nitrogen if instrument air is lost) for 8 hours (Nitrogen supply limitation). This failure condition may challenge the Decay Heat Removal Nuclear Safety Performance Criteria. This condition represents a variance from the deterministic requirements of Section 4.2.3 of NFPA 805. This is a pre-existing operator manual action. Evaluate for compliance using the performance-based approach of NFPA 805, Section 4.2.4.
Component(s)	2SV VA0019 - S/G 2A PORV
Disposition	Satisfies Risk, DID, and Safety Margin Criteria Without Further Action (VFDR not modeled in Fire PRA)

Attachment C
Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 01 (U1) - ND & NS Pump Room El 522 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
01	ND Pump Rm 1B El 522	None	None	R	ND pump room walls: R
02	ND Pump Rm 1A El 522	None	None	R	ND pump room walls: R
03	NS Pump Rm 1B El 522	None	None	None	None
04	NS Pump Rm 1A El 522	None	None	None	None
05	ND Pump Rm 2B El 522	None	None	R	ND pump room walls: R
06	ND Pump Rm 2A El 522	None	None	R	ND pump room walls: R
07	NS Pump Rm 2B El 522	None	None	None	None
08	NS Pump Rm 2A El 522	None	None	None	None
212	U0 AB FW Recirc Pump Rm El 522	None	None	None	None

Fire Area ID: 01 (U2) - ND & NS Pump Room El 522 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
01	ND Pump Rm 1B El 522	None	None	R	ND pump room walls: R
02	ND Pump Rm 1A El 522	None	None	R	ND pump room walls: R
03	NS Pump Rm 1B El 522	None	None	None	None
04	NS Pump Rm 1A El 522	None	None	None	None
05	ND Pump Rm 2B El 522	None	None	R	ND pump room walls: R
06	ND Pump Rm 2A El 522	None	None	R	ND pump room walls: R
07	NS Pump Rm 2B El 522	None	None	None	None
08	NS Pump Rm 2A El 522	None	None	None	None
212	U0 AB FW Recirc Pump Rm El 522	None	None	None	None

Attachment C
Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 02 - Unit 2 CA Pump Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19GEN	Unit 2 CA Pump Room El 543	E, R	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R Transient Control: D

Fire Area ID: 03 - Unit 1 CA Pump Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9GEN	Unit 1 CA Pump Rm Gen Area El 543	E, R	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R Transient Control: D

Fire Area ID: 04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
10	U1 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
11	U1 AB SE Corridor El 543	None	None	None	None
12	U1 PD Pump Rm El 543	None	None	None	None
13	NI Pump Rm 1B El 543	None	None	None	None
14	NI Pump Rm 1A El 543	None	None	None	None
15	NV Pump Rm 1B El 543	None	None	R	Fire rated pump room walls: R
16	NV Pump Rm 1A El 543	None	None	R	Fire rated pump room walls: R
17	U1 AB Open Area El 543	None	None	None	None
18	U1 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
185	U2 AB Rm 203, 205, 205A, 206A, 206B, 207 & 209A El 543	None	None	None	None
20	U2 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
21	U2 AB NE Corridor El 543	None	None	None	None
22	U2 PD Pump Rm El 543	None	None	None	None
23	NI Pump Rm 2B El 543	None	None	None	None

Attachment C
Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 04 (U1) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
24	NI Pump Rm 2A El 543	None	None	None	None
25	NV Pump Rm 2B El 543	None	None	R	Fire rated pump room walls: R
26	NV Pump Rm 2A El 543	None	None	R	Fire rated pump room walls: R
27	U2 AB Open Area El 543	None	None	None	None
28	U2 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
31	U1 AB Mech Pen Rm West El 560	None	None	None	None
32	U1 AB Mech Pen Rm East El 560	None	None	None	None
43	U2 AB Mech Pen Rm West El 560	None	None	None	None
44	U2 AB Mech Pen Rm East El 560	None	None	None	None

Fire Area ID: 04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
10	U1 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
11	U1 AB SE Corridor El 543	None	None	None	None
12	U1 PD Pump Rm El 543	None	None	None	None
13	NI Pump Rm 1B El 543	None	None	None	None
14	NI Pump Rm 1A El 543	None	None	None	None
15	NV Pump Rm 1B El 543	None	None	R	Fire rated pump room walls: R
16	NV Pump Rm 1A El 543	None	None	R	Fire rated pump room walls: R
17	U1 AB Open Area El 543	None	None	None	None
18	U1 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
185	U2 AB Rm 203, 205, 205A, 206A, 206B, 207 & 209A El 543	None	None	None	None
20	U2 AB Mech Pen Rm El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
21	U2 AB NE Corridor El 543	None	None	None	None
22	U2 PD Pump Rm El 543	None	None	None	None
23	NI Pump Rm 2B El 543	None	None	None	None
24	NI Pump Rm 2A El 543	None	None	None	None
25	NV Pump Rm 2B El 543	None	None	R	Fire rated pump room walls: R
26	NV Pump Rm 2A El 543	None	None	R	Fire rated pump room walls: R

Attachment C
Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 04 (U2) - Aux Bldg Gen Area & NV Pump Room El 543 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
27	U2 AB Open Area El 543	None	None	None	None
28	U2 AB Cable Shaft Area El 543	None	None	E	Combustible Loading: E
31	U1 AB Mech Pen Rm West El 560	None	None	None	None
32	U1 AB Mech Pen Rm East El 560	None	None	None	None
43	U2 AB Mech Pen Rm West El 560	None	None	None	None
44	U2 AB Mech Pen Rm East El 560	None	None	None	None

Fire Area ID: 05 - Unit 2 Electrical Pen Room El 560
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
42	U2 AB Elect Pen Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 06 - Unit 1 Electrical Pen Room El 560
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
30	U1 AB Elect Pen Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Attachment C

Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 07 - Unit 2 4160V Essential SWGR Room El 560
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
41	U2 AB B-SWGR Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 08 - Unit 1 4160V Essential SWGR Room El 560
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
29	U1 AB B-SWGR Rm El 560	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 09 - Unit 2 Battery Room El 554
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
214	U2 AB Aux Cntrl Batt Rm 2CBA & 2CBB El 554	None	R	None	Detection System, Installed: R
28A	U2 AB South Cable Shaft El 543	None	R	None	Detection System, Installed: R
49	Vital Batt Rm 2EBA & 2EBB El 554	None	R	None	Detection System, Installed: R
50	Vital Batt Rm 2EBC & 2EBD El 554	None	R	None	Detection System, Installed: R
51	U2 AB Batt Rm El 554	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
69A	U2 AB South Cable Shaft El 574	None	R	None	Detection System, Installed: R

Attachment C

Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 10 - Unit 1 Battery Room El 554
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
18A	U1 AB North Cable Shaft El 543	None	R	None	Detection System, Installed: R
213	U1 AB Aux Cntrl Batt Rm 1CBA & 1CBB El 554	None	R	None	Detection System, Installed: R
37	Vital Batt Rm 1EBA & 1EBB El 554	None	R	None	Detection System, Installed: R
38	Vital Batt Rm 1EBC & 1EBD El 554	None	R	None	Detection System, Installed: R
39	U1 Batt Rm El 554	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
60A	U1 AB North Cable Shaft El 574	None	R	None	Detection System, Installed: R

Fire Area ID: 11 (U1) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
184	U1 AB Rm 331 & 332 El 560	None	None	None	None
186	U2 AB Rm 301, 302, 305 & 307 El 560	None	None	None	None
1AB-2	U1 AB General Area El 560 (Filter Bunker Rooms)	None	None	None	None
33	U1 AB SE Corridor El 560	None	None	None	None
34	U1 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
35	MCC Rm 1EMXJ & 1EMXB El 560	None	None	None	None
36	U1 AB Cable Tray Access Rm El 560	None	None	None	None
45	U2 AB NE Corridor El 560	None	None	None	None
46	U2 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
47	MCC Rm 2EMXJ & 2EMXB El 560	None	None	None	None
48	U2 AB Cable Tray Access Rm El 560	None	None	None	None

Attachment C

Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 11 (U2) - Aux Bldg Gen Area & U1 KC Pump Room El 560 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
184	U1 AB Rm 331 & 332 El 560	None	None	None	None
186	U2 AB Rm 301, 302, 305 & 307 El 560	None	None	None	None
1AB-2	U1 AB General Area El 560 (Filter Bunker Rooms)	None	None	None	None
33	U1 AB SE Corridor El 560	None	None	None	None
34	U1 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
35	MCC Rm 1EMXJ & 1EMXB El 560	None	None	None	None
36	U1 AB Cable Tray Access Rm El 560	None	None	None	None
45	U2 AB NE Corridor El 560	None	None	None	None
46	U2 AB Open Area & KC Pumps El 560	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
47	MCC Rm 2EMXJ & 2EMXB El 560	None	None	None	None
48	U2 AB Cable Tray Access Rm El 560	None	None	None	None

Fire Area ID: 12 - Unit 2 Electrical Pen Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
63	U2 AB Elect Pen Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Attachment C

Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 13 - Unit 1 Electrical Pen Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
54	U1 AB Elect Pen Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 14 - Unit 2 4160V Essential SWGR Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
62	U2 AB A-SWGR Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 15 - Unit 1 4160V Essential SWGR Room El 577
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
53	U1 AB A-SWGR Rm El 577	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 16 - Unit 2 Cable Room El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
69	U2 AB Cable Rm El 574	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 17 - Unit 1 Cable Room El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
60	U1 AB Cable Rm El 574	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 18 (U1) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
219	U1 AB Mech Pen Rm El 577	None	None	None	None
220	U2 AB Mech Pen Rm El 577	None	None	None	None
55	U1 AB SE Area El 577	None	None	None	None
56	U1 AB Above Filter Pits East El 577	None	None	None	None
57	U1 AB Above Filter Pits West El 577	None	None	None	None
58	U1 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
59	MCC Rm 1EMXA & 1EMXI El 577	None	None	None	None
64	U2 AB NE Area El 577	None	None	None	None
65	U2 AB Above Filter Pits East El 577	None	None	None	None
66	U2 AB Above Filter Pits West El 577	None	None	None	None
67	U2 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
68	MCC Rm 2EMXA & 2EMXI El 577	None	None	None	None

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 18 (U2) - Aux Bldg Gen Area & U2 KC Pump Room El 577 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
219	U1 AB Mech Pen Rm El 577	None	None	None	None
220	U2 AB Mech Pen Rm El 577	None	None	None	None
55	U1 AB SE Area El 577	None	None	None	None
56	U1 AB Above Filter Pits East El 577	None	None	None	None
57	U1 AB Above Filter Pits West El 577	None	None	None	None
58	U1 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
59	MCC Rm 1EMXA & 1EMXI El 577	None	None	None	None
64	U2 AB NE Area El 577	None	None	None	None
65	U2 AB Above Filter Pits East El 577	None	None	None	None
66	U2 AB Above Filter Pits West El 577	None	None	None	None
67	U2 AB Area East of KC Pumps El 577	R	None	E	Combustible Loading: E Water Suppression, Installed Fixed Sprinkler: R
68	MCC Rm 2EMXA & 2EMXI El 577	None	None	None	None

Fire Area ID: 19 - Unit 2 Electrical Pen Room El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
79	U2 AB Elect Pen Rm El 594	None	R	E	Combustible Loading: E Detection System, Installed: R

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 20 - Unit 1 Electrical Pen Room El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
71	U1 AB Elect Pen Rm El 594	None	R	E	Combustible Loading: E Detection System, Installed: R

Fire Area ID: 21 (U1) - Control Room El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72	U1 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
80	U2 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 21 (U2) - Control Room El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72	U1 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R
80	U2 Control Rm El 594	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 22 (U1) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
221	U1 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
222	U1 FB Upper Cont Pal El 605	None	None	None	None
223	U2 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
224	U2 FB Upper Cont Pal El 605	None	None	None	None
73	U1 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 22 (U1) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
74	U1 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E
76	U1 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
77	U1 AB RP Resp Issue/RIC El 594	None	None	None	None
81	U2 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E
82	U2 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E
84	U2 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
85	U2 AB HP Count Rm El 594	None	None	None	None
89A	U1 FB Access Hatch & Stairwell Areas	None	None	None	None
90A	U2 FB Access Hatch & Stairwell Areas	None	None	None	None

Fire Area ID: 22 (U2) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
221	U1 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
222	U1 FB Upper Cont Pal El 605	None	None	None	None
223	U2 FB Cont Tool Storage Rm El 605	None	None	E	Combustible Loading: E
224	U2 FB Upper Cont Pal El 605	None	None	None	None
73	U1 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E
74	U1 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E
76	U1 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
77	U1 AB RP Resp Issue/RIC El 594	None	None	None	None
81	U2 Control Rm Vent Equip Rm El 594	None	E	E	Combustible Loading: E Detection System, Installed: E
82	U2 AB Vent Equip Area West El 594	None	None	E	Combustible Loading: E

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 22 (U2) - Aux Bldg Gen Area El 594 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
84	U2 AB Vent Equip Area East El 594	None	None	E	Combustible Loading: E
85	U2 AB HP Count Rm El 594	None	None	None	None
89A	U1 FB Access Hatch & Stairwell Areas	None	None	None	None
90A	U2 FB Access Hatch & Stairwell Areas	None	None	None	None

Fire Area ID: 23 - Unit 2 Fuel Storage Area El 605
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
90	U2 FB Fuel Pool Area El 605	None	R	None	Detection System, Installed: R

Fire Area ID: 24 - Unit 1 Fuel Storage Area El 605
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
89	U1 FB Fuel Pool Area El 605	None	R	None	Detection System, Installed: R

Fire Area ID: 25 - Diesel Generator Bldg 1A El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG1A	DG1A El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 26 - Diesel Generator Bldg 1B El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG1B	DG1B El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

Fire Area ID: 27 - Diesel Generator Bldg 2A El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG2A	DG2A El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

Fire Area ID: 28 - Diesel Generator Bldg 2B El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
DG2B	DG2B El 556	R	None	None	Gaseous Suppression, Installed Automatic CO2: R

Fire Area ID: 29 (U1) - Train A RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
226	RN Pump House A Side	None	None	E	Combustible Loading: E

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 29 (U2) - Train A RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
226	RN Pump House A Side	None	None	E	Combustible Loading: E

Fire Area ID: 30 (U1) - Train B RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
225	RN Pump House B Side	None	None	E	Combustible Loading: E

Fire Area ID: 30 (U2) - Train B RN Pump Structure El 600 (Common)
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
225	RN Pump House B Side	None	None	E	Combustible Loading: E

Fire Area ID: 31 - Unit 2 Train A Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19ASPA	U2 Train A Aux Shutdown Pnl El 543	None	R	None	Detection System, Installed: R

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 32 - Unit 1 Train A Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9ASPA	U1 Train A Aux Shutdown Pnl El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 33 - Unit 2 Train B Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19ASPB	U2 Train B Aux Shutdown Pnl El 543	None	E, R	E	Combustible Loading: E Detection System, Installed: E R

Fire Area ID: 34 - Unit 1 Train B Aux Shutdown Panel El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9ASPB	U1 Train B Aux Shutdown Pnl El 543	None	R	E	Combustible Loading: E Detection System, Installed: R

Fire Area ID: 35 (U1) - Control Room Tagout Area El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72A	Control Rm Tagout Area El 594	None	R	None	Detection System, Installed: R

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 35 (U2) - Control Room Tagout Area El 594
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
72A	Control Rm Tagout Area El 594	None	R	None	Detection System, Installed: R

Fire Area ID: 36 - Unit 2 Turbine Driven CA Pump Control Panel Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19TDPNL	U2 CA Pump Turbine Pnl El 543	None	R	E	Combustible Loading: E Detection System, Installed: R

Fire Area ID: 37 - Unit 1 Turbine Driven CA Pump Control Panel Room El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9TDPNL	U1 CA Pump Turbine Pnl El 543	None	R	E	Combustible Loading: E Detection System, Installed: R

Fire Area ID: 38 - Unit 1 Fuel Storage Area HVAC Room El 631
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
129	U1 FB HVAC Rm El 631	None	R	E	Combustible Loading: E Detection System, Installed: R

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 39 - Unit 2 Turbine Driven CA Pump Pit El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
19TDPIT	U2 TDCA Pump Pit El 543	E, R	E, R	E	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R

Fire Area ID: 40 - Unit 1 Turbine Driven CA Pump Pit El 543
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
9TDPIT	U1 TDCA Pump Pit El 543	E, R	E, R	E	Combustible Loading: E Detection System, Installed: E R Gaseous Suppression, Installed Automatic CO2: E R

Fire Area ID: 41 - DG1A Sequencer Tunnel El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
215	DG1A Seq Tunnel El 556	None	R	None	Detection System, Installed: R

Fire Area ID: 42 - DG1B Sequencer Tunnel El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
216	DG1B Seq Tunnel El 556	None	R	None	Detection System, Installed: R

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 43 - DG2A Sequencer Tunnel El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
217	DG2A Seq Tunnel El 556	None	R	None	Detection System, Installed: R

Fire Area ID: 44 - DG2B Sequencer Tunnel El 556
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
218	DG2B Seq Tunnel El 556	None	R	None	Detection System, Installed: R

Fire Area ID: 45 - Unit 1 Cable Room Corridor El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
18B	U1 AB South Cable Shaft El 543	None	R	D	Detection System, Installed: R Transient Control: D
39A	U1 AB South Cable Shaft El 554	None	R	D	Detection System, Installed: R Transient Control: D
60B	U1 AB South Cable Shaft El 574	E	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Transient Control: D Water Suppression, Installed Fixed Sprinkler: E
60C	U1 AB Cable Room Corridor El 574	None	R	D	Detection System, Installed: R Transient Control: D

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 46 - Unit 2 Cable Room Corridor El 574
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
28B	U2 AB North Cable Shaft El 543	None	R	D	Detection System, Installed: R Transient Control: D
51A	U2 AB North Cable Shaft El 554	None	R	D	Detection System, Installed: R Transient Control: D
69B	U2 AB North Cable Shaft El 574	E	E, R	E, D	Combustible Loading: E Detection System, Installed: E R Transient Control: D Water Suppression, Installed Fixed Sprinkler: E
69C	U2 AB Cable Room Corridor El 574	None	R	D	Detection System, Installed: R Transient Control: D

Fire Area ID: 47 - Unit 2 Fuel Storage Area HVAC Room El 631
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
183	U2 FB HVAC Rm El 631	None	R	E	Combustible Loading: E Detection System, Installed: R

Fire Area ID: 48 - Unit 2 Inner Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
2INTDH	U2 Inner DH	None	None	E	Combustible Loading: E

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: 49 - Unit 1 Inner Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
1INTDH	U1 Inner DH	None	None	E	Combustible Loading: E

Fire Area ID: 50 - Unit 2 Outer Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
2EXTDH	U2 Outer DH	None	None	None	None

Fire Area ID: 51 - Unit 1 Outer Doghouse
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
1EXTDH	U1 Outer DH	None	None	None	None

Fire Area ID: ASB - Auxiliary Service Building
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
127	HP Hot Lab and Vent Equip	None	None	None	None
75	HP Cold Lab	None	None	None	None
78	Hot Machine Shop	None	None	None	None
83	HP Lab - AA Rm	None	None	None	None
86	Laundry	None	None	None	None
87	Storage/Compactor Area	None	None	None	None
88	Clothing Storage	None	None	None	None
HMS1	Hot Machine Ship Area	None	None	None	None
HPL1	Health Physics Lab Area	None	None	None	None

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: RB1 - Unit 1 Reactor Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
1RB-1	Unit 1 RB Annulus.	E	E, D	E	Combustible Loading: E Detection System, Installed: E D Water Suppression, 1-Annulus: E
1RB-2	Unit 1 Containment - Outside Shield Wall below El 591-2 1/2	None	E, D	E	Combustible Loading: E Detection System, Installed: E D
1RB-3	Unit 1 Containment - Inside Shield Wall	None	E, D	R, D	Detection System, Installed: E D MI Cable: D RCP oil collection system: R

Fire Area ID: RB2 - Unit 2 Reactor Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
2RB-1	U2 RB Annulus	E	E, D	E	Combustible Loading: E Detection System, Installed: E D Water Suppression, 2-Annulus: E
2RB-2	Unit 2 Containment - Outside Shield Wall below El 591-2 1/2	None	E, D	E	Combustible Loading: E Detection System, Installed: E D
2RB-3	Unit 2 Containment - Inside Shield Wall	None	E, D	R, D	Detection System, Installed: E D MI Cable: D RCP oil collection system: R

Fire Area ID: SRV (U1) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
100	SB KR Equip Area El 568	None	None	None	None
101	SB RF Jockey Pumps & Tank El 568	None	None	None	None
102	SB U1 250 VDC Battery Rm El 568	None	None	None	None
103	SB U1 Aux Elect Boiler El 568	None	None	None	None
104	SB Lube Oil Storage Rm El 568 (no longer used for oil storage)	None	None	None	None
105	SB U2 250 VDC Battery Rm El 568	None	None	None	None

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Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: SRV (U1) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
106	SB U2 Aux Elect Boiler El 568	None	None	None	None
116	SB Tech Support Centre El 594	None	None	None	None
117	SB Blackout SWGR Rm El 594	None	None	None	None
118	SB RR Bay Tool Rm El 594	None	None	None	None
119	SB U1 Aux Elect Boiler El 594	None	None	None	None
120	SB U2 Aux Elect Boiler El 594	None	None	None	None
121	SB RR Bay Tool Rm QA Holding Area El 594	None	None	None	None
122	SB RR Bay Tool Rm Office El 594	None	None	None	None
205	SB OAC Computer Rm Flr U1 Side	None	None	None	None
206	SB OAC Computer Rm Flr U2 Side	None	None	None	None
207	SB OAC Computer Rm Ceiling and OPS Kittchen	None	None	None	None
208	RP/SAC Customer Service El 594	None	None	None	None
209	SB HVAC Equip Rm El 594	None	None	None	None
210	SB RP/DRC Office El 594	None	None	None	None
227	SB Security Comp Rm El 594	None	None	None	None
40	U1 SB Elect Equip Rm El 554	None	None	None	None
52	U2 SB Elect Equip Rm El 554	None	None	None	None
61	U1 SB Cable Spreading Rm El 574	None	None	None	None
70	U2 SB Cable Spreading Rm El 574	None	None	None	None
99	SB Air Equip Area El 568	None	None	None	None
SRV-1	SB General Area El 568	None	None	E	Combustible Loading: E
SRV-2	SB General Area El 594	None	None	None	None

Attachment C

Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: SRV (U2) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
100	SB KR Equip Area El 568	None	None	None	None
101	SB RF Jockey Pumps & Tank El 568	None	None	None	None
102	SB U1 250 VDC Battery Rm El 568	None	None	None	None
103	SB U1 Aux Elect Boiler El 568	None	None	None	None
104	SB Lube Oil Storage Rm El 568 (no longer used for oil storage)	None	None	None	None
105	SB U2 250 VDC Battery Rm El 568	None	None	None	None
106	SB U2 Aux Elect Boiler El 568	None	None	None	None
116	SB Tech Support Centre El 594	None	None	None	None
117	SB Blackout SWGR Rm El 594	None	None	None	None
118	SB RR Bay Tool Rm El 594	None	None	None	None
119	SB U1 Aux Elect Boiler El 594	None	None	None	None
120	SB U2 Aux Elect Boiler El 594	None	None	None	None
121	SB RR Bay Tool Rm QA Holding Area El 594	None	None	None	None
122	SB RR Bay Tool Rm Office El 594	None	None	None	None
205	SB OAC Computer Rm Flr U1 Side	None	None	None	None
206	SB OAC Computer Rm Flr U2 Side	None	None	None	None
207	SB OAC Computer Rm Ceiling and OPS Kittchen	None	None	None	None
208	RP/SAC Customer Service El 594	None	None	None	None
209	SB HVAC Equip Rm El 594	None	None	None	None
210	SB RP/DRC Office El 594	None	None	None	None
227	SB Security Comp Rm El 594	None	None	None	None
40	U1 SB Elect Equip Rm El 554	None	None	None	None
52	U2 SB Elect Equip Rm El 554	None	None	None	None
61	U1 SB Cable Spreading Rm El 574	None	None	None	None
70	U2 SB Cable Spreading Rm El 574	None	None	None	None
99	SB Air Equip Area El 568	None	None	None	None
SRV-1	SB General Area El 568	None	None	E	Combustible Loading: E

Attachment C
Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: SRV (U2) - Service Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
SRV-2	SB General Area El 594	None	None	None	None

Fire Area ID: SSF (U1) - Standby Shutdown Facility
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
201	SSF Battery Rm & Control Rm	None	None	None	None
202	SSF Diesel Rm	None	None	None	None
203	SSF Elect Equip Rm	None	None	None	None
204	SSF HVAC Rm	None	None	None	None

Fire Area ID: SSF (U2) - Standby Shutdown Facility
Compliance Basis: NFPA 805, Section 4.2.3.2 Deterministic Approach

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
201	SSF Battery Rm & Control Rm	None	None	None	None
202	SSF Diesel Rm	None	None	None	None
203	SSF Elect Equip Rm	None	None	None	None
204	SSF HVAC Rm	None	None	None	None

Fire Area ID: TB1 - Unit 1 Turbine Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
107	U1 TB Main Turbine Oil Tank El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
108	U1 TB CF Pumps El 594	D	None	None	Water Suppression, Installed Spray: D
109	SWGR Rm 1TC & 1TD El 594	None	None	None	None
110	SWGR Rm 1TA & 1TB El 594	None	None	None	None
1TB-1	U1 TB General Area El 568	D	None	E	Combustible Loading: E Dike: E Floor Drain/Trench: E Water Suppression, Installed Spray-MT oil piping: D

Attachment C
Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: TB1 - Unit 1 Turbine Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
1TB-2	U1 TB General Area El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
1TB-3	U1 TB General Area El 619	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
91	U1 TB Turbine Oil Trans Tank El 568	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
92	U1 TB Transducer Rm El 568	None	None	None	None
93	U1 TB Hydrogen Seal Oil System El 568	D	None	None	Water Suppression, Installed Spray: D
94	U1 TB MCC Area El 568	None	None	None	None

Fire Area ID: TB2 - Unit 2 Turbine Building
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
111	U2 TB Main Turbine Oil Tank El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
112	U2 TB CF Pumps El 594	D	None	None	Water Suppression, Installed Spray: D
113	SWGR Rm 2TC & 2TD El 594	None	None	None	None
114	SWGR Rm 2TA & 2TB El 594	None	None	None	None
2TB-1	U2 TB General Area El 568	D	None	E	Combustible Loading: E Dike: E Floor Drain/Trench: E Water Suppression, Installed Spray-MT oil piping: D
2TB-2	U2 TB General Area El 594	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
2TB-3	U2 TB General Area El 619	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
95	U2 TB Turbine Oil Trans Tank El 568	D	None	None	Water Suppression, Installed Spray-MT oil piping: D
96	U2 TB Transducer Rm El 568	None	None	None	None
97	U2 TB Hydrogen Seal Oil System El 568	D	None	None	Water Suppression, Installed Spray: D
98	U2 TB MCC Area El 568	None	None	None	None

Attachment C

Table C-2 – NFPA 805 Required Fire Protection Systems and Features

Fire Area ID: YRD (U1) - Yard Area
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
YRD	Yard Area	None	None	E	Combustible Loading: E

Fire Area ID: YRD (U2) - Yard Area
Compliance Basis: NFPA 805, Section 4.2.4.2 Performance-Based Approach - Fire Risk Evaluation with simplifying deterministic assumptions

Fire Zone ID	Description	Required Suppression System	Required Detection System	Required Fire Protection Feature	Required Fire Protection Feature and System Details
YRD	Yard Area	None	None	E	Combustible Loading: E

D. NEI 04-02 Non-Power Operational Modes Transition

5 Pages Attached

The Nuclear Safety Goal from Section 1.3.1 of NFPA 805 is to provide reasonable assurance that a fire during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition as defined in Section 4.2.1.2 of this LAR submittal.

Implementing Guidance F.1 of FAQ 07-0040

Review Existing Outage Management Processes

Implementing guidance F.1 of NEI 04-02 requires a review of the existing Outage Management Processes. The review should define Higher Risk Evolutions (HREs) if not already defined in plant outage management procedures. The HRE definition should consider:

1. *Time to boil*
2. *Reactor coolant system and fuel pool inventory*
3. *Decay heat removal capability*

Review

Duke Energy Nuclear System Directive NSD-403, Shutdown Risk Management (Modes 4, 5, 6, and No-Mode) per 10 CFR 50.65 (a)(4)" defines the philosophy and program for assessing and managing risk during shutdown. Higher Risk Evolutions for NFPA 805 purposes are referred to as Higher Risk Plant Operating States (HRPOS) at Duke Energy. HRPOS are those higher risk periods of plant operation during an outage where loss of a KSF due to fire may have higher consequences.

For Catawba, the following HRPOS definitions will be used:

- High Decay Heat Loops not filled with upper internals installed
- Lowered Inventory Conditions
- DID sheet for decay heat removal in a Red or Orange condition

Orange condition is The key safety function is degraded and steps should be taken to minimize the amount of time in this condition. Risk Management Plan is required prior to a planned entry. Planned entry is not allowed without Plant Operational Review Committee (PORC) approval.

Red condition is the KSF is severely threatened. Immediate restoration is required. Planned entry into a Red condition is not standard Duke Energy practice and a Red condition is not normally entered voluntarily.

CNS addresses the issues of Decay Heat Removal capability and time to boiling in NSD-403 with the term Thermal Margin, which is the time to core boiling upon loss of decay heat removal. When the reactor coolant system is intact, with secondary side heat removal capability available, thermal margin is not an issue and an estimate of greater than two hours on the Defense In Depth sheets for thermal margin is used.

Implementing Guidance F.2 of FAQ 07-0040

Identify Components and Cables

Implementing guidance F.2 of NEI 04-02 requires the identification of systems and components to be included in this NPO Review. This process begins with the identification of the plant operational states (POSs) that need to be considered and a determination of which POSs are the most risk significant.

Review

FAQ 07-0040 has identified those plant operating states with respect to NFPA 805 for pressurized water reactors that need to be considered and evaluated as part of the NPO review process. The plant operational states listed are based on FAQ 07-0040. For the purposes of the NPO review effort, POS-1 from FAQ 07-0040 has been identified as POS-1, (split into POS-1A, and POS-1B depending upon Steam Generator Decay Heat Removal capability), POS 2, and POS 3. These correspond to Modes 3-6 & Defueled. The NFPA 805 Non-Power Operations Component Selection report documents each POS with respect to its risk for a loss of any one of the KSFs identified in NSD-403. The KSFs considered in the review are:

1. Decay Heat Removal
2. Inventory Control
3. Reactivity Control
4. Spent Fuel Pool Cooling
5. Electrical Power Availability

Containment control is excluded from consideration as maintenance of this KSF is not required for NFPA 805. By managing the decay heat removal and inventory control KSF, the need to rapidly establish closure should be eliminated. Administrative controls are placed on the maintenance of containment closure in NSD-403 such that predefined actions for re-establishing closure are put in place before the penetrations are opened. These controls apply to all containment penetrations.

POS 2 would be considered the most risk significant as this POS includes portions of Mode 5 (Cold Shutdown) and Mode 6 (refueling) prior to the time when the refueling cavity water level is at or above the minimum level required for movement of irradiated fuel assemblies. This POS includes lowered inventory operations and mid-loop operations.

The NFPA 805 Non-Power Operations Component Selection report identified the components necessary to accomplish the KSFs using a methodology consistent with that identified for the CNS At-power Analysis, including identification of components that could spuriously operate and impair the KSF path. The components comprising each KSF path were compared to the population of components contained in the CNS At-power Analysis. The majority of equipment required to maintain the NPO KSFs is the same as that required to safely shutdown the plant while at power. Some safe shutdown components have a different functional requirement during NPO modes. In these cases additional cable selection and routing was performed.

Implementing Guidance F.3 of FAQ 07-0040

Perform Fire Area Assessments (Identify pinch points)

Implementing guidance F.3 of NEI 04-02 requires fire area assessments be performed to identify pinch points. Pinch points are locations where:

1. *Fires may cause damage to the equipment (and cabling) credited above, or*
2. *KSFs are achieved solely by crediting recovery actions, e.g., alignment of gravity feed.*

Fire modeling may be used to determine if postulated fires in a fire area are expected to damage equipment (and cabling) thereby eliminating a pinch point.

Review

The calculation entitled "NFPA 805 Transition Non-Power Fire Area Assessments (Pinch Points Analysis)" documents area analyses performed for the components selected to meet the KSFs that directly impact fuel heat-up (i.e., Decay Heat Removal) or lead to uncovering the core (i.e., Inventory Control) as well as those that affect Electrical Power Availability supporting those KSFs. In addition, Reactivity Control and Spent Fuel Pool Cooling (KF) were evaluated. The area analysis was performed utilizing the CNS Safe Shutdown Analyses and supplemental component selection report.

Fire modeling was not used to eliminate KSF pinch points. Results of the NPO assessments for each of CNS fire areas is summarized below:

- Four areas were found to have an adequate number of KSF success paths to survive the entire contents loss of the fire area such that all KSF's are available. No recommendations for additional fire protection measures during Higher Risk Plant Operating States are made for these areas. (Category 1)
- Thirty areas involve the loss of one or more KSF's on one or both units due to the loss of all unit specific KSF success paths for a fire in that fire area. These KSF success paths can be preserved through the fire protection/fire prevention actions recommended to be established during Higher Risk Plant Operating States. (Category 2)
- Twenty-one areas involve the loss of all KSF's in a single unit. These areas have been recommended for limitation or prohibitions of hot work and transient combustible storage during Higher Risk Plant Operating States (which may necessitate rescheduling of work activities) and verification of functionality of available fire detection and suppression systems to manage fire risk to an appropriate level. These success paths can be maintained through use of fire detection/suppression and/or other fire protection/fire prevention actions. (Category 3)
- Seven fire areas common to both units involve loss of all KSFs for both units. With the exception of the Control Rooms, which are constantly manned, a fire watch is being recommended for those areas to preclude loss of all KSFs due to a single fire. These actions along with verification of available detection and

suppression and control of Switch Yard Operations provide additional defense in depth to preclude a fire from disabling all KSF's. (Category 4).

Implementing Guidance F.4 of FAQ 07-0040

Manage Risks Associated with Fire-Induced Vulnerabilities During the Outage

Implementing guidance F.4 of NEI 04-02 requires plants to manage risks associated with fire-induced vulnerabilities during the outage. During those NPO evolutions where risk is relatively low, the normal fire protection program defense-in-depth actions are credited for addressing the risk impact of those fires. These fires of relatively low risk potentially impact one or more trains of equipment that provide a KSF required during non-power operations, but would not be expected to cause the total loss of that KSF. The following actions are considered to be adequate to address minor losses of system capability or redundancy:

1. *Control of Ignition Sources*
    a. *Hot Work (cutting, welding and/or grinding)*
    b. *Temporary Electrical Installations*
    c. *Electric portable space heaters*
2. *Control of Combustibles*
    a. *Transient fire hazards*
    b. *Modifications*
    c. *Flammable and Combustible liquids and gases*
3. *Compensatory Actions for fire protection system impairments*
    a. *Openings in fire barriers*
    b. *Inoperable fire detectors or detection systems*
    c. *Inoperable fire suppression systems*
4. *Housekeeping*

During those NPO evolutions that are defined as HREs additional fire protection defense in depth measures will be taken during HREs by:

1. *Managing risk in fire areas that contain known pinch points.*
2. *Managing risk in fire areas where pinch points may arise because of equipment taken out of service (i.e., equipment which is not functional / not available).*

NUMARC 91-06 discusses the development of outage plans and schedules. A key element of that process is to ensure the KSFs perform as needed during the various outage evolutions. During outage planning, the NPO Fire Area Assessment should be reviewed to identify areas of single-point KSF vulnerability during higher risk evolutions to develop any needed contingency plans/actions. For those areas, consider combinations of the following options to reduce fire risk depending upon the significance of the potential damage.

1. *Restriction of hot work in fire areas during periods of increased vulnerability*
2. *Verification of functional detection and / or suppression in the vulnerable areas*
3. *Restriction of transient combustible materials in fire areas during periods of increased vulnerability*
4. *Plant lineup modifications (removing power from equipment once it is placed in its desired position)*

5. *Provision of additional fire patrols at periodic intervals or other appropriate compensatory measures (such as surveillance cameras) during increased vulnerability*
6. *Use of recovery actions to mitigate potential losses of key safety functions*
7. *Identification and monitoring in-situ ignition sources for fire precursors (e.g., equipment temperatures)*

In addition, for KSF Equipment removed from service during the HREs the impact should be evaluated based on KSF equipment status and the NPO Fire Area Assessment to develop needed contingency plans/actions.

Review

NSD-403, Shutdown Risk Management, implements the philosophy of outage risk management. This directive contains recommendations to minimize the fire risk to the key safety functions. These recommendations include:

- Include HRPOS definition.
- Limit hot work in this fire area during Higher Risk Plant Operating States (HRPOS's).
- Prohibit hot work in this fire area during Higher Risk Plant Operating States (HRPOS's).
- Verify that the available fire detection systems located in the fire area are functional. Post firewatch per SLCs in affected Fire Areas prior to entering Higher Risk Plant Operating States if system(s) are impaired.
- Verify that the available fire suppression systems located in the fire area are functional. Post firewatch per SLCs in affected Fire Areas prior to entering Higher Risk Plant Operating States if system(s) are impaired.
- Limit transient combustible storage in this fire area during Higher Risk Plant Operating States (HRPOS's).
- Prohibit transient combustible storage in this fire area during Higher Risk Plant Operating States (HRPOS's).
- Provide a firewatch (continuous or periodic) in this fire area during Higher Risk Plant Operating States (HRPOS's).
- Activities in fire areas be rescheduled to non-Higher Risk Plant Operating States (HRPOS's) periods.

See Implementation Item 12 in Table S-3 of Attachment S.

E. NEI 04-02 Radioactive Release Transition

23 Pages Attached

Compartment: Containments - Units 1 and 2

Compartment Selection and Justification Basis

The Unit 1 Containment (Building #7737) and Unit 2 Containment (Building #7740) are completely independent structures with independent supporting systems. The design characteristics for each Containment are similar and allow for common documentation of the features to support the radioactive release criteria.

Fire Area	Fire Area Description	Fire Strategy	Description
RB1	Containment U1	1.28	FS FA RB-1 (U1) Reactor Building
		1.29	FS FA RB-2 (U1) Reactor Building
		1.30	FS FA RB-3 (U1) Reactor Building
RB2	Containment U2	2.20	FS FA RB-1 (U2) Reactor Building
		2.21	FS FA RB-2 (U2) Reactor Building
		2.22	FS FA RB-3 (U2) Reactor Building

Smoke and By Products of Combustion-Airborne Effluent Evaluation

Air is exhausted from the containment through the Containment Purge Exhaust System to the unit vent where it is monitored for radioactivity level prior to release to the atmosphere. No smoke can escape the building.

The Containment Purge System is available to vent smoke if needed. This system is only used in Mode 5, Mode 6, and No-mode. The Containment Purge System includes a network of filters and is monitored prior to release through the unit vent.

Fire Suppressant Runoff-Liquid Effluent Evaluation

Liquids from the floor drains in the Containment are collected in the Floor Drain Tank. Liquids drain directly to the Floor Drain Tank or are transferred via Floor Drain Sumps 1(2)A and 1(2)B. The contents of the floor drain tank are discharged for processing.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance.

Non-Power Operations

During Non-Power Operations the Containment Purge System is available to exhaust smoke. This is important because the equipment hatch being open is the most likely route for smoke to escape the Containment.

No change in the route for liquids occurs during Non-Power Operation.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use installed engineering controls, or administrative controls when engineering controls are not provided or are insufficient, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Auxiliary Building - RCA

Compartment Selection and Justification Basis

The Auxiliary Building (Building #7738) is designed to contain both RCA and Non-RCA areas. This compartment review includes the RCA and RCA interface areas.

Fire Area	Fire Area Description	Fire Strategy	Description
01	ND and NS Pump Room - Elevation 522'	1.1	Auxiliary Building 522, RHR Pump Rooms
02	CA Pump Room	2.1	Auxiliary Building 543, CA Pump Room and Motor Driven CA Pump Pits
03	CA Pump Room	1.2	Auxiliary Building 543, CA Pump Room and Motor Driven CA Pump Pits
04	Aux Building General Area and NV Pump Room	1.7	Auxiliary Building 543
05	Electrical Penetration Room (B train)	2.11	Auxiliary Building 560, Elect. Pent. Room
06	Electrical Penetration Room (B train)	1.13	Auxiliary Building 560, Penetration Room
11	Aux Building General Area and U1 KC Pump Room	1.15	Auxiliary Building 560
12	Electrical Penetration Room (A train)	2.15	Auxiliary Building 577, Elec. Pent. Room
13	Electrical Penetration Room (A train)	1.18	Auxiliary Building 577, Electrical Penetration Room
14	4160V Essential SWGR Room	2.16	Auxiliary Building 577, Essen. SWGR Room
15	4160V Essential SWGR Room	1.19	Auxiliary Building 577, Essential Swgr. Room
16	Cable Room - Elevation 574'	2.14	Auxiliary Building 574, Cable Room
17	Cable Room - Elevation 574'	1.17	Auxiliary Building 574, Cable Room
18	Aux Building General Area and U2 KC Pump Room	1.20	Auxiliary Building 577
19	Electrical Penetration Room	2.17	Auxiliary Building 594, SWGR Room
20	Electrical Penetration Room	1.21	Auxiliary Building 594, Switchgear Room
22	General Aux Building Area - Elevation 594'	1.24	Auxiliary Building 594
23	Fuel Storage Area	2.18	Auxiliary Building 605, Spent Fuel Pool
24	Fuel Storage Area	1.26	Auxiliary Building 605, Spent Fuel Pool
31	Train A Aux Shutdown Panel	2.2	Auxiliary Building 543, "A" Train Aux Shutdown Panel
32	Train A Aux Shutdown Panel	1.3	Auxiliary Building 543, Train Aux. Shutdown Panel
33	Train B Aux Shutdown Panel	2.4	Auxiliary Building 543, "B" Train Aux. Shutdown Panel
34	Train B Aux Shutdown Panel	1.5	Auxiliary Building 543, Train Aux Shutdown Panel
36	Turbine Driven CA Pump Panel Room - Elevation 543'	2.5	Auxiliary Building 543, Aux. Feedwater Pump Panels
37	Turbine Driven CA Pump Control Room	1.6	Auxiliary Building 543, Aux. Feedwater Pump Panel
38	Fuel Storage Area HVAC Room (Train B VF Equipment)	1.27	Auxiliary Building 631, Fuel Pool Purge Unit
39	Turbine Driven CA Pump Pit	2.3	Auxiliary Building 543, CA Turbine Driven Pump Pit
40	Turbine Driven CA Pump Pit - Elevation 543'	1.4	Auxiliary Building 543, CA Turbine Driven Pump Pit
45	Cable Room Corridor U1 & U2	1.16	Auxiliary Building 574, Corridor
46	Cable Room Corridor U2	1.13	Auxiliary Building 574, Corridor
47	Fuel Storage Area HVAC Room (Train B VF Equipment)	2.19	Auxiliary Building 636, Spent Fuel Pool Purge Unit
48	Inner Doghouse U2	2.23	Interior Doghouse
49	Inner Doghouse U1	1.31	Interior Doghouse

Fire Area	Fire Area Description	Fire Strategy	Description
N/A		FS L-1	EL. 594+0, Auxiliary Building, East End
N/A		FS Q-1	EL. 605+10, Auxiliary Building, East End

Smoke and By Products of Combustion-Airborne Effluent Evaluation

The Filtered Exhaust System serves all parts of the Auxiliary Building that are subject to contamination. It consists of two filter trains with fans with radiation monitoring upstream of the filter trains and in the unit vent. A high radiation alarm from either of these monitors switches the system from filter bypass to filter alignment and shuts down the Unfiltered Exhaust and Supply Systems. Effluent is monitored before release to the atmosphere through the unit vent.

Fire Suppressant Runoff-Liquid Effluent Evaluation

In RCA locations, liquids that are potentially radioactive and are not suited for plant discharge without treatment, are collected in the Floor Drain Tank. Liquid effluent is processed through the Liquid Radwaste System.

Auxiliary Building areas that are designated Non-RCA are equipped with features to prevent radioactive release as well. If liquid effluent was to reach the Non-RCA, liquids are collected in floor drain sumps C and D and routed through a radiation monitor directly to the Turbine Building sump. Upon detection of radioactivity, a signal closes the valve and effluent is diverted to the ND and NS sump and then sent to the Floor Drain Tank or waste evaporator feed tank.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance.

Non-Power Operations

The operational condition of the plant does not affect the engineering controls and administrative controls used to prevent radioactive release. Thus, Non-Power Operations does not impact this compartment.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use installed engineering controls, or administrative controls when engineering controls are not provided or are insufficient, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Fuel Pool and Fuel Handling Buildings

Compartment Selection and Justification Basis

The Fuel Pool and Fuel Handling Buildings are a subsection of the Auxiliary Building (Building #7738). They are hardened structures with systems specific to each unit/building. Although they are two independent buildings, the design features, system description and functions are consistent in function to support radioactive release.

Fire Area	Fire Area Description	Fire Strategy	Description
23	Fuel Storage Area	2.18	Auxiliary Building 605, Spent Fuel Pool
24	Fuel Storage Area	1.26	Auxiliary Building 605, Spent Fuel Pool

Smoke and By Products of Combustion-Airborne Effluent Evaluation

The Fuel Building Exhaust Ventilation System consists of two 50% capacity filter trains. In the normal mode of operation, the filter trains are bypassed. Radiation monitors are located in the duct system header, upstream of the filter train inlet, and at the unit vent. When radiation is detected, the bypass dampers are closed and the filter train dampers are opened. This arrangement is achieved manually during fuel handling activities. Effluent is monitored before release to the atmosphere through the unit vent.

Fire Suppressant Runoff-Liquid Effluent Evaluation

The floor drains located within the Fuel Pool and Handling Buildings are part of the Auxiliary Building floor drain system. All drains will transfer to the Floor Drain Tank. The Floor Drain Tank is part of the Liquid Radwaste System where it is processed and monitored for proper release.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance

Non-Power Operations

The operational condition of the plant does not affect the engineering controls and administrative controls used to prevent radioactive release. Thus, Non-Power Operations does not impact this compartment.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use installed engineering controls, or administrative controls when engineering controls are not provided or are insufficient, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Monitor Tank Building

Compartment Selection and Justification Basis

The Monitor Tank Building (Building #7761) has independent ventilation and drainage controls. As such, it is reviewed independent of other Yard Fire Area structures.

Fire Area	Fire Area Description	Fire Strategy	Description
YRD	U1 & 2 Yard	FS AP	Building #7761, Monitor Tank Building EL 594+0 & 596+0
		FS AQ	Building #7761, Monitor Tank Building EL 611+0
		FS AR	Building #7761, Monitor Tank Building EL 623+0

Smoke and By Products of Combustion-Airborne Effluent Evaluation

The portions of the Monitor Tank Building that contain the process equipment and tank storage and the truck bay are exhausted through carbon filters and HEPA filters prior to monitored release. Excessive radioactivity will actuate an alarm. The remaining areas are exhausted unmonitored. Administrative controls will be used in these areas to meet the requirements of NFPA 805, Radioactive Release.

Fire Suppressant Runoff-Liquid Effluent Evaluation

Runoff within the Monitor Tank Building is collected by floor drains and equipment drains and routed to the Monitor Tank Building sump. Liquids are pumped to the Steam Generator Drain Tank Subsystem where sampling may take place. Liquids are then discharged from the Steam Generator Drain Tank to the Monitor Tank Building for processing and release. A portion of the Monitor Tank Building is constructed as a concrete containment area for handling the full content of the tanks. It also serves as a containment area for runoff of potentially contaminated water from fire suppression activities.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance.

Non-Power Operations

The operational condition of the plant does not affect the engineering controls and administrative controls used to prevent radioactive release. Thus, Non-Power Operations does not impact this compartment.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use installed engineering controls, or administrative controls when engineering controls are not provided or are insufficient, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Retired Steam Generator Storage Facility

Compartment Selection and Justification Basis

The Retired Steam Generator Storage Facility (RSGSF) (Building #7777) is a standalone, hardened structure in the Yard. It has limited airborne and liquid effluent control and monitoring capabilities. This differs from other Yard-RCA facilities and justifies an independent review.

Fire Area	Fire Area Description	Fire Strategy	Description
YRD	U-1 & 2 Yard	NEW	Develop a new Fire Strategy for this area.

Smoke and By Products of Combustion-Airborne Effluent Evaluation

The RSGSF ventilation system includes a passive HEPA system to prevent contaminated releases from the facility. Due to the lack of active ventilation controls, administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Fire Suppressant Runoff-Liquid Effluent Evaluation

The RSGSF construction includes a sump to collect runoff or leakage for sampling prior to release. Administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance.

Non-Power Operations

Yard areas rely on administrative controls to minimize the likelihood of radioactive release. These features are not impacted by Non-Power Operations.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use administrative controls, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Service Building - RCA

Compartment Selection and Justification Basis

The RCA control point, refered to as the Single Point of Access (SPA) by CNS, is located within the Service Building (Building #7731). This facility creates an interface location that is evaluated separately from other RCA compartments. In addition to the SPA, adjacent rooms store radioative material used by the Radiation Protection organization.

Fire Area	Fire Area Description	Fire Strategy	Description
SRV	Service Building	FS H	El. 574+0, Service Building, RP SPA Area

Smoke and By Products of Combustion-Airborne Effluent Evaluation

Treatment and monitoring of exhaust air is not provided in the Service Building. All ventilation is discharged directly to the atmosphere. Administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Fire Suppressant Runoff-Liquid Effluent Evaluation

Service Building floor drains feed the Service Building Sump. Treatment and monitoring of floor drainage is not provided in the Service Building. Administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance

Non-Power Operations

The operational condition of the plant does not affect the engineering controls and administrative controls used to prevent radioactive release. Thus, Non-Power Operations does not impact this compartment.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use installed engineering controls, or administrative controls when engineering controls are not provided or are insufficient, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Turbine Buildings - RCA

Compartment Selection and Justification Basis

Unit 1 Turbine Building (Building #7732) and Unit 2 Turbine Building (Building #7733) are completely independent structures with independent equipment. This evaluation applies to the areas of the Turbine Buildings that are identified as having an RCA during normal operation. At the time of this evaluation, the spare Reactor Coolant Pump (located in the northwest corner of Elevation 619, Unit 1 Turbine Building)and the respective Turbine Building Sumps (located on the north end of elevation 568) are are posted as an RCA. Temporary or isolated locations may exist during outages and in chemistry labs. The method of addressing these potential locations will be the same in all areas of the Turbine Buildings.

Fire Area	Fire Area Description	Fire Strategy	Description
TB1	Turbine Building U1	FS E	El. 568+0, Turbine Building Unit 1 **
		FS Y	El. 619+6, Turbine Building Unit 1 **
TB2	Turbine Building U2	FS G	El. 568+0, Turbine Building Unit 2 **

** Identifies locations that are primarily non-RCA and may be listed in the Non-RCA Areas compartment as well.

Smoke and By Products of Combustion-Airborne Effluent Evaluation

Treatment and monitoring of exhaust air is not provided in the Turbine Building. All ventilation is discharged directly to the atmosphere. Administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Fire Suppressant Runoff-Liquid Effluent Evaluation

Turbine Building floor drains are collected in the Turbine Building Sump. The sumps will transfer through a monitored flow path. The sump discharge is normally pumped to the Conventional Waste Water Treatment System. However, if the setpoint of the radiation monitor is reached, the Turbine Building sump pumps will trip and an associated alarm indication in the control room will activate. Discharge can be diverted to the Liquid Waste System for processing prior to release.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance

Non-Power Operations

The operational condition of the plant does not affect the engineering controls and administrative controls used to prevent radioactive release. Thus, Non-Power Operations does not impact this compartment.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use installed engineering controls, or administrative controls when engineering controls are not provided or are insufficient, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Yard and Miscellaneous- RCA

Compartment Selection and Justification Basis

This is a general area compartment intended to capture those locations that are not contained within the boundaries of a building specificly designed to contain radioactive material or are otherwise vented, unmonitored, and has the potential to release to atmosphere. This includes, but is not limited to, outdoor RCA storage, radiation protection storage lockers, potentially contaiminater filters and similar situation. A sample of locations would include, the Service Building Radiation Protection Storage Locker, Warehouse 9 radioactive materials shipping and receiving cage, Secondary Chemistry Lab mini filter/demin.

Fire Area	Fire Area Description	Fire Strategy	Description
YRD	Yard	FS BB	Building #7762, Warehouse #2 & #3
		FS BC	Building #7760, Warehouse #4
		FS BU	Building # 77116, Warehouse #9 **
		FS BE	Building # 7720, Administration Building **
		NEW	Develop a new Fire Strategy for Hold-up Pond.
		NEW	Develop a new Fire Strategy for Radioactive Material Containers Area.
		NEW	Develop a new Fire Strategy for Radiography Vault.
		NEW	Develop a new Fire Strategy for Radiation Materials Control Building (#7767).
		NEW	Develop a new Fire Strategy for Tents Containing Radioactive Materials.
		NEW	Develop a new Fire Strategy for Mixed Waste Storage.
		NEW	Develop a new Fire Strategy for ISFSI Storage of non-ISFSI Radioactive Materials

** Identifies locations that are primarily non-RCA and may be listed in the Non-RCA Areas compartment as well.

Smoke and By Products of Combustion-Airborne Effluent Evaluation

The Yard-RCA areas are open to the atmosphere. Administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Fire Suppressant Runoff-Liquid Effluent Evaluation

The Yard-RCA areas are not equipped with engineering controls to monitor or contain contaminated runoff. Administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedure that establishes the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance.

Non-Power Operations

Yard areas rely on administrative controls to minimize the likelihood of radioactive release. These features are not impacted by Non-Power Operations.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use administrative controls, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Essential Switchgear Rooms (Rooms 362, 363, 372 and 373 of Auxiliary Building)

Compartment Selection and Justification Basis

This compartment is part of the Auxiliary Building and is typically a non-RCA. However, parts of these areas are periodically posted as an RCA to support the transfer of materials into and out of the Auxiliary Building. These activities are most common during refueling outages, however they are not limited to only refueling outages.

Fire Area	Fire Area Description	Fire Strategy	Description
07	4160V Essential Switchgear Room (B train)	2.12	Auxiliary Building 560, Essential Switchgear
08	4160V Essential Switchgear Room (B train)	1.14	Auxiliary Building 560, Essential Switchgear

Smoke and By Products of Combustion-Airborne Effluent Evaluation

This compartment is provided with forced air supply ventilation. As this area is not typically an RCA, radiation monitors are not provided. Administrative controls will be used to meet the requirements of NFPA 805, Radioactive Release.

Fire Suppressant Runoff-Liquid Effluent Evaluation

Drainage in the non-RCA portions of the Auxiliary Building are collected in floor drain sumps C and D and are routed through a radiation monitor directly to the Turbine Building sump. Upon detection of radioactivity, a signal closes the valve and effluent is diverted to the ND and NS sump and then sent to the Floor Drain Tank or Waste Evaporator Feed Tank.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

Fire strategies provide an area overview including potential radiation level. Fire Strategies will be enhanced to aid in identification of typical RCA boundary locations as well as potential release points. Examples of release points include: passage doors, overhead doors, and hatches.

Guidance is provided to notify the radiation protection technician and the location to meet the fire brigade. Enhancement to the response procedures will provide additional guidance for the radiation protection technicians need to monitor, collect samples and provide support to the fire brigade leader during fires involving radioactive materials.

Fire Brigade Training to Minimize Radioactive Release

Fire Brigade Training is consistent throughout Legacy Duke nuclear facilities. The training program reinforces fire strategy use and the use of Fire Brigade Response procedures that establish the responsibility to monitor to prevent radioactive release. Revised strategies will provide recommended guidance

Non-Power Operations

The operational condition of the plant does not affect the engineering controls and administrative controls used to prevent radioactive release. Thus, Non-Power Operations does not impact this compartment.

Conclusion

Upon completion of Implementation Item 1 in Table S-3 of Attachment S, CNS will use administrative controls, combined with pre-fire plans, training and procedures to provide reasonable assurance that fire suppression activities will not cause a radioactive release that exceeds the requirements of 10 CFR 20 limits.

Compartment: Non-RCA Areas

Compartment Selection and Justification Basis

The Non-RCA Areas compartment consists of those Fire Area/Fire Zones that are not part of the radiologically controlled area of Unit 1 and Unit 2. These areas do not store or contain radioactive material that could result in the potential for a radioactive release. Yard areas not defined here could include RCAs. These areas have been defined as individual compartments within the Yard.

Fire Area	Fire Area Description	Fire Strategy	Description
09	Battery Room - Elevation 554'	2.10	Auxiliary Building 554, Battery Rooms
10	Battery Room - Elevation 554'	1.12	Auxiliary Building 554, Battery Rooms
21	Control Room	1.22	Auxiliary Building 594, Control Room
25	Diesel Generator 1A Room	1.8	Diesel Generator Building, Diesel Generator Room
26	Diesel Generator 1B Room	1.10	Diesel Generator Building, Diesel Generator Room
27	Diesel Generator 2A Room	2.6	Diesel Generator Building, "A" Diesel Generator Room
28	Diesel Generator 2B Room	2.8	Diesel Generator Building, "B" Diesel Generator Room
29	Train A RN Pump Room - Elevation 600'	1.25	RN Pump Structure
30	Train B RN Pump Room - Elevation 600'	1.25	RN Pump Structure
35	Control Room Tagout Area - Elevation 594'	1.23	Auxiliary Building 594, OSM Office and Copy Room
41	D/G 1A Sequencer Tunnel - Elevation 556'	1.9	Diesel Generator Building, Diesel Room Corridor
42	D/G 1B Sequencer Tunnel - Elevation 556'	1.11	Diesel Generator Building, Diesel Room Corridor
43	D/G 2A Sequencer Tunnel - Elevation 556'	2.7	Diesel Generator Building, "A" Diesel Room Corridor
44	D/G 2B Sequencer Tunnel - Elevation 556'	2.9	Diesel Generator Building, "B" Diesel Room
50	Outer Doghouse U2	2.11	Exterior Doghouse
51	Outer Doghouse U1	2.24	Exterior Doghouse
SRV	Service Building	FS A	El. 554+0, Service Building
		FS B	El. 568+0, Service Building
		FS C	El. 568+0, Service Building
		FS I	El. 594+0 I, Service Building
		FS J	El. 594+0 J, Service Building
		FS K	El. 594+0 K, Service Building
		FS L	El. 594+0 L, Service Building
		FS Q	El. 608+0, Service Building
		FS R	El. 609+0 L, Service Building
		FS S	El. 610+0 S, Service Building
		FS T	El. 610+0 T, Service Building
		FS U	El. 611+0, Service Building
		FS V	El. 619+6 V, Service Building
		FS W	El. 619+6 W, Service Building
SSF	Safe Shutdown Facility	FS AW	Building #7748, Standby Shutdown Facility El. 594+0
		FS AX	Building #7748, Standby Shutdown Facility El. 611+4

Fire Area	Fire Area Description	Fire Strategy	Description
TB1	Turbine Building U1	FS D	El. 568+0 D, Turbine Building Unit 1
		FS E	El. 568+0 E, Turbine Building Unit 1
		FS M	El. 594+0 M, Turbine Building Unit 1
		FS N	El. 594+0 M, Turbine Building Unit 1
		FS X	El. 619+6 Y, Turbine Building Unit 1
		FS Y	El. 619+6 Y, Turbine Building Unit 1
TB2	Turbine Building U2	FS F	El. 568+0, Turbine Building Unit 2
		FS G	El. 568+0, Turbine Building Unit 2
		FS O	El. 594+0, Turbine Building Unit 2
		FS P	El. 594+0, Turbine Building Unit 2
		FS Z	El. 619+6, Turbine Building Unit 2
		FS AA	El. 619+6, Turbine Building Unit 2
FA YRD	U1 & 2 Yard	FS AB	Building #7747, Bottled Gas Storage Building
		FS AC	Building #7754, Containment Mechanical Equipment Building
		FS AD	Building #7756, Containment Mechanical Equipment Building
		FS AE	Building #7750, Hazardous Waste Storage Building
		FS AF	Building #7744, High Rise First Floor
		FS AF-1	Building #7743, Office Building (NUB) First Floor
		FS AF-2	Building #7743, Office Building (NUB) Second
		FS AG	Building #7744, High Rise Second Floor
		FS AH	Building #7744, High Rise Third Floor
		FS AI	Building #7744, High Rise Fourth Floor
		FS AJ	Building #7744, High Rise Fifth Floor
		FS AK	Building #7744, High Rise Sixth Floor
		FS AL	Building #7746, Hydrogen Storage
		FS AM	Building #7745, I&E Engineering Office First Floor
		FS AN	Building #7745, I&E Engineering Office Second Floor
		FS AO	Building #7749, Lube Oil Storage
		FS AS	Building #7753, Nitrogen Storage
		FS AT	Building #7759, Outside Maint. Facility (OMF) First Floor
		FS AU	Building #7759, Outside Maint. Facility (OMF) Second Floor
		FS AV	Building #7751, Oxygen Storage
		FS AY	Transformer Yard Unit 1
		FS AZ	Transformer Yard Unit 2
		FS BA	Building #7763, Warehouse #1
		FS BD	Building #7770, Old Metal Fabrication Shop
		FS BE	Building #7720, Administration Building
		FS BF	Building #7727, Communications Building
		FS BG	Cooling Towers 1A, 1B, 1C, 2A, 2B, 2C
		FS BH	Building #7765, Office Building

Fire Area	Fire Area Description	Fire Strategy	Description
		FS BJ	Building #7788, Maintenance Shops
		FS BK	Building #7724, Medical Facility
		FS BL	Building #77107, New Metal/Pipe Fab Shop
		FS BM	Motor Control Center Houses 1A, 1B, 1C, 2A, 3B, 2C
		FS BO	Building #7718, 230 KV Relay House
		FS BP	230 KV Switching Station
		FS BQ	Building #7710, Training Center Upper LVL
		FS BR	Building #7710, Training Center Lower LVL
		FS BS	Building #7766, Maintenance Training Facility/Auditorium
		FS BT	Building #7714, Water Chemistry Building
		FS BU	Building #77116, Receiving Warehouse #9
		FS BV	Building #77114, Vehicle Maintenance Facility
		FS BW	Building #77100, Coating & Blasting Facility

Smoke and By Products of Combustion-Airborne Effluent Evaluation
Non-RCA - Screens out of Radioactive Release Evaluation.

Fire Suppressant Runoff- Liquid Effluent Evaluation
Non-RCA - Screens out of Radioactive Release Evaluation.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release
Non-RCA - Screens out of Radioactive Release Evaluation.

Fire Brigade Training to Minimize Radioactive Release
Non-RCA - Screens out of Radioactive Release Evaluation.

Non-Power Operations
Non-RCA - Screens out of Radioactive Release Evaluation.

Conclusion
Non-RCA - Screens out of Radioactive Release Evaluation.

Compartment: ISFSI

Compartment Selection and Justification Basis

ISFSI is outside of the scope of NFPA 805 and this review. ISFSI has been included within this document to show each fire area and radiologically controlled area was considered during the Radioactive Release Evaluation.

Fire Area	Fire Area Description	Fire Strategy	Description
N/A	ISFSI is outside of the scope of NFPA 805	N/A	ISFSI is outside of the scope of NFPA 805

Smoke and By Products of Combustion-Airborne Effluent Evaluation

ISFSI is outside of the scope of NFPA 805.

Fire Suppressant Runoff-Liquid Effluent Evaluation

ISFSI is outside of the scope of NFPA 805.

Administrative Controls-Pre-Fire Plans, Procedures and Guidelines to Minimize the Risk or Radioactive Release

ISFSI is outside of the scope of NFPA 805.

Fire Brigade Training to Minimize Radioactive Release

ISFSI is outside of the scope of NFPA 805.

Non-Power Operations

ISFSI is outside of the scope of NFPA 805.

Conclusion

ISFSI is outside of the scope of NFPA 805.

F. Fire-Induced Multiple Spurious Operations Resolution

5 Pages Attached

MSO Process Summary

The following provides the guidance from FAQ 07-0038, Revision 3, along with the process and results.

Step 1 – Identify potential MSOs of concern

Information sources that may be used as input include:

- Post-fire safe shutdown analysis (NEI 00-01, Revision 1, Chapter 3)
- Generic lists of MSOs (e.g., from Owners Groups and/or later versions of NEI 00-01, if endorsed by NRC for use in assessing MSOs)
- Self-assessment results (e.g., NEI 04-06 assessments performed to addressed RIS 2004-03)
- PRA insights (e.g., NEI 00-01 Revision 1, Appendix F)
- Operating Experience (e.g., licensee event reports, NRC Inspection Findings, etc.)

Results of Step 1:

The following information sources were used to identify the potential CNS MSOs of concern:

- Safe shutdown analysis
- PWROG generic MSO list
- Fire PRA model
- Internal events PRA

Step 2 – Conduct an expert panel to assess plant specific vulnerabilities (e.g., per NEI 00-01, Rev. 1 Section F.4.2).

The expert panel should focus on system and component interactions that could impact nuclear safety. This information will be used in later tasks to identify cables and potential locations where vulnerabilities could exist.

The documentation of the results of the expert panel should include how the expert panel was conducted including the members of the expert panel, their experience, education, and areas of expertise. The documentation should include the list of MSOs reviewed as well as the source for each MSO. This documentation should provide a list the MSOs that were included in the PRA and a separate list of MSOs that were not kept for further analysis (and the reasons for rejecting these MSOs for further analysis).

Describe the expert panel process (e.g., when it was held, what training was provided to the panel members, what analyses were reviewed to identify MSOs, how was consensus achieved on which MSOs to keep and any dispute resolution process criteria used in decision process, etc.).

[Note: The physical location of the cables of concern (e.g., fire zone/area routing of the identified MSO cables), if known, may be used at this step in the process to focus the scope of the detailed review in further steps.]

Results of Step 2:

The Expert Panel was conducted in April 2009. The Expert Panel consisted of a three day meeting with representatives from Duke Energy (and contractors) with experience in fire protection, post-fire safe shutdown, circuit analysis, system engineering, plant operations and PRA. The panel conducted document reviews, and held discussions on potential fire-induced spurious operations that could potentially impact plant safety. Documents that were used as guidance included:

- PWROG Draft Working MSO list [file named PWR+MSO+List+rev+E.xls (file dated 3-25-08) from the NEI MSO Webboard]
- NFPA 805 FAQ 07-0038, Lessons Learned on Multiple Spurious Operations, Revision 1
- NEI 00-01, Guidance for Post-Fire Safe Shutdown Circuit Analysis, Draft Revision 2

Training was conducted in the form of an introductory overview and slide presentation. Topics discussed included:

- Purpose and scope of the safe shutdown analysis
- PRA overview
- Overview training on the MSO issue, including
  - Background on Fire-Induced MSOs
  - Role of the MSO resolution in the Fire PRA and resolution of the MSO issue transition
  - Format and status of the CNS SSA and Fire PRA efforts

Detailed discussion on the types of circuit failures was not held since the focus of the panel was on system and component level failures. Key points included:

- The proposed scenarios should not have presupposed limits on the number of fire-induced hot shorts or spurious operations (e.g., do not assume only one or two, one at a time, etc.).
- The focus would not be on individual fire area locations, but rather focus on a system/component approach, in order to allow the analysis following the Expert Panel (e.g., PRA model and scenario development) to determine the vulnerability of the proposed interactions to credible fires.

The first day of the Expert Panel focused on a review of the PWROG scenarios. The PWROG Generic MSO List includes scenarios related to the following functions:

- Reactivity Control
- RCS Inventory Control (Makeup)
- RCS Pressure Control
- Decay Heat Removal
- Support Functions

By using the PWROG Generic MSO List as guidance, a step-by-step discussion was held, typically by reviewing P&IDs and simplified system training diagrams, postulating scenarios, discussing the potential consequences and likelihood, discussing operator

response, and recommending additional courses of action. Key considerations, in addition to consequences, were:

- Whether the scenario of concern was currently modeled in the CNS SSA.
- Whether the scenario of concern was currently modeled in the CNS Internal Events PRA (and modeled for fire in the "in progress" Fire PRA for CNS).
- Whether procedures addressed the potential scenarios of concern.
- Additional analyses or justification that may be necessary to document exclusion of a particular scenario.
- Potential generic issues that may be best resolved by PWROG analysis/justification.

In addition to the item-by-item review of the PWROG Generic MSO list, an additional "brainstorming" review was conducted by the Expert Panel in order to look for additional plant specific scenarios and general system pinch points that may not have existed specifically on the generic list. The additional reviews were conducted on the following key systems:

- Auxiliary Feedwater
- Chemical and Volume Control System
- Component Cooling Water
- Containment Spray
- Feedwater
- Main Steam
- Residual Heat Removal
- Reactor Coolant System
- Safety Injection
- Service Water
- Steam Generator Blowdown
- SSF Components

Consensus was achieved in the expert panel process by discussing individual scenarios, reaching a conclusion, and asking for any dissenting opinions.

Step 3 – Update the Fire PRA model and NSCA to include the MSOs of concern.

This includes the:

- Identification of equipment (NUREG/CR-6850 Task 2)
- Identification of cables that, if damaged by fire, could result in the spurious operation (NUREG/CR-6850 Task 3, Task 9)
- Identify routing of the cables identified above, including associating that routing with fire areas, fire zones and/or Fire PRA physical analysis units, as applicable.

Include the equipment/cables of concern in the Nuclear Safety Capability Assessment (NSCA). Including the equipment and cable information in the NSCA does not necessarily imply that the interaction is possible since separation/protection may exist throughout the plant fire areas such that the interaction is not possible).

Note: Instances may exist where conditions associated with MSOs do not require update of the Fire PRA and NSCA analysis. For example, Fire PRA analysis in NUREG/CR-6850 Task 2, Component Selection, may determine that the particular interaction may not lead to core damage, or pre-existing equipment and cable routing information may determine that the particular MSO interaction is not physically possible. In other instances, the update of the PRA may not be warranted if the contribution is negligible. The rationale for exclusion of identified MSOs from the Fire PRA and NSCA should be documented and the configuration control mechanisms should be reviewed to provide reasonable confidence that the exclusion basis will remain valid.

Results of Step 3:

The NSCA and Fire PRA were updated to reflect the treatment of applicable MSO scenarios. This included the identification of equipment, identification of cables, and the routing of cables by plant locations. The CNS Results are documented in:

- NSCA – CNS Post-Fire Safe Shutdown Analysis (Calculation entitled "AREVA NP Inc., EIR, Document No. 51-9183972- 002,Catawba Nuclear Station Units 1&2 NFPA-805 Transition – Deterministic Safe Shutdown Analysis").
- Fire PRA - CNS Fire PRA Documentation (Calculation entitled, "Fire PRA Component Selection Report" and "CNS Fire PRA (FPRA) Model Development Report").

Step 4 – Evaluate for NFPA 805 Compliance

The MSO combinations included in the NSCA should be evaluated with respect to compliance with the deterministic requirements of NFPA 805, as discussed in Section 4.2.3 of NFPA 805. For those situations in which the MSO combination does not meet the deterministic requirements of NFPA 805 (VFDR), the issue with the components and associated cables should be mitigated by other means (e.g., performance-based approach per Section 4.2.4 of NFPA 805, plant modification, etc.).

The performance-based approach may include the use of feasible and reliable recovery actions. The use of recovery actions to demonstrate the availability of a success path for the nuclear safety performance criteria requires that the additional risk presented by the use of these recovery actions be evaluated (NFPA 805 Section 4.2.4).

Results of Step 4:

The MSO combination components of concern were also evaluated as part of the CNS NSCA. For cases where the pre-transition MSO combination components did not meet the deterministic compliance, the MSO combination components were added to the scope of the Fire Risk Evaluations. The process and results for Fire Risk Evaluations are summarized in Section 4.5 of the Transition Report.

Step 5 - Document Results

The results of the process should be documented. The results should provide a detailed description of the MSO identification, analysis, disposition, and evaluation results (e.g., references used to identify MSOs; the composition of the expert panel, the expert panel process, and the results of the expert panel process; disposition and evaluation results for each MSO, etc.). High level methodology utilized as part of the

transition process should be included in the 10 CFR 50.48(c) License Amendment Request/Transition Report.

Results of Step 5:

The CNS results are documented in:

- MSO Expert Panel Report (CNS Calculation entitled, "NFPA 805 Transition Expert Panel Report for Addressing Potential Catawba Multiple Spurious Operations")
- NSCA - CNS Safe Shutdown Analysis (Calculation entitled, "AREVA NP Inc., EIR, Document No. 51-9183972- 002,Catawba Nuclear Station Units 1&2 NFPA-805 Transition – Deterministic Safe Shutdown Analysis")
- Fire PRA - CNS Fire PRA Documentation (Calculation entitled, "Fire PRA Component Selection Report" and "CNS Fire PRA (FPRA) Model Development Report")
- CNS Fire Risk Evaluations (Calculation entitled, "NFPA 805 Transition, Fire Risk Evaluations (FREs)") - See NEI 04-02 Table B-3 (Attachment C, Table C-1)