SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 133 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF- 63

TRANSITION TO A RISK-INFORMED, PERFORMANCE-BASED FIRE PROTECTION

PROGRAM IN ACCORDANCE WITH 10 CFR 50.48(c)

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

PUBLICLY AVAILABLE ATTACHMENTS

TABLE OF CONTENTS*

Attachment A: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix 109

Attachment B: Nuclear Safety Capability Assessment Method Review 153

Attachment C: Fire Risk Evaluation Tables 169

Attachment C1: Table 3.4-1, Internal Events PRA F&O Resolution 170

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution 173

Attachment C3: Table 3.4-3, V&V Basis for Fire Modeling Correlations Used at HNP 194

Attachment C4: Table 3.4-4, V&V Basis for Fire Model Calculations of Other Models Used at HNP 199

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information 206

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues 234

Attachment D: Nuclear Safety Capability Assessment Results by Fire Area 241

Attachment D1: Deterministic Compliance with NFPA 805 Section 4.2.3 242

Attachment D2: Performance-Based Compliance with NFPA 805 Section 4.2.4 300

Attachment E: Radioactive Release Tables 503

* Note: The page numbers are consistent with a continuation of the publicly available Shearon Harris NFPA 805 safety evaluation made available on June 28, 2010, at ADAMS Accession No. ML101750602.

Attachment A: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

This attachment contains Table 3.1-1, which provides the specific fire protection program elements and minimum design requirements from NFPA 805 Chapter 3, as appropriately modified by 10 CFR 50.48(c). In addition, the table describes each fundamental fire protection program element from NFPA 805 Chapter 3 and identifies which of the methods listed below the licensee used as the means for achieving compliance with the requirement. Table 3.1-1 also provides the NRC staff's evaluation of the licensee's compliance statement for each fire protection program element. LAR Attachment A, "NEI 04-02 Table B-1, Transition of Fundamental Fire Protection Program and Design Elements (NFPA 805 Chapter 3)," provides further details regarding the licensee's compliance strategy for specific NFPA 805 Chapter 3 requirements, including references to where compliance is documented.

As part of the assessment of its compliance with the NFPA 805 Chapter 3 elements, the licensee reviewed each section and subsection against the existing HNP fire protection program and provided specific compliance statements for each NFPA 805 Chapter 3 attribute that contained applicable requirements. The methods used by HNP for achieving compliance with the NFPA 805 Chapter 3 fundamental fire protection program elements and minimum design requirements are as follows:

1. The existing fire protection program element directly complies with the requirement; noted in LAR Attachment A, also called the B-1 Table, as "Complies." In assessing these statements, the NRC staff reviewed the provided information to ensure that it presented a reasonable basis for concluding that the existing fire protection program element was adequate to meet the associated NFPA 805 Chapter 3 element.

2. The existing fire protection program element complies through the use of an explanation or clarification; noted in the B-1 Table as "Complies with Clarification." In assessing these statements, the NRC staff reviewed the provided information to ensure that it presented a reasonable basis for concluding that the fire protection program element, as clarified by the supplemental information, was adequate to meet the NFPA 805 Chapter 3 element.

3. The existing fire protection program element complies with the requirement based on prior NRC approval of an alternative to the fundamental fire protection program attribute and the bases for the NRC approval remain valid; noted in the B-1 Table as "Complies Via Previous NRC Approval." In assessing these statements, the NRC staff reviewed the approved alternative to ensure that the basis was still valid for concluding that the alternative was adequate to meet the NFPA 805 Chapter 3 element.

4. The existing fire protection program element complies through the use of existing engineering equivalency evaluations (EEEEs) whose bases remain valid and are of sufficient quality; noted in the B-1 Table as "Complies with the Use of EEEEs." In assessing these statements, the NRC staff reviewed the EEEEs to ensure that the basis was still valid and of sufficient quality for concluding that the alternative was adequate to meet the NFPA 805 Chapter 3 element.

5. The existing fire protection program element does not comply with the requirement, but the licensee is requesting approval for a performance-based method in accordance with 10 CFR 50.48(c)(2)(vii); noted as "License Amendment Required."

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
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.		Subsection not reviewed for acceptability (self-explanatory).
3.2	**Fire Protection Plan.**		Subsection not reviewed for acceptability (unnecessary).
3.2.1	**Intent.** A site-wide fire protection plan shall be established. This plan shall document management policy and program direction and shall define the responsibilities of those individuals responsible for the plan's implementation. This section establishes the criteria for an integrated combination of components, procedures, and personnel to implement all fire protection program activities.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.2.2	**Management Policy Direction and Responsibility.** A policy document shall be prepared that defines management authority and responsibilities and establishes the general policy for the site fire protection program.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.2.2.1	The policy document shall designate the senior management position with immediate authority and responsibility for the FPP.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.2.2.2	The policy document shall designate a position responsible for the daily administration and coordination of the FPP and its implementation.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.2.2.3	The policy document shall define the fire protection interfaces with other organizations and assign responsibilities for the coordination of activities. In addition, this policy document shall identify the various plant positions having the authority for implementing the various areas of the fire protection program.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.2.2.4	The policy document shall identify the appropriate AHJ for the various areas of the fire protection program.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
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:		Subsection not reviewed for acceptability (individual elements reviewed below).
3.2.3.(1)	Inspection, testing, and maintenance for fire protection systems and features credited by the fire protection program	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element. IMPLEMENTATION ITEM – The licensee identified an implementation action to complete the development and use of performance-based surveillance frequencies (SE Section 2.9; Item 12).
3.2.3.(2)	Compensatory actions implemented when fire protection systems and other systems credited by the FPP and this standard cannot perform their intended function and limits on impairment duration	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.2.3.(3)	Reviews of fire protection program-related performance and trends	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.2.3.(4)	Reviews of physical plant modifications and procedure changes for impact on the fire protection program	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.2.3.(5)	Long-term maintenance and configuration of the fire protection program	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.2.3.(6)	Emergency response procedures for the plant industrial fire brigade	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
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:		Subsection not reviewed for acceptability (individual elements reviewed below).
3.3.(1)	Prevention of fires and fire spread by controls on operational activities	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.(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.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.1	**Fire Prevention for Operational Activities.** The fire prevention program activities shall consist of the necessary elements to address the control of ignition sources and the use of transient combustible materials during all aspects of plant operations. The fire prevention program shall focus on the human and programmatic elements necessary to prevent fires from starting or, should a fire start, to keep the fire as small as possible.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.1.1	**General Fire Prevention Activities.** The fire prevention activities shall include but not be limited to the following program elements:		Subsection not reviewed for acceptability (individual elements reviewed below).
3.3.1.1.(1)	Training on fire safety information for all employees and contractors including, as a minimum, familiarization with plant fire prevention procedures, fire reporting, and plant emergency alarms	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
3.3.1.1.(2)	Documented plant inspections including provisions for corrective actions for conditions where unanalyzed fire hazards are identified	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.1.1.(3)	Administrative controls addressing the review of plant modifications and maintenance to ensure that both fire hazards and the impact on plant fire protection systems and features are minimized	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
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:	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
3.3.1.2.(1)	Wood used within the power block shall be listed pressure-impregnated or coated with a listed fire-retardant application. *Exception: Cribbing timbers 6 in. by 6 in. (15.2 cm by 15.2 cm) or larger shall not be required to be fire-retardant treated.*	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.1.2.(2)	Plastic sheeting materials used in the power block shall be fire-retardant types that have passed NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, large-scale tests, or equivalent.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.1.2.(3)	Waste, debris, scrap, packing materials, or other combustibles shall be removed from an area immediately following the completion of work or at the end of the shift, whichever comes first.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
3.3.1.2.(4)	Combustible storage or staging areas shall be designated, and limits shall be established on the types and quantities of stored materials.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.1.2.(5)	Controls on use and storage of flammable and combustible liquids shall be in accordance with NFPA 30, *Flammable and Combustible Liquids Code*, or other applicable NFPA standards.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
		Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.1.2.(6)	Controls on use and storage of flammable gases shall be in accordance with applicable NFPA standards.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
3.3.1.3	**Control of Ignition Sources.**		Subsection not reviewed for acceptability (unnecessary).
3.3.1.3.1	A hot work safety procedure shall be developed, implemented, and periodically updated as necessary in accordance with NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,* and NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
		Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.1.3.2	Smoking and other possible sources of ignition shall be restricted to properly designated and supervised safe areas of the plant.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.1.3.3	Open flames or combustion-generated smoke shall not be permitted for leak or air flow testing.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.1.3.4	Plant administrative procedure shall control the use of portable electrical heaters in the plant. Portable fuel-fired heaters shall not be permitted in plant areas containing equipment important to nuclear safety or where there is a potential for radiological releases resulting from a fire.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.2	**Structural.** Walls, floors, and components required to maintain structural integrity shall be of noncombustible construction, as defined in NFPA 220, *Standard on Types of Building Construction*.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.3	**Interior Finishes.** Interior wall or ceiling finish classification shall be in accordance with NFPA 101, *Life Safety Code*, requirements for Class A materials. Interior floor finishes shall be in accordance with NFPA 101 requirements for Class I interior floor finishes.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the interior finishes installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-48. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.4	**Insulation Materials.** Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.4 continued	**- CONTINUED -** **Insulation Materials.** Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.	Complies Via Previous NRC Approval	The NRC staff approved the use of insulating materials having flame spread and smoke development indices of 50 or less, as described in the original HNP SER, NUREG-1038, Page 9-48. The NRC staff also approved the limited use of combustible flexible air duct coupling material as described in the HNP Supplemental SER, NUREG-1038, Supplement 4, Page 9-4. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.5	**Electrical.**		Subsection not reviewed for acceptability (unnecessary).
3.3.5.1	Wiring above suspended ceiling shall be kept to a minimum. Where installed, electrical wiring shall be listed for plenum use, routed in armored cable, routed in metallic conduit, or routed in cable trays with solid metal top and bottom covers.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.5.1 continued	**- CONTINUED -** Wiring above suspended ceiling shall be kept to a minimum. Where installed, electrical wiring shall be listed for plenum use, routed in armored cable, routed in metallic conduit, or routed in cable trays with solid metal top and bottom covers.	Complies Via Previous NRC Approval	The NRC staff approved the licensee's use of lighting and communication cables in concealed spaces when the cables are routed in conduits, as described in the original HNP SER, NUREG-1038, Page 9-49. The NRC staff approved the licensee's installation of cables in conduits in the control room, as described in the original HNP SER, NUREG-1038, Page 9-53. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.5.2	Only metal tray and metal conduits shall be used for electrical raceways. Thin wall metallic tubing shall not be used for power, instrumentation, or control cables. Flexible metallic conduits shall only be used in short lengths to connect components.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the electrical raceway construction installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-49.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.5.2 continued	**- CONTINUED -** Only metal tray and metal conduits shall be used for electrical raceways. Thin wall metallic tubing shall not be used for power, instrumentation, or control cables. Flexible metallic conduits shall only be used in short lengths to connect components.	Complies Via Previous NRC Approval	Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable. Note that the licensee also provided additional detail regarding short (less than 3 feet) cable air drops that conforms with NRC staff guidance.
3.3.5.3	Electric cable construction shall comply with a flame propagation test as acceptable to the AHJ. [Note: This entry modified per 10 CFR 50.48(c)(2)(v)]	Complies with use of an EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
		Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the use of unqualified electrical cables for lighting and communication cables, as described in the original HNP SER, NUREG-1038, Page 9-49.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.5.3 continued	**- CONTINUED -** Electric cable construction shall comply with a flame propagation test as acceptable to the AHJ. [Note: This entry modified per 10 CFR 50.48(c)(2)(v)]	Complies Via Previous NRC Approval	Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.6	**Roofs.** Metal roof deck construction shall be designed and installed so the roofing system will not sustain a self-propagating fire on the underside of the deck when the deck is heated by a fire inside the building. Roof coverings shall be Class A as determined by tests described in NFPA 256, *Standard Methods of Fire Tests of Roof Coverings*.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.7	**Bulk Flammable Gas Storage.** Bulk compressed or cryogenic flammable gas storage shall not be permitted inside structures housing systems, equipment, or components important to nuclear safety.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the configuration of the storage of flammable gasses and design of hydrogen lines in safety related areas as described in HNP Supplemental SER, NUREG-1038, Supplement 2, Page 9-9.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.7 continued	**- CONTINUED -** **Bulk Flammable Gas Storage.** Bulk compressed or cryogenic flammable gas storage shall not be permitted inside structures housing systems, equipment, or components important to nuclear safety.	Complies Via Previous NRC Approval	Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.7.1	Storage of flammable gas shall be located outdoors, or in separate detached buildings, so that a fire or explosion will not adversely impact systems, equipment, or components important to nuclear safety. NFPA 50A, *Standard for Gaseous Hydrogen Systems at Consumer Sites*, shall be followed for hydrogen storage.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
		Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the configuration of the storage of flammable gases and design of hydrogen lines in safety related areas as described in HNP Supplemental SER, NUREG-1038, Supplement 2, Page 9-9. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.7.2	Outdoor high-pressure flammable gas storage containers shall be located so that the long axis is not pointed at buildings.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.7.3	Flammable gas storage cylinders not required for normal operation shall be isolated from the system.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
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 Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the configuration of the storage of flammable and combustible liquids as described in HNP Supplemental SER, NUREG-1038, Supplement 2, Page 9-9. The NRC staff approved the size and configuration of the diesel generator day tanks, as described in the original HNP SER, NUREG-1038, Page 9-55.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.8 continued	**- CONTINUED -** **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 Via Previous NRC Approval	Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.9	**Transformers.** Where provided, transformer oil collection basins and drain paths shall be periodically inspected to ensure that they are free of debris and capable of performing their design function.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.10	**Hot Pipes and Surfaces.** Combustible liquids, including high flashpoint lubricating oils, shall be kept from coming in contact with hot pipes and surfaces, including insulated pipes and surfaces. Administrative controls shall require the prompt cleanup of oil on insulation.	Complies	The NRC staff finds the licensee's statement of compliance acceptable. IMPLEMENTATION ITEM – The licensee identified an implementation action to modify plant procedures to meet the requirements of this element (SE Section 2.9; Item 13).
3.3.11	**Electrical Equipment.** Adequate clearance, free of combustible material, shall be maintained around energized electrical equipment.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.3.12	**Reactor Coolant Pumps.** For facilities with non-inerted containments, reactor coolant pumps with an external lubrication system shall be provided with an oil collection system. The oil collection system shall be designed and installed such that leakage from the oil system is safely contained for off normal conditions such as accident conditions or earthquakes. All of the following shall apply.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.12 continued	**- CONTINUED -** **Reactor Coolant Pumps.** For facilities with non-inerted containments, reactor coolant pumps with an external lubrication system shall be provided with an oil collection system. The oil collection system shall be designed and installed such that leakage from the oil system is safely contained for off normal conditions such as accident conditions or earthquakes. All of the following shall apply.	Complies Via Previous NRC Approval	The NRC staff approved the design of the reactor coolant pump oil collection system installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.12.(1)	The oil collection system for each reactor coolant pump shall be capable of collecting lubricating oil from all potential pressurized and nonpressurized leakage sites in each reactor coolant pump oil system.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the reactor coolant pump oil collection system installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.12.(2)	Leakage shall be collected and drained to a vented closed container that can hold the inventory of the reactor coolant pump lubricating oil system.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the reactor coolant pump oil collection system installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.12.(3)	A flame arrestor is required in the vent if the flash point characteristics of the oil present the hazard of a fire flashback.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the reactor coolant pump oil collection system installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.3.12.(4)	Leakage points on a reactor coolant pump motor to be protected shall include but not be limited to the lift pump and piping, overflow lines, oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines, and the oil reservoirs, where such features exist on the reactor coolant pumps.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the reactor coolant pump oil collection system installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.3.12.(5)	The collection basin drain line to the collection tank shall be large enough to accommodate the largest potential oil leak such that oil leakage does not overflow the basin.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the reactor coolant pump oil collection system installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.4	**Industrial Fire Brigade.**		Subsection not reviewed for acceptability (unnecessary).
3.4.1	**On-Site Fire-Fighting Capability.** All of the following requirements shall apply.		Subsection not reviewed for acceptability (individual elements reviewed below).
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	The NRC staff finds the licensee's statement of compliance acceptable. Note that the licensee states it will comply with NFPA 600, in accordance with NRC staff guidance.
3.4.1(a)(1)	NFPA 600, *Standard on Industrial Fire Brigades* (interior structural fire fighting)	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.4.1(a)(2)	NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*		HNP complies with NFPA 600; see subsection 3.4.1.(a) above. Therefore, this subsection was not reviewed for acceptability.
3.4.1(a)(3)	NFPA 1582, *Standard on Medical Requirements for Fire Fighters and Information for Fire Department Physicians*		HNP complies with NFPA 600; see subsection 3.4.1.(a) above. Therefore, this subsection was not reviewed for acceptability.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.4.1.(b)	Industrial fire brigade members shall have no other assigned normal plant duties that would prevent immediate response to a fire or other emergency as required.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.1.(c)	During every shift, the brigade leader and at least two brigade members shall have sufficient training and knowledge of nuclear safety systems to understand the effects of fire and fire suppressants on nuclear safety performance criteria. *Exception to (c): Sufficient training and knowledge shall be permitted to be provided by an operations advisor dedicated to industrial fire brigade support.*	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.1.(d)	The industrial fire brigade shall be notified immediately upon verification of a fire.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.1.(e)	Each industrial fire brigade member shall pass an annual physical examination to determine that he or she can perform the strenuous activity required during manual firefighting operations. The physical examination shall determine the ability of each member to use respiratory protection equipment.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.2	**Pre-Fire Plans.** Current and detailed pre-fire plans shall be available to the industrial fire brigade for all areas in which a fire could jeopardize the ability to meet the performance criteria described in Section 1.5.	Complies	The NRC staff finds the licensee's statement of compliance acceptable. IMPLEMENTATION ITEM – The licensee identified an implementation action to develop and employ a new Yard pre-fire plan (SE Section 2.9; Item 14).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.4.2.1	The plans shall detail the fire area configuration and fire hazards to be encountered in the fire area, along with any nuclear safety components and fire protection systems and features that are present.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
3.4.2.2	Pre-fire plans shall be reviewed and updated as necessary.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.2.3	Pre-fire plans shall be available in the control room and made available to the plant industrial fire brigade.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.2.4	Pre-fire plans shall address coordination with other plant groups during fire emergencies.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
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.		Subsection not reviewed for acceptability (individual elements reviewed below).
3.4.3.(a)	*Plant Industrial Fire Brigade Training*. All of the following requirements shall apply.		Subsection not reviewed for acceptability (individual elements reviewed below).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.4.3(a)(1)	Plant industrial fire brigade members shall receive training consistent with the requirements contained in NFPA 600, *Standard on Industrial Fire Brigades*, or NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, as appropriate.	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.4.3(a)(2)	Industrial fire brigade members shall be given quarterly training and practice in fire fighting, including radioactivity and health physics considerations, to ensure that each member is thoroughly familiar with the steps to be taken in the event of a fire.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.3(a)(3)	A written program shall detail the industrial fire brigade training program.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.3(a)(4)	Written records that include but are not limited to initial industrial fire brigade classroom and hands-on training, refresher training, special training schools attended, drill attendance records, and leadership training for industrial fire brigades shall be maintained for each industrial fire brigade member.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
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.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.3.(c)	*Drills*. All of the following requirements shall apply.		Subsection not reviewed for acceptability (individual elements reviewed below).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.4.3(c)(1)	Drills shall be conducted quarterly for each shift to test the response capability of the industrial fire brigade.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.3(c)(2)	Industrial fire brigade drills shall be developed to test and challenge industrial fire brigade response, including brigade performance as a team, proper use of equipment, effective use of pre-fire plans, and coordination with other groups. These drills shall evaluate the industrial fire brigade's abilities to react, respond, and demonstrate proper fire-fighting techniques to control and extinguish the fire and smoke conditions being simulated by the drill scenario.	Complies with Clarification	The NRC staff finds the licensee's explanation of their method for compliance with these requirements acceptable to meet the intent of this subsection.
3.4.3(c)(3)	Industrial fire brigade drills shall be conducted in various plant areas, especially in those areas identified to be essential to plant operation and to contain significant fire hazards.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.3(c)(4)	Drill records shall be maintained detailing the drill scenario, industrial fire brigade member response, and ability of the industrial fire brigade to perform as a team.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.3(c)(5)	A critique shall be held and documented after each drill.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.4	**Fire-Fighting Equipment.** Protective clothing, respiratory protective equipment, radiation monitoring equipment, personal dosimeters, and fire suppression equipment such as hoses, nozzles, fire extinguishers, and other needed equipment shall be provided for the industrial fire brigade. This equipment shall conform with the applicable NFPA standards.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.5	**Off-Site Fire Department Interface.**		Subsection not reviewed for acceptability (individual elements reviewed below).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.4.5.1	**Mutual Aid Agreement.** Off-site fire authorities shall be offered a plan for their interface during fires and related emergencies on site.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
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 be invited to participate in a drill at least annually.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.5.3	**Security and Radiation Protection.** Plant security and radiation protection plans shall address off-site fire authority response.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.4.6	**Communications.** An effective emergency communications capability shall be provided for the industrial fire brigade.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.5	**Water Supply.**		Subsection not reviewed for acceptability (individual elements reviewed below).
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.	Complies with Clarification	The NRC staff finds the licensee's explanation of their method for compliance with these requirements acceptable to meet the intent of this subsection.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.5.2	The tanks shall be interconnected such that fire pumps can take suction from either or both. A failure in one tank or its piping shall not allow both tanks to drain. The tanks shall be designed in accordance with NFPA 22, *Standard for Water Tanks for Private Fire Protection*. *Exception No. 1: Water storage tanks shall not be required when fire pumps are able to take suction from a large body of water (such as a lake), provided each fire pump has its own suction and both suctions and pumps are adequately separated.* *Exception No. 2: Cooling tower basins shall be an acceptable water source for fire pumps when the volume is sufficient for both purposes and water quality is consistent with the demands of the fire service.*	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
3.5.3	Fire pumps, designed and installed in accordance with NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, shall be provided to ensure that 100 percent of the required flow rate and pressure are available assuming failure of the largest pump or pump power source.	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
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	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
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 Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the arrangement of the fire pumps installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-51. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.5.6	Fire pumps shall be provided with automatic start and manual stop only.	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.5.7	Individual fire pump connections to the yard fire main loop shall be provided and separated with sectionalizing valves between connections.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.5.8	A method of automatic pressure maintenance of the fire protection water system shall be provided independent of the fire pumps.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.5.9	Means shall be provided to immediately notify the control room, or other suitable constantly attended location, of operation of fire pumps.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.5.10	An underground yard fire main loop, designed and installed in accordance with NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, shall be installed to furnish anticipated water requirements.	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.5.11	Means shall be provided to isolate portions of the yard fire main loop for maintenance or repair without simultaneously shutting off the supply to both fixed fire suppression systems and fire hose stations provided for manual backup. Sprinkler systems and manual hose station standpipes shall be connected to the plant fire protection water main so that a single active failure or a crack to the water supply piping to these systems can be isolated so as not to impair both the primary and backup fire suppression systems.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.5.12	Threads compatible with those used by local fire departments shall be provided on all hydrants, hose couplings, and standpipe risers. *Exception: Fire departments shall be permitted to be provided with adapters that allow interconnection between plant equipment and the fire department equipment if adequate training and procedures are provided.*	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.5.13	Headers fed from each end shall be permitted inside buildings to supply both sprinkler and standpipe systems, provided steel piping and fittings meeting the requirements of ANSI B31.1, *Code for Power Piping*, are used for the headers (up to and including the first valve) supplying the sprinkler systems where such headers are part of the seismically analyzed hose standpipe system. Where provided, such headers shall be considered an extension of the yard main system. Each sprinkler and standpipe system shall be equipped with an outside screw and yoke (OS&Y) gate valve or other approved shutoff valve.	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the standpipe system piping installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.5.14	All fire protection water supply and fire suppression system control valves shall be under a periodic inspection program and shall be supervised by one of the following methods. (a) Electrical supervision with audible and visual signals in the main control room or other suitable constantly attended location. (b) Locking valves in their normal position. Keys shall be made available only to authorized personnel. (c) Sealing valves in their normal positions. This option shall be utilized only where valves are located within fenced areas or under the direct control of the owner/operator.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.5.15	Hydrants shall be installed approximately every 250 ft (76 m) apart on the yard main system. A hose house equipped with hose and combination nozzle and other auxiliary equipment specified in NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* shall be provided at intervals of not more than 1000 ft (305 m) along the yard main system. *Exception: Mobile means of providing hose and associated equipment, such as hose carts or trucks, shall be permitted in lieu of hose houses. Where provided, such mobile equipment shall be equivalent to the equipment supplied by three hose houses.*	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
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.*	License Amendment Required	The NRC staff finds that the licensee's proposed performance-based method to demonstrate compliance with this requirement is acceptable, as described in SE Section 3.1.4.
3.6	**Standpipe and Hose Stations.**		Subsection not reviewed for acceptability (individual elements reviewed below).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
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 Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the NFPA 14 Class II standpipe and hose systems installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
		Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.6.2	A capability shall be provided to ensure an adequate water flow rate and nozzle pressure for all hose stations. This capability includes the provision of hose station pressure reducers where necessary for the safety of plant industrial fire brigade members and off-site fire department personnel.	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.6.3	The proper type of hose nozzle to be supplied to each power block area shall be based on the area fire hazards. The usual combination spray/straight stream nozzle shall not be used in areas where the straight stream can cause unacceptable damage or present an electrical hazard to fire-fighting personnel. Listed electrically safe fixed fog nozzles shall be provided at locations where high-voltage shock hazards exist. All hose nozzles shall have shutoff capability and be able to control water flow from full open to full closed.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
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. [Note: This entry modified per 10 CFR 50.48(c)(2)(vi)]	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the design of the standpipe and hose systems installed at HNP as described in the original HNP SER, NUREG-1038, Page 9-52.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.6.4 continued	**- CONTINUED -** 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. [Note: This entry modified per 10 CFR 50.48(c)(2)(vi)]	Complies Via Previous NRC Approval	The NRC staff approved exceptions to the seismic standpipe requirements as described in HNP Supplemental SER, NUREG-1038, Supplement 4, Page 9-6. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
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.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
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 EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.8	**Fire Alarm and Detection Systems.**		Subsection not reviewed for acceptability (unnecessary).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.8.1	**Fire Alarm.** Alarm initiating devices shall be installed in accordance with NFPA 72, *National Fire Alarm Code*. Alarm annunciation shall allow the proprietary alarm system to transmit fire-related alarms, supervisory signals, and trouble signals to the control room or other constantly attended location from which required notifications and response can be initiated. Personnel assigned to the proprietary alarm station shall be permitted to have other duties. The following fire-related signals shall be transmitted:	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
		Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the installation of NFPA 72D and 72E compliant fire detection systems at HNP as described in the original HNP SER, NUREG-1038, Page 9-50. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.(1)	Actuation of any fire detection device	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.(2)	Actuation of any fixed fire suppression system	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.8.1.(3)	Actuation of any manual fire alarm station	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.(4)	Starting of any fire pump	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.(5)	Actuation of any fire protection supervisory device	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.(6)	Indication of alarm system trouble condition	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.1	Means shall be provided to allow a person observing a fire at any location in the plant to quickly and reliably communicate to the control room or other suitable constantly attended location.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
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:		Subsection not reviewed for acceptability (individual elements reviewed below).
3.8.1.2.(1)	General site population in all occupied areas	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.2.(2)	Members of the industrial fire brigade and other groups supporting fire emergency response	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.8.1.2.(3)	Off-site fire emergency response agencies. Two independent means shall be available (e.g., telephone and radio) for notification of off-site emergency services.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
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 EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.9	**Automatic and Manual Water-Based Fire Suppression Systems.**		Subsection not reviewed for acceptability (unnecessary).
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:		Subsection not reviewed for acceptability (individual elements reviewed below).
3.9.1.(1)	NFPA 13, *Standard for the Installation of Sprinkler Systems*	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
3.9.1.(2)	NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*		The licensee stated that there are no required systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.9.1.(3)	NFPA 750, *Standard on Water Mist Fire Protection Systems*		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.9.1.(4)	NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.9.2	Each system shall be equipped with a water flow alarm.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.9.3	All alarms from fire suppression systems shall annunciate in the control room or other suitable constantly attended location.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.9.4	Diesel-driven fire pumps shall be protected by automatic sprinklers.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
		Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.9.4 continued	**- CONTINUED -** Diesel-driven fire pumps shall be protected by automatic sprinklers.	Complies Via Previous NRC Approval	The NRC staff approved the arrangement of the installed fire pumps without sprinkler protection at HNP as described in the original HNP SER, NUREG-1038, Page 9-52. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.9.5	Each system shall be equipped with an OS&Y gate valve or other approved shutoff valve.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.
3.9.6	All valves controlling water-based fire suppression systems required to meet the performance or deterministic requirements of Chapter 4 shall be supervised as described in 3.5.14.	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
3.10	**Gaseous Fire Suppression Systems.**		Subsection not reviewed for acceptability (unnecessary).
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:		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.10.1.(1)	NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.10.1.(2)	NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.10.1.(3)	NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.10.2	Operation of gaseous fire suppression systems shall annunciate and alarm in the control room or other constantly attended location identified.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
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.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
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.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.10.5	Provisions for locally disarming automatic gaseous suppression systems shall be secured and under strict administrative control.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.10.6	Total flooding carbon dioxide systems shall not be used in normally occupied areas.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
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.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.10.8	Positive mechanical means shall be provided to lock out total flooding carbon dioxide systems during work in the protected space.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
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.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.
3.10.10	Particular attention shall be given to corrosive characteristics of agent decomposition products on safety systems.		The licensee stated that there are no systems of this type installed at HNP. Therefore, this element was not reviewed for acceptability.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
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.		Subsection not reviewed for acceptability (individual elements reviewed below).
3.11.1	**Building Separation.** Each major building within the power block shall be separated from the others by barriers having a designated fire resistance rating of 3 hours or by open space of at least 50 ft (15.2 m) or space that meets the requirements of NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*. *Exception: Where a performance-based analysis determines the adequacy of building separation, the requirements of 3.11.1 shall not apply.*	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
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	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.11.3	**Fire Barrier Penetrations.** Penetrations in fire barriers shall be provided with listed fire-rated door assemblies or listed rated fire dampers having a fire resistance rating consistent with the designated fire resistance rating of the barrier as determined by the performance requirements established by Chapter 4. *(See 3.11.3.4 for penetration seals for through penetration fire stops.)* Passive fire protection devices such as doors and dampers shall conform with the following NFPA standards, as applicable: (1) NFPA 80, *Standard for Fire Doors and Fire Windows* (2) NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems* (3) NFPA *101*, *Life Safety Code* *Exception: Where fire area boundaries are not wall-to-wall, floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, a performance-based analysis shall be required to assess the adequacy of fire barrier forming the fire boundary to determine if the barrier will withstand the fire effects of the hazards in the area. Openings in fire barriers shall be permitted to be protected by other means as acceptable to the AHJ.*	Complies with Clarification	The NRC staff finds that the licensee's explanation of their method for compliance with these requirements is acceptable based on the information provided in the associated B-1 table element.
		Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
		Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.11.3 continued	**- CONTINUED -** **Fire Barrier Penetrations.** Penetrations in fire barriers shall be provided with listed fire-rated door assemblies or listed rated fire dampers having a fire resistance rating consistent with the designated fire resistance rating of the barrier as determined by the performance requirements established by Chapter 4…	Complies Via Previous NRC Approval	The NRC staff approved specific deviations regarding fire barrier penetration protective assemblies at HNP as described in the original HNP SER, NUREG-1038, Page 9-48, HNP Supplemental SER, NUREG-1038, Supplement 2, Page 9-8, and HNP Supplemental SER, NUREG-1038, Supplement 4, Page 9-5. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
3.11.4	**Through Penetration Fire Stops.** Through penetration fire stops for penetrations such as pipes, conduits, bus ducts, cables, wires, pneumatic tubes and ducts, and similar building service equipment that pass through fire barriers shall be protected as follows. (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	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.11.4 continued	**- CONTINUED -** (b) Conduits shall be provided with an internal fire seal that has an equivalent fire-resistive rating to that of the fire barrier through opening fire stop and shall be permitted to be installed on either side of the barrier in a location that is as close to the barrier as possible. *Exception: Openings inside conduit 4 in. (10.2 cm) or less in diameter shall be sealed at the fire barrier with a fire-rated internal seal unless the conduit extends greater than 5 ft (1.5 m) on each side of the fire barrier. In this case the conduit opening shall be provided with noncombustible material to prevent the passage of smoke and hot gases. The fill depth of the material packed to a depth of 2 in. (5.1 cm) shall constitute an acceptable smoke and hot gas seal in this application.*	Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.
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.	Complies	The NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.1-1: NFPA 805 Chapter 3 Fundamental Elements Compliance Matrix

Element	NFPA 805 Requirement	HNP Compliance Statement	NRC Staff Evaluation
3.11.5 continued	**- CONTINUED -** *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.*	Complies Via Previous NRC Approval	The NRC staff has previously approved an alternative to this requirement that the licensee is carrying forward into the RI/PB FPP. The NRC staff approved the use of fire rated cable in lieu of three hour rated electrical raceway fire barriers at HNP as described in the May 1, 2006 license amendment [ML061140227]. Based on the licensee's justification of continued validity, the NRC staff finds the licensee's statement of compliance acceptable.
		Complies with Use of EEEEs	The licensee stated that compliance has been demonstrated through the use of an engineering equivalency evaluation. Based on the licensee's justification of continued validity and evaluation quality, the NRC staff finds the licensee's statement of compliance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment B: Nuclear Safety Capability Assessment Method Review

Regulatory Guide 1.205, “Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants,” Revision 1, endorses NEI 04-02, “Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c),” Revision 2, and Chapter 3 of NEI 00-01, Revision 2, “Guidance for Post-Fire Safe Shutdown Circuit Analysis”, and promulgates the method outlined in NEI 04-02 for conducting a nuclear safety capability assessment. This NRC endorsed method documents in a table format (i.e., NEI 04-02 Table B-2, “NFPA 805 Chapter 2 – Nuclear Safety Transition – Methodology Review”) the licensee’s comparison of its post-fire safe shutdown analyses to the guidance in NEI 00-01 Chapter 3, which has been determined to address the related requirements of NFPA 805, Section 2.4.2, “Nuclear Safety Capability Assessment.”

This attachment contains Table 3.2-1, which identifies each applicable NEI 00-01 guidance section, documents whether the licensee stated that it met the guidance or provided justification for meeting the intent of that guidance, and presents the staff’s evaluation of each NEI 00-01 Chapter 3 attribute for which the licensee stated its process/justification for meeting the intent of the guidance.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.0	Deterministic Methodology	Although the licensee stated that it aligns with the intent of this section, the comparison in the LAR was to the original licensing basis of NUREG-0800 and not NEI 00-01. However, the licensee stated that one of the references used for the revalidation of the safe shutdown analysis performed prior to and in conjunction with the transition to NFPA 805, was NEI 00-01, Rev. 1.	As documented in the detailed discussions for each of the table attributes below, the staff finds that the licensee has achieved either alignment with the NEI 00-01 guidance document, or alignment with the intent of the guidance. The staff finds this approach acceptable.
3.1 [A] Intro	Safe Shutdown Systems and Path Development	The licensee stated that it aligns with the intent of the guidance, and that the systems and components required for safe shutdown were identified and included in the analysis. Pre-determined safe shutdown paths were not used. However, the analysis was based on safe shutdown divisions, which are functionally similar.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.
3.1 [B] Goals	Safe Shutdown Systems and Path Development	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1 [C] Spurious Operations	Safe Shutdown Systems and Path Development	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1	Criteria/Assumptions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.1	GE BWR Paths	N/A	N/A
3.1.1.2	Safety Relief Valves and Low Power Systems	N/A	N/A

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.1.1.3	Pressurizer Heaters	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.4	Alternative Shutdown Capability	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.5	Initial Conditions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.6	Other Events in Conjunction w/ Fire	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.7	Offsite Power	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.8	Safety-Related Equipment	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.9	72 Hour Coping	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.10	Manual/Automatic Initiation of Systems	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.1.11	Multiple Affected Units	N/A	N/A
3.1.2	Shutdown Functions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.2.1	Reactivity Control	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.1.2.2	Pressure Control Systems	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.2.3	Inventory Control	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.2.4	Decay Heat Removal	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.2.5	Process Monitoring	The licensee stated that the approach used to address the process monitoring function aligns with the intent of the guidance since the process monitoring function is capable of providing direct readings of those plant variables necessary for plant operators to perform and/or control the identified safe shutdown functions. In selected fire areas, indirect readings are used for some variables (e.g., pressurizer level as an indication of proper charging system operation, or steam generator pressure to determine steam generator saturation temperature in lieu of RCS cold leg temperature).	The ability to assess the success or failure of safe shutdown actions is a requirement of NFPA 805. Based on the information supplied by the licensee, the necessary process variables can be monitored as required (although through the use of indirect means in some fire areas). Accordingly, aligning with the intent of the process monitoring function is acceptable to the staff.
3.1.2.6	Support Systems	N/A	N/A
3.1.2.6.1	Electrical Systems	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.2.6.2	Cooling Systems [HVAC]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.2.6.2	Cooling Systems [Main Section]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.1.3	Methodology for Safe Shutdown System Selection	The licensee stated that the approach used aligns with the intent of the guidance since systems were assigned to one of two (or both) safe shutdown divisions in lieu of paths. The possible combinations of systems were modeled using the EPRI Computer Aided Fault Tree Analysis (CAFTA) tool.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.
3.1.3.1	Identify Safe Shutdown Functions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.3.2	Identify Combinations of Systems that Satisfy Each Safe Shutdown function	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.1.3.3	Define Combinations of Systems for Each Safe Shutdown Path	The licensee stated that the approach used aligns with the intent of the guidance since systems were assigned to one of two (or both) safe shutdown divisions in lieu of paths. The possible combinations of systems were modeled using the EPRI CAFTA tool.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.
3.1.3.4	Assign Shutdown Paths to Each Combination of Systems	The licensee stated that the approach used aligns with the intent of the guidance since systems were assigned to one of two (or both) safe shutdown divisions in lieu of paths. The possible combinations of systems were modeled using the EPRI CAFTA tool.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.2	Safe Shutdown Equipment Selection	The licensee stated that the approach used aligns with the intent of the guidance since systems were assigned to one of two (or both) safe shutdown divisions in lieu of paths. The possible combinations of systems were modeled using the EPRI CAFTA tool.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.
3.2.1	Criteria/Assumptions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.1.1	Primary Secondary Components	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.1.2	Fire Damage to Mechanical Components (not electrically supervised)	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.1.3	Manual Valve Positions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.1.4	Check Valves	The licensee stated that the treatment of check valves met the intent of the NEI guidance since the analysis credited the proper functioning of the check valves but did not articulate the assumptions to the extent cited in NEI 00-01. The analysis credits proper seating of the check valve with reverse flow and proper opening with forward flow.	The staff finds this acceptable because the licensee assumed that check valves functioned in accordance with the approach outlined in the endorsed guidance.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.2.1.5	Instrument Failures	The licensee stated that the approach used to address potential fire damage to instruments aligns with the intent of the guidance since the analysis assumed that instruments fail as a result of fire damage and that they generally fail to the worst possible mode, unless a more detailed treatment is documented and justified.	The licensee's approach is consistent with NEI 00-01. Instrument failure is discretely addressed in the analysis and instruments are assumed to fail in the worst possible mode. The staff finds this approach acceptable.
3.2.1.6	Spurious Components	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.1.7	Instrument Tubing	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.2	Methodology for Equipment Selection	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.2.1	Identify the System Flow Path for Each Shutdown Path	The licensee stated that the approach used to identify the system flow paths for safe shutdown components aligns with the intent of the guidance because safe shutdown flow diagrams were developed and the analysis was reflected in the CAFTA fault trees.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.
3.2.2.2	Identify the Equipment in Each Safe Shutdown System Flow Path Including Equipment That May Spuriously Operate and Affect System Operation	The licensee stated that the approach used to identify the system flow paths for safe shutdown components aligns with the intent of the guidance because safe shutdown flow diagrams were developed and the analysis was reflected in the CAFTA fault trees.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.2.2.3	Develop a Safe Shutdown Equipment List and Assign the Corresponding System and Safe Shutdown Path(s) to Each	The licensee stated that the approach used to develop the Safe Shutdown Equipment List aligns with the intent of this guidance, although a safe shutdown division may be assigned rather than a safe shutdown path.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.
3.2.2.4	Identify Equipment Information Required for the Safe Shutdown Analysis	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.2.2.5	Identify Dependencies Between Equipment, Supporting Equipment, Safe Shutdown Systems and Safe Shutdown Paths	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3	Safe Shutdown Cable Selection and Location	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.1	Criteria/Assumptions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.1.1	Cable Selection	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.3.1.2	Cables Affecting Multiple Components	The licensee stated that although the analysis procedures do not specifically address more than one component being associated with the same cable, the circuit analysis for each component is performed independently, such that no cable or circuit may be overlooked. In addition, the safe shutdown database links all cables that could affect the operation of a given component to that component when augmenting the associated CAFTA fault tree.	The staff finds this acceptable because the approach used by the licensee ensures that cables which could potentially impact the operation of a given component have been addressed.
3.3.1.3	Isolation Devices	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.1.4	Identify "Not Required" Cables	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.1.5	Identification of Power Supplies	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.1.6	ESFAS Initiation	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.1.7	Circuit Coordination	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.2	Associated Circuit Cables	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.2 [A]	Cables Whose Failure May Cause Spurious Actuations	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.3.2 [B]	Common Power Source Cables	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.2 [C]	Common Enclosure Cables	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.3	Methodology for Cable Selection and Location	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.3.1	Identify Circuits Required for the Operation of the Safe Shutdown Equipment	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.3.2	Identify Interlocked Circuits and Cables Whose Spurious Operation or Mal-operation Could Affect Shutdown	The licensee stated that the approach used aligns with the intent of this guidance. Interlocked circuits were either included in the analysis, or the interlocked contact or relay was assumed to be in its worst-case position. In addition, associated circuits identified for each component are either included in the main circuit analysis with an "A" in the existing basis column, or are included by listing the applicable circuit in the "Power Supplies, Related Auxiliary, and other Important Circuits" section on the Circuit Information Form.	The staff finds the approach used by the licensee to address interlocked components acceptable based on the description of the process applied, in that when a deviation from the endorsed guidance was identified, a conservative assumption was used in the circuit analysis (i.e., interlocked contact or relay will be assumed to be in the worst-case position).
3.3.3.3	Assign Cables to the Safe Shutdown Equipment	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.3.3.4	Identify Routing of Cables	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.3.3.5	Identify Location of Raceway and Cables by Fire Area	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4	Fire Area assessment and Compliance Assessment	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.1	Criteria/Assumptions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.1.1	Number of Postulated Fires	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.1.2	Damage to Unprotected Equipment and Cables	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.1.3	Assess Impacts to Required Components	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.1.4	Manual Actions	The licensee stated that the binning of operator manual actions being transitioned to recovery actions as a part of the NFPA 805 transition was performed in accordance with FAQ 06-0012, "Determining Manual Actions That Require a Change Evaluation During Transition," rather than the guidance in NEI 00-01.	The staff finds this acceptable because the licensee used guidance accepted by the staff in FAQ 06-0012.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.4.1.5	Repairs	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.1.6	Assess Compliance with Deterministic Criteria	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.1.7	Consider Additional Equipment	The consideration of additional equipment is inherent in performing the safe shutdown analysis. Verification that additional equipment was considered is the inclusion in the analysis of the normal service water system as a credited system during the revalidation.	Based on the information provided, the licensee considered additional equipment as necessary, and at times included in the safe shutdown equipment list. The staff finds this acceptable.
3.4.1.8	Consider Instrument Tubing Effects	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.2	Methodology for Fire Area Assessment	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.2.1	Identify the Affected Equipment By Fire Area	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.2.2	Determine the Shutdown Paths Least Impacted by a Fire in Each Fire Area	The licensee stated that the approach used aligns with the intent of this guidance because, while specific safe shutdown paths were not designated or identified, the least affected safe shutdown division was selected and the CAFTA fault tree, as well as other information in the Fire Safe Shutdown Program Manager Database, was used to develop the best overall safe shutdown strategy.	Although the licensee did not utilize the term safe shutdown paths, the safe shutdown analysis was broken down by safe shutdown divisions, which are functionally similar. The staff finds this approach acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.4.2.3	Determine Safe Shutdown Equipment Impacts	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.4.2.4	Develop a Compliance Strategy or Disposition to Mitigate the Effects Due to fire Damage to Each Required Component or Cable	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
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	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5	Circuit Analysis and Evaluation	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.1	Criteria/Assumptions	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.5.1.1	Circuit Failure Types and Impact	The licensee deviated from the NEI guidance by incorporating an existing deviation from the requirements with regard to cable-to-cable spurious actuations into the safe shutdown analysis. Specifically, in the deterministic safe shutdown analysis, cable-to-cable hot shorts were not assumed to occur. However, all cables and circuits were analyzed and the information from that analysis was included in the Fire PRA. Accordingly, the Fire PRA was performed without any limitation on the types of hot shorts (inter-cable or intra-cable). In addition, post-transition analyses and modifications will consider inter-cable hot shorts to be a credible failure mode.	The staff finds this approach acceptable because the licensee did not limit the spurious actuations assumed in the Fire PRA to intra-cable hot shorts. In addition, any risk significant inter-cable hot shorts should be identified during post-transition analyses and modifications.
3.5.1.2	Circuit Contacts and Operational Modes	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.1.3	Duration of Circuit Failures	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.1.4	Cable Failure Configurations	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.1.5 [A]	Circuit Failure Risk Assessment Guidance	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.1.5 [B]	Cable Failure Modes	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.5.1.5 [C]	Likelihood of Undesired Consequences	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2	Types of Circuit Failures	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.1	Circuit Failures Due to Open Circuits	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.2	Circuit Failures Due to Shorts to Ground [General]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.2	Circuit Failures Due to Shorts to Ground [Grounded Circuits]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.2	Circuit Failures Due to Shorts to Ground [Ungrounded Circuits]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.3	Circuit Failures Due to Hot Shorts [General]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.3	Circuit Failures Due to Hot Shorts [Grounded Circuits]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.2-1: Nuclear Safety Capability Assessment Method Review

NEI 00-01 Section	Section Title	HNP Alignment Basis	NRC Staff Evaluation
3.5.2.3	Circuit Failures Due to Hot Shorts [Ungrounded Circuits]	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.4	Circuit Failures Due to Inadequate Circuit Coordination	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.
3.5.2.5	Circuit Failures Due to Common Enclosure Concerns	Aligns	The NRC staff finds the licensee's statement of alignment to the endorsed guidance acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C: Fire Risk Evaluation Tables

The licensee evaluated the technical adequacy of the portions of its internal events PRA model used to support development of the Fire PRA (FPRA) model by first performing a peer review of the HNP internal events PRA model, followed by a self assessment gap analysis for the model, and finally a focused scope peer review of the internal events PRA. Table 3.4-1, "Internal Events PRA Findings and Observations Resolution," summarizes the NRC staff's review of the licensee's resolution of the internal events PRA F&Os, which demonstrates the technical adequacy.

Since HNP is an industry pilot for NFPA 805, consistent with RG 1.205, Revision 0, the NRC staff performed the review of the licensee's Fire PRA model to determine its technical adequacy because an industry peer review of the HNP Fire PRA model had not yet been performed. Upon completion of the HNP Fire PRA, the industry conducted a focused scope peer review of the licensee's Fire PRA model. This assessment consisted of a focused scope review evaluating areas previously identified by the NRC as (1) not complete, (2) having findings or suggestions, or (3) assigned a Capability Category (CC) I. This review generated additional findings and suggestions, which the licensee then dispositioned. In addition, because a full-scope industry peer review of the HNP Fire PRA was not performed, the NRC staff reviewed a number of aspects of the Fire PRA model in detail. Table 3.4-2, "Fire PRA Findings and Observations Resolution," summarizes the staff review of the licensee's resolution for findings from the NRC staff audit (including both F&Os as well as supporting requirements evaluated as less than Capability Category II without any specific F&O) and the focused scope peer review. This evaluation establishes the technical adequacy of the HNP Fire PRA.

The licensee provided detailed information regarding the correlations and fire models used to support implementation of NFPA 805 at HNP, as well as a cross reference between major sections of American Society for Testing and Materials (ASTM) guidance document ASTM E 1355-05a, "Standard Guide for Evaluating Predictive Capability of Deterministic Fire Models," and the associated correlations in terms of their applicability and validation. Table 3.4-3, "V&V Basis for Fire Modeling Correlations Used at HNP," identifies the empirical correlations and models used in the screening tool, the basis for acceptability with respect to verification and validation (V&V), and the staff's evaluation of that basis. Table 3.4-4, "V&V Basis for Fire Model Calculations of Other Models Used at HNP," identifies the other fire modeling calculations used in the development of the HNP Fire PRA. For each of these additional methods, the NRC staff reviewed the fire protection program quality assurance process requirements of NFPA 805, Section 2.7.3, for performing V&V, limiting the application of acceptable methods and models to within prescribed boundaries, ensuring that personnel applying acceptable methods are qualified, and performing uncertainty analyses.

While performing its review of the licensee's fire risk evaluations, the NRC staff identified several issues that required the licensee to provide additional information in order to demonstrate that it had adequately evaluated the cumulative change in risk associated with transition to NFPA 805. By letter dated August 6, 2009, the staff requested additional information regarding a number of regulatory and technical issues pertaining to the fire risk evaluations. Table 3.4-5, "Resolution of Fire Risk Assessment Requests for Additional Information," provides a summary of these RAIs, the licensee's response, and the NRC staff's evaluation of the licensee's response.

During the development of the HNP Fire PRA, the licensee identified the key assumptions and sources of uncertainty that could potentially impact the risk analyses which support its LAR to transition to NFPA 805, and provided an evaluation of the sensitivity of the risk results to these issues. Table 3.4-6, "Uncertainty and Sensitivity Issues," provides a summary of the uncertainty and sensitivity issues identified and the NRC staff's evaluation of the impact on the associated risk analyses.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C1: Table 3.4-1, Internal Events PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O DA-C1-01 A value of 0.33 was applied to generic data sources with zero failures, which is not consistent with typically accepted statistical approaches.	The use of the 0.33 value in 34 of the 140 generic failure rates is based on a documented approach and has only a small impact on the resulting data distribution. It is applied appropriately and is valid. The documentation has been changed to eliminate confusion introduced through the one-third failure discussion.	-----	The licensee has not adequately addressed the peer review finding. However, use of the licensee's current approach will not significantly change the final failure rates used in the PRA model or the decisions associated with this licensing action, and therefore it is acceptable for this application.
F&O DA-C4-01 Trips of a water chiller unit, if restarted within one hour by the operator and then successfully run, are not counted as valid failures.	The assumption has not actually been applied to any plant-specific water chiller data, and the assumption has been deleted from the documentation.	-----	This deficiency did not impact actual PRA data or modeling, and the correction of the documentation is adequate to resolve the issue.
F&O DA-C8-01 There is no estimate of the time that motor-operated valves were configured in standby.	This item has been resolved by a data update, with an impact of 0.02 percent increase in CDF.	-----	This deficiency has been appropriately resolved.
F&O DA-C10-01 There is no evidence that partial tests of components are distinguished from complete tests in the data.	A review of components using plant-specific data did not identify any partial tests.	CC-III	This deficiency has been appropriately investigated and resolved.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C1: Table 3.4-1, Internal Events PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O DA-D6-01 There is no evidence of a systematic comparison of component boundaries to assure consistency with the common cause data source, and an example of an inconsistency (emergency diesel generator) was identified.	A review was conducted to evaluate boundary consistency and three outliers were identified and corrected.	-----	This deficiency has been appropriately investigated and resolved.
F&O DA-D6-02 A statistical analysis of multiple Greek letter (MGL) parameters for common cause failure consistency with plant experience has not been performed.	A statistical analysis was performed in response to this deficiency, and the MGL parameters used in the PRA model are generally conservative with regard to the plant-specific data. However, the plant data show no common cause failures, and so in general there are no statistical insights gained from this evaluation.	-----	This deficiency has been appropriately investigated and resolved.
Unlabeled The MGL parameters are based on a staggered testing scheme, but no evaluation has been made to assure consistency with the testing scheme actually used.	A review of MGL parameters and testing schemes was made, and the data revised to correct components inappropriately using staggered test scheme parameters.	-----	This deficiency has been appropriately investigated and resolved.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C1: Table 3.4-1, Internal Events PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
<u>F&O QU-E3-01</u> Common cause events are not labeled using a type code unique to a particular component, and therefore the statistical correlations may not be appropriately evaluated in the uncertainty analyses.	This item has no impact on the supporting requirement QU-E3, but instead identifies a deficiency of the uncertainty analyses for capability category III. No change was made, but the documentation was updated to identify this impact.	-----	QU-E3 requires, for capability category II, estimation of parameter uncertainties, which this F&O identifies as deficient. Capability category III requires these parameter uncertainties to be propagated. The staff accepts that this deficiency, as identified, adversely impacts supporting requirement QU-E3 for capability category III, since propagation of uncertainties in estimating the uncertainty of CDF cannot be accomplished unless there is statistical linkage between the independent and common cause failure events. However, capability category II is acceptable for this application, and is met by the licensee estimating parameter uncertainty, which has been accomplished.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
PP-B1 (NRC) The NRC audit found this supporting requirement to be not met based on non-conformance to the referenced supporting requirement PP-B2. F&Os PP-B2-1 and PP-B2-2 therefore apply to this requirement by reference, and are addressed below.	See F&Os PP-B2-1 and PP-B2-2.	CC-II/III	Based on satisfactory resolution of relevant F&Os PP-B2-1 and PP-B2-2, this deficiency has been appropriately resolved by the licensee.
F&O PP-B2-1 (NRC) The justification for use of non-rated barriers as partition boundaries is not sufficient compared to the requirements of the standard and NUREG/CR-6850.	Additional walkdowns of non-rated barriers were performed, and additional descriptive information was added into the documentation. The item was subsequently reviewed by the focused scope peer review and dispositioned as acceptable in F&O PP-C3-1, which is an additional F&O covering the same technical issues for a different standard requirement (see below).	CC-II/III	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O PP-B2-2 (NRC) The justification for the use of “rooms” within fire compartments is inadequate to conclude that hot gas layer formation would be confined to smaller areas than the full compartment.	The use of “rooms” within compartments has been eliminated. The item was subsequently reviewed by the focused scope peer review and dispositioned as acceptable in F&O PP-C3-1, which is an additional F&O covering the same technical issues for a different standard requirement (see below).	CC-II/III	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O PP-B2-01 (Peer Review) Documentation of the characteristics of non-rated barriers is not adequate.	The documentation was enhanced based on the additional walkdowns performed.	CC-II/III	This deficiency has been appropriately resolved by the licensee.
F&O PP-C3-1 (NRC) This F&O covers the same issues identified by F&Os PP-B2-1 and PP-B2-2, which also apply to standard requirement PP-C3.	The focused scope peer review found this F&O to be acceptably resolved.	Met	Based on satisfactory resolution of relevant F&Os PP-B2-1 and PP-B2-2, this deficiency has been appropriately resolved by the licensee.
F&O ES-A6-1 (NRC) The quantification of LERF is not complete.	LERF calculations have been completed, and were reviewed by the focused scope peer review team.	CC-III	Based on the licensee's stated completion of the LERF analysis and review by the focused scope peer review team, this deficiency is resolved.
F&O ES-B4-1 (NRC) No containment bypass except interfacing systems LOCA pathways have been considered, and there is no documentation that pathways beyond two spurious operations have been considered.	All containment release pathways are considered without regard to the number of spurious operations required. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	CC-III	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O ES-C1-1 (NRC) A general assumption of adequate diverse instrumentation available for performance of required operator actions is not justified based on some actions having only a single instrument identified.	This general assumption is no longer used, and cable routing for required instruments has been performed in cases where there is inadequate redundancy and diversity.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review (see F&O ES-C1-01 below) of the technical issue (the F&O identifies only a documentation issue), this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O ES-C1-01 (Peer Review) The documentation of instruments for which cable routing was performed and used in the PRA model contains conflicting information.	The documentation has been revised to clarify how instrument cable routing is used in the PRA.	Met	Based on the identification of corrective actions being completed, this deficiency has been appropriately resolved by the licensee.
F&O ES-D1-1 (NRC) The documentation associated with this supporting requirement was identified as inadequate.	The creation of additional documentation and databases, as well as improvements to specific calculations, has been completed. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O CS-A3-1 (NRC) An example of possible fire damage not being reflected in the PRA model was identified.	A systematic problem during a model update led to the discrepancy. The scope of the problem was identified and the errors corrected. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O CS-A4-1 (NRC) This F&O covers the same issues identified by F&O CS-A3-1, which also applies to standard requirement CS-A4.	See F&O CS-A3-1.	Met	Based on satisfactory resolution of relevant F&O CS-A3-1, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O CS-A7-1 (NRC) Inter-cable hot shorts were not considered for containment bypass leading to a potential large early release from containment.	The issue has been resolved through evaluation of each potential containment release pathway for multiple spurious operations, and consideration by an expert panel of the potential impacts of more than two spurious operations. Inter-cable hot shorts were not applicable to containment penetrations because the valves are solenoid-operated, fail-closed valves not subject to inter-cable three-phase hot shorts. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the evaluation of containment release pathways and the determination that the type of valve employed is not subject to inter-cable three-phase hot shorts, this deficiency has been appropriately resolved by the licensee.
F&O CS-A8-1 (NRC) Three-phase hot shorts were not considered for containment bypass leading to a potential large early release from containment.	See F&O CS-A7-1	Met	Based on satisfactory resolution of relevant F&O CS-A7-1, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O CS-C4-1 (NRC) Configuration management is not linked to the electrical coordination calculations performed.	Configuration management controls have been identified and revisions to the administrative procedures applicable to the Fire PRA model configuration control process have been completed in order to reference the applicable coordination analyses. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O PRM-A1-1 (NRC) No specific conditional LERF model was developed.	LERF calculations have been completed, and were reviewed by the focused scope peer review team.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O PRM-A2-1 (NRC) This F&O covers the same issues identified by F&O PRM-A1-1, which also applies to standard requirement PRM-A2.	See F&O PRM-A1-1.	Met	Based on satisfactory resolution of relevant F&O PRM-A1-1, this deficiency has been appropriately resolved by the licensee.
F&O PRM-B1-1 (NRC) The Fire PRA neglects that minor LERF contributors for the internal events PRA model could become more important for fire scenarios.	The Fire PRA development process was revised to reconsider minor LERF contributors that were screened in the internal events PRA model. This aspect of the Fire PRA LERF model was reviewed by the focused scope peer review team and found acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O PRM-B8-1 (NRC) Modeling for spurious operations is conservative based on four specific examples, indicating that requirement SY-A20 of the internal events PRA standard (referenced by PRM-B8) is only met at capability category I.	A disposition of each of the four specific examples was provided to justify the conservative treatment. The focused scope peer review team considered this F&O and concurred that no changes to the PRA model were necessary.	Met	Based on the disposition of the deficiencies, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately dispositioned by the licensee.
PRM-B13 This F&O covers the same issues identified by F&O PRM-B1-1, which also applies to standard requirement PRM-B13.	See F&O PRM-B1-1.	Met	Based on satisfactory resolution of relevant F&O PRM-B1-1, this deficiency has been appropriately resolved by the licensee.
PRM-B14 This F&O covers the same issues identified by F&O PRM-B1-1, which also applies to standard requirement PRM-B14.	See F&O PRM-B1-1.	Met	Based on satisfactory resolution of relevant F&O PRM-B1-1, this deficiency has been appropriately resolved by the licensee.
F&O FSS-A2-1 (NRC) Critical equipment with a lower threshold temperature for damage, and the effects of wall and corner zones of influence for transient fires, were not considered.	Critical equipment was considered in the Scoping Walkdown calculation, with any special treatment performed during the quantification task. Further, transient combustibles were placed in conservative locations not requiring consideration of wall and corner ZOIs. The focused scope peer review considered this F&O and concurred with the licensee's dispositions.	Met	Based on the disposition of the deficiencies, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately dispositioned by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O FSS-B1-1 (NRC) Lost or degraded functions are not discussed in the control room abandonment analysis.	The documentation was enhanced to include this information. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O FSS-C5-1 (NRC) Consideration of solid state control components with a lower damage threshold than cable has not been made.	Applicable calculations were revised to consider identification of equipment with lower damage thresholds. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	CC-I/II	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O FSS-D1-1 (NRC) Detailed fire modeling was not applied, which appears to be giving very conservative estimates of fire damage.	Some additional fire modeling has been performed to remove conservatism. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
FSS-D3 (NRC) The NRC audit found that this supporting requirement was met at capability category I based on no use of detailed fire modeling, which had not been completed at the time of the audit.	The focused scope peer review team evaluated this supporting requirement to meet capability category III.	CC-III	Based on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
FSS-D7 (NRC) The NRC audit found that this supporting requirement was met at capability category I based on a review of the licensees calculations and the treatment of fire detection system unavailability. Capability category II would require a review to confirm that detection systems have not experienced outlier behavior with regards to unavailability.	The focused scope peer review team also evaluated this supporting requirement to meet capability category I. The licensee dispositioned capability category I as being acceptable for this supporting requirement because of the minor impact treatment of detection system unavailability would have on the results. In addition, the generic unavailability values employed in the Fire PRA are conservative with respect to actual system performance. The system is also installed in accordance with applicable code requirements, and availability is monitored by the NFPA 805 monitoring program.	CC-I	Based on the conservative treatment of unavailability in the generic data when compared to the actual system performance, as well as ongoing monitoring of unavailability, capability category I is acceptable for this application.
F&O FSS-E3-1 (NRC) No uncertainty analysis was performed.	The parametric uncertainties associated with various elements of the Fire PRA, including identification of sources and methods, have been completed. The focused scope peer review team evaluated this supporting requirement as capability category I.	CC-I	Based on the margin to the risk acceptance guidelines, it is unlikely that the parametric uncertainties of the failure rates would significantly impact the Fire PRA results or decisions. As such, capability category I is deemed sufficient for this plant-specific application.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
FSS-D9 (NRC) The NRC audit found that this supporting requirement was met at capability category I based on no treatment of the potential for smoke damage to the equipment credited in the Fire PRA.	The focused scope peer review team also evaluated this supporting requirement to meet capability category I. The licensee dispositioned capability category I as being acceptable for this supporting requirement because of the minor impact treatment of smoke effects would have on the results. HNP utilizes smoke purge ventilation systems for major plant areas such as switchgear rooms, electrical protection rooms, rod control cabinets rooms and stairs, the control room, and cable vault areas. Smoke purge capabilities are further detailed in the fire safety analyses for individual plant fire areas. For all other plant fire areas, smoke management, in addition to smoke purge ventilation, is provided through the use of portable smoke ejectors by the fire brigade, as described in the Fire Pre-Plans for individual plant fire areas/zones. By minimizing the time of exposure and extent of smoke migration, smoke damage to Fire PRA related equipment is reasonably expected to be minimized.	-----	Based on the plant-specific design for smoke mitigation, as well as administrative controls for management of smoke, the assumption of capability category I is acceptable for this application.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O FSS-F-1 (NRC) Tasks associated with high level requirement FSS-F have not been performed. This requirement addresses the impact of fires on exposed structural steel.	The licensee identified and assessed qualitatively the most limiting location, which was the turbine building and a large turbine lube oil fire. The licensee provided its assessment of the supporting requirements as capability category I/II for FSS-F1 and capability category I for FSS-F2. The focused scope peer review team also evaluated these supporting requirements as capability category I/II and I. The licensee dispositioned capability category I as acceptable based on the open design of the turbine building, which contains the only significant exposure of structural steel, and stated that the impact of such fires is a reactor/turbine trip with minor complications such as a loss of offsite power Other structures at HNP were also reviewed to assess the potential for large oil fires capable of causing the failure of structural steel. With the exception of the turbine building, there are no large oil hazards capable of sustaining the fire temperatures necessary to cause structural damage. The turbine building would be the only structure at HNP that satisfies the above criteria, both from the exposed structural steel and high hazard fire source perspective. Therefore, the evaluation for potential damage to exposed structural steel was performed for all locations identified as meeting the criteria of both (a) exposed structural steel is present and (b) a high hazard fire source is present in that location.	F1: CC-I/II F2: CC-I F3: Not Met**	FSS-F2 requires establishing and justifying criteria for structural collapse due to fire failure. Based on the licensee's evaluation of the open turbine building as the only vulnerable structure, capability category I is acceptable for this application.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O FSS-F3-01 (Peer Review) There are no clearly described scenarios regarding fire-induced structural steel failure.	The licensee acknowledged the deficiency, but justified not meeting this supporting requirement with a statement that the limited scope of potential fire scenarios involving fire-induced structural steel failure has a minimal potential impact on CDF or LERF. The finding itself remains open.	Not Met**	Based on the licensee's evaluation of the open turbine building as the only vulnerable structure, capability category I for FSS-F3-01 is acceptable for this application, and not specifically meeting FSS-F3-01 is also acceptable for this application.
F&O FSS-G-1 (NRC) Tasks associated with high level requirement FSS-G for multi-compartment fire scenarios have not been performed.	This area has now been completed and the focused scope peer review team completed its assessment. All requirements were met at least at capability category II (where applicable). Requirement FSS-G5 was identified as not applicable to the HNP PRA, since it deals with active fire barrier elements that are not credited in the HNP model.	G1: Met G2: Met G3: Met G4: CC-II G5: N/A G6: CC-II/III	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee. The justification for requirement FSS-G5 as not applicable to the plant-specific design is also acceptable.
F&O FSS-H2 (NRC) The NRC audit found that this supporting requirement was met at capability category I based on no documentation of references for plant-specific or target-specific performance criteria, as required for capability category II/III.	References have been identified and the focused scope peer review team evaluated this supporting requirement to meet capability category II/III.	CC-II/III	Based on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O FSS-H5 (NRC) The NRC audit found that this supporting requirement was met at capability category I based on the absence of parameter uncertainty evaluations, as required for capability category II.	The focused scope peer review team found that this requirement is only met at capability category I, and no further changes have been made to the supporting documentation. The basis for capability category I being acceptable is that statistical and parameter uncertainty documentation do not have a direct impact on the specific results, but do indicate areas for further investigation.	CC-I	Based on the margin to the risk acceptance guidelines, it is unlikely that the parametric uncertainties of the failure rates would significantly impact the Fire PRA results or decisions. As such, capability category I is deemed sufficient for this plant-specific application.
Undocumented (NRC) Supporting requirement FSS-H6 is met only at capability category I, but no F&O was identified. The issue is addressed by F&O FSS-H5.	See F&O FSS-H5.	CC-I	See F&O FSS-H5.
F&O FSS-H8-1 (NRC) This F&O covers the same issues identified by F&O FSS-G-1, which also applies to standard requirement FSS-H8.	See F&O FSS-G-1.	-----	Based on satisfactory resolution of relevant F&O FSS-G-1, this deficiency has been appropriately resolved by the licensee.
F&O FSS-H9-1 (NRC) No work on uncertainties was completed.	This task was subsequently completed and reviewed satisfactorily by the focused scope peer review team.	Met	Based on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
IGN-A4 The NRC audit found that this supporting requirement was met at capability category I based on a lack of consideration of plant-specific experience for fire events, as required for capability category II.	The focused scope peer review team found that this requirement is only met at capability category I, and no further changes have been made to the supporting documentation. The licensee reviewed and documented plant experience for fire events, and concluded that there were no outliers. Since a Bayesian update of the generic data using zero plant events would reduce the generic frequencies results, the currently applied values were considered conservative. Therefore, based on the current analysis, supporting requirement IGN-A4 meets capability category II.	CC-I	Based on the licensee's evaluation of plant-specific experience for fire events and the determination that no outlier experience existed, this deficiency has been appropriately resolved.
F&O IGN-A5-1 (NRC) This F&O identifies that the supporting requirement is met – no further review is therefore required.	Not Required	Met	Not Required.
F&O CF-A1-01 (Peer Review) Both intra- and inter-cable contributions to hot short probability are not included.	The licensee identified conservatisms in the selection of hot short probabilities applicable to the specific cable types and configurations at HNP, as well as uncertainties in the data, as justification that omitting the contribution of both intra- and inter-cable to hot short probabilities is acceptable.	CC-I	Based on the conservative approach taken by the licensee in assessing hot short probabilities for the plant-specific cable types and configurations, capability category I is acceptable for this application.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O CF-B1-1 (NRC) The associated documentation needs to be updated to include additional technical information.	The documentation was updated and reviewed satisfactorily by the focused scope peer review team.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O HRA-B2-1 (NRC) Recovery actions not credited in the PRA model have potential negative consequences which should be modeled.	The affected procedures are being revised to eliminate the negative consequences. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O HRA-C1-3 (NRC) The determination of significant human failure events requiring detailed analysis does not conform to the standard definition of “significant” for capability category II.	The determination of significant human failure events requiring detailed analysis was made based on contribution to CDF. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O HRA-C1-4 (NRC) This F&O covers the same issues identified by F&O HRA-B3-1, which also applies to standard requirement HRA-C1.	See F&O HRA-B3-1.	Met	See F&O HRA-B3-1.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O HRA-B3-1 (NRC) The determination that adequate redundant instruments are available for a particular fire scenario includes an unverified assumption that redundant indications have cable separation.	The assumption remains unverified. This supporting requirement was reviewed by the focused scope peer review team. The supporting requirement HRA-B3 distinguishes capability categories I, II, and III, but the peer review only identified that the requirement was "met." The licensee identified that assumed cable routing for instruments is used in the Fire PRA as a part of the model. As a general practice, divisionally separated redundant instrument channels are not routed in the same cable trays or conduits. Instruments penetrating containment would also generally be routed through their associated train penetration rooms. Several of the assumed routings are associated with instruments credited in the safe shutdown analysis, thereby requiring protection of these instruments from a fire impacting both divisions. Additionally, the diverse instrument requirement was added to provide margin by including additional parameters with greater likelihood of independent routing. Therefore, the assumption of independent cable routing for diverse and redundant, divisionally separated instruments is reasonable.	Met	Based on the plant-specific configuration of instrument cable routings identified by the licensee, the assumption is reasonable to support the human reliability analysis.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O HRA-C1-5 (NRC) The general assumption that the event timing in support of the human reliability analysis is not affected by fire was identified as not consistent with the requirements of HRA-G4 from the internal events PRA standard. This supporting requirement addresses the thermal-hydraulic basis for event timing using generic or plant-specific analyses.	The human failure events were examined for event timing in the associated fire scenarios, and were either not credited or conservatively treated. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable.	Met	Based on the identification of a conservative treatment for credited actions, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O HRA-C1-6 (NRC) The requirements of HRA-G6 from the internal events PRA standard have not yet been completed due to the completion status of the Fire PRA. This supporting requirement addresses consistency of the human failure event probabilities.	This task has been completed and reviewed satisfactorily by the focused scope peer review team.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O SF-1 (NRC) Tasks associated with this high level requirement have not been performed. This supporting requirement addresses issues related to the qualitative evaluation of seismic-fire interactions.	This task has been completed and reviewed satisfactorily by the focused scope peer review team. Note that one F&O was identified and resolved (see F&O SF-A1-01, below).	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O SF-A1-01 (Peer Review) The seismic-fire interactions analysis was not updated from the original individual plant examination for external events (IPEEE).	An updated evaluation was provided and reviewed by the focused scope peer review team, and found to be acceptable.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O FQ-A2-01 (Peer Review) The basis for the probability of a reactor trip in each fire compartment is not identified.	This information was added to the applicable calculation file.	Met	Based on the corrective action being completed, this deficiency has been appropriately resolved by the licensee. (Note: the NRC audit found that this supporting requirement was met, and the licensee did not identify that this item was within the scope of the focused scope peer review.)
F&O FQ-A4-1 (NRC) Fire quantification does not identify individual sequences to permit significant sequences to be identified.	A manual review of the most significant compartments and sources was conducted to identify applicable sequences. This supporting requirement was reviewed by the focused scope peer review team and found to be acceptable. The licensee also stated that the supporting requirement (QU-A2a) from the internal events PRA standard is not applicable to Fire PRA, based on fires being complete transient events with some minor interfacing systems LOCA sequences, such that identification of significant sequences does not provide additional information.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O FQ-A4-02 (Peer Review) Correlated uncertainty estimates for CDF are not performed, which does not satisfy capability category II for the referenced internal events supporting requirement (QU-A2b).	The focused scope peer review team found that this requirement is only met at capability category I, and no further changes have been made to the supporting documentation. The F&O remains open.	Met	Correlated uncertainty is not expected to have a significant impact on the results of the Fire PRA. Typically, a fire will damage one train of equipment, and then a random failure of the undamaged train will result in loss of a safety function. These failure modes are not correlated, and so this supporting requirement is not relevant. Therefore capability category I is an acceptable level of technical adequacy for this supporting requirement.
F&O FQ-D1-1 (NRC) This F&O covers the same issues identified by F&O PRM-A1-1 for the lack of LERF analyses, which also applies to standard requirement FQ-D1.	See F&O PRM-A1-1.	Met	Based on satisfactory resolution of relevant F&O PRM-A1-1, this deficiency has been appropriately resolved by the licensee.
F&O FQ-D1-01 (Peer Review) A parametric uncertainty analysis is not performed.	The software used by the licensee limits the ability to perform such an analysis. The licensee also stated that such an analysis is of limited or no value because of the overwhelming uncertainties associated with fire analysis elements. The F&O remains open.	Met	Quantitative treatment of parametric uncertainties is not required to comply with the risk evaluations for NFPA 805. Therefore capability category I is an acceptable level of technical adequacy for this supporting requirement.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O FQ-E1-1 (NRC) This F&O covers the same issues identified by F&O PRM-A1-1 for the lack of LERF analyses, which also applies to standard requirement FQ-E1. An additional issue involves the subsuming of non-minimal events in cutset files, such that not all equipment failed by the fire may be included.	The focused scope peer review team identified that the results generally meet the supporting requirements, but are not documented in a final format. Therefore, the licensee stated that the open status of this item is a documentation issue only.	Met	Based on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee for this application.
F&O FQ-E1-01 (Peer Review) This F&O covers the same issue identified by F&O FQ-E1-1.	See F&O FQ-E1-1.	Met	See F&O FQ-E1-1.
F&O FQ-E1-2 (NRC) The standard definition of “significant contributor” includes the top 95 percent of sequences, which is apparently not applied to the Fire PRA.	The definition is now applied in the relevant calculation files. This supporting requirement was reviewed by the focused scope peer review team and the specific deficiency was not identified.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O FQ-F1-1 (NRC) The documentation requirements of supporting requirement QU-F2 from the internal events PRA standard are not in place.	The focused scope peer review team identified that the results generally meet the supporting requirements, but are not documented in a final format. Therefore, the licensee stated that the open status of this item is a documentation issue only.	Met	Based on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O FQ-F1-01 (Peer Review) This F&O covers the same issue identified by F&O FQ-F1-1.	See F&O FQ-F1-1.	Met	See F&O FQ-F1-1.
F&O FQ-F1-2 (NRC) Significant contributors to the fire CDF are not documented.	Documentation of significant contributors to fire CDF is now complete, and reviewed satisfactorily by the focused scope peer review team.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O FQ-F1-3 (NRC) Assumptions and sources of uncertainty are not documented.	This documentation is now complete, and reviewed satisfactorily by the focused scope peer review team.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.
F&O FQ-F2-1 (NRC) There is no assessment of the referenced requirements of the internal events PRA standard to document any non-applicability.	The focused scope peer review team identified that the results generally meet the supporting requirements, but are not documented in a final format. Therefore, the licensee stated that the open status of this item is a documentation issue only.	Not Met**	Based on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee for this application.
F&O UNC-1 (NRC) Tasks associated with this high level requirement on uncertainty analyses have not been performed.	This task was completed and the focused scope peer review team completed its assessment.	Met	Based on the identification of corrective actions being completed, and on satisfactory review by the focused scope peer review, this deficiency has been appropriately resolved by the licensee.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C2: Table 3.4-2, Fire PRA F&O Resolution

Finding and Observation	Licensee Disposition	Final Status	NRC Staff Disposition
F&O UNC-A1-01 (Peer Review) This F&O covers the same issues identified by F&O FQ-D1-01.	See F&O FQ-D1-01.	Met	See F&O FQ-D1-01.
F&O MU-A1-01 (Peer Review) Configuration control for the Fire PRA links to plant documents related to safe shutdown and electrical coordination should be specified in administrative procedures.	The affected procedure was revised as identified.	Met	Based on the identification of corrective actions being completed, this deficiency has been appropriately resolved by the licensee.
F&O MUD-B4-1 (NRC) The Fire PRA standard is not referenced in administrative procedures for configuration control.	The affected procedure was revised as identified.	Met	Based on the identification of corrective actions being completed, this deficiency has been appropriately resolved by the licensee.
F&O MUD-B4-01 (Peer Review) Outdated references for PRA standards are identified in administrative procedures for configuration control.	The affected procedure was revised as identified.	Met	Based on the identification of corrective actions being completed, this deficiency has been appropriately resolved by the licensee.

** Not meeting a specific supporting requirement of the PRA can be acceptable if it is deemed to have minimal impact on the overall model as it is being utilized for the current application. The NRC staff has concluded that this is the case for the HNP NFPA 805 LAR and its associated Fire PRA model.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C3: Table 3.4-3, V&V Basis for Fire Modeling Correlations Used at HNP

Correlation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Flame Height	Provides a limit on the use of the ZOI.	NUREG-1805 NUREG-1824	• The flame height correlation is used in both the Collaborative Force Analysis, Sustainment, and Transportation (CFAST) and NUREG-1805 fire models, for which V&V was documented in NUREG-1824. • Use of the correlation was limited to its range of applicability. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.
Radiant Heat Flux Method of Shokri and Beyler (detailed)	Calculates target heat flux to determine the lateral extent of the ZOI.	NUREG-1805 NUREG-1824 SFPE Engineering Guide,1999	• This correlation produces the most conservative results of the four correlations considered in the calculation, while maintaining a credible radiated energy fraction from the flame shapes postulated. • The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824; and the V&V basis for the correlation is documented in an authoritative publication of the SFPE Engineering Guide. • Use of the correlation was limited to its range of applicability. Since (1) the correlation produces conservative results, (2) the V&V basis is NUREG-1824 and an authoritative publication of the SFPE Engineering Guide, and (3) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C3: Table 3.4-3, V&V Basis for Fire Modeling Correlations Used at HNP

Correlation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Plume Heat Fluxes	Calculates the vertical separation distance to the target in order to determine the vertical extent of the ZOI.	Wakamatsu et al., 2003 SFPE Handbook, 4th Edition, Chapter 2-14, Lattimer, B., 2008	• The ZOI vertical separation distance used in the HNP application is based on the more severe result from this calculation and the calculation for plume centerline temperature (see below). • The correlation is documented in an authoritative publication of the SFPE Handbook of Fire Protection Engineering and in a published conference report. • The correlation was used within the limits of its range of applicability. Since (1) the application uses the more conservative of the two correlations for determining the vertical extent of the ZOI, (2) the V&V basis is an authoritative publication of the SFPE Handbook of Fire Protection Engineering and a published article in a conference report, and (3) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.
Hydrocarbon Spill Fire Size	Determines the heat release rate for unconfined hydrocarbon spill fires.	SFPE Handbook, 3rd Edition, Chapter 3-11, Beyler, C., 2002	• The correlation is documented in an authoritative publication of the SFPE Handbook of Fire Protection Engineering. Since the V&V basis is an authoritative publication of the SFPE Handbook of Fire Protection Engineering, the NRC staff finds use of this correlation in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C3: Table 3.4-3, V&V Basis for Fire Modeling Correlations Used at HNP

Correlation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Plume Centerline Temperature	Calculates the vertical separation distance to the target in order to determine the vertical extent of the ZOI.	NUREG-1805 NUREG-1824 SFPE Handbook, 4th Edition, Chapter 2-1, Heskestad, G., 2008	• The ZOI vertical separation distance used in the HNP application is based on the more severe result from this calculation and the calculation for plume heat fluxes (see above). • The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824; and the V&V basis for the correlation is documented in an authoritative publication of the SFPE Handbook of Fire Protection Engineering. • The correlation was used within the limits of its range of applicability. Since (1) the application uses the more conservative of the two correlations for determining the vertical extent of the ZOI, (2) the V&V basis is NUREG-1824 and an authoritative publication of the SFPE Handbook of Fire Protection Engineering, and (3) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.
Flame Extension	Determines the fire offset for open panel fires; only used when the possibility of flame extensions are present.	SFPE Handbook, 3rd Edition, Chapter 3-11, Beyler, C., 2002	• The correlation is documented in an authoritative publication of the SFPE Handbook of Fire Protection Engineering. Since the V&V basis is an authoritative publication of the SFPE Handbook of Fire Protection Engineering, the NRC staff finds use of this correlation in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C3: Table 3.4-3, V&V Basis for Fire Modeling Correlations Used at HNP

Correlation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Corner Flame Height	Determines the heat release rate for fires that are proximate to a corner to determine the vertical extent of the ZOI.	SFPE Handbook, 3rd Edition, Chapter 2-14, Lattimer, B., 2002	• This correlation is used to ensure that a conservative separation distance is calculated when the fire dynamics have limited entrainment conditions. • The correlation is documented in an authoritative publication of the SFPE Handbook of Fire Protection Engineering. Since (1) the correlation produces conservative results and (2) the V&V basis is an authoritative publication of the SFPE Handbook of Fire Protection Engineering, the NRC staff finds use of this correlation in the HNP application acceptable.
Line Fire Plume Centerline Temperature	Calculates simplified separation distances to the target in order to provide a limit on use of the ZOI and the extent of the ZOI for cable tray fires.	Yuan et al.,1996 (peer-reviewed journal experimental data)	• The correlation is documented in a peer-reviewed journal article. Since the V&V basis is a peer-reviewed journal article, the NRC staff finds use of this correlation in the HNP application acceptable.
Ventilation Limited Fire Size	Assesses the significance of vent position on the hot gas layer temperature to determine the fire size due to ventilation limitations.	SFPE Engineering Guide, 2004	• This correlation is used to develop generic rules for various ventilation opening sizes while ensuring bounding cases are applied. • The correlation is documented in an authoritative publication of the SFPE Engineering Guide. Since (1) the methodology ensures use of bounding results and (2) the V&V basis is an authoritative publication of the SFPE Engineering Guide, the NRC staff finds use of this correlation in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

References for Table 3.4-3

1. NUREG-1805, "Fire Dynamics Tools (FDT^{s}) Quantitative Fire Hazard Analysis Methods for the U. S. Nuclear Regulatory Commission Fire Protection Inspection Program," U.S. Nuclear Regulatory Commission, Washington, DC, December 2004.

2. NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," U.S. Nuclear Regulatory Commission, Washington, DC, May 2007.

3. The SFPE Engineering Guide, "Assessing Flame Radiation to External Targets from Pool Fires," Society of Fire Protection Engineers, Bethesda, MD, June 1999.

4. Wakamatsu, T., Hasemi, Y., Kagiya, K., and Kamikawa, D., "Heating Mechanism of Unprotected Steel Beam Installed Beneath Ceiling and Exposed to a Localized Fire: Verification Using the Real-scale Experiment and Effects of the Smoke Layer," Proceedings of the Seventh International Symposium on Fire Safety Science, International Association for Fire Safety Science, London, UK, 2003.

5. Lattimer, B. Y., "Heat Fluxes from Fires to Surfaces," Chapter 2–14 of The SFPE Handbook of Fire Protection Engineering, 4th Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.

6. Beyler, C.L., "Fire Hazard Calculations for Large, Open Hydrocarbon Fire," Chapter 3-11 of The SFPE Handbook of Fire Protection Engineering, 3rd Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2002.

7. Heskestad, G., "Fire Plumes, Flame Height, and Air Entrainment," Chapter 2–1 of The SFPE Handbook of Fire Protection Engineering, 4th Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.

8. Lattimer, B. Y., "Heat Fluxes from Fires to Surfaces," Chapter 2–14 of The SFPE Handbook of Fire Protection Engineering, 3rd Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2002.

9. Yuan, L. and Cox, F., "An Experimental Study of Some Line Fires," Fire Safety Journal, Volume 27, 1996.

10. The SFPE Engineering Guide, "Fire Exposures to Structural Elements," Society of Fire Protection Engineers, Bethesda, MD, May 2004.

11. Kleinsorg Group Risk Services, LLC, "Generic Fire Modeling Treatments," Revision 0, January 23, 2008, prepared for ERIN Engineering and Research, Inc.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C4: Table 3.4-4, V&V Basis for Fire Model Calculations of Other Models Used at HNP

Calculation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Hot Gas Layer Calculation (HNP-M/ MECH-1128)	The prediction of a damaging hot gas layer within a compartment.	NUREG-1805 NUREG-1824 NUREG/CR-6850, Damage Criteria	• Based on thermoplastic and thermoset targets, the smallest HRR to generate a bounding damaging HGL was used as a result of the analysis based on NUREG-1805. • The values for a square room configuration and target damage limits were determined to be conservatively bounding. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.
Fire ZOI Calculation (HNP-M/ MECH-1129)	To determine the ZOI for a given fire, for a given target.	NUREG-1805 NUREG-1824 NUREG/CR-6850, Damage Criteria	• In estimating the radiant heat flux, NUREG-1805 provides sufficiently conservative results to warrant its use in this application. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.
Fire Area 1-A-BAL-B Fixed and Transient Ignition Source Fire Modeling Analysis (HNP-M/ MECH-1140)	To determine the impact of a lube oil spill fire in the chiller room.	NUREG-1805 NUREG-1824 NUREG/CR-6850, Damage Criteria	• This calculation determines the oil spill fire scenario for exposure to overhead cable trays. The NUREG-1805 correlations were used within their appropriate scopes and limitations for this analysis. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C4: Table 3.4-4, V&V Basis for Fire Model Calculations of Other Models Used at HNP

Calculation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Process Instrument and Control (PIC) Room Hot Gas Layer Temperature Resulting from Small Electrical Cabinet Fires (HNP-M/ MECH-1193)	To determine fire sizes in the PIC room.	CFAST Version 6.0.10 NUREG-1824 NUREG/CR-6850, Damage Criteria	• This analysis summarizes the minimum fire sizes in the PIC room that could produce a damaging hot gas layer temperature, including natural and forced ventilation conditions. • The documentation, data, and analysis used in the CFAST model for calculating temperatures are within the capability and limitation of the model. The model is expected to give reasonably accurate or conservative answers. • Sensitivity evaluations were appropriately conducted for ventilation condition impact on the hot gas layer temperature. Benchmark verification was conducted because the CFAST version used differs from that V&V'd in NUREG-1824. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that CFAST was applied within the limits of its applicability, the NRC staff finds use of this version of CFAST in the HNP application acceptable.
Thermal Damage Time of Cables Above a Burning Electrical Cabinet (HNP-M/ MECH-1194)	To calculate the time to cable damage.	NUREG-1805 NUREG-1824 NUREG/CR-6850, Damage Criteria	• This calculation was used to compute the time at which cables suspended over a burning electrical cabinet are damaged according to NUREG/CR-6850 guidance and criteria. • The NUREG-1805 correlations were used for determining centerline plume temperatures. This data, in conjunction with the NUREG/CR-6850, Appendix H, cable endurance times for cables at various elevated temperatures, was used to form the basis for a composite calculated damage time for targets at varied elevations above several different ignition source fire sizes. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C4: Table 3.4-4, V&V Basis for Fire Model Calculations of Other Models Used at HNP

Calculation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Flame Spread Rate Along a Cable Tray (HNP-M/ MECH-1195)	-----	Lee, 1985	The method used for calculating flame spread rate is a departure from NUREG/CR-6850, where a methodology is employed that is dependent on the thermo-physical properties of specific heat, thermal conductivity, density, and “ignition temperature,” as well as the phenomenological values of incident heat flux from the flame to the fuel (cable) surface and the “heated fuel distance” (which is selected by engineering judgment). Because the thermo-physical properties for Kerite fire-rated cables are not available in published sources, nor is alternate research available, an empirically-based method with the single variable of heat release rate was selected to calculate the flame spread rate. NUREG-1805 and IMC 0609 data was used, in conjunction with horizontal flame spread correlations as documented in Lee, 1985, to correlate bench-scale data to moderate-scale tests in terms of an area spread rate for a single cable tray array. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that the correlation was applied within the limits of its applicability, the NRC staff finds use of this correlation in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C4: Table 3.4-4, V&V Basis for Fire Model Calculations of Other Models Used at HNP

Calculation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Fire Area 1-A-SWGRB Transient Fire Modeling Analysis of a Fixed Ignition Source (HNP-M/ MECH-1196)	To calculate hot gas layer temperature in the "B" switchgear room	CFAST Version 6.0.10 NUREG-1824 NUREG/CR-6850, Damage Criteria	• The goal of the calculation was to determine the HGL temperature for various fire scenarios involving ignition sources that burned for 60 minutes. The time that the HGL reached 400°F was of particular interest because that was the assumed failure temperature of the targets. • CFAST was used in conjunction with a post-processing routine as part of the analysis. This includes supplemental information provided in the licensee's letter dated August 13, 2009 (see response to RAI 5-6 (c)), related to the revised ZOI for specific electrical cabinets that exhibit vent plume characteristics. • In estimating the hot gas layer, CFAST provides a sufficiently conservative result to warrant its use in the NFPA 805 fire modeling efforts. The licensee evaluated the propagation of fire that results in cable damage of targets above select electrical cabinets by calculating the temperature of the exposing vent plume at the target cable tray positions using methods presented by S. Yokoi. The vent mass flows, external burning, and gas temperatures are determined using the zone model CFAST, and are subsequently used as inputs to the plume trajectory correlation. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that CFAST was applied within the limits of its applicability, the NRC staff finds use of this version of CFAST in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C4: Table 3.4-4, V&V Basis for Fire Model Calculations of Other Models Used at HNP

Calculation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Fire Area 1-A-SWGRA Transient Fire Modeling Analysis of Fixed Ignition Source Fires (HNP-M/ MECH-1197)	To calculate hot gas layer temperature in the "A" switchgear room	CFAST Version 6.0.10 NUREG-1824 NUREG/CR-6850, Damage Criteria	• This calculation was very similar to HNP-M/MECH-1196 except that, due to a different ignition source-target relationship, the modified plume trajectory analysis and radiant heat flux assessment were not necessary. The calculation used CFAST to determine HGL temperatures for various fire scenarios after a 60 minute burning period. • Cable tray ignition times, ignition source and cable tray heat release rate(s) are evaluated using sufficiently verified input data and software algorithms. • Sensitivity evaluations were appropriately conducted for hot gas layer temperature and height. Benchmark verification was conducted because the CFAST version used differs from that V&V'd in NUREG-1824. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that CFAST was applied within the limits of its applicability, the NRC staff finds use of this version of CFAST in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C4: Table 3.4-4, V&V Basis for Fire Model Calculations of Other Models Used at HNP

Calculation	Application at HNP	V&V Basis	NRC Staff Evaluation of Acceptability
Fire-induced Flow within a Motor Control Center (HNP-M/ MECH-1207)	This is used to provide guidance for limiting fire-induced multiple spurious operations	NUREG-1824 NUREG/CR-6850, Damage Criteria	• This calculation was used to determine the general fire-induced flow characteristics within a motor control center (MCC) resulting from a single cubicle fire scenario, as well as to provide guidance for limiting fire-induced multiple spurious operations (MSOs) in MCC cabinets of interest. • An internal examination of an MCC cabinet, and subsequent fire dynamics simulator (FDS) fire modeling by the licensee, resulted in the development of a proposed modification to limit MSOs of equipment with controls located in the cabinet. • Internal ventilation conditions and physical construction were used by the licensee to assess the conditions likely to be seen in an MCC enclosure. • FDS was used within the bounds of its applicability, as identified in NUREG-1824, to supplement the guidance developed in the calculation. Additionally, data from the cable response to live fire (CAROLFIRE) tests was used for further insight. Since (1) the V&V basis is NUREG-1824 and (2) the licensee stated that FDS was applied within the limits of its applicability, the NRC staff finds use of this version of FDS in the HNP application acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

References for Table 3.4-4

1. NUREG-1805, “Fire Dynamics Tools (FDT^{s}) Quantitative Fire Hazard Analysis Methods for the U. S. Nuclear Regulatory Commission Fire Protection Inspection Program,” U.S. Nuclear Regulatory Commission, Washington, DC, December 2004.

2. NUREG-1824, “Verification & Validation of Selected Fire Models for Nuclear Power Plant Applications,” U.S. Nuclear Regulatory Commission, Washington, DC, May 2007.

3. NUREG/CR-6850, “EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities,” U.S. Nuclear Regulatory Commission, Washington, DC, September 2005.

4. Peacock, R.D., Jones, W.W., Reneke, P.A., and Forney, G.P., “CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6) User's Guide,” NIST Special Publication 1041, National Institute of Standards and Technology, Gaithersburg, MD, December 2005.

5. Yokoi, S., “Study on the Prevention of Fire Spread Caused by Hot Upward Current,” Report Number 34, Building Research Institute, Tokyo, Japan, 1960.

6. Hughes Associates, Inc., “Fire Hazard Assessment of Exposure to Safe Shutdown Raceways, St. Lucie Unit 1,” Chapter 6, November 2001 (Attachment 3 to ADAMS Accession No. ML013390436).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
Note:	RAIs 1.0 - 19.0 were captured in a letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-09-096), dated December 16, 2009, "Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, 'Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants' (TAC NO. MD8807)" [ADAMS Accession No. ML093630879]. The remainder of the RAIs were sent via NRC letter dated August 6, 2009, and the responses were captured in the licensee's previously referenced supplemental letters dated August 13, 2009, August 28, 2009, October 9, 2009, and February 4, 2010.		
1.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Section 4, Page 10: An assumption states that "fire brigade response times applied are 50 percent of the drill times based on analysis from HNP fire protection (ref. FPIP-0150)." Provide the sensitivity of the results to fire brigade response times up to 100 percent of the drill times.	The sensitivity analysis provided by the licensee indicates a 17 percent increase above the total fire CDF reported in the LAR (3.06E-05/yr) if the results are updated to include fire brigade response times up to 100 percent of the drill times. If this was applied equally to the delta-CDF results, no change in the conclusions applicable to the NFPA 805 transition would be expected. This resolves the NRC staff's concern.	Brigade Times
2.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Section 4, Page 11: Provide the basis for the assumption that no credible fire-induced piping or other mechanical instrument air supply failure will occur, except in the turbine building, including why the turbine building is an exception.	The licensee clarified the basis for the assumption of no credible fire-induced piping or other mechanical instrument air supply failure, including an explanation as to why this assumption was not applied to the turbine building, where IA failure is conservatively assumed a priori. This resolves the NRC staff's concern.	Other
3.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Section 4, Page 12: An assumption states that "modifications will be installed consistent with the references and that cable routing for modifications will be implemented as to not impact the risk." Discuss whether or not this implies that at least some of the cable routing for credited modifications in the FPRA is not yet known. If so, discuss how HNP ensures that cable routing for modifications will be implemented as to not impact the risk.	The licensee stated that Meggitt cables are planned as needed to avoid impacting target sets. The robustness of Meggitt cables to fire damage minimizes the need to know their exact routes in advance. This resolves the NRC staff's concern.	Compartmental

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
4.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Section 5.3.4.4, Page 30: The 75th and 98th percentile HRRs for hydrogen ignition sources are both listed as 69 kW. Provide the basis for this, given that Appendix N of NUREG/CR-6850 on hydrogen fires does not provide a heat release rate.	The licensee indicated that (1) the CCDP is unaffected by the assumption of 69 kW for both HRR percentiles and (2) the value of 69 kW is not actually used as other than a placeholder in the associated analysis spreadsheets since hydrogen would not generate an HGL. Instead, ZOIs for actual, specific area configurations were developed using guidance from NUREG/CR-6850 (the recommended ZOIs are provided in Appendix N of NUREG/CR-6850). Therefore, while the NRC staff concern is resolved, the staff expects that the licensee will remove the assumption regarding the hydrogen HRR post-transition such that the Fire PRA will accurately reflect the analysis employed.	Fire Modeling
5.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Section 5.4.2, Page 37: For time period T2 in the general timeline, the "time to ignite the first target (tray) [is] based on Reference 8 (if the tray has a solid bottom add 30min@69kW, 15min@143kW, 10min@211kW, and 5min@702kW (ref. discussion in NUREG/CR-6850 section Q.2.2)." Section Q.2.2 of NUREG/CR-6850, which is referenced, does not discuss specific HRRs or times. Provide the basis for the assumed times and HRRs being added to the time to ignite the first tray.	The fact that the target sets were not based on the HRRs negates the need to consider the propriety of the timing assumptions in light of the sensitivity analysis provided in the licensee's supplemental letter dated August 28, 2009 (see response to RAI 5-26). Accordingly, the licensee's approach is applicable to the NFPA 805 transition because no change in conclusions would be expected. However, this does not constitute an acceptance of the proposed times since neither Section Q.2.2 of NUREG/CR-6850 nor the licensee response provide a basis. Therefore, while the NRC staff concern is resolved, the staff expects that the licensee will remove the assumption regarding the times to ignition post-transition such that the Fire PRA will accurately reflect the analysis employed.	Fire Modeling

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
6.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Section 5.4.2.2, Page 39: Two special cases are discussed: (1) [redacted] within [redacted] and (2) Fire Zone [redacted] in [redacted]. For the first, it is stated that "a HGL fails all of [redacted]. This treatment is too conservative and the HGL ... fails all of the equipment in the rooms, but not all of [redacted]." For the second, it is stated that "because Fire Zone [redacted] is open some of the gas is expected to escape and provide a larger footprint for HGL formation. The effective floor space is conservatively assumed to be double [so] ... a damaging HGL does not form." Provide the basis for considering the first case treatment as "too conservative." For the second case, does the doubling of the effective floor space bound the actual floor space (i.e., is it less than the actual)? In addition, discuss the nature of the opening between Fire Zone [redacted] and [redacted], presumably such that an HGL within Fire Zone [redacted] would not be able to form solely in this location (i.e., there are no barriers at the ceiling level).	The licensee provided the bases for citing the treatment as "too conservative" as follows: (1) the assumed room is actually smaller than what would be appropriate for the ZOI calculation and (2) the assumed room is not actually closed, such that the potential to generate an HGL does not exist. This resolves the NRC staff's concern.	Compartmental
7.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Attachment 4, Page 8: Provide a basis for the statement that "the occurrence of any realistic fire in a main control cabinet or board is likely to be a relatively slowly developing fire," including whether or not the NUREG/CR-6850 fire events database was reviewed.	The licensee explained that (1) the specific HNP main control board combustible loading of cabling was reviewed and (2) while there was no formal review of the NUREG/CR-6850 fire events database for corresponding events, a cursory review indicated no propagation to targets external to cabinets in 109 similar events. This resolves the NRC staff's concern.	Main Control Room

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
8.0	HNP-F/PSA-0079, Revision 1, Harris Fire PRA – Quantification Calculation, Attachment 4, Page 21: The calculation states that "because of this consideration, the overall treatment involves two evaluation iterations. The first involves the examination of all of the main control room cabinets and boards with an assumption that the postulated fire is successfully suppressed before abandonment is required. A second iteration is then performed for each of the cabinets and boards assuming abandonment is required." Discuss whether fires outside the MCR which render the instrumentation or controls in the MCR essentially useless (or misleading) would also constitute an MCR abandonment scenario. If not, provide the basis for this conclusion.	The licensee indicated that no credit is taken for abandoning the MCR except due to environmental conditions inside the MCR. For the loss of environmental conditions, a 0.1 probability is assumed. Accordingly, the HNP Fire PRA model should be conservative in that no alternate means of monitoring, activation, etc., of potentially available components would be credited upon loss of the MCR function in scenarios for which the Fire PRA does not take credit for MCR abandonment. Effectively, this implies a maximum penalty (conservatism) given the conditions that would render the MCR "useless." This resolves the NRC staff's concern.	Main Control Room
9.0	HNP-F/PSA-0077, Revision 0, Fire PRA Component Selection and Fire-Induced Model Calculation, Section 3.3.1.5, Page 18: The calculation states that "operator training reinforces and evaluates the use of checking redundant and diverse indications prior to initiating any action ..." Discuss the potential implications if the redundant or diverse indications were subject to a common failure or faulty indication due to a fire in one location.	The licensee validated at least one set of instrumentation for the ability to complete safe shutdown given a fire in a specific area. Procedures instruct operators to consider a primary and secondary set of indications in the event of fire in specific locations. If the primary set might be compromised, the operators are instructed to rely on the secondary indications. This resolves the NRC staff's concern.	Instrumentation

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
10.0	HNP-F/PSA-0081, Revision 1, Harris Fire PRA – Support for NFPA 805 Transition, Section 8.3, Page 15: The calculation states that "the risk benefit of eliminating VFDRs is insensitive to changing the fire drill response time from 50 percent to 100 percent of drill time." In light of this conclusion, discuss why the fire brigade response time is assumed to be 50 percent of the drill time rather than the same as actual the drill time.	The licensee provided the basis for assuming that the fire brigade response time is 50 percent of the drill time. A sensitivity analysis was also provided by the licensee to determine the impact of updating the calculation results to include fire brigade response times up to 100 percent of the drill times (see the licensee's supplemental letter dated August 28, 2009; response to RAI 5-34, as well as the NRC staff's evaluation for RAI 1.0). This resolves the NRC staff's concern.	Brigade Times
11.0	HNP-F/PSA-0081, Revision 1, Harris Fire PRA – Support for NFPA 805 Transition, Section 9.1, Page 17: Rather than report a negative delta-LERF for FC17, discuss whether it would be reasonable to bound the value by the ratio of LERF to CDF for other compartments where there is no LERF effect independent of the CDF effect, assuming FC17 is such a compartment (i.e., no inter-system LOCA or containment bypass scenarios).	If the delta-LERF were ratioed by the largest delta-LERF-to-delta-CDF ratio (0.37 for FC21), the delta-LERF for FC17 would be 6.5E-10/yr, which is low enough to not pose a concern with regard to affecting any conclusions relevant in determining the applicability of the result to the acceptability of the NFPA 805 transition. Therefore, while the NRC staff concern is resolved, the staff expects that the licensee will rectify the negative delta-LERF anomaly post-transition such that the Fire PRA will accurately reflect the LERF (see the NRC staff's evaluation for RAI 5-01).	LERF
12.0	LAR Section 4.5.1.3: The licensee stated that "another area discussed with the staff and subsequently incorporated in the final PRA is the human reliability analysis (HRA) screening method." This statement should indicate that the NRC staff neither approved nor disapproved this method.	The licensee has clarified that the NRC staff audit does not include specific approvals for technical details of the PRA. This resolves the NRC staff's concern.	NUREG/CR-6850 Deviations

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
13.0	LAR Attachment S, Page S-14: For EC 70350, it is stated that "this logic uses generic diesel generator data. The effect of this modification is that all common losses of reactor coolant pump seal injection are lost. The modification also has the ability for the new diesel to power station essential batteries (manual action required with a 0.1 failure probability)." Discuss whether there has been any plant-specific experience with this type of diesel generator such that it could be considered in conjunction with the generic data (e.g., Bayesian update). In addition, provide the basis of the 0.1 failure probability for the manual action.	The licensee indicated that there is no specific plant experience, and that the 0.1 failure probability was selected as a typically conservative screening value for human error probability. This resolves the NRC staff's concern.	Fire Frequencies
14.0	LAR Attachment W, Page W-2: The response to supporting requirement DA-C1-01 explains HNP's decision to reject the December 2007 Peer Review Finding regarding use of 0.33 instead of 0.5 (or some other value) for the number of failures when no failure had occurred. Review of the cited approach indicates that the use of 0.33 corresponds to only the 27th percentile value (0.5 would correspond to the 40th percentile, 0.7 to the 50th percentile, and 3.0 to the 95th percentile). Apparently, 34 generic failure rates retained use of the 0.33 factor. Discuss how the use of 0.33 instead of a more accepted value (at least 0.5, but more likely 0.7, or approximately double) potentially affects CDF and LERF calculations in the Fire PRA, assuming basic events using these generic values could appear in potentially fire-risk significant cutsets. Also provide the results of any sensitivity analysis performed.	The licensee indicated that HNP compared its generic analysis against the NUREG/CR-6850 generic failure data. The HNP comparison confirms that the effect of retaining the 0.33 "zero-failure-rate" factor should be minimal. Therefore, while the NRC staff concern is resolved, the staff expects that the licensee will rectify the 0.33 "zero-failure-rate" factor anomaly post-transition such that the Fire PRA will employ a more defensible factor when addressing situations where no failure has occurred.	Other

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
15.0	LAR Attachment X, Page X-45: The response to F&O FSS-A2-2 states that "F&O FSS-A2-2 suggests that the screening approach (referring to the approach for determining time for reaching a damaging hot gas layer temperature) is incorrect and may be very conservative. It is concluded after a review of the calculations for determining time for hot gas layer reaching damaging temperatures that the approach is correct." Provide the basis for this conclusion of correctness and non-over-conservatism.	The focused scope peer review verified the source of the methodology for determining the time necessary to reach a damaging hot gas layer temperature, as well as the basis for the conclusion of correctness and non-over-conservatism in the screening approach. This resolves the NRC staff's concern.	NUREG/CR-6850 Deviations
16.0	LAR Attachment X, Page X-46: From the response to F&O FSS-B1-1, it appears that a pre-existing HNP assumption that no spurious actuations occur within 10 minutes of a fire may have implicitly been retained in the MCR abandonment study, and that this assumption was not carried into the Fire PRA. If this assumption was implicitly retained in the MCR abandonment study, discuss how the MCR abandonment analysis for the Fire PRA compensates for this. It also appears that the analysis for MCR abandonment addresses only degradation/loss of functions due to fire effects within the MCR. Discuss how degradation/loss of functions in the MCR due to fire outside the MCR (even if there are no resulting environmental fire effects within the MCR) has been addressed. Has abandonment of the MCR under these conditions been considered? In addition, if enough spurious actuations occurred within the first 10 minutes to cause degradation/loss of functions within the MCR, would non-procedural MCR abandonment be considered?	The licensee stated that MCR abandonment would be expected before all functions would be lost, and that abandonment is time critical since if it occurs too early there could be adverse risk implications and if it occurs too late, functions could be lost and not recovered. The licensee indicated that no credit is taken for abandoning the MCR except due to environmental conditions inside the MCR. For the loss of environmental conditions, a 0.1 probability is assumed. Accordingly, the HNP Fire PRA model should be conservative in that no alternate means of monitoring, activation, etc., of potentially available components would be credited upon loss of the MCR function in scenarios for which the Fire PRA does not take credit for MCR abandonment. Effectively, this implies a maximum penalty (conservatism) given the conditions that would render the MCR "useless." This resolves the NRC staff's concern.	Main Control Room

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
17.0	LAR Attachment X, Pages X-60 and X-64: The response to F&O HRA-B3-1 states that "in all cases redundant and diverse indications were found to exist and were identified such that operators would have clear indication of whether or not a problem actually existed. In some cases local verification provides the confirmation." The response to F&O HRA-C1-4 states that "redundant and diverse indications are assumed to provide sufficient cable separation such that specific cable routing of the instruments is not necessary. If redundant and diverse indication cannot be shown, then no credit is given to the human factors engineering unless specific instrumentation is routed and failure of the instrument is modeled in the Fire PRA fault tree." In dispositioning F&O HRA-B3-1, discuss how the cable locations were identified to reach the conclusion that "operators would have clear indication of whether or not a problem actually existed." For F&O HRA-C1-4, provide the basis for assuming that, if redundant and diverse indications are available, then specific cable routing is not necessary. Is there a plant-specific approach that provides high confidence that the existence of redundancy and diversity automatically translates into cable routing that would be immune to complete loss of all such indication due to a single fire?	The licensee used a combination of operator input and safe shutdown analysis as its basis for making a decision regarding when enough diverse and redundant instrumentation exists to prevent undesired actions. The licensee validated at least one set of instrumentation for the ability to complete safe shutdown given a fire in a specific area. Procedures instruct operators to consider a primary and secondary set of indications in the event of fire in specific locations. If the primary set might be compromised, the operators are instructed to rely on the secondary indications. This resolves the NRC staff's concern.	Instrumentation

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
18.0	LAR Attachment X, Page X-82: The response to F&O CF-A1-01 states that "the inter-cable short is an order of magnitude less than the intra-cable and the best estimate value (which is used by Progress Energy) has an error band that is significantly larger than the resulting value if these two events are added together ... Progress Energy believes it meets capability category II for this supporting requirement." Table 10-1 of NUREG/CR-6850 gives multi-conductor (M/C) intra-cable hot shorting a best estimate of 0.30 and a high confidence range of 0.10-0.50 (thermoset cable with a control power transformer (CPT)). Similar values are presented for thermoplastic cable with a CPT in Table 10-3. The corresponding multi-conductor to single conductor (1/C) inter-cable hot short best estimate is 0.10, such that the sum of these probabilities would be 0.40 as a best estimate. While this lies within the high confidence range for the M/C intra-cable hot short, does HNP consider the upper end of this range (0.50) to be "significantly larger than the resulting value if these two events are added together?" If so, provide the basis for this conclusion, as well as that for the belief that capability category II has been satisfied. In addition, discuss whether the recent efforts surrounding the NFPA 805 FAQ process to address the summation of hot short probabilities (i.e., FAQ 08-0047, "Spurious Operation Probability") have been incorporated.	The licensee clarified that there are very few single-conductor cables such that, if their failure probability were combined with multi-conductor cables, the upper limit on the high confidence range for multi-conductor intra-cable hot shorting would be approached (0.50). The only plausible combination for intra- and inter-cable hot shorts would raise the joint failure probability from 0.30 to 0.32, which is well within the upper limit for multi-conductor intra-cable hot shorting of 0.50. In addition, the conclusions of FAQ 08-0047 have been appropriately reviewed and addressed by the licensee. This resolves the NRC staff's concern.	Hot Shorts

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
19.0	LAR Attachment D, Page D-8: Key safety functions where multiple systems/flow paths are listed do not necessarily specify if each system/flow path is capable of maintaining the KSF independently (e.g., the A train RHR pump and heat exchanger are capable of 100 percent capacity for the entire RHR system), or if combinations of systems/flow paths are needed (e.g., distribution panels SI and SIII together are capable of 100 percent capacity for the 120 VAC uninterruptible buses for electrical distribution). Indicate which, if any, combinations of systems/flow paths are necessary to maintain a KSF.	The licensee indicated that specific redundancies are provided in a plant-specific calculation. This resolves the NRC staff's concern.	Other

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.01	During the HNP onsite regulatory audit, the NRC staff identified apparent anomalies in the CDF and LERF calculations for Fire Compartment 03 (FC03). The reported values for LERF were a factor of two higher than the reported values for CDF, which is not a correct result. Although the associated risks for the affected FC03 components are small, the anomaly does not appear to be a result of the screening method used for low probability events. A review of Attachment 19 to calculation HNP-F/PSA-0079 reveals that except for FC03, the ratio of LERF to CDF for all other fire compartments is less than 15 percent. However, for FC03, this ratio is nearly 60 percent. Further, a review of the data spreadsheets indicates that 12 fire scenarios in FC03 have LERFs that are greater than CDFs, and another 23 fire scenarios have LERFs between 60 and 100 percent of their CDFs. Of the 59 scenarios where the ratio of LERF to CDF exceeds 20 percent, all but five are associated with FC03. Please provide an explanation for these apparent anomalies in the CDF and LERF calculations for FC03, and clarify what should be the fire LERF for FC03. In addition, discuss how this affects the total fire LERF and any associated delta-LERF calculations for FC03 and other potentially impacted fire compartments. Please explain why this error appears only for FC03 (i.e., no other compartment showed such a high LERF ratio, although there are absolute LERF values that are comparable in other compartments). Alternatively, if the LERF value for FC03 is correct, please discuss how HNP has assured that any truncation effect is isolated only to FC03 and does not affect the CDF or delta-CDF values significantly.	The licensee (1) confirmed the reality of the anomalous LERF results, particularly for FC03; (2) explained their presence due to limitations in the currently available software; and (3) assessed the impact as always conservative but not enough to affect the conclusions based on the acceptance threshold for delta-LERF. While the NRC staff concern is resolved, the staff expects that the licensee will rectify the anomaly post-transition via the use of updated software (e.g., as suggested in the response) or by other means, such that the anomaly will be eliminated and the Fire PRA will accurately reflect the LERF.	LERF

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.13	HNP-F/PSA-0079: Section 5.2.3 states that "if the fire zone is continuously occupied a brigade response time of 2 minutes was applied." While it might be expected that a human response to a fire would occur very rapidly in a continuously occupied zone, the time for the fire brigade to muster and respond, even if notified immediately, would likely be more than 2 minutes. Accordingly, please discuss whether or not non-brigade response by personnel in the location undergoing the fire is being assumed to achieve the same level of success in terms of suppression effectiveness, etc., as a fire brigade response. If so, provide a justification for this conclusion as well as a discussion of the effect of assuming longer brigade response times.	The licensee confirmed that the reference to a "brigade response time of two minutes" actually meant a "continuous fire-watch response time of two minutes," not the response by the fire brigade itself. This resolves the NRC staff's concern.	Brigade Times
5.14	HNP-F/PSA-0079: Section 5.2.5 states that "transient fires due to cutting and welding have been determined to have a negligible contribution due to the presence of a continuous fire watch." However, Bins 6, 24, and 36 in Table 6-1of NUREG/CR-6850 assign ignition frequencies that range from approximately 0.005 to 0.01 per reactor-year. In addition, the non-suppression probability for welding fires, based on historic fire event data which presumably incorporated the presence of a continuous fire watch for at least some, if not most, "hot work" activities, does not reach the lower limit of 0.001 per reactor-year until approximately 35 minutes have elapsed (reference Table P-2 of NUREG/CR-6850). Finally, if only five minutes are available for the manual suppression of a cutting or welding fire, the non-suppression probability is 0.38 per reactor-year. Provide the basis for this apparently a priori dismissal of transient fires due to cutting and welding, given the presence of a continuous fire watch, and provide a risk estimate for what would be the effect of not dismissing these types of fires.	The licensee provided a sensitivity analysis that substitutes the frequencies for Bins 6, 24, and 36 for those corresponding to the general transient source scenarios (Bins 3, 7, 25, and 37). The assumed non-suppression probability is based on the welding non-suppression curve from NUREG/CR-6850, using a lambda value of 0.19/min with the corresponding time to damage for the particular scenario. No additional reduction factors, other than those allowed by NUREG/CR-6850 on the ignition frequency, were applied. Based on the results from the sensitivity analysis, the NRC staff finds the licensee's conclusion regarding no significant plant impact due to a transient cutting and welding fire acceptable.	NUREG/CR-6850 Deviations

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.15	HNP-F/PSA-0079: Section 5.4.2.1 states that "after the HEAF, a source fire of 69 kilowatts (kW) is assumed to propagate to secondary combustibles." Section M.6.1 of NUREG/CR-6850 states that for the ensuing fire after the energetic phase, a generic frequency for HEAFs should be assigned and apportioned using the location and ignition source weighting factors. Section G.7 gives the following guidance for HEAF sources: (1) 4160V Switchgear: The fire in the switchgear will remain confined to a single bundle and the distribution with 65 kW and 200 kW as the 75th and 98th percentiles can be assumed if the cables are qualified; (2) 480V MCC: MCCs of this type with qualified cable are considered to satisfy the criteria established for a 65 kW HRR as the 75th percentile. In contrast, if the cabinet has unqualified cable, and assuming a closed door, a value of 220 kW would be assigned as the 75th percentile. (Note that HNP uses a 6.9kV switchgear; however, the guidance above is still applicable) Please provide the basis for the apparent a priori limiting of the propagation of a source fire from an HEAF to the 69 kW HRR (i.e., versus 200 kW).	The licensee has provided a reasonable justification for limiting the HRR from the secondary fire after the HEAF to the 75 percentile value of 69 kW assuming qualified cable. This resolves the NRC staff's concern.	Fire Modeling

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.16	HNP-F/PSA-0079: Section 5.4.3 states, in part, that failure of prompt detection is assumed to have a probability of 0.0 if the compartment contains highly sensitive fire detectors. Section P.1.3 of NUREG/CR-6850 provides limitations as to when prompt detection should be credited and when an installed high sensitivity smoke detection system merits a 5 minute addition to the time to target damage (or, equivalently, to the time available for suppression). Prompt suppression refers specifically to suppression actions by a fire watch, and can be credited following prompt detection in hot work fire scenarios only. When credited, high sensitivity smoke detection must consider the failure probability of the system when this credit is incorporated into the analysis. Please provide the basis for assuming that failure of prompt detection in a compartment, not just an electrical cabinet, merits the high sensitivity smoke detection credit (a probability of 0.0).	The licensee did not employ the stated assumption, which resolves the NRC staff's concern. However, this does not constitute an acceptance by the NRC of the proposed assumption that failure of prompt detection has a probability of 0.0 if the compartment contains highly sensitive fire detectors.	NUREG/CR-6850 Deviations
5.17	HNP-F/PSA-0079: Section 5.8.1 states that "compartments that do not generate a HGL internally are not considered to be able to generate multiple compartment damage." Please provide a basis for the apparent assumption that an HGL is the only means by which fire or fire effects could propagate between multiple compartments.	The licensee followed accepted practices for Fire PRA from NUREG/CR-6850, citing specifically the appropriate reference. This resolves the NRC staff's concern.	Fire Modeling

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.18	HNP-F/PSA-0079: Section 5.8.3 states that "if no issues are identified with the compartment barriers and the compartment barriers are all three hour rated barriers or evaluated as equivalent they can be deemed acceptable if the HGL multi-compartment ignition frequency is less than 1E-6 per year." These screening values are based on HGL ignition frequencies in compartments for which the CCDP could be close to 1.0, or have the potential to increase to values close to 1.0 due to failures in the propagated compartment. Accordingly, please provide the basis for the "no further evaluation is performed" screening value of less than 1.0E-7 per year. In addition, discuss the correspondence, if any, between the less than 1.0E-7 per year screening criterion and that for the less than 1.0E-6 per year screening criterion.	In regard to Section 5.8.2 of HNP-F/PSA-0079, the licensee utilized a more conservative approach than that provided in Section 11.5.4.4 of NUREG/CR-6850 to screen out multiple compartment fire scenarios. For addressing Section 5.8.3, the licensee clarified that the screening value of 1.0E-7 per year was utilized, consistent with Section 5.8.2 of HNP-F/PSA-0079. With regard to the use of the 1.0E-6 per year instead of 1.0E-7 per year screening criterion, the licensee clarified that this higher screening threshold is only used if no issues are identified for the compartment barrier, such that the barrier likelihood of failure can be qualitatively judged to have improved (decreased) by an order of magnitude, raising the threshold to 1.0E-7/0.1 = 1.0E-6. This resolves the NRC staff's concern.	Fire Frequencies
5.19	HNP-F/PSA-0079: Section 6.4.1 states that "modifications to protect cable trays from HEAFs have been credited in this room as well as incipient detection in the transfer panel." Please discuss which modifications have been credited to protect cable trays against HEAFs in the "B" switchgear room.	The licensee discussed the specific modifications to be performed. This resolves the NRC staff's concern.	Compartmental

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.20	HNP-F/PSA-0079: Attachment 4 includes Table 3, "Main Control Board (MCB) Fire Consequence Characterization – Successful Fire Suppression." The following minimum groupings appear to generate a CCDP equal to 1.0 (or close enough that the risk significance merits further analysis): (1) [redacted]; (2) [redacted]; and (3) [redacted]. However, there are other "non-minimal" groupings contained in Table 3 (i.e., [redacted] and [redacted]), each of which includes at least one cabinet that is also associated with the higher risk significance groupings. Given the discussion above, please specify which main control room groupings of MCBs actually result from the analyses associated with Table 3.	The licensee explained that there is consistency between the citing of CCDPs equal to 1.0 in Table 3 and Table 10 of Attachment 4 to HNP-F/PSA-0079. This resolves the NRC staff's concern.	Main Control Room
5.21	HNP-F/PSA-0079: Section 4 of Attachment 4 states, in part, that combining the frequency terms for transient combustibles yields: 5.7E-4 x 1.0E-2 x 2.63E-2 = 1.50E-7 per year. It appears that an MCR transient ignition frequency of 5.7E-4 per year is assumed. However, this value is actually the conditional probability of damage given a fire event, per Figure L-1 of NUREG/CR-6850. Bin 7 of Table 6-1 in NUREG/CR-6850 gives the transient ignition frequency in the control/auxiliary/reactor building as 3.9E-3 per year. Accordingly, please revise these calculations, if appropriate, using the correct NUREG/CR-6850 value, or provide the basis for the value currently assumed for transient ignition frequency.	The licensee indicated the reference calculation for the updated MCR transient ignition frequency as a justification, showing that it is bounded by the transient ignition frequency value previously used. While the NRC staff concern is resolved, the staff expects that the licensee will rectify the anomaly post-transition such that the Fire PRA will employ the correct value for the MCR transient ignition frequency.	Main Control Room

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.22	HNP-F/PSA-0079: Throughout Sections 5.3 and Section 5.4, the ignition frequency calculations assume that that the probability of MCB spurious actuations is equal to 0.30. Tables 10-1 through 10-4 in NUREG/CR-6850 provide failure mode probability estimates given cable damage for various cable types/configurations. Please provide the basis for using a spurious actuation probability of 0.30 instead of 0.60 as the best estimate for failure mode probability in the ignition frequency calculations throughout Section 5.3 and Section 5.4. (For example, was a CPT indeed assumed to protect all the circuits in the main control room analysis?)	In addressing the use of the 0.30 spurious operation probability for the MOVs in the RWST draindown scenario, the licensee cites the appropriate guidance from NUREG/CR-6850. In addressing the use of the 0.30 spurious operation probability for AOVs with DC solenoid controllers instead of the appropriate value of 0.60, the licensee identified which sections of the MCB received credit for a hot short probability of 0.3 versus the appropriate 0.6. These sections accounted for 2.1 percent of the overall risk from the MCR, increasing the overall MCR risk by only 10 percent if the 0.6 value is used, as shown by sensitivity analysis. As such, the dominant risk contribution for the main control room arises from scenarios that do not apply hot short probabilities. In addition, if credit is applied for a VEWFDS, there is approximately a factor of two decrease in MCR CDF, assuming the 0.3 hot short probability. Since the effect of using 0.6 versus 0.3 is only a 10 percent increase, the "offset in conservatism" that would arise from crediting the VEWFDS would be sufficient without considering other "offsetting conservatisms." This resolves the NRC staff's concern.	Main Control Room
5.23	HNP-F/PSA-0079: Table 1 of Attachment 6 lists direct current (DC) Cable 0250A and Cable 0251A as susceptible to intra-cable and inter-cable failures with the same best estimate failure probability as for alternating current (AC) cables (i.e., 0.60). In light of recent developments suggesting that DC cable failure probabilities can be greater than those for AC cables, please provide the basis for assuming the same 0.60 failure probability value for both DC and AC cables. In addition, please address whether or not these DC cables should be assumed to always fail, given the generally conservative approach used throughout Attachment 6.	The licensee followed accepted practices for Fire PRA from NUREG/CR-6850, citing specifically the appropriate reference. While recent tests suggest that the duration of DC hot shorts is likely longer than that for AC, the tests have not suggested an increased probability of DC hot shorting versus AC. This resolves the NRC staff's concern.	Hot Shorts

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.24	HNP-F/PSA-0079: Table 1 of Attachment 6 identifies Cable 0156B and Cable 0156L as subject to intra-cable faults, but the failure probability given is zero, presumably due to the presence of a dedicated conduit. However, Tables 10-1 through 10-4 of NUREG/CR-6850 assign non-zero probabilities for intra-cable faults even when there is a conduit present. Accordingly, please provide a justification for the assignment of a zero failure probability to these cables.	The licensee explained the apparent discrepancy as an error in the comment field, but not the numerical value, for Table 1 of Attachment 6 to HNP-F/PSA-0079 (i.e., the zero failure probability is correct, but not for the reason cited). The correct justification is provided in the response. This resolves the NRC staff's concern.	Hot Shorts
5.25	HNP-F/PSA-0079: Table 1 of Attachment 6 identifies Cable 0330E and Cable 0330F as subject only to inter-cable faults, but the higher intra-cable failure probability (0.30 with CPT, per Table 10-1 and/or 10-3 of NUREG/CR-6850) is assumed. While this appears to be conservative, please discuss the basis for assignment of the higher intra-cable failure probability to the inter-cable hot shorting for these cables.	The licensee explained the use of the more conservative, if incorrect, hot short probability value as an error. While the more appropriate, lower value should have been used, the fact that a conservative value was used, if erroneously, would only lead to a more conservative result and not be expected to adversely impact the conclusions made from the analysis. This resolves the NRC staff's concern.	Hot Shorts
5.26	HNP-F/PSA-0079: Section 9.9 of Attachment 16 cites "engineering judgment" as the means of translating the test results from Reference 2.7 (NUREG/CR-0381) into the delay times for ignition of solid-bottom cable trays based on fire size. NUREG/CR-0381 lists specific tests and results for various types/configurations of fire barriers and fire retardant coatings; accordingly, please identify which of these were selected for the engineering judgment assumption cited above. In addition, if the recommended uncertainty and/or sensitivity analyses for the ignition time delay assumptions were performed, discuss the results. If the uncertainty/sensitivity analyses were not performed, please explain why not.	The sensitivity analyses indicate that the increases in CDF and LERF relative to the baseline values (3.06E-05/yr and 3.48E-06/yr, respectively, from Section 6.1 of HNP-F/PSA-0079) are limited to 13 percent (CDF) and 31 percent (LERF) based on Case Number 3. In addition, there is no increase in the delta-CDF or delta-LERF for the VFDRs. This resolves the NRC staff's concern.	Fire Modeling

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.27	HNP-F/PSA-0079: Item 7 of Attachment 26 states, in part, that iso-phase bus and non-segregated bus are used to connect the transformers to the main generator, switchgear, and control circuitry as necessary to support the design functions of the transformers. Please discuss whether or not the possibility of a HEAF originating in either iso-phase bus or non-segregated bus (ducts) was considered. If so, provide a summary of the impact/results of this consideration, and if not, explain why the possibility of a HEAF was not considered.	The licensee demonstrated through sensitivity analyses that the impact on the fire risk results caused by including the resolution for FAQ 07-0035 into the bus duct HEAF frequencies would be negligible compared to the fire risk results reported in the LAR. Namely: CDF = 3.06E-05/yr LERF = 3.48E-06/yr VFDR-delta-CDF = 1.13E-06/yr VFDR-delta-LERF = 5.36E-08/yr. This resolves the NRC staff's concern.	Fire Modeling
5.28	HNP-F/PSA-0071: In Section 3.3.1 it appears that for bus duct fires, HNP has not incorporated the potential ignition sources and their associated frequencies listed into the Fire PRA. Although not yet closed out when HNP-F/PSA-0071, Revision 2, was written, NFPA 805 FAQ 07-0035, "Bus Duct Counting Guidance for High Energy Arcing Faults," reached a consensus on ignition frequencies for bus duct fires. Given that it appears HNP has not yet incorporated these consensus values for ignition frequencies of bus duct fires, please discuss how the licensee has assured that the potential effect from bus duct fires does not significantly impact the results from the current Fire PRA.	The licensee demonstrated through sensitivity analyses that the impact on the fire risk results caused by including the resolution for FAQ 07-0035 into the bus duct HEAF frequencies would be negligible compared to the fire risk results reported in the LAR. Namely, CDF = 3.06E-05/yr and LERF = 3.48E-06/yr. This resolves the NRC staff's concern.	Fire Frequencies

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.29	HNP-F/PSA-0081: Table 15.1 of Attachment 15 includes assumptions 15, 16, 17, 18, 19, 21, 22, 23, and 26 regarding HRR, severity factors, the fire risk model, and plant partitioning. These assumptions provide statements as follows: (1) In Assumption 15, the need for a specific sensitivity analysis (per the "Basis for Including or Excluding Issue as a Key Issue" field) is dismissed based on the argument given as the basis for Assumption 14. (2) In Assumptions 16, 17, 18, 19, 21, 22, and 23, there is a statement that the potential conservatisms are not expected to have masking effects. (3) In Assumption 26, it is stated that there are "significant uncertainties" associated with the Plant Boundary Definition and Partitioning element. For Item 1, Assumption 14 addresses an uncertainty generic to NUREG/CR-6850, while Assumption 15 addresses a HNP plant-specific potential uncertainty. Accordingly, please provide the basis for dismissing a sensitivity analysis for Assumption 15 (other than the current reference to Assumption 14). For Item 2, please provide the basis for the conclusion that no masking effects would be expected from the conservatisms outlined in the assumptions. For Item 3, please provide the basis as to why there would be "significant uncertainties" associated with the Plant Boundary Definition and Partitioning element when HNP partitioning includes only a "few large fire compartments."	The licensee provided the bases for the statements regarding sensitivity/uncertainty in item (1) and conservatisms in item (2), and corrected a misstatement in item (3). This resolves the NRC staff's concern.	Sensitivity

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.30	LAR Attachment X: The disposition for F&O FSS-E3-1 states that “the uncertainty intervals for the estimated mean values for the ignition frequencies, heat release rates, and severity factors are from NUREG/CR-6850. The range of uncertainties for the human failure probabilities was determined using the same process used for the model of record human failure probabilities.” Please discuss how these uncertainty values were incorporated into the fire risk quantification.	The licensee stated that it “did not perform an overall statistical uncertainty analysis such as that typically performed for internal events because of software limitations with the methodology used to quantify the Fire PRA. The impact of this is not expected to influence the decisions related to this application ... [the decisions] would be expected to remain acceptable.” To justify this, the licensee stated that "the individual parameters in the Fire PRA are identical to those in the internal events with the exception of certain HEPs and certain fire specific basic events. The methodology for determining the uncertainty parameters for fire HEPs is the same as that used for the internal events HEPs. Therefore, the relative ranges of these uncertainties are the same as, or essentially equivalent to those employed in the internal events PRA with respect to the best-estimate values." The licensee continues by stating that "... because the formal model is essentially equivalent to the internal events model, and the fire specific basic events are based on the data recommended by the preferred guidance, and the balance of the uncertainty analysis and sensitivities indicate that most of the uncertainty is in the conservative direction, the lack of the overall uncertainty interval is not expected to influence the decisions related to this application ... [there is] the tendency for uncertainties to cancel out during the delta risk calculation." Therefore, while the NRC staff concern is resolved for the NFPA 805 transition, the staff expects that the licensee will incorporate a more formal uncertainty analysis into its Fire PRA for use during post-transition applications.	Sensitivity

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.31	HNP-F/PSA-0081: Table 15.1 of Attachment 15 includes assumptions 30, 31, and 32 regarding the fire risk model and cable selection. These assumptions provide statements as follows: (1) In Assumption 30 and Assumption 32, there is a statement that the potential conservatisms are not expected to have masking effects. (2) In Assumption 31 there appears to be a connection between cable damage and pressure or thermally induced steam generator tube ruptures that results in no expectation of a risk impact. For Item 1, please provide the basis for the conclusion that no masking effects would be expected from the conservatisms outlined in the assumptions. For Item 2, please provide a basis/justification for the conclusion of no expected risk impact.	The NRC staff noted that the licensee considered the most pessimistic (last) sensitivity case as incredible, and therefore focuses on the second case in the response to RAI 5-33, as supplemented in the response to RAI 5-33.1(fourth case in the follow-on response to RAI 5-33) as most representative. In this case, the licensee considered sensitivities in the parameters SI, ID, and IP that increased their values from the base (first) case by factors of 10, 10, and 50, respectively. The results indicated an approximately 33 percent increase in both the total fire CDF and VFDR-delta-CDF, in neither case of a magnitude that would impact the decisions related to NFPA 805 transition based on the results. In addition, the licensee provided a table showing the CDF and VFDR-delta-CDF increases from the base to most representative sensitivity case for each fire compartment, none of which would affect the decisions related to transition based on the results. Finally, the licensee stated that "the post-transition monitoring program will ensure that the VEWFDS unreliability will be kept below the level needed to assure the effectiveness being credited by maintaining the system according to both NFPA 72 and the manufacturer's maintenance and testing schedule. Additionally, the system is self monitoring and will alert the plant to system faults or precursors to a fault. Based on the anticipated level of monitoring and maintenance, the manufacturer has provided reliability estimates that are better than those currently used in the PRA analysis." Based on these observations, the NRC staff finds the response acceptable and the concern appropriately resolved.	Sensitivity

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.32	HNP/F-PSA-0081: Section 3.3.5.1 of Attachment 16 implies that the sensitivity calculation that is performed only examines “one direction” (e.g., the difference between an unvarying case with and without VFDRs). Specifically, for both the Nominal and Alternate Model for MCC arcing faults, only the difference with and without VFDRs is examined. Accordingly, please provide the “increased MCC ZOI” for the Alternate Model when damage outside the MCC cabinet is assumed to occur. In addition, estimate the difference between the Alternate and Nominal Models as the “second direction” sensitivity is more important than the “first direction” to the post-transition fire CDF for the case with VFDRs (i.e., 1.42E-5 per reactor year for the deterministically compliant case).	The licensee demonstrated through a sensitivity analysis that the effect of assuming no damage outside an MCC from an HEAF would not impact the LAR conclusion that the risk is below the threshold for acceptance. This was accomplished by performing the requested sensitivity analysis to assess the effect of assuming no damage outside an MCC due to an HEAF compared to assuming that 10 percent of the fires could create a vent that would lead to a 211 kW 98th percentile fire located at the vent. The resultant fire CDF, LERF, VFDR-delta-CDF and VFDR-delta-LERF increased by 4 percent, 1 percent, 32 percent, and 23 percent, respectively. While the latter two increases are the largest, each remains below the threshold for acceptance (i.e., 1.0E-5/yr for delta-CDF and 1.0E-6/yr for delta-LERF). This resolves the NRC staff’s concern.	Sensitivity

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.33	HNP-F/PSA-0081: Section 3.3.5.2 of Attachment 16 implies that the sensitivity calculation that is performed only examines “one direction;” specifically, the difference between an unvarying case with and without VFDRs for three fire models based on VEWFDS unavailability. Please provide a discussion of sensitivities in the “second direction,” which could show that the variation in assumed VEWFDS reliability has a significant effect upon the fire CDF, as the “second direction” sensitivity is more important than the “first direction” to the post-transition fire CDF. This includes the sensitivity to any assumed delay time (e.g., 30 to 60 minutes) for this “second direction.” (Note that Appendix P, “Detection and Suppression Analysis,” of NUREG/CR-6850, indicates that a 30 minute delay in manual suppression could significantly impact the non-suppression probability depending upon the category of fire that is assumed.)	The NRC staff noted that the licensee considered the most pessimistic (last) sensitivity case as incredible, and therefore focuses on the second case in the response to RAI 5-33, as supplemented in the response to RAI 5-33.1(fourth case in the follow-on response to RAI 5-33) as most representative. In this case, the licensee considered sensitivities in the parameters SI, ID, and IP that increased their values from the base (first) case by factors of 10, 10, and 50, respectively. The results indicated an approximately 33 percent increase in both the total fire CDF and VFDR-delta-CDF, in neither case of a magnitude that would impact the decisions related to NFPA 805 transition based on the results. In addition, the licensee provided a table showing the CDF and VFDR-delta-CDF increases from the base to most representative sensitivity case for each fire compartment, none of which would affect the decisions related to transition based on the results. Finally, the licensee stated that "the post-transition monitoring program will ensure that the VEWFDS unreliability will be kept below the level needed to assure the effectiveness being credited by maintaining the system according to both NFPA 72 and the manufacturer's maintenance and testing schedule. Additionally, the system is self monitoring and will alert the plant to system faults or precursors to a fault. Based on the anticipated level of monitoring and maintenance, the manufacturer has provided reliability estimates that are better than those currently used in the PRA analysis." Based on these observations, the NRC staff finds the response acceptable and the concern appropriately resolved.	Sensitivity

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.34	HNP-F/PSA-0081: Section 3.3.5.4 of Attachment 16 implies that the sensitivity calculation that is performed only examines "one direction;" specifically, the difference between an unvarying case with and without VFDRs for two fire models based on 50 percent and 100 percent fire brigade response time given the nominal overall expected drill response time. Please provide a discussion of sensitivities in the "second direction," which could show that the variation in assumed fire brigade response time has a non-negligible effect upon the fire CDF, as the "second direction" sensitivity is more important than the "first direction" to the post-transition fire CDF.	The sensitivity analyses indicate that the increases in CDF and LERF relative to the baseline values (3.06E-05/yr and 3.48E-06/yr, respectively, from Section 6.1 of HNP-F/PSA-0079) are limited to 17 percent (CDF) and 24 percent (LERF) based on doubling the fire brigade response time. In addition, there is no increase in the delta-CDF or delta-LERF for the VFDRs. This resolves the NRC staff's concern. The staff also notes that, with regard to the reference to FAQ 08-0050, "Non Suppression Probability," the above conclusion of acceptability does not imply any conclusion regarding the FAQ, as this is addressed in a process separate from this LAR review.	Sensitivity
5.35	LAR Section 4.6.2: This LAR section states that "another aspect of risk criteria is establishing performance criteria. These performance criteria will be established for items within the NFPA 805 monitoring scope, regardless of their ability to be measured using risk significant criteria." It appears that the second part of the statement contradicts the first; namely, that "risk performance criteria" will be developed even for items that do not have the ability to be measured against risk-significant criteria. Please correct this apparently incongruous statement, or discuss why there is no contradiction.	The licensee clarified the apparent incongruity in the original statement by qualifying when performance criteria that are not amenable to risk measurement will be used. This resolves the NRC staff's concern.	Other

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.36	LAR Attachment X: The disposition for F&O FSS-E3-1 states that "the uncertainty intervals for the estimated mean values for the ignition frequencies, heat release rates, and severity factors are from NUREG/CR-6850. The range of uncertainties for the human failure probabilities was determined using the same process used for the model of record human failure probabilities." Please discuss how these uncertainty values were incorporated into the fire risk quantification.	The licensee stated that the impact of this approach "is not expected to influence the decisions related to this application ... [the decisions] would be expected to remain acceptable." To justify this, the licensee stated that "the individual parameters in the Fire PRA are identical to those in the internal events with the exception of certain HEPs and those listed below. The parameter values and uncertainty intervals for the following are all taken from NUREG/CR-6850: (1) Ignition Frequencies: Appendix C (2) Non-Suppression Probabilities: Appendix P (3) Hot Short Probabilities: Page 10-7." The licensee continues by stating that "... because the formal model is essentially equivalent to the internal events model, and the fire specific basic events are based on the data recommended by the preferred guidance, and the balance of the uncertainty analysis and sensitivities indicate that most of the uncertainty is in the conservative direction, the lack of the overall uncertainty interval is not expected to influence the decisions related to this application ... [there is] the tendency for uncertainties to cancel out during the delta risk calculation." Therefore, while the NRC staff concern is resolved for the NFPA 805 transition, the staff expects that the licensee will incorporate a more formal uncertainty analysis into its Fire PRA for use during post-transition applications.	FPRA Quality

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.37	LAR Attachment X: The dispositions for F&Os FQ-F1-1, FQ-A4-02, FQ-D1-01, and FQ-F1-01 state that certain required elements have not been completed due to software limitations because the sensitivity and uncertainty of CDF and LERF are driven mostly by two factors much more important than the data uncertainty: (1) the fire frequency of the generic data is a direct multiplicative effect on CDF and LERF; and (2) the fire growth, severity factors, heat release rates, and the associated non-suppression probability. Thus, the lack of a quantitative uncertainty distribution does not impact the quality of the HNP Fire PRA. While the last statement may be accurate for the base HNP Fire PRA being used during the NFPA 805 transition, it may not be sustainable for post-transition applications. Please provide a discussion of how HNP will account for this lack of an uncertainty distribution when applying the Fire PRA to post-transition applications (i.e., how will the uncertainties be treated).	The licensee stated that post-transition change evaluations will use the same methods as those employed for the fire risk evaluations used to support the HNP NFPA 805 LAR and transition. The licensee also stated that, should a change evaluation require the use of an unreviewed new method, additional review and approval may be required and will be sought as necessary. Change evaluations and other risk applications will utilize the latest approved PRA, with Peer Review Findings addressed on an ongoing basis as needed. The licensee's expectation is that the situations requiring change evaluations will need to be addressed on a case-by-case basis. While this specific NRC staff concern is resolved for the NFPA 805 transition, the staff notes that there may be some situations where the licensee's approach was accepted for the purpose of transition, but that, as noted in a subsequent RAI response evaluation, this same approach may require upgrade or enhancement for post-transition applications. Accordingly, acceptance of the response to RAI 5-37 does not supersede this staff expectation.	FPRA Quality
5.38	LAR Attachment Y: Section Y.1.1 states that for [redacted], [redacted], "the transformer yard contains the main output transformers." Please clarify whether or not there are scenarios involving concurrent fire-induced loss of multiple transformers. In addition, discuss what this would contribute to the CDF and LERF for [redacted]. (Note that reference to Attachment 2, "Source Results," of calculation HNP-F/PSA-0079 seems to indicate that concurrent, multiple transformer losses were not considered.)	The licensee: (1) clarified that the two "other" main transformers are assumed lost (2) provided a plant-specific justification (Attachment 26 to HNP-F/PSA-0079) for assuming that no more than the one yard transformer where the fire occurs would be lost due to a fire. This resolves the NRC staff's concern.	Compartmental

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Attachment C5: Table 3.4-5, Resolution of Fire Risk Assessment Requests for Additional Information

RAI	Subject	NRC Staff Evaluation of RAI Response and Basis for Acceptability	Subject Area
5.39	LAR Attachment Y: Section Y.1.1 states that for [redacted], [redacted], "the incipient detection system significantly reduces the potential for HGL and the resulting risk is due to the number of important cabinets in this room ... Fire modeling ... was applied by crediting solid bottom cable trays and adjusting the severity factor of several large fires. Because of the large amount of vital equipment...a modification to install incipient detection in higher risk or HGL potential cabinets has been credited in this section." Please clarify whether or not the solid bottom cable trays are already present in this compartment, or if they are a planned modification. In addition, provide a discussion of how the solid bottoms to the cable trays are modeled and credited, and how sensitive the analysis results are to these credits. Finally, please describe any "fire modeling" that has been performed within the [redacted] room.	The licensee clarified that the solid bottom cable trays are already present and referenced the sensitivity analyses performed in response to RAI 5-26 with regard to the modeling and crediting of fire scenarios involving solid bottom cable trays. However, this does not constitute an acceptance by the NRC of the proposed approach for the modeling and crediting of fire scenarios involving solid bottom cable trays since neither Section Q.2.2 of NUREG/CR-6850 nor the licensee response provide a basis.	Compartmental
5.40	LAR Attachment: In Table Y-3, "Fire Sources for CDF by Importance," HGL contributes to CDF for only a few fire sources. However, in Table Y-4, "Fire Sources for LERF by Importance," HGL contributes to LERF for most of the fire sources. Please explain why there is such a difference in HGL contribution to CDF versus LERF for these two tables.	For the purpose of the transition to NFPA 805, the licensee (1) explained the apparent discrepancy between the results in the CDF and LERF tables; (2) explained their presence due to limitations in the currently available software; and (3) assessed the impact as always conservative but not enough to impact the conclusions related to the acceptance of the results for transition. While the NRC staff concern is resolved, the staff expects that the licensee will rectify the anomaly post-transition via the use of updated software (e.g., as suggested in the response) or by other means, such that the anomaly will be eliminated and the Fire PRA will accurately reflect the HGL contributions to LERF.	LERF

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues

Issue Description	Evaluation	NRC Staff Conclusion
The risk results are sensitive to the assumption that arcing in MCC cabinets does not result in damage outside of the MCC.	The licensee deviated from the general guidance in NUREG/CR-6850 for MCCs with voltage above 440V by assuming the cabinets remain closed after an arcing fault. The data indicate that although cabinet doors may open in about 25 percent of the events, there is no case of any damage occurring outside of the cabinet. Assuming the cabinet remains closed is less conservative than the NUREG/CR-6850 guidance, and if these fires propagate outside the cabinet they have the potential to impact additional cables and increase the risk of VFDRs. There is no guidance on the percentage of MCC fires which result in arcing faults, and review of the data indicates that the percentage is small. In addition, a sensitivity study demonstrates that the risk results are relatively insensitive to this assumption. Specifically, the licensee selected a representative fire zone with closed MCCs and reevaluated the change in CDF associated with the VFDRs in the zone assuming that 10 percent of the fires result from arcing faults that cause a breach of the MCC enclosure. The result was a baseline risk increase of 4 percent, and a delta-CDF increase of 32 percent. This increase in risk would not change the conclusions of the risk-informed decisions related to the fire area used to perform the sensitivity.	The staff has evaluated the licensee's assumptions from a fire protection engineering standpoint and accepts that assuming the MCCs remain closed after an arcing fault is sufficient specifically for the configuration and type of MCCs present at HNP. A detailed discussion of this issue is provided in Section 3.4.7 of this safety evaluation.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues

Issue Description	Evaluation	NRC Staff Conclusion
The risk results are insensitive to the assumed detection/warning time (60 minutes) and assumed 100 percent availability of the VEWFDS.	The licensee assumed that the VEWFDS was always available (0 percent unavailability) and reliable at 99.5 percent (0.005 unreliability), and that the system provides an additional 60 minutes for manual fire suppression in low voltage cabinets (less than 140 volts). NUREG/CR-6850 provides no specific guidance for crediting these systems. The licensee examined its assumptions regarding the VEWFDS when compared with alternative modeling approaches (i.e., EPRI 1016735, “Fire PRA Methods Enhancement,” and FAQ 08-0046, “Incipient Fire Detection Systems”), and provided sensitivity analyses related to the VEWFDS credit using a range of values for input parameters. The results indicated an approximately 33 percent increase in both the total fire CDF and the VFDR-delta-CDF. The performance and availability of the VEWFDS will be addressed in the licensee’s NFPA 805 performance monitoring program. In addition, the VEWFDS utilizes a self-monitoring function for internal fault detection, and the PRA model data is conservative with respect to the manufacturer’s estimate of reliability.	The assumptions related to the reliability and availability of the plant-specific VEWFDS are consistent with FAQ 08-0046; and the sensitivity studies performed using alternative assumptions demonstrate that the overall risk results are not overly sensitive to the actual modeling and data used to represent the VEWFDS. Therefore, this assumption is reasonable.
The risk results are insensitive to the assumed fire brigade response time of 50 percent of the typical fire drill times.	The licensee assumed that the fire brigade would respond to an actual fire event in half of the typical fire drill response time. This is based on the focus of fire drills being training rather than speed, so the assumption is more realistic of the expected fire brigade performance during actual fire scenarios. The sensitivity analyses showed that if the full drill response times were used, the baseline risk increased, but the delta-risk was essentially unchanged.	Since the bounding sensitivity analysis shows no significant impact on the risk results, this assumption is acceptable for this application.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues

Issue Description	Evaluation	NRC Staff Conclusion
Solid bottom cable trays prevent cable fire propagation and damage for fires with low heat release rates.	The licensee assumed that solid bottom cable trays delay the propagation of fires, which limits the fire damage for such scenarios. In response to an RAI (see Table 3.4-3, Item 5.0), the licensee identified that this assumption was not applied to the risk analyses supporting the NFPA 805 LAR.	Since the LAR does not credit this assumption, it is not a key source of uncertainty for this application. Accordingly, the NRC staff has not evaluated the validity of the assumption.
Compartmental fire barriers are assumed to be 100 percent effective.	Compartmental fire barriers are assumed to be 100 percent effective at preventing the spread of fires, other than for hot gas layers addressed in the multi-compartment fire scenario analysis.	The staff review of the compartmental fire barriers did not identify any unusual outlier configurations in the concrete and reinforced steel wall barriers. Therefore, it is reasonable to conclude that the barriers are effective at preventing fire spread (other than hot gas layer spread).
The quantification results may be overly conservative.	The conservative assumptions applied to the Fire PRA produce conservative results. Several CCDPs were assumed to be 1.0 based on the configuration being evaluated, as well as on the acceptability of the risk results for these scenarios. This may mask the actual risk impact of VFDRs related to barriers.	The risk calculations are conservative, and therefore acceptable for this application.
Bounding values from NUREG/CR-6850 for HRRs were typically applied using the 98th percentile case.	The 98th percentile values for HRRs from NUREG/CR-6850 were generally applied as the source for fire scenarios, except for some cabinets and transient scenarios, where the HRRs were adjusted downward. The bases for the adjustments were fire modeling insights and stricter controls on transient combustibles in some areas.	The assumption of applying the 98th percentile HRR is consistent with the available guidance and is expected to be conservative since the actual source configurations are unlikely to be capable of generating the HRRs assumed. The exceptions for cabinets and transient fires are based on plant-specific evaluation of the actual cabinet configurations, and are therefore reasonable and acceptable for this application.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues

Issue Description	Evaluation	NRC Staff Conclusion
No credit is given for the incipient/smoldering stage of fires.	The model does not credit any detection or suppression of fires at the incipient stage (except for cabinets with VEWFDS installed). If credited, this would provide additional time for manual suppression and would lower the fire scenario frequencies.	The assumption is conservative and therefore acceptable.
No consideration is made of actual combustible loading or other factors in assessing fire growth times.	Most fires use a fire growth profile with a 12 minute ramp to peak HRR, 8 minutes at peak HRR, and a 19 minute decay time. No methodology is provided for consideration of combustible loading or other factors which could change this assumed fire growth profile. The profile is considered to be conservative.	The assumptions on fire growth, peak, and decay are conservative, and consideration of other factors would likely shorten the fire duration or reduce the peak HRR for most fire scenarios. Therefore, the assumption is acceptable.
There is a conservative selection of heat release rates to determine the zone(s) of influence and targets.	Only single point fires (98th percentile heat release rate) are used for target selection, and the evaluation of target damage was similarly not further refined to consider the possible distribution of heat release rates. This is a conservative approach since a more refined consideration of the distribution of heat release rates and the resulting zones of influence could result in the screening out of some targets. This is a conservative approach for CCDP, since it maximizes fire damage to targets.	The assumption is consistent with the screening approach described in NUREG/CR-6850, is conservative, and is therefore acceptable.
A 400°F zone of influence for target damage is assumed due to the presence of Kerite cable (650°F may be more appropriate).	A conservatively low temperature of 400°F for cable damage is used due to the application of Kerite cable. A more refined analysis could increase this damage threshold up to 650°F.	The use of 400°F is conservative; a more realistic evaluation would result in smaller zones of influence, and reduce the CCDPs. This approach also conservatively reduces the time for hot gas layer formation. The assumption is conservative and therefore acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues

Issue Description	Evaluation	NRC Staff Conclusion
Target damage at 400°F (Kerite cable) and no credit for a conduit providing protection is conservative.	A conservatively low temperature of 400°F for cable damage is used due to the application of Kerite cable. A more refined analysis could increase this damage threshold up to 650°F. Cables in conduit are not credited with longer damage times.	The use of 400°F is conservative; a more realistic evaluation of higher damage threshold temperatures would increase the time to cable damage, thereby allowing more time for suppression. Similarly, credit for conduit protecting enclosed cables would increase the damage times, such that not crediting conduit is a conservative approach. The assumptions are conservative and therefore acceptable.
The cable tray growth model is overly conservative.	The cable tray growth model of NUREG/CR-6850 has limited applicability and appears to be conservative when applied outside the limits. No consideration of fire decay is made when evaluating the spread of fire in cable trays.	The cable tray model, when applied within the limits of NUREG/CR-6850 and FAQ 08-0049, “Cable Tray Fire Propagation,” is acceptable. When applied outside of these limits, the NRC staff does not accept that the results are always conservative, but rather are dependent upon the specific configuration and conditions. The assumption is consistent with NUREG/CR-6850, and is therefore acceptable for this application.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues

Issue Description	Evaluation	NRC Staff Conclusion
The fire brigade response times are subtracted from the suppression timeline.	The NUREG/CR-6850 methodology subtracts the fire brigade response time from the timeline for suppression. This effectively assumes that only fire brigade personnel will act to suppress a fire, which is conservative.	The methodology of NUREG/CR-6850 is conservative and has been updated in FAQ 08-0050, “Manual Non-Suppression Probability,” to allow additional credit for non-brigade personnel suppressing fires. Accordingly, use of the conservative approach applied by the licensee for this application is acceptable.
Modifications are conceptual at this point; actual risk impacts are not available.	Assumptions associated with the Fire PRA results are maintained during the NFPA 805 modification design and implementation phases through the use of risk screening processes similar to those that will be applied to the post-transition NFPA 805 change process. This screening process will flag any change if it impacts the risk results within the PRA assumptions. If a modification or change were to be proposed during implementation of NFPA 805 that potentially adversely increases the Fire PRA risk, it would be identified as such, and submitted to the NRC for approval.	Use of the post-transition NFPA 805 change process to review modification design and implementation is acceptable only to the extent that the licensee is bounded by the transition license condition which states that before achieving full compliance with 10 CFR 50.48(c), risk-informed changes to the licensee’s fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact. Accordingly, the staff considers the licensee to have committed that the Fire PRA, including implementation of all credited modifications, is modeled so as to ensure that the impact on risk from any changes to the currently planned modifications (or any additional subsequent changes) will not increase the risk above that estimated for the transition model.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment C6: Table 3.4-6, Uncertainty and Sensitivity Issues

Issue Description	Evaluation	NRC Staff Conclusion
Fire damage to the power supplies assumed to be available to cause spurious operations is conservative.	A simplifying assumption is made that the power to a cable assumed damaged by the fire and causing a spurious operation is available, when in fact the fire may cause the power supply to be interrupted.	This is a conservative approach in that there would appear to be some spurious events for which the power supply may not be available. The assumption is conservative and therefore acceptable.
The HRA uses screening values.	No credit is taken for OMAs and most ex-control room actions.	The use of HRA screening values is conservative and therefore acceptable.

References for Table 3.4-6

1. NUREG/CR-6850, “EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities,” U.S. Nuclear Regulatory Commission, Washington, DC, September 2005.

2. EPRI Technical Report 1016735, “Fire PRA Methods Enhancements: Additions, Clarifications, and Refinements to EPRI 1011989 (NUREG/CR-6850),” Electric Power Research Institute, Palo Alto, CA, December 2008.

3. Memorandum to file from Alexander R. Klein, U.S. Nuclear Regulatory Commission, dated November 23, 2009, “Closure of National Fire Protection Association 805 Frequently Asked Question 08-0046 - Incipient Fire Detection Systems” (ADAMS Accession No. ML093220426).

4. Memorandum to file from Alexander R. Klein, U.S. Nuclear Regulatory Commission, dated July 30, 2009, “Closure of National Fire Protection Association 805 Frequently Asked Question 08-0049 – Cable Tray Fire Propagation” (ADAMS Accession No. ML092100274).

5. Memorandum to file from Alexander R. Klein, U.S. Nuclear Regulatory Commission, dated September 14, 2009, “Closure of National Fire Protection Association 805 Frequently Asked Question 08-0509 – Manual Non-Suppression Probability” (ADAMS Accession No. ML092190555).

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment D: Nuclear Safety Capability Assessment Results by Fire Area

Attachment D is broken down into those HNP fire areas that were analyzed using the deterministic approach in accordance with NFPA 805, Section 4.2.3, and those using the performance-based approach in accordance with NFPA 805, Section 4.2.4.

Each fire area includes a discussion of how the licensee met the NFPA 805 requirement to evaluate the potential fire suppression effects on the ability to meet the nuclear safety performance criteria.

Each fire area also contains a section that addresses those NRC approved deviations from the existing deterministic fire protection licensing basis that the licensee desires to incorporate into the RI/PB FPP, as allowed by NFPA 805, Section 2.2.7. This discussion for each applicable fire area includes a description of the previously approved deviation from the deterministic requirements, the basis for and continuing validity of the deviation, and the NRC staff's evaluation of that deviation.

Where required, each section of the attachment includes an evaluation of the defense-in-depth recovery actions necessary for the applicable fire area. As discussed in SE Section 3.2.4, the licensee created a class of recovery actions that are not needed to maintain the availability of a success path and do not adversely impact risk, but which are being credited to enhance defense-in-depth for the fire area. Because the licensee has identified these recovery actions as being necessary to provide adequate defense-in-depth, the NRC staff has evaluated them as a part of the RI/PB FPP. As such, future removal of these defense-in-depth recovery actions would require a plant change evaluation in accordance with NFPA 805, Section 2.4.4.

Attachment D also provides an evaluation of the credited recovery actions for each applicable fire area. The NRC staff has documented the credited recovery actions and provided the additional risk of their use as evaluated by the licensee.

In addition, as documented in the applicable fire areas, the ERFBS used at HNP have all been analyzed using the performance-based approach in accordance with NFPA 805, Section 4.2.4. Accordingly, each fire area utilizing ERFBS includes a discussion of the VFDR analysis used to evaluate the acceptability of this feature, as well as the staff's evaluation of that conclusion.

For all fire areas where the licensee utilized the performance-based approach to meet the nuclear safety performance criteria, each VFDR and the associated disposition has been listed, as well as the NRC staff's evaluation of each.

As a part of the nuclear safety capability assessment, the licensee evaluated fire detection and suppression systems on a fire area basis. Accordingly, the evaluation of each fire area includes a table that documents the licensee's review of these fire detection and suppression systems, as well as the NRC staff's evaluation of the review and its results.

Finally, each fire area includes a summary assessment documenting the NRC staff's conclusion regarding the ability to meet the NFPA 805 requirements and the associated nuclear safety performance criteria.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment D1: Deterministic Compliance with NFPA 805 Section 4.2.3

For each fire area where the licensee selected the deterministic approach to demonstrate compliance with the NFPA 805 requirements, the NRC verified that the deterministic requirements of NFPA 805, Section 4.2.3, are met without the use of recovery actions. Fire areas that meet the deterministic requirements of NFPA 805 are deemed to adequately satisfy the nuclear safety performance criteria, as stated in NFPA 805, Section 4.1.

The licensee evaluated suppression and detection systems using a process that looked at several key aspects of the fire protection program to determine if a given system is required (i.e., deterministically in support of compliance with NFPA 805 Chapter 4, in support of a previous NRC approved deviation, in support of a licensee-developed engineering equivalency evaluation, or as a result of the performance-based evaluations).

Accordingly, each of the fire areas listed below include a section discussing those fire suppression and fire detection systems the licensee has determined to be required to meet the nuclear safety performance criteria.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Fire Area [redacted]

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Areas [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is protected with water tight enclosures and mounted on floor pedestals. Damage to plant areas and equipment from the accumulation of water discharged from the sprinkler system and hose lines is minimized by the provision of a floor drainage system. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drain system. Therefore, fire suppression activities will not adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit three previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b, for not providing 3-hour fire barrier (doors) between the intake structures.	The deviation was based on the exterior doors to the Train A and Train B cubicles being installed in labyrinth shield walls and the doors being separated by more than 20 feet. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.6.c, for installing seismic hose stations in safety related areas.	The deviation was approved based on the separation of redundant safe shutdown equipment by 3-hour rated Seismic Category 1 fire barriers, the areas being provided with non-seismic fire protection systems, and the combustible loading in these areas being considered low, except in the case of the diesel day tank and storage tank area where the enclosures are Seismic Category 1 or meet ASME Section III.	This deviation was reevaluated for consideration/inclusion in the HNP RI/PB FPP. See discussion in Section 3.5.1 of this safety evaluation for details.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a(4), for fire dampers in exterior walls.	Based on the barriers not being contiguous with fire areas, the original deviation was judged to be acceptable. The submittal letter was referenced in the HNP Supplemental SER, NUREG-1038, Supplement 4, Page 9-4, but this particular deviation from NFPA 90A was not noted specifically in NUREG-1038, Supplement 4. It is being included here to ensure it remains part of the HNP licensing basis. There are no safe shutdown cables that could cause a loss of function routed in [redacted] near non-rated exterior walls or openings in walls of the intake structure ([redacted]). The cables in [redacted] are either (1) in duct banks, with the only openings at man holes with concrete lids, (2) embedded in walls with no ignition source within the zone of influence at the exposed pull box (> 100 feet), (3) in the switchyard, (4) transmission lines coming/going to the switchyard, or (5) in a cable trench leading from the startup transformer to the switchyard. The only location where cables are close to a building is at the [redacted]. In the safe shutdown analysis, these [redacted] are included in both the [redacted] and [redacted] fire areas for this reason. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

Fire Areas [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the three described deviations.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Areas [redacted] meet the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Areas [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that this area contains no cabling or electrically supervised equipment that is required for post fire safe shutdown. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.6.c, for installing seismic hose stations in safety related areas.	The deviation was approved based on the separation of redundant safe shutdown equipment by 3-hour rated Seismic Category 1 fire barriers, the areas being provided with non-seismic fire protection systems, and the combustible loading in these areas being considered low, except in the case of the diesel day tank and storage tank area where the enclosures are Seismic Category 1 or meet ASME Section III.	This deviation was reevaluated for consideration/inclusion in the HNP RI/PB FPP. See discussion in Section 3.5.1 of this safety evaluation for details.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

Fire Areas [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Areas [redacted] meet the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or storm drainage system, as detailed in FSAR Section 9.3.3. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements, nor did it credit any previously approved deviations from the deterministic guidance for this fire area.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes**	No	No	No	No	No

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or storm drainage system, as detailed in FSAR Section 9.3.3. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements, nor did it credit any previously approved deviations from the deterministic guidance for this fire area.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or storm drainage system, as detailed in FSAR Section 9.3.3. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements, nor did it credit any previously approved deviations from the deterministic guidance for this fire area.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?					
				S	D	E	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I)**	No	**Yes**	**Yes**	**60257**	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or storm drainage system, as detailed in FSAR Section 9.3.3. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements, nor did it credit any previously approved deviations from the deterministic guidance for this fire area.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	**Yes**	**60257**	No	No	**Yes**	No	No	**Yes (I,T)**	**60257**	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is mounted on racks four inches high. Damage to plant areas and equipment from the accumulation of water discharged from hose lines is minimized by the provision of the floor drainage system and curbs. While the floor water surcharge is estimated to be significant, the floor drain and curb will reduce the potential of overflow to adjacent areas. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements, nor did it credit any previously approved deviations from the deterministic guidance for this fire area.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I)**	No	No	No	**Yes**	**Yes** *

* The licensee is making the detection system "required" in order to support a defense-in-depth recovery action in this fire area.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is mounted on racks four inches high. Damage to plant areas and equipment from the accumulation of water discharged from hose lines is minimized by the provision of the floor drainage system and curbs. While the floor water surcharge is estimated to be significant, the floor drain and curb will reduce the potential of overflow to adjacent areas. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements, nor did it credit any previously approved deviations from the deterministic guidance for this fire area.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I)**	No	No	No	**Yes**	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant electrical equipment subject to water damage is protected by watertight enclosures and floor pedestals. Damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the pitch of the floor toward floor drains throughout the building. Floor water surcharge is estimated to be minimal in the containment sump area. Runoff is directed to the containment sump. Therefore, fire suppression activities are not expected to adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from providing full area suppression.	The deviations were granted based upon existing fire protection features such as detection, partial suppression, separation, and low in-situ combustibles per HNP Supplemental SER, NUREG-1038, Supplement 2. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	No	No	**Yes (I, T)**	**Yes**	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	No	No	**Yes (T)**	**Yes**	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	No	No	**Yes (T)**	**Yes**	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	No	No	**Yes**	No	No	No	**Yes (T)**	**Yes**	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	No	No	**Yes (T)**	**Yes**	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	No	No	**Yes**	No	No	No	**Yes (T)**	**Yes**	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	No	No	**Yes (I, T)**	**Yes**	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	No	No	**Yes (I, T)**	**Yes**	**Yes**	No	No	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Areas [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is protected with watertight enclosures or floor pedestals, or both. Damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines on [redacted] is minimized by the provision of adequate floor drainage to the diesel generator sump. A six inch curb is provided at the access door to the electrical equipment room (Fire Zone [redacted]), and the electrical equipment is installed on four inch pedestals to prevent flooding. In addition, curbs six inches high are provided at the access doors to each diesel generator room and to the access corridor. Water can overflow into the corridor as well as adjacent areas and out into the yard. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.i, for the [redacted] wall.	The [redacted] wall was considered to be an equivalent 3-hour fire rated barrier, despite the HVAC opening, based on it being an exterior wall. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.6.c, for installing seismic hose stations in safety related areas.	The deviation was approved based on the separation of redundant safe shutdown equipment by 3-hour rated Seismic Category 1 fire barriers, the areas being provided with non-seismic fire protection systems, and the combustible loading in these areas being considered low, except in the case of the diesel day tank and storage tank area where the enclosures are Seismic Category 1 or meet ASME Section III.	This deviation was reevaluated for consideration/inclusion in the HNP RI/PB FPP. See discussion in Section 3.5.1 of this safety evaluation for details.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (T)**	No	No	**Yes**	**ESR 99-00395**	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	-	**Yes**	No	**Yes (T)**	No	No	No	-	**Yes**	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (T)**	No	No	**Yes**	**ESR 99-00395**	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	-	**Yes**	No	**Yes (T)**	No	No	No	-	**Yes**	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	**Yes**	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
T	Abbreviation for Thermal Detection	

While performing a review of Fire Areas [redacted], the NRC staff identified an issue that required the licensee to provide additional information in order to adequately demonstrate compliance with specific portions of the applicable NFPA 805 requirements.

By letter dated August 6, 2009, the staff requested additional information regarding a regulatory and technical issue pertaining to adequately demonstrating that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2 (in particular, RAI 3-25 of the associated letter addresses this concern).

The staff requested that the licensee provide a technical justification to demonstrate that a warped fire door will not impact the ability of the operator(s) to complete a required recovery action in Fire Area [redacted].

In its supplemental letter dated August 28, 2009, the licensee responded by stating that Fire Doors [redacted] and [redacted] separate the top floor of the diesel generator building ([redacted]) from the remainder of the building. The doors are installed at the top of stairs, are not part of a stairwell, and do not form any part of a fire barrier.

The NRC staff finds this acceptable because, based on the information provided in the LAR and associated RAI response, Fire Doors [redacted] and [redacted] do not form any part of a fire barrier and are not part of a stairwell. In addition, the licensee stated that these fire doors are no longer a rated fire protection feature and have been removed from the RI/PB FPP.

Fire Areas [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the two described deviations.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Areas [redacted] meet the deterministic requirements of NFPA 805 Section 4.2.3.2.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Areas [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that the fire area is contained within a water tight cubicle. The water discharged from the sprinkler system and hose lines is drained after a fire to the [redacted] sump through a normally closed, valved connection. Excess water cannot overflow to adjacent areas due to the presence of a three foot retaining wall. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.6.c, for installing seismic hose stations in safety related areas.	The deviation was approved based on the separation of redundant safe shutdown equipment by 3-hour rated Seismic Category 1 fire barriers, the areas being provided with non-seismic fire protection systems, and the combustible loading in these areas being considered low, except in the case of the diesel day tank and storage tank area where the enclosures are Seismic Category 1 or meet ASME Section III.	This deviation was reevaluated for consideration/inclusion in the HNP RI/PB FPP. See discussion in Section 3.5.1 of this safety evaluation for details.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.i, for diesel fuel oil day tank capacity.	The diesel fuel oil day tanks are sized to hold 3000 gallons of diesel fuel instead of the maximum of 1100 gallons recommended by the NRC guidelines. Because each 3000 gallon diesel fuel oil day tank is located in a separate enclosure that is designed with walls, floor, and ceiling that have a 3 hour fire-resistive rating and is sized to contain 110 percent of the total contents of the tank, the NRC staff found that that this was an acceptable deviation. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed. The staff concludes that with the application of this acceptable deviation, the protection provided for the diesel generator rooms meets BTP CMEB 9.5-1, Section C.7.i, and is therefore acceptable.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	**Yes**	**ESR 99-00395**	No	No	**Yes (T)**	No	No	**Yes**	**ESR 99-00395**	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	**Yes**	**ESR 99-00395**	No	No	**Yes (T)**	No	No	**Yes**	**ESR 99-00395**	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
T	Abbreviation for Thermal Detection	

Fire Areas [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the two described deviations.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Areas [redacted] meet the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems, water spray systems, and hose lines is minimized by the provision of a floor drainage system. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed by means of floors sloped to floor drains to either the acid caustic sump ([redacted]) or the industrial waste sumps ([redacted]). Plant equipment subject to water damage is protected with watertight enclosures, or is mounted on pedestals. Therefore, fire suppression activities are not expected to adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes (I, T)**	No	No	No	No	**Yes (I)** [1]
[redacted]	[redacted]	[redacted]	**Yes**	No	**Yes**[2]	No	No	No	**Yes (I, T)**	No	**Yes**	No	**Yes (I,T)**	**Yes (I,T)** [3]

1 The licensee is making the detection system "required" in order to support a defense-in-depth recovery action in this fire area. The required detection systems are in detection Zones [redacted], and involve ionization only for the [redacted] and [redacted] (general floor area outside the [redacted]).

2 The required suppression systems are the [redacted] pump deluge, the [redacted] pumps deluge, and the [redacted].

3 The licensee is making the detection system "required" in order to support a defense-in-depth recovery action in this fire area. The required detection systems are ionization detection in Zone [redacted] for the [redacted], and thermal detection (necessary for the actuation of [redacted] suppression systems) in Zone [redacted] for the [redacted] system, Zone [redacted] for the [redacted] pumps, and Zone [redacted] for [redacted] pumps.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	**Yes**[4]	No	**Yes**	No	**Yes (I, T)**	No	**Yes**	No	**Yes (I,T)**	**Yes (I,T)**[5]
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	No	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	

4 The required suppression systems are the [redacted] systems below the operating floor (note that two systems are required, the [redacted] systems).

5 The licensee is making the detection system "required" in order to support a defense-in-depth recovery action in this fire area. The required detection systems are ionization detection in Zone [redacted] for the [redacted] room, and thermal detection (necessary for the actuation of [redacted] suppression systems) in Zone [redacted] for the [redacted], Zone [redacted] for the [redacted], and Zones [redacted] for the [redacted].

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the two described deviations.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Areas [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from the sprinkler system and hose lines is minimized by the presence of a catch basin. The accumulation of water on the floor is estimated to be insignificant. Runoff is directed to the diesel fuel oil sump and then pumped to the yard oil separator. Therefore, fire suppression activities are not expected to adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.6.c, for installing seismic hose stations in safety related areas.	The deviation was approved based on the separation of redundant safe shutdown equipment by 3-hour rated Seismic Category 1 fire barriers, the areas being provided with non-seismic fire protection systems, and the combustible loading in these areas being considered low, except in the case of the diesel day tank and storage tank area where the enclosures are Seismic Category 1 or meet ASME Section III.	This deviation was reevaluated for consideration/inclusion in the HNP RI/PB FPP. See discussion in Section 3.5.1 of this safety evaluation for details.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes**	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

Fire Areas [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the two described deviations.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Areas [redacted] meet the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from hose lines is minimized by the provision of an adequate floor drainage system. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the radioactive floor drain system. Therefore, fire suppression activities will not adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the two described deviations.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is protected by being enclosed in a separate room, having the HVAC motors totally enclosed, and the provision of pads 4 to 6 inches high for electrical equipment. Damage to plant areas and equipment from the accumulation of water discharged from the sprinkler systems and hose lines is minimized by the provision of an adequate floor drainage system. Floor water surcharge is estimated to be significant, with runoff directed to the radioactive floor drain waste system. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	-	No	No	**Yes (I)**	No	No	**Yes**	**50804-3, Att. B**	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	-	No	No	**Yes (I)**	No	No	**Yes**	**50804-3, Att. B**	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	-	No	No	**Yes**	No	No	No	-	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is protected with watertight enclosures, or is mounted on floor pedestals. Damage to plant areas and equipment from the accumulation of water discharged from the sprinkler systems and hose lines is minimized by the provision of a floor drainage system. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the radioactive floor drain waste system. Therefore, fire suppression activities will not adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	**Yes**	**Yes**	**48007**	No	No	**Yes (T)**	No	**Yes**	**Yes**	**48007**	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	Yes	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	Yes	No	No	No	-	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
T	Abbreviation for Thermal Detection	

While performing a review of Fire Area [redacted], the NRC staff identified several issues that required the licensee to provide additional information in order to adequately demonstrate compliance with specific portions of the applicable NFPA 805 requirements. By letter dated March 9, 2010, the staff requested additional information regarding the required suppression and detection systems for Fire Area [redacted].

The NRC staff requested that the licensee provide clarification of the information provided in its February 4, 2010, supplemental letter in that, according to the fire protection drawings observed during the staff's onsite regulatory audit, Fire Zones [redacted] and [redacted] do not have suppression systems installed. In addition, LAR Tables 4-8-1 and 4-8-2 credit suppression and detection in Fire Zone [redacted] due to a previously approved deviation, yet the cited deviation does not mention suppression and detection.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Finally, Engineering Change (EC) 48007 credits suppression in Fire Zone [redacted] and detection in Fire Zones [redacted], [redacted], and [redacted]. However, LAR Tables 4-8-1 and 4-8-2 provided in the February 4, 2010, supplemental letter did not credit suppression and/or detection for EC 48007. The staff requested that the licensee address these apparent discrepancies.

In its supplemental letter dated April 5, 2010, the licensee responded by stating that a deviation involving a fire door deficiency credited suppression (and the associated thermal detection required for initiating the suppression system) for Fire Zone [redacted]. The deviation is applicable to numerous fire areas and is discussed in the applicable fire areas in LAR Attachment C (specifically, Fire Areas [redacted], [redacted], [redacted], [redacted], [redacted], [redacted], [redacted], [redacted], [redacted], [redacted], [redacted], and [redacted]). The discussion of this deviation in each of the fire areas where it is credited, as well as the detailed discussion of the deviation in LAR Attachment K, "Licensing Action Transition," has been revised to accurately state that the associated fire suppression and detection systems for those areas credited in the original deviation continue to be required.

EC 48007 also credits the suppression system and its associated thermal detection system in Fire Zone [redacted] for the non-rated metal hatches in the adjoining rooms. Accordingly, the licensee stated that LAR Table 4-8-1 has been revised to indicate that Fire Zones [redacted] and [redacted] do not have a suppression system installed. EC 48007 also originally credited an ionization detection system installed as part of the fuel handling building ventilation system smoke control system to meet the requirements of NFPA 90A in Fire Zones [redacted] and [redacted]. The licensee reevaluated the basis for EC 48007 and concluded that there is sufficient fire protection defense-in-depth to justify the non-rated metal hatches in these two fire zones without crediting the ionization detection system. As such, EC 48007 will be revised during NFPA 805 program implementation in order to remove credit for the ionization detection system for Fire Zones [redacted] and [redacted]. Revising EC 48007 to remove credit for the ionization detection system in Fire Zones [redacted] and [redacted] is an implementation item (SE Section 2.9; Item 23).

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the NSPC.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that portable extinguishers and hose lines from yard hydrants are available for fire fighting. Water discharged from the hose lines is not expected to affect other areas. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.6.c, for installing seismic hose stations in safety related areas.	The deviation was approved based on the separation of redundant safe shutdown equipment by 3-hour rated Seismic Category 1 fire barriers, the areas being provided with non-seismic fire protection systems, and the combustible loading in these areas being considered low, except in the case of the diesel day tank and storage tank area where the enclosures are Seismic Category 1 or meet ASME Section III.	This deviation was reevaluated for consideration/inclusion in the HNP RI/PB FPP. See discussion in Section 3.5.1 of this safety evaluation for details.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that with prompt response by plant operators and fire brigade personnel using portable fire extinguishers and hose lines from yard hydrants for cooling and control, the resultant fire (or water) damage in the area will be limited and confined to the area of ignition. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.6.a, for fire detection in areas with safety related equipment.	The deviation was approved based on low combustible loading and redundant equipment being located in a separate fire area. Note that the submittal did not specify a section of the BTP. The separation guidelines of Section C.5.b do not require separation if a 3-hour fire rated barrier separates redundant equipment, which is true in this case. However, the area does contain safety-related equipment, and Section C.6.a requires detection in such areas. In the HNP Supplemental SER, NUREG-1038, Supplement 2, the conclusion of the section discussing this deviation (among several others) states that the requirements of Section C.5.b are met. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the NSPC.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that with prompt response by plant operators and fire brigade personnel using portable fire extinguishers and hose lines from yard hydrants for cooling and control, the resultant fire (or water) damage in the area will be limited and confined to the area of ignition. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from the installation of fire detection and automatic suppression throughout the area.	The deviation was approved based on the existing fire protection features and low combustible loading. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	**Yes (I)**	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	**Yes (I)**	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes**	No	No	No	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes**	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee stated that deterministic compliance has been met in accordance with NFPA 805 Section 4.2.3.2, which requires that one success path of required cables and equipment be located in a separate area having boundaries containing fire barriers with a minimum fire resistance rating of 3 hours. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that Fire Area [redacted] includes the outside plant areas, so fire suppression activities will have no impact on achieving the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Based on the information provided in the LAR, the licensee did not identify any variations from the deterministic requirements. The licensee did, however, credit one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	**Yes** *	No	**Yes (T)**	No	No	No	**Yes**	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
T	Abbreviation for Thermal Detection	

Fire Area [redacted] Conclusion

Based on:

1. The licensee's documented compliance with NFPA 805 Section 4.2.3.2, and the licensee's assertion that the success path will be free of fire damage without reliance on recovery actions.

2. The assessment of the impact of suppression systems on the ability to meet the nuclear safety performance criteria.

3. The licensee's determination of the continued applicability and validity of the described deviation.

4. The licensee's determination of the automatic suppression and detection systems required to meet the nuclear safety performance criteria.

Fire Area [redacted] meets the deterministic requirements of NFPA 805 Section 4.2.3.2.

* Transformer suppression systems.

Attachment D2: Performance-Based Compliance with NFPA 805 Section 4.2.4

For each fire area where the licensee selected fire risk evaluation as the performance-based approach, the NRC staff verified that the change in risk is appropriately defined, the magnitude is acceptable, and defense-in-depth and sufficient safety margins are maintained. The staff has also verified that the additional risk of recovery actions is acceptable.

The licensee included an assessment of defense-in-depth and safety margins in the fire safety analysis (FSA) for each of the areas addressed using the performance-based approach. Each change evaluation assessed most of the aspects of defense-in-depth, including passive fire protection features (fire barriers, through penetration fire stops, penetration seals, radiant energy shields, etc.), active fire protection features (doors and dampers), and programmatic controls (combustible controls, hot work, design-flame spread of surfaces, electrical design, etc.), as well as manual suppression using fire extinguishers and hoses.

The licensee addressed the remaining defense-in-depth attributes (fire suppression, fire detection, and ERFBS) separately. ERFBS were treated as VFDRs, and as such the risk and associated defense-in-depth attributes were assessed in the change evaluation for each fire area where ERFBS was utilized.

The licensee evaluated suppression and detection systems using a process that looked at several key aspects of the fire protection program to determine if a given system is required (i.e., deterministically in support of compliance with NFPA 805 Chapter 4, in support of a previous NRC approved deviation, in support of a licensee-developed engineering equivalency evaluation, or as a result of the performance-based evaluations).

Accordingly, in addition to a discussion regarding risk, recovery actions (as applicable), defense-in-depth, and safety margins, each of the fire areas listed below also include a section discussing those fire suppression and fire detection systems the licensee has determined to be required to meet the nuclear safety performance criteria.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is protected with water tight enclosures and mounted on floor pedestals. Damage to plant areas and equipment from the accumulation of water discharged from the sprinkler system and hose lines is minimized by the provision of a floor drainage system. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drain system. Therefore, fire suppression activities will not adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited four previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a/b, in Fire Area [redacted] for fire area boundaries.	Requests per HNP letters NLS-84-090 and NLS-86-219 provide the following justification for fire boundary deviations from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a (1, 2, 4, and 5) regarding the requirement to have fire-rated dampers, doors, and penetration seals in walls and floors designated as 3-hour rated: For those penetrations and doors where safe shutdown equipment is within 20 feet, automatic suppression and detection has been provided on at least one side of the door or penetration. In addition, the combustible loading in the area(s) is considered low to moderate. The doors are also manufactured to the same engineering specification as a 3-hour rated fire door. Finally, the safe shutdown equipment identified within a 20 foot radius of the doors or penetrations in question do not have their redundant counterpart within 20 feet (except for [redacted] - pertains to [redacted]). The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.c, in Fire Area [redacted] for alternate or dedicated shutdown capability.	In the event of a fire in Fire Area [redacted], [redacted], or [redacted], the MCR does not need to be evacuated. However, the use of a non-safety-related dedicated HVAC unit to cool the PIC room is required. With the dedicated HVAC unit running, shutdown is otherwise normal. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the continued availability of a dedicated HVAC unit to provide cooling to the PIC room, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
315	The MT™ ERFBS located in Fire Zone [redacted] for power cables to [redacted], which provides power to credited HVAC components, does not meet the baseline configuration for the "HNP Fire Test Configuration" and needs to be upgraded to the baseline.	[redacted]	Not within the ZOI of a significant ignition source.	Based on (1) the tested fire rating of 115 minutes, (2) the fact that the MT™ ERFBS is not within the ZOI of a significant ignition source, and (3) the licensee's statement that the MT™ ERFBS will be upgraded to the tested configuration baseline, the NRC staff finds this VFDR acceptable.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of this VFDR is zero.

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	**Yes**	**50804-3 & ESR 99-00395**	No	No	**Yes (I,T)**	No	**Yes**	**Yes (I,T)**	**50804-3 & ESR 99-00395**	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	**Yes (I)**	No	**Yes**	No	-	No	**Yes**
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	No	**Yes**	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	**Yes (I)**	No	**Yes**	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	-	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Performance-Based Compliance with NFPA 805 Section 4.2.4

While performing a review of Fire Area [redacted], the NRC staff identified several issues that required the licensee to provide additional information in order to adequately demonstrate compliance with specific portions of the applicable NFPA 805 requirements. By letter dated August 6, 2009, the staff requested additional information regarding a number of regulatory and technical issues pertaining to adequately demonstrating that performance-based compliance has been met in accordance with NFPA 805 Section 4.2.4 (in particular, RAI 3-26 and RAI 3-27 of the associated letter address these concerns).

That staff requested that the licensee explain why detection was required for defense-in-depth in this fire area, while suppression was not. In its supplemental letter dated August 28, 2009, the licensee responded by stating that the original safe shutdown strategy for this fire area was to provide 3 hour protection in the form of MT™ fire wrap material for one train of safe shutdown equipment in the area. Fire detection is also required in the fire area for defense-in-depth. However, as outlined above, the VFDR for this fire area is that the MT™ ERFBS is rated for 115 minutes (1 hour, 55 minutes) rather than the required 3 hours. Consequently, the degraded MT™ fire wrap has been evaluated by the licensee with respect to risk and found to be acceptable. This acceptance is based on the small impact to the non-suppression probability (between 115 and 180 minutes).

The NRC staff finds this acceptable based on the information provided in the LAR and associated RAI response, which states that detection is required for defense-in-depth in order to ensure that manual firefighting efforts are initiated and control of the fire is achieved within the 1 hour, 55 minute rating of the MT™ fire wrap. Without detection in the room, this cannot be assured. Thus, the staff accepts that defense-in-depth is maintained without a suppression system based on the presence of the MT™ fire barrier, and the available detection in the room providing early warning such that fire suppression and control can be achieved manually.

The staff also asked the licensee to discuss the disposition of potential spurious operation of the seal injection filter backwash valves by de-energizing several breakers. The staff requested the licensee describe the administrative controls to be used when the valves needed to be operated while the plant was at power, resulting in the valves being susceptible to spurious operations.

In its supplemental letter dated August 28, 2009, the licensee responded by stating that the modification to change the circuit breaker positions to open had been completed. The only time the seal injection filter backwash valves will be energized and susceptible to fire-induced spurious operation is during filter backwash operations. This is a short duration evolution and the normal configuration will be restored immediately following the evolution.

The NRC staff finds this acceptable based on the information provided in the LAR and associated RAI response, which states that the licensee will use administrative controls to ensure that the seal injection backwash valves will be maintained closed with power removed except for the short duration time when filter backwash operations are required, and also states that procedures have been changed to require restoration of the required state of the valves (closed with power removed) immediately upon completion.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Four previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.
- One variation from the deterministic requirements was identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).
- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.
- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:
  - On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.
  - Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.
  - Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment subject to water damage is mounted on floor pedestals. Floor water surcharge is estimated to be insignificant. Floor drains located in areas adjacent to the [redacted] provide drainage for fire suppression water. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited six previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.b, for conduit above the [redacted] and cable trench under the [redacted] cabinet.	The deviation was approved based on low fuel loading, installed smoke detectors, and the [redacted]. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.b, for the areas peripheral to the [redacted].	The peripheral areas to the [redacted] are not separated from the [redacted] room by 1-hour rated fire barriers and an automatic water suppression system as required by Section C.7.b. The deviation was approved based on low fuel loading, the installed detection system, the [redacted], and the installation of an automatic sprinkler in the [redacted] area. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.b, in that cables are routed under the [redacted] floor in the [redacted] room without an automatic suppression system.	The deviation was approved based on the negligible fuel loading under the [redacted] floor in conjunction with the installed detection system and the [redacted]. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.b, that requires there be no carpeting [redacted] room.	The deviation was approved based on the carpeting being non-combustible in accordance with NUREG-0800, BTP CMEB 9.5-1, Section C.5.a(9). The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
NRC Approval of Meggitt Safety Systems Cable.	The NRC issued a license amendment approving the use of Meggitt Safety Systems fire resistive cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
51	There are emergent issues concerning the potential for safety injection valves to spuriously open, potentially resulting in solid plant conditions.	[redacted]	Planned modifications to install Meggitt fire resistive cable, a VEWFDS, and an alternate seal injection system.	Based on the proposed modifications, which provide (1) defense-in-depth with regard to safe shutdown (installation of Meggitt cable), (2) identification of fires and rapidly suppressing those fires that do occur (installation of a VEWFDS), and (3) an independent means of achieving the reactor coolant inventory and reactivity control requirements (installation of an alternate seal injection system), the NRC staff finds this VFDR acceptable.
53	EC 62343 is being written to eliminate an emergent issue concerning the spurious opening of SG PORV C.	[redacted]	Planned modification to allow failing closed component [redacted] from the ACP.	Based on the proposed modification, which negates the postulated fire damage, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
326	Spurious opening of [redacted] and / or [redacted] could result in the loss of RWST inventory to the containment sump. The ECs are addressing the issue.	[redacted]	Planned modifications to install Meggitt fire resistive cable, a VEWFDS, and to allow auto-close of the in-line valves upon transfer to the ACP.	Based on the proposed modifications, which provide (1) defense-in-depth with regard to safe shutdown (installation of Meggitt cable), (2) identification of fires and rapidly suppressing those fires that do occur (installation of a VEWFDS), and (3) automatic closure of the in-line valves upon transfer to the ACP, the NRC staff finds this VFDR acceptable.
349	The hot standby manual actions credited for [redacted], [redacted], [redacted], and [redacted] are required to maintain RCP seal thermal barrier cooling as the credited means of providing for RCP seal integrity. Because this is an alternate shutdown area, these actions are allowable under the current licensing basis and a change evaluation is not required. However, due to time constraints, the actions are not feasible.	[redacted]	Planned modification to install an alternate seal injection system.	Based on the proposed modification to install an alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
350	The hot standby manual actions credited for [redacted], [redacted], [redacted], [redacted], [redacted], [redacted], and [redacted] are required to maintain RCS make up. Because this is an alternate shutdown area, these actions are allowable under the current licensing basis and a change evaluation is not required. However, due to time constraints, the actions are not feasible.	[redacted]	Planned modification to install an alternate seal injection system.	Based on the proposed modification to install an alternate seal injection system, the NRC staff finds this VFDR acceptable.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

Recovery Actions (RAs)

Component ID	Component Name	Licensee's Description of Action
[redacted]	SG [redacted] Blowdown Flow Control Valve	De-energize [redacted] at [redacted], in Fire Zone [redacted] in order to fail the valve closed.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	Valve [redacted]	De-energize [redacted] and [redacted] at MCC power panel [redacted], [redacted], in Fire Zone [redacted] to fail the valves closed.
[redacted]	Valve [redacted]	De-energize [redacted] and [redacted] at MCC power panel [redacted], [redacted], in Fire Zone [redacted] to fail the valves closed.
[redacted]	Pressurizer Backup Heater Group [redacted] Power Panel Supply ([redacted])	Remove control power fuses and open breaker [redacted] at 480V Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Pressurizer Backup Heater Group [redacted] Power Panel Supply ([redacted])	Remove control power fuses and open breaker [redacted] at 480V Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Main Feedwater Pump [redacted]	Remove control power and trip [redacted] at Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Main Feedwater Pump [redacted]	Remove control power and trip [redacted] at Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Reactor Coolant Pump [redacted]	Locally trip RCP A per AOP-004 at Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Reactor Coolant Pump [redacted]	Locally trip RCP B per AOP-004 at Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Reactor Coolant Pump [redacted]	Locally trip RCP C per AOP-004 at Auxiliary Bus [redacted] in Fire Area [redacted].
Transfer Panels	Transfer Panels	Transfer control to the auxiliary control panel.*

* This action is part of the process to enable the auxiliary control panel, so it does not need to be evaluated for delta risk because it is a part of the overall ACP process.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these recovery actions is 4.99E-07 (ΔCDF) and 4.99E-08 (ΔLERF).**

** Discrete delta-CDF and delta-LERF calculations were not performed for this fire area. The total fire risk for the [redacted] scenarios has been used as a bounding delta risk assessment.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action	Required for Success Path?	ΔCDF	ΔLERF
[redacted]	SEAL INJECTION FLOW CONTROL VALVE OUTLET ISOLATION VALVE	Isolate RCP seal injection: Shut [redacted], seal injection flow control valve outlet isolation valve, to isolate RCP seal injection. Verify shut [redacted], seal injection flow control valve bypass valve.	No	N/A	N/A
[redacted]	REACTOR COOLANT PUMP [redacted] SEAL BYPASS	Open the following breakers to ensure shut [redacted], RCP No.1 seal bypass, and to ensure open [redacted], [redacted], and [redacted]: [redacted], [redacted] ([redacted]), [redacted], and [redacted] ([redacted]).	No	N/A	N/A
[redacted]	EXCESS LETDOWN UPSTREAM ISOLATION [redacted] OPERATOR	Open [redacted], MTC [redacted], to verify excess letdown is isolated.	No	N/A	N/A
[redacted]	REACTOR COOLANT PUMP SEAL WATER RETURN	Isolate RCP seal return: Place breaker [redacted] in off. Shut [redacted], RCP seal water return.	No	N/A	N/A
[redacted]	CENTRIFUGAL SAFETY INJECTION PUMP [redacted]	When RCS cold leg temperature is between 325°F and 350°F, perform the following: Rack out the non-running CSIP.	No	N/A	N/A
[redacted]	CENTRIFUGAL SAFETY INJECTION PUMP [redacted]	When RCS cold leg temperature is between 325°F and 350°F, perform the following: Rack out the non-running CSIP.	No	N/A	N/A

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action	Required for Success Path?	ΔCDF	ΔLERF
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.	No	N/A	N/A
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].	No	N/A	N/A
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].	No	N/A	N/A
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.	No	N/A	N/A
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.	No	N/A	N/A
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].	No	N/A	N/A
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].	No	N/A	N/A
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].	No	N/A	N/A
[redacted]	LOW HEAD SAFETY INJECTION [redacted] TO RCS HOT LEG	De-energize [redacted] at MCC [redacted], Compartment [redacted], in Fire Zone [redacted]. Then verify closed for CSD or manually close [redacted] in Fire Zone [redacted].	No	N/A	N/A

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action	Required for Success Path?	ΔCDF	ΔLERF
[redacted]	-----	Remove control power fuses and open breaker for [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted]. Remove control power fuses and open breaker for [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted].	No	N/A	N/A
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.	No	N/A	N/A
Rod Drive Motor Generator (MG) Sets	ROD DRIVE MG SET MG-A ROD DRIVE MG SET MG-B	Remove control power fuses and mechanically trip rod drive motor generator sets at switchgear - MG-A: 480V Bus [redacted] MG-B: 480V Bus [redacted].	No	N/A	N/A

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes [1] (I, AS)**	No	**Yes (I)**	No	**Yes (I, AS)**	**Yes (I, AS)**
[redacted]	[redacted]	[redacted]	**Yes [2]**	No	**Yes**	No	No	No	**Yes (I, AS)**	No	**Yes (I)**	No	**Yes (I, AS)**	**Yes (I, AS)**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
AS	Abbreviation for Air Sampling Detection	

While performing a review of Fire Area [redacted], the NRC staff identified several issues that required the licensee to provide additional information in order to adequately demonstrate compliance with specific portions of the applicable NFPA 805 requirements. By letters dated August 6, 2009, and January 14, 2010, the staff requested additional information regarding a number of regulatory and technical issues pertaining to adequately demonstrating that performance-based compliance has been met in accordance with NFPA 805 Section 4.2.4 (in particular, RAI 3-20, RAI 3-23n, RAI 3-28, RAI 3-30, RAI 3-31, RAI 3-62, and RAI 3-72 of the associated letter address these concerns).

RAI 3-20 requested that the licensee clarify how the RCS inventory control, boration, and RCP seal integrity functions are being achieved for each fire area, how the availability of at least one charging pump is being assured given the potential for pump damage due to fire, and for which fire areas the new plant equipment is being credited. In its supplemental letter dated August 28, 2009, the licensee responded by stating that on a fire area basis, the means of ensuring that RCS inventory control, reactivity control (boration), and the RCP seal integrity functions are being achieved is detailed in the plant safe shutdown calculation.

---

1 A VEWFDS is being installed to monitor risk significant control panels in order to increase defense-in-depth.

2 An automatic suppression system has been provided in the [redacted] per the approved deviation.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Where new plant equipment is being credited but is not yet installed (as in the case of the alternate seal injection (ASI) modification), the equipment has not been credited in the deterministic safe shutdown calculation. In the performance-based evaluations performed for numerous fire areas, the new equipment is credited in the associated change evaluation and the Fire PRA. In addition, the ASI modification has the dual function of (1) maintaining seal injection to ensure cooling to the RCP seals and (2) providing a backup source of borated water for RCS inventory and reactivity control in all fire areas except [redacted] and [redacted] (where thermal barrier cooling and normal charging/seal injection are not affected).

Based on the information provided in the LAR and associated RAI response, the licensee has either identified how the availability of at least one charging pump is being assured or identified the fire areas where new equipment is being credited in the performance-based change evaluations. Therefore, the NRC staff finds this acceptable.

RAI 3-23n requested that the licensee revise documentation as necessary to clearly state how delta-risk calculations were developed (i.e., by actual calculation, screening, or by assuming no change in risk). The FSA for the [redacted] documented the delta-risk results as zero, but the licensee stated that no delta-risk evaluations were performed for alternate shutdown because it was consistent with the existing licensing basis. The NRC staff found the tables in the calculation misleading since they implied delta-risk calculations had been performed and are of very low risk (zero). In its supplemental letter dated October 9, 2009, the licensee responded by stating that the [redacted] FSA and other similar calculations will be revised prior to implementation of the NFPA 805 program to clearly state how the delta risks were determined.

Completion of the revisions for the affected FSAs is an implementation item (SE Section 2.9; Item 15).

RAI 3-28 requested that the licensee describe how the installation of Meggitt cable will aid in preventing spurious actuations within the [redacted]. The licensee was also asked to address the fact that spurious actuations of numerous safety injection valves could impact the continued operation of one or more of the centrifugal safety injection pumps (CSIP). In addition, spurious actuation of the containment spray pump suction valves ([redacted] and [redacted]) could result in draining the reactor water storage tank (RWST) to the reactor containment emergency sump.

In its supplemental letter dated August 28, 2009, the licensee responded by stating that in addition to the installation of Meggitt cable from the [redacted] to termination points outside this fire area, a VEWFDS is being installed for the [redacted] to reduce the probability and consequences of a fire in the [redacted]. Modification EC 70350 (the ASI modification) provides an alternate source of seal injection upon loss of seal injection flow (either due to CSIP failure or stoppage of the running CSIP). In addition, modification EC 54065 modified the circuits for valves in-line with the containment spray pump suction valves ([redacted] and [redacted]) such that they would receive an automatic close signal on transfer to the auxiliary control panel (ACP).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The NRC staff finds this acceptable based on the information provided in the LAR and associated RAI response because the licensee has significantly reduced the risk of spurious actuation of the associated safety injection and containment spray valves by installing Meggitt fire rated cables. In addition, the licensee is adding a VEWFDS to monitor conditions inside the [redacted], which further reduces the risk of fire in the [redacted]. Finally, in order to address the concern that spurious actuations could result in the RWST draining to the emergency sump, the licensee has modified the control circuits for valves in-line with the containment spray pump suction valves to prevent this from occurring once control has been transferred to the ACP.

RAI 3-30 discussed the disposition of un-isolated control cable for [redacted] and the spurious operation of valves [redacted] and [redacted]. From the description of modification EC 68656, it did not appear that all three items had been appropriately addressed. In its supplemental letter dated August 28, 2009, the licensee responded by stating that modification EC 68656 fully addressed the spurious actuation of Valve [redacted]. The revised LAR provided on October 9, 2009, states that EC 68656 modified the control circuit to eliminate the possibility of a hot short maintaining the valve open following control transfer by rerouting a conductor through a normally closed contact of a transfer relay. Accordingly, upon transfer to the ACP, the valve will fail closed.

Modification EC 68660 fully addressed potential fire damage to [redacted] by moving the associated cable outside the fire area via routing to a multiplexer (MUX) cabinet in Fire Area [redacted] where the cable already terminates. Valve [redacted] did not require modification because it is the redundant counterpart to Valve [redacted]. By assuring that Valve [redacted] will remain available, no further action is required. Based on the information provided by the licensee in the LAR and associated RAI response, both components have been modified to address potential fire damage. Therefore, the NRC staff finds this acceptable.

RAI 3-31 requested that the licensee provide a performance-based analysis, in accordance with the appropriate requirements of NFPA 805, justifying the continued use of a 10 minute operator time window during alternate shutdown wherein no spurious equipment actuations are postulated to occur. In addition, RAI 3-62 requested that the licensee provide a discussion of how NRC Information Notice (IN) 92-18, "Potential Loss of Remote Shutdown Capability During a Control Room Fire," was addressed for Valve [redacted], including a justification for any reliance on the 10 minute exclusion window for spurious actuations.

In its supplemental letter dated August 28, 2009, the licensee responded by stating that the PRA took no credit for the ten minute exclusion window. If a component was assumed to spuriously operate (including Valve [redacted]) in the PRA, it was not recovered. The PRA also did not take credit for alternate shutdown for a fire not in the [redacted] itself. In an effort to reduce the risk of a significant fire in the [redacted], a VEWFDS is being installed to monitor conditions inside the [redacted]. In addition, an ASI system is being installed to provide a fully independent and redundant means to supply RCP seal cooling. Finally, a modification is being installed to provide redundant control power fuses at the ACP to supply power for Valves [redacted], [redacted], and [redacted] upon ACP control transfer.

Based on the information provided by the licensee in the LAR and associated RAI response, the NRC staff requested additional information about the control circuits for Valves [redacted], [redacted], and [redacted]. By letter dated January 14, 2010, the staff

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

forwarded RAI 3-23m.1, which asked the licensee if the valves were vulnerable to fire-induced damage that could bypass the torque and/or limit switches of the actuators. In its supplemental letter dated February 4, 2010, the licensee responded by stating that the IN 92-18 vulnerability is not being addressed directly. Instead, defense-in-depth is being increased by the installation of a VEWFDS in the [redacted] section of concern, EC 70985 is installing fuses at the ACP for all three turbine driven AFW valves rather than just one credited path, and the remaining AFW valves and their associated pumps can be utilized from the ACP as well, should all three valves for the turbine driven pump be damaged.

The NRC staff notes that Valves [redacted], [redacted], and [redacted] are vulnerable to an IN 92-18 type event for a limited time period from fire initiation to completion of the control transfer to the ACP. Therefore, the staff accepts that increased defense-in-depth is achieved based on the installation of a VEWFDS in the [redacted], the installation of redundant fuses at the ACP for all three AFW valves from the turbine driven pump, and the availability of the controls for remaining AFW pumps and valves at the ACP. Therefore, the NRC staff finds this acceptable.

RAI 3-72 requested that the licensee make the delta risk calculated for the control room consistent with the statement in LAR Attachment G, "Operator Manual Actions - Transition to Recovery Actions," Section G.5.3.2, that the fire area risk for alternative shutdown areas provides a bounding risk for the recovery actions taken in those areas. In its supplemental letter dated February 4, 2010, the licensee responded by stating that the additional risk due to recovery actions during control room abandonment is 4.99E-07 (CDF) and 4.99E-08 (LERF). These recovery actions were previously approved as part of the pre-transition (to NFPA 805) fire protection program. Accordingly, the delta risk for these recovery actions is acceptable based on the previous NRC staff approval of the actions as part of the alternative shutdown strategy for HNP.

The staff also notes that the delta risk for these recovery actions is acceptable based on the numbers themselves, in that they are below the acceptance requirements of RG 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," and RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Performance-Based Compliance with NFPA 805 Section 4.2.4

Based on the information provided in the LAR as supplemented:

- Six previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Five variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- Eleven recovery actions were identified, evaluated by including the associated unprotected cables in the Fire PRA, and incorporated into the fire area core damage frequency and large early release frequency. The licensee utilized the overall fire risk for the fire area as a surrogate for the delta risk evaluations required by NFPA 805 Section 4.2.4. The delta core damage frequency (4.99E-07) and delta large early release frequency (4.99E-08) for this fire area meet the requirements of RG 1.174 for a plant with total risk numbers of 3.63E-05 (CDF) and 4.99E-06 (LERF).

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that ready access is provided to the area from adjacent plant areas, thereby facilitating initial use of area fire extinguishers on incipient fires and supplemental use of standpipe hose lines by the responding fire brigade personnel. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to floor drains. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
101	The hot standby manual actions credited for [redacted], [redacted], [redacted], [redacted], and [redacted] are required to establish RCP seal thermal barrier cooling as the credited means of providing for RCP seal integrity. The actions will be changed to simply de-energize the valves since they cannot be reopened and thermal barrier cooling reestablished in time to prevent RCP seal temperatures equalizing with RCS temperature. Because this is an alternate shutdown area, these actions are allowable under the current licensing basis and a change evaluation is not required. However, due to time constraints, the actions are not feasible.	[redacted]	EC 70350 will provide alternate seal injection on loss of normal seal injection, thereby replacing the previously approved manual actions.	Based on the proposed modification to install an alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
33	Spurious operation of [redacted] and / or [redacted] could result in the loss of RWST inventory to the containment sump. The ECs are addressing this issue.	[redacted] [redacted]	Planned modifications to install Meggitt fire resistive cable, a VEWFDS, and to allow auto-close of the in-line valves upon transfer to the ACP.	Based on the proposed modifications, which provide (1) defense-in-depth with regard to safe shutdown (installation of Meggitt cable), (2) identification of fires and rapidly suppressing those fires that do occur (installation of a VEWFDS), and (3) automatic closure of the in-line valves upon transfer to the ACP, the NRC staff finds this VFDR acceptable.
346	A postulated fire in Fire Area [redacted] or Fire Area [redacted] could cause spurious closure and a subsequent loss of valve control power for [redacted], [redacted], and [redacted].	[redacted] [redacted] [redacted]	EC 69501 will install a VEWFDS to reduce the risk of fire in critical cabinets in Fire Area [redacted]. EC 70895 will provide redundant fuses for powering turbine driven AFW MOVs [redacted], [redacted], and [redacted] to address the possible loss of power resulting from fire damage in Fire Area [redacted]. In addition, having the controls for both motor driven AFW pumps and the associated valves transferred to the ACP provides defense-in-depth since only one train of AFW is required to function in order to achieve adequate decay heat removal.	The NRC staff notes that although Valves [redacted], [redacted], and [redacted] are vulnerable to fire-induced damage as described in IN 92-18, the valve/actuator is only susceptible during a limited time window between fire initiation and completion of control transfer to the ACP. In addition, the licensee has provided significant defense-in-depth. Based on (1) the limited time the valves are vulnerable to fire-induced damage, (2) the proposed installation of a VEWFDS in critical cabinets in Fire Area [redacted], (3) the proposed modification to protect Valves [redacted], [redacted], and [redacted], and (4) having additional trains of AFW available at the ACP, the staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
35	EC 62343 is being written to eliminate an emergent issue concerning the spurious opening of SG PORV C.	[redacted]	EC 62343 will install a switch that allows SG PORV C to be failed closed from the ACP.	Based on the proposed modification to fail component [redacted] closed from the ACP, the NRC staff finds this VFDR acceptable.
351	There are emergent issues concerning the potential for safety injection valves to spuriously open, potentially resulting in solid plant conditions.	[redacted] [redacted]	Spurious opening of a high head SI valve cannot run out a CSIP at normal plant pressure, but could lead to solid plant conditions; or if the VCT empties could gas bind the running CSIP. Should the plant reach solid conditions before the CSIP is secured, the pressurizer PORVs will cycle to control pressure until their air supply is exhausted. Subsequently, the pressurizer safety valves will cycle. Upon transfer to the ACP, the CSIP is secured until the valve lineup can be verified. EC 67772 installed Meggitt cable from the [redacted] to termination points outside this fire area. EC 69501 will install a VEWFDS to reduce the probability and consequences of fire in critical cabinets in this fire area. EC 70350 will provide an alternate source of seal injection on loss of normal seal injection flow (either due to CSIP failure or stoppage of the running CSIP).	Based on (1) the installed modifications to [redacted] and [redacted] (Meggitt cable), (2) the proposed installation of a VEWFDS in critical cabinets in this fire area, and (3) the proposed modification to install an alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
352	The hot standby manual actions credited for [redacted], [redacted], [redacted], [redacted], [redacted], and [redacted] are required to maintain RCS make up. Because this is an alternate shutdown area, these actions are allowable under the current licensing basis and a change evaluation is not required. However, due to time constraints, the actions are not feasible.	[redacted]	EC 70350 will provide an alternate means of RCS makeup (as well as seal injection) due to loss of the running CSIP, thereby replacing the previously approved manual actions.	Based on the proposed modification to install an alternate seal injection system, the NRC staff finds this VFDR acceptable.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

Recovery Actions (RAs)

Component ID	Component Name	Licensee's Description of Action
[redacted]	Valve [redacted]	De-energize [redacted] and [redacted] at MCC power panel [redacted], [redacted], in Fire Zone [redacted] to fail the valves closed.
[redacted]	Valve [redacted]	De-energize [redacted] and [redacted] at MCC power panel [redacted], [redacted], in Fire Zone [redacted] to fail the valves closed.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	Pressurizer Backup Heater Group [redacted] Power Panel Supply ([redacted])	Remove control power fuses and open breaker [redacted] at 480V Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Pressurizer Backup Heater Group [redacted] Power Panel Supply ([redacted])	Remove control power fuses and open breaker [redacted] at 480V Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Main Feedwater Pump [redacted]	Remove control power and trip [redacted] at Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Main Feedwater Pump [redacted]	Remove control power and trip [redacted] at Auxiliary Bus [redacted] in Fire Area [redacted].
[redacted]	Pressurizer Heater Power Controller (Group [redacted])	Damage to this cable may cause heater group C to spuriously operate. Remove control power fuses and open breaker [redacted] at 480V Auxiliary Bus [redacted] in Fire Area [redacted].

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these recovery actions is 5.09E-08 (ΔCDF) and 6.19E-08 (ΔLERF).

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	SEAL INJECTION FLOW CONTROL VALVE OUTLET ISOLATION VALVE	Isolate RCP seal injection: Shut [redacted], seal injection flow control valve outlet isolation valve, to isolate RCP seal injection. Verify shut [redacted], seal injection flow control valve bypass valve.
[redacted]	REACTOR COOLANT PUMP [redacted] SEAL BYPASS	Open the following breakers to ensure shut [redacted], RCP No.1 seal bypass, and to ensure open [redacted], [redacted], and [redacted]: [redacted], [redacted] ([redacted]), [redacted], and [redacted] ([redacted]).
[redacted]	EXCESS LETDOWN UPSTREAM ISOLATION [redacted] OPERATOR	Open [redacted], MTC [redacted], to verify excess letdown is isolated.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	REACTOR COOLANT PUMP SEAL WATER RETURN	Isolate RCP seal return: Place breaker [redacted] in off. Shut [redacted], RCP seal water return.
[redacted]	CENTRIFUGAL SAFETY INJECTION PUMP [redacted]	When RCS cold leg temperature is between 325°F and 350°F, perform the following: Rack out the non-running CSIP.
[redacted]	CENTRIFUGAL SAFETY INJECTION PUMP [redacted]	When RCS cold leg temperature is between 325°F and 350°F, perform the following: Rack out the non-running CSIP.
[redacted]	HEAT EXCHANGER A FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	-----	Remove control power fuses and open breaker for [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted]. Remove control power fuses and open breaker for [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.
Rod Drive MG Sets	ROD DRIVE MG SET MG-A ROD DRIVE MG SET MG-B	Remove control power fuses and mechanically trip rod drive motor generator sets at switchgear - MG-A: 480V Bus [redacted] MG-B: 480V Bus [redacted].

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I, AS)**	No	**Yes (I)**	**Yes (I)**	**ESR 99-00395**	**Yes (I, AS)**	**Yes (I, AS)**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I, AS)**	No	**Yes**	No	-	**Yes**	**Yes**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I)**	No	**Yes**	No	-	**Yes**	**Yes**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I, AS)**	No	**Yes**	No	-	**Yes (I, AS)**	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
AS	Abbreviation for Air Sampling Detection	

While performing a review of Fire Area [redacted], the NRC staff identified several issues that required the licensee to provide additional information in order to adequately demonstrate compliance with specific portions of the applicable NFPA 805 requirements. By letters dated August 6, 2009, and January 13, 2010, the staff requested additional information regarding a number of regulatory and technical issues pertaining to adequately demonstrating that performance-based compliance has been met in accordance with NFPA 805 Section 4.2.4 (in particular, RAI 3-23l, RAI 3-23m, and RAI 3-72 of the associated letter address these concerns).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

RAI 3-23l pointed out that although Fire Area [redacted] is being transitioned using the performance-based approach, the supporting fire safety analysis (FSA) calculation did not include a plant change evaluation to address several VFDRs for this area. Specifically, LAR Attachment C includes Open Item 101, which states that the previously approved manual actions to de-energize the operator and re-open the motor-operated valves required to establish thermal barrier cooling will be changed to not require re-opening of the valves. The open item also states that the likelihood and consequences of a RCP seal LOCA will be evaluated in the Fire PRA and considered in the change evaluation for this area. The disposition of this item refers to Attachment 2, "Record of Lead Review," of the associated FSA, which is simply the engineering review record for the calculation.

The NRC staff stated that the recovery action discussed requires a risk review, and requested that the licensee revise the required calculations to submit for staff review. In its supplemental letter dated August 28, 2009, the licensee responded by stating that EC 70350 will provide another source of RCS makeup and seal injection that is not dependent on the CCW valves. As shown in Table G-2, "Disposition of Pre-Transition Operator Manual Actions," of LAR Attachment G, "Operator Manual Actions - Transition to Recovery Actions," actions to restore thermal barrier cooling will no longer be required. Accordingly, based on the licensee's commitment to install EC 70350, the NRC staff finds this approach acceptable.

RAI 3-23m pointed out that the resolution for Open Item 346 in LAR Attachment C also refers to a change evaluation in the same FSA discussed for RAI 3-23l. The NRC staff requested that the licensee provide an appropriate justification for disposition of the open item and update the associated analysis to adequately reflect the licensing basis. In its supplemental letter dated August 28, 2009, the licensee responded by stating that EC 70895 protects turbine driven AFW MOVs [redacted], [redacted], and [redacted] from fire damage in Fire Area [redacted], thereby ensuring that following control transfer to the ACP the valves are isolated from the [redacted] foot elevation and a clean fuse is available if the primary fuse has already been blown.

Based on the information provided by the licensee in the LAR and associated RAI response, the NRC staff requested additional information regarding the potential loss of function of one or more of these valves as a result of fire-induced damage to the valve/actuator as described in NRC IN 92-18. By letter dated January 14, 2010, the staff forwarded RAI 3-23m.1, which asked the licensee if the valves were vulnerable to fire-induced damage that could bypass the torque and/or limit switches of the actuators.

In its supplemental letter dated February 4, 2010, the licensee responded by stating that EC 69501 will install a VEWFDS to reduce the risk of fire in critical cabinets in Fire Area [redacted]. In addition, EC 70895 will provide redundant fuses for powering turbine driven AFW MOVs [redacted], [redacted], and [redacted] in order to address the possible loss of power resulting from fire damage in Fire Area [redacted]. Finally, having the controls for both motor driven AFW pumps and the associated valves transferred to the ACP provides defense-in-depth since only one train of AFW is required to function in order to achieve adequate decay heat removal.

The NRC staff notes that although Valves [redacted], [redacted], and [redacted] are vulnerable to fire-induced damage as described in IN 92-18, the valve/actuator is only susceptible during a limited time window between fire initiation and transfer of control to the ACP.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

In addition, the licensee has provided significant defense-in-depth for these valves. Accordingly, based on the proposed installation of a VEWFDS in critical cabinets in Fire Area [redacted], the proposed modification to provide redundant fuses for powering Valves [redacted], [redacted], and [redacted], and having additional trains of AFW available at the ACP, the staff finds this acceptable.

RAI 3-72 requested that the licensee make the delta risk calculated for the control room consistent with the statement in LAR Attachment G, "Operator Manual Actions - Transition to Recovery Actions," Section G.5.3.2, that the fire area risk for alternative shutdown areas provides a bounding risk for the recovery actions taken in those areas. In its supplemental letter dated February 4, 2010, the licensee responded by stating that the additional risk due to recovery actions during control room abandonment is 4.99E-07 (CDF) and 4.99E-08 (LERF). These recovery actions were previously approved as part of the pre-transition (to NFPA 805) fire protection program. Accordingly, the delta risk for these recovery actions is acceptable based on the previous NRC staff approval of the actions as part of the alternative shutdown strategy for HNP.

The staff also notes that the delta risk for these recovery actions is acceptable based on the numbers themselves, in that they are below the acceptance requirements of RG 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," and RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Two previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Six variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

- Seven recovery actions were identified, evaluated by assessing a fire scenario wherein the cables associated with the components necessitating recovery actions were unprotected, and then comparing those risk numbers (CDF and LERF) with those of a fire scenario calculated assuming these cables were properly protected in accordance with the deterministic rules. The delta core damage frequency (5.09E-08) and delta large early release frequency (6.19E-08) for this fire area bounding assessment meet the requirements of RG 1.174 for a plant with total risk numbers of 3.63E-05 (CDF) and 4.99E-06 (LERF).

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that motors of the air handling units are totally enclosed, and the MCCs are mounted on 4-inch pedestals. Damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of a floor drainage system. Floor water surcharge is estimated to be insignificant since excess water is removed by the floor drainage system and can overflow to adjacent areas. Runoff is directed to the floor drain transfer tank. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

This fire area did not contain any VFDRs. A fire in this area could potentially damage cables that supply power to the [redacted] system for the [redacted]. Compliance was demonstrated through the use of an alternative shutdown approach utilizing the auxiliary control panel (ACP). The licensee performed a qualitative risk review that indicated no increase in risk associated with this approach. The NRC staff finds this acceptable because the NSPC can be achieved and maintained from the ACP.

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	SEAL INJECTION FLOW CONTROL VALVE OUTLET ISOLATION VALVE	Isolate RCP seal injection: Shut [redacted], seal injection flow control valve outlet isolation valve, to isolate RCP seal injection. Verify shut [redacted], seal injection flow control valve bypass valve.
[redacted]	REACTOR COOLANT PUMP [redacted] SEAL BYPASS	Open the following breakers to ensure shut [redacted], RCP No.1 seal bypass, and to ensure open [redacted], [redacted], and [redacted]: [redacted], [redacted] ([redacted]), [redacted], and [redacted] ([redacted]).
[redacted]	EXCESS LETDOWN UPSTREAM ISOLATION [redacted] OPERATOR	Open [redacted], MTC [redacted], to verify excess letdown is isolated.
[redacted]	REACTOR COOLANT PUMP SEAL WATER RETURN	Isolate RCP seal return: Place breaker [redacted] in off. Shut [redacted], RCP seal water return.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	CENTRIFUGAL SAFETY INJECTION PUMP [redacted]	When RCS cold leg temperature is between 325°F and 350°F, perform the following: Rack out the non-running CSIP.
[redacted]	CENTRIFUGAL SAFETY INJECTION PUMP [redacted]	When RCS cold leg temperature is between 325°F and 350°F, perform the following: Rack out the non-running CSIP.
[redacted]	HEAT EXCHANGER A FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	LOW HEAD SAFETY INJECTION [redacted] TO RCS HOT LEG	De-energize [redacted] at MCC [redacted], Compartment [redacted], in Fire Zone [redacted]. Then verify closed for CSD or manually close [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	-----	Remove control power fuses and open breaker for [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted]. Remove control power fuses and open breaker for [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.
Rod Drive MG Sets	ROD DRIVE MG SET MG-A ROD DRIVE MG SET MG-B	Remove control power fuses and mechanically trip rod drive motor generator sets at switchgear - MG-A: 480V Bus [redacted] MG-B: 480V Bus [redacted].

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	No	**Yes (I, T)**	No	**Yes (I)**	No	No	**Yes (I)**
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I)**	No	No	No	No	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- One previously approved deviation from the pre-transition fire protection requirements was evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- This fire area did not contain any variations from the deterministic requirements. Compliance was demonstrated through the use of an alternative shutdown approach utilizing the auxiliary control panel (ACP). The licensee performed a qualitative risk review that indicated no increase in risk associated with this approach.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — The fire area was evaluated using a qualitative fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant equipment in Fire Area [redacted] subject to water damage is mounted on floor pedestals and arranged to facilitate access by firefighters. In the event of a fire requiring the use of a manual hose station, accumulated water can migrate to adjacent areas. Drainage into the adjacent areas will not damage safety related equipment. Therefore, fire suppression activities will not adversely affect achievement of the NSPC.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.g, for the requirement to provide 8-hour emergency lights for cold shutdown actions, and to allow use of the lights backed by the security diesel to gain access to the [redacted] building.	The deviation from providing battery-backed lighting was approved on the basis that providing 8 hour battery-backed lighting for cold shutdown actions would provide little to no benefit. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
10	A required access path to Fire Area [redacted] is not adequately lighted.	-----	Engineering change request (ECR) 1876 was generated since no EC addresses this specific issue. In general, portable lighting will be used to perform actions where fixed lighting is not provided. However, the manual actions in Fire Area [redacted] will no longer be required pending completion of EC 68645, which will allow [redacted] to be credited instead of [redacted] (and its associated manual actions). In addition, EC 67742 is complete, which renders the manual action to de-energize the smoke purge fan as no longer necessary.	Based on the proposed modification associated with EC 68645, which renders the manual action requiring the emergency lighting as no longer necessary, the NRC staff finds this VFDR acceptable.
128	The manual action credited to de-energize and open [redacted] is required to establish the credited path of auxiliary feedwater. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted] [redacted]	EC 68645 is removing the cables for [redacted] from the fire area, such that a flow path of water to the [redacted] SG is assured. All other conditions for using the [redacted] SG for decay heat removal are met for this area. Therefore, [redacted] will no longer be required to maintain hot standby.	Based on the proposed modification associated with EC 68645, which results in [redacted] remaining free of fire damage given a fire in this area, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
131	Exception [redacted] is applied to [redacted] in this fire area. The concern is that emergency lighting for the [redacted] room might be lost.	[redacted] [redacted]	EC 58779 evaluated the availability of diesel backed lighting for the [redacted] room. One conduit ([redacted]) was found to be not protected. A change evaluation for this conduit was performed which showed that this conduit is not in the ZOI of a significant ignition source based on the addition of incipient detection in the ACP per EC 69501.	Based on the performance-based evaluation (change evaluation) performed, which documents that Conduit [redacted] will not be within the zone of influence of a significant ignition source once the VEWFDS is installed in the ACP, the NRC staff finds this VFDR acceptable. Revision of HNP-M/MECH-1124 to incorporate the revised change evaluation is an implementation item (SE Section 2.9; Item 16).
374	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	HNP-M/MECH-1124 will be revised to document a change evaluation which shows that the affected cable is not in the ZOI of a significant ignition source based on the addition of incipient detection in the ACP per EC 69501.	Based on the performance-based evaluation (change evaluation) performed, which documents that Cable [redacted] will not be within the zone of influence of a significant ignition source once the VEWFDS is installed in the ACP, the NRC staff finds this VFDR acceptable. Revision of HNP-M/MECH-1124 to incorporate the revised change evaluation is an implementation item (SE Section 2.9; Item 16).

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	EMERGENCY BORATION FLOW ISOLATION VALVE	Locally fail open [redacted] by shutting [redacted] in Fire Zone [redacted] and venting the [redacted] air filter. Unlock and open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP [redacted] TO RHR PUMP [redacted]	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	Manually close [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I, AS)**	No	No	No	**Yes (I,AS)**	**Yes (I,AS)**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
AS	Abbreviation for Air Sampling Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- One previously approved deviation from the pre-transition fire protection requirements was evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Four variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Performance-Based Compliance with NFPA 805 Section 4.2.4

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:
  - On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.
  - Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.
  - The fire area was evaluated using a qualitative fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or the storm drainage system, as detailed in HNP FSAR Section 9.3.3. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited ten previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b.2, for having to consider intervening combustibles between the power and control cables for the [redacted] Pump, the [redacted] pump and related cables.	The deviation was approved based on the existing separation between the redundant components, the installed automatic detection and suppression systems, and the installation of IEEE-383 cables in the intervening cable trays. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP 9.5-1, Section C.5.b(2), for intervening combustibles.	The deviation was approved based on the existing separation in the fire area, the automatic fire detection and suppression systems, and the presence of an on-site fire brigade. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b.2(c), for providing a 1-hour fire rated enclosure for the [redacted] pumps.	The deviation was approved based on the installed features, which include separate cubicles separated by 3-hour fire barriers, automatic suppression, and detection systems installed in and adjacent to the pump cubicles, as well as the distance between the [redacted] pumps. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b.(2)(b), for consideration of intervening combustibles.	The deviation was approved based on a combination of separation (greater than 20 feet between redundant components), automatic sprinkler coverage in the zones under consideration, and the installation and use of IEEE-383 cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b(2)(c).	The deviation was approved based on installed automatic suppression systems and the fact that the air handlers only provide local cooling. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b.2(B), for providing 20 feet of separation between the [redacted] pump and [redacted] pump.	The deviation was approved based on a combination of fire protection features, which include full automatic suppression and detection systems, as well as spatial separation of the [redacted] pumps. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from the requirement to install fire detection and automatic suppression throughout Fire Area [redacted].	The deviation was approved based on the existing fire protection features and low combustible loading in the fire area. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from the requirement to provide a 1-hour fire barrier for the [redacted] pumps, as well as from the requirement to consider intervening combustibles.	The deviation was approved based on a combination of features determined to provide an equivalent level of protection. The features credited include 3-hour fire rated concrete barriers between the pumps, automatic suppression and detection, and 17 feet of separation. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
30	The MT™ ERFBS is credited as a 3-hour fire barrier in this area, but is not a fully rated 3-hour fire barrier. The change evaluation process is determining whether the installed fire barrier provides an adequate level of protection for the hazards in the fire area.	[redacted]	These cables are not within the ZOI of a fixed ignition source. Accordingly, the associated MT™ barrier is acceptable because it is not subject to fire damage. The MT™ ERFBS is credited for 115 minutes (1 hour and 55 minutes), in lieu of the 3 hours necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the MT™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 115 min. and 3 hours being low.	Based on (1) the MT™ ERFBS fire barrier not being within the zone of influence of a fixed ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 30	- CONTINUED - A MT™ ERFBS is credited as a 3-hour fire barrier in this area, but is not a fully rated 3-hour fire barrier. The change evaluation process is evaluating whether the current fire barrier provides an adequate level of protection for the hazards in the fire area.	(continued) [redacted]	The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the MT™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69765 will modify the MT™ ERFBS consistent with the tested configuration for the fire resistance assumed.	- CONTINUED - Based on (1) the MT™ ERFBS fire barrier not being within the zone of influence of a fixed ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.
203	Exceptions [redacted], [redacted], and [redacted] identify cable separation issues between [redacted] pumps in Fire Area [redacted]. The existing deviation does not take into account that there is less than 20 feet of separation between the mechanical end of [redacted] pump [redacted] and the closest cables from the [redacted] pump.	[redacted]	These cables (and associated instrument lines) are not within the zone of influence of a significant ignition source. No ignition source can damage both the cables for the [redacted] pump components and those for the [redacted] pump components.	Based on the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
32	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	These cables are not within the ZOI of a significant ignition source (Cable [redacted]) or are not within the ZOI of a fixed ignition source (all others). Accordingly, the associated HEMYC™ barrier is acceptable because it is not subject to fire damage. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results.	Based on (1) the target relationship to the zone of influence of the ignition source(s) and (2) the proposed modifications to bring the fire barrier up to the tested configuration, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 32	**- CONTINUED -** The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	(continued) [redacted]	This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed.	**- CONTINUED -** Based on (1) the target relationship to the zone of influence of the ignition source(s) and (2) the proposed modifications to bring the fire barrier up to the tested configuration, the NRC staff finds this VFDR acceptable.
353	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	The affected cables are not within the zone of influence of a significant ignition source.	Based on the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
115	This fire area contains cables for both [redacted] and [redacted], the RWST supply valves to the CSIP. The hot standby manual action credited for [redacted] is required to establish a flow path from the RWST to the common charging pump suction header. This flow path is required for operation of the credited source of borated water to the RCS. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	Cables [redacted] and [redacted] are not within the zone of influence of an ignition source. Because the cables are not subject to fire damage, Valve [redacted] will be available when required. Cables [redacted] and [redacted] are not within the zone of influence of a significant ignition source. Accordingly, Valve [redacted] remains available if power is lost to [redacted].	Based on the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.
116	Multiple spurious actuations could result in cross-connecting the chilled water headers, placing the system at risk. This fire area credits a hot standby action to split the two chilled water headers (Exception [redacted]). This action is considered unallowable (pending additional research) and will require a change evaluation.	[redacted]	This scenario requires multiple spurious actuations of the listed valve pairs (e.g., [redacted] and [redacted]). These cables are not within the zone of influence of a significant ignition source.	Based on the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
133	Exception [redacted] is applied to the train [redacted] pump. It references the approved deviation, which addresses intervening combustibles between the train [redacted] pump and the [redacted] pump. The deviation was approved based on greater than 20 feet of separation between the two pumps. However, there are less than 20 feet between the cables for the [redacted] pump and the [redacted] pump, so the basis for the existing deviation is not valid. AR 228505 is tracking this issue, which should be addressed in the change evaluation for this area. The existing deviation cannot transfer as it is written. The original submittal is in NLS-84-090, with a clarification in NLS-86-040 that the 20 feet of separation applied to the cables as well as the equipment itself.	[redacted]	These cables are not within the zone of influence of a significant ignition source. No ignition source can damage both the cables for the [redacted] pump components and those for the [redacted] pump components.	Based on the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
139	Exception [redacted] is applied to [redacted] and states that either emergency service water or normal service water will remain available depending upon the location of the fire within the area. The lack of intervening combustibles and the presence of suppression and detection in the fire area needs to be verified, as there is currently no reference to a formal separation analysis. The previous resolution code referenced ESR 00-00439. However, further review indicates that the correct resolution is a combination of separation and a 1-hour rated ERFBS (HEMYC™). This issue is being addressed in the change evaluation for this fire area.	[redacted]	Cable [redacted] is not within the zone of influence of a significant ignition source. Cable [redacted] is also not within the zone of influence of a significant ignition source.	Based on the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.
354	This fire area credits operator manual actions to close one of the VCT outlet valves (when aligning CSIP suction to the RWST) in the case of cable damage or loss of power.	[redacted] [redacted] [redacted]	Cable [redacted] is not within the zone of influence of an ignition source. Cables [redacted] and [redacted] are not within the zone of influence of a significant ignition source. Cable [redacted] is not within the zone of influence of a significant ignition source.	Based on the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
370	The potential exists for loss of RCP seal integrity in this fire area due to the simultaneous loss of seal injection and seal cooling (Exception [redacted]). This issue is being addressed in the change evaluation for this fire area.	[redacted]	EC 70350 will provide an additional source of RCS makeup/seal injection in the event water flow to the seals is interrupted.	Based on the proposed modification to install an alternate seal injection system, the NRC staff finds this VFDR acceptable.
150	Exception [redacted] is applied to [redacted] and addresses the potential that a fire in Fire Area [redacted] can disable [redacted] and cause a loss of the credited emergency service water train. A buffer area review determined that separation is less than 20 feet from the redundant train equipment. This issue is being addressed in the change evaluation for this fire area.	[redacted]	Further analysis shows that the [redacted] train emergency service water and [redacted] is available. The cables for [redacted] are wrapped with HEMYC™ ERFBS in conduits [redacted] and [redacted]. These conduits are not within the zone of influence of a significant ignition source, and the HEMYC™ ERFBS is acceptable.	Based on (1) the installed HEMYC™ ERFBS, (2) the proposed modifications to bring the fire barriers up to the tested configuration, and (3) the target relationship to the zone of influence of the ignition source(s), the NRC staff finds this VFDR acceptable.
348	The potential exists for loss of RCP seal integrity in this fire area due to the simultaneous loss of seal injection and seal cooling (Exception [redacted]). This issue is being addressed in the change evaluation for this fire area.	[redacted]	EC 70350 will provide an additional source of RCS makeup/seal injection in the event water flow to the seals is interrupted.	Based on the proposed modification to install an alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is 1.57E-09 (ΔCDF) and less than 1.0E-10 (ΔLERF).

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	EMERGENCY BORATION FLOW ISOLATION VALVE	Locally fail open [redacted] by shutting [redacted] in Fire Zone [redacted] and venting the [redacted] air filter. Unlock and open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP [redacted] TO RHR PUMP [redacted]	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted]) per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Pull the solid state protection system (SSPS) fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	Yes (I)	Yes	Yes	No	-	Yes	Yes
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	Yes (I)	Yes	Yes	No	-	Yes	Yes
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	No	-	No	No	Yes (I)	Yes	Yes	No	-	No	No
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	No	-	No	No	Yes (T)	Yes	Yes	No	-	No	Yes
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	No	-	No	No	Yes (I, T)	Yes (I,T)	Yes (I,T)	No	-	No	Yes (I,T)
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	No	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	Yes	ESR 99-00395	Yes	Yes	Yes (I, T)	Yes (I,T)	Yes (I,T)	Yes (I,T)	ESR 99-00395	Yes (I,T)	Yes (I,T)
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	Yes	ESR 99-00395	No	Yes	Yes (I, T)	Yes (I,T)	Yes (I,T)	Yes (I,T)	ESR 99-00395	No	Yes (I,T)
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	Yes	ESR 99-00395	No	No	Yes (I, T)	Yes (I,T)	Yes (I,T)	Yes (I,T)	ESR 99-00395	No	Yes (I,T)
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	No	-	No	Yes	Yes (T)	Yes	Yes	No	-	No	Yes
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	Yes	60257	No	Yes	Yes (T)	Yes	Yes	Yes	60257	No	Yes
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	No	No	No	No	-	No	No

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	**Yes**	**60257**	No	**Yes**	**Yes (I, T)**	**Yes (I,T)**	**Yes (I,T)**	**Yes (I,T)**	**60257**	No	**Yes (I,T)**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	No	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	No	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	**Yes**	**ESR 99-00395**	**Yes**	No	**Yes (I, T)**	**Yes (I,T)**	**Yes (I,T)**	**Yes (I,T)**	**ESR 99-00395**	**Yes (I,T)**	**Yes (I,T)**
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	-	No	No	**Yes (I, T)**	**Yes**	**Yes**	No	-	No	**Yes**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	No	No	No	No	-	No	No
[redacted]	[redacted]	[redacted]	**Yes**	**Yes**	**Yes**	No	-	**Yes**	No	**Yes (I, T)**	**Yes (I,T)**	**Yes (I,T)**	No	-	**Yes (I,T)**	**Yes (I,T)**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	No	No	No	No	-	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Ten previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Twelve variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or the storm drainage system, as detailed in HNP FSAR Section 9.3.3. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited nine previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b(2), for providing a 3-hour fire rated enclosure between electrical pull boxes.	The deviation was approved based on the existing separation between the required components, the installed partial suppression system, and other fire protection features within the area. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800 BTP CMEB 9.5-1, Section C.5.b(2), for providing full area wide suppression and detection.	The deviation was approved based on low combustible loading in the fire area, the lack of concentrations of cable trays, and the existing protection provided for the safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800 BTP CMEB 9.5-1, Section C.5.b(2), for providing a 1-hour fire barrier between redundant instrument racks.	The deviation was approved based on the physical separation between the instrument racks, the installed automatic detection and suppression systems, the embedment of the cables except at the instrument racks, and other features as noted in the submittal. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b.(2)(b) and (c), for providing 1-hour fire rated enclosures for the equipment listed, as well as from the requirement to consider IEEE-383 cable as an intervening combustible.	The deviation was approved, but was granted from BTP CMEB 9.5-1, Section C.5.b.(2)(b) for intervening combustibles since greater than 20 feet existed between the redundant components, and automatic suppression and detection was available for all applicable zones. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from the requirement to provide 1-hour fire rated enclosures for one train of HVAC equipment in Fire Zone [redacted].	The deviation was approved based on the existing separation, the installed sprinkler coverage, and the fact that the redundant units only provide local area cooling. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b.(2), for providing 20 feet of separation between redundant MCCs.	The deviation was approved based on the installed automatic suppression system and the physical separation between redundant MCCs. The conditions forming the basis for the previous staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
NRC Approval of Meggitt Safety Systems Cable.	The NRC issued a license amendment approving the use of Meggitt Safety Systems fire resistive cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
31	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	The change evaluation demonstrated that the HEMYC™ ERFBS as tested provide adequate protection, as detailed below. These cables are not within the ZOI of a significant ignition source (Cables [redacted], [redacted], and [redacted]), or are not within the ZOI of a fixed ignition source (all others). Accordingly, the associated HEMYC™ barrier is acceptable because it is not subject to fire damage. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205.	Based on (1) the HEMYC™ ERFBS fire barrier not being within the zone of influence of a fixed ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 31	**- CONTINUED -** The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	**(continued)** [redacted]	The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed.	**- CONTINUED -** Based on (1) the HEMYC™ ERFBS fire barrier not being within the zone of influence of a fixed ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
355	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted] [redacted] [redacted]	The change evaluation showed that the affected cables are not within the zone of influence of an ignition source (Cables [redacted] and [redacted]), or are not within the ZOI of a significant ignition source (Cables [redacted], [redacted], and [redacted]). To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in a hot gas layer (HGL). Cable [redacted] is within the zone of influence of [redacted]. However, per an FSSPMD circuit analysis, failure of this cable alone (as Cable [redacted] will not be damaged per the above discussion) will not cause spurious operation of component [redacted]. The VFDR delta-CDF is less than 1.0E-08, and the delta-LERF is less than1.0E-09.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
70	The hot standby manual actions to preserve RWST inventory are considered allowable because they can be completed before the RWST inventory is decreased below the level required to support shutdown to cold shutdown conditions. However, adequate lighting does not exist for performance of these actions, so the actions are not currently considered feasible. The change evaluation for this fire area is assessing the variance for the best resolution.	[redacted]	Cable [redacted] is not within the zone of influence of a significant ignition source. To reduce the probability that a transient could impact the cable, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.
71	Emergent issues in the Fire Safe Shutdown Program Manager Database (FSSPMD) (Exception [redacted]) concerning the potential for spurious opening of the SG PORVs are being evaluated in the change evaluation for this fire area.	[redacted]	The affected cables are not within the ZOI of an ignition source, with the exception of two cables, Cable [redacted] and [redacted], which go the to the servo amps. Cables [redacted] and [redacted] are not within the zone of influence of a significant ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. A calculation documents detailed fire modeling in Fire Area [redacted] for a lube oil fire due to chiller [redacted] or [redacted]. Based on the short duration of the expected fire and the large size of the area, a hot gas layer is not expected to be generated.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
75	ECR 2169 was generated to address the potential loss of RWST inventory to the containment sump due to the spurious operation of Valves [redacted], [redacted], [redacted], and [redacted] (Exception [redacted]).	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. If the RWST were to drain, modifications per EC 70350 would provide an alternate source of RCS makeup that would not require the RWST.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
78	An emergent issue exists in this fire area concerning the ability of the boric acid tank to support hot standby in the event the RWST drains to the containment sump (Exception [redacted]). If the normal charging valve fails open (which it does on a loss of air or power), neither the boric acid transfer pump or gravity feed provide adequate net positive suction head to the charging pump with Valve [redacted] failed open. If the RWST inventory is lost to the containment sump, then it will need to be recovered to support cold shutdown.	[redacted]	The change evaluation and EC 70350 (ASI modification) address RWST drain down (see Open Item 75 above). A calculation demonstrates that boration from just the RWST will support cooldown all the way to 200 degrees F with no letdown, only accounting for filling the pressurizer and shrinking the RCS during the cooldown.	Based on (1) a calculation demonstrating that boration from the RWST will support cooldown to 200 degrees F, (2) the relationship between the target(s) and the zone of influence of the ignition sources, (3) the creation of a transient combustible exclusion zone, (4) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 78	- CONTINUED - An emergent issue exists in this fire area concerning the ability of the boric acid tank to support hot standby in the event the RWST drains to the containment sump (Exception [redacted]). If the normal charging valve fails open (which it does on a loss of air or power), neither the boric acid transfer pump or gravity feed provide adequate net positive suction head to the charging pump with Valve [redacted] failed open. If the RWST inventory is lost to the containment sump, then it will need to be recovered to support cold shutdown.	(continued) [redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. If the RWST were to drain, modifications per EC 70350 would provide an alternate source of RCS makeup that would not require the RWST.	- CONTINUED - Based on (1) a calculation demonstrating that boration from the RWST will support cooldown to 200 degrees F, (2) the relationship between the target(s) and the zone of influence of the ignition sources, (3) the creation of a transient combustible exclusion zone, (4) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
79	EC 58008 was written to address the potential loss of all RWST level indication in this fire area. Preliminary results from the change evaluation reviews indicate that at least 3 of the 4 RWST level transmitters should remain available for any postulated fire.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of an ignition source (Cable [redacted], Table A2-5), or are not within the ZOI of a significant ignition source (Cable [redacted]). To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
112	The hot standby manual action credited for [redacted] is required to isolate a potential spurious train [redacted] containment spray actuation. Note that this action is a designated alternative to securing the train [redacted] containment spray pump from the main control room, but also note that the control cables for the train [redacted] containment spray pump could be affected. This manual action is not required to ensure the operation of credited equipment, but the concurrent spurious actuation of [redacted] and [redacted] result in a loss of RWST inventory and, if unmitigated, could adversely affect the credited safe shutdown functions. Since adequate time exists to complete this action prior to reaching an unrecoverable condition or damage to equipment, the action is considered allowable and a change evaluation is not required. The necessity of performing this action is being addressed in the change evaluation for this fire area.	[redacted]	Cable [redacted] is not within the zone of influence of a significant ignition source. To reduce the probability that a transient could impact the cable, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
311	All six AFW flow control valves ([redacted], [redacted], [redacted] and [redacted], [redacted], [redacted]) are in this fire area. The cables for the turbine driven AFW pump valve operators and the [redacted] valve operator are wrapped up to the operator.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of an ignition source (Cables [redacted], [redacted], [redacted], [redacted], and [redacted]), or are not within the ZOI of a significant ignition source (Cable [redacted]). To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. Thus, AFW supply from the turbine driven AFW pump remains available to both SG [redacted] and SG [redacted]. As additional defense-in-depth, the conduits of the cables for the valves are either embedded or wrapped up to the valve operator. The change evaluation demonstrated that the HEMYC™ ERFBS as tested provide adequate protection. EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the use of HEMYC™ ERFBS and the commitment to modify the barrier to the tested configuration, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
312	A fire in this area has the potential to disable the train [redacted] chiller, train [redacted] electric power, train [redacted] switchgear room ventilation, and the train [redacted] battery room fans.	[redacted]	The change evaluation showed that Cables [redacted] and [redacted] are not within the zone of influence of a significant ignition source, while Cables [redacted] and [redacted] are within the ZOI of chiller [redacted] ([redacted]). The change evaluation also showed that Cables [redacted], [redacted], [redacted], [redacted], [redacted], and [redacted] are not within the ZOI of an ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205; therefore, they are acceptable.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
313	All pressurizer heaters could potentially be lost in this fire area.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.
320	The corrective action references (ARs) are investigating multiple issues related to the loss of train [redacted] power and components. Originally, train [redacted] was credited.	[redacted]	The change evaluation showed that Cable [redacted] is not within the zone of influence of an ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 320	**- CONTINUED -** The corrective action references (ARs) are investigating multiple issues related to the loss of train [redacted] power and components. Originally, train [redacted] was credited.	**(continued)** [redacted]	To provide room cooling for the [redacted] train CSIP and RHR pump using [redacted] train ventilation, EC 70027 will supply portable fans that can draw cool air from adjacent areas cooled by the [redacted] train. For the RHR pump this is a cold shutdown recovery action. For the CSIP, since the time to establish the cooling is too limiting, EC 70350 will provide an additional source of RCS makeup/seal injection in the event that ventilation is lost.	**- CONTINUED -** Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
322	The potential exists for SG PORV spurious actuation due to a fire in this area.	[redacted]	The change evaluation showed that the affected cables are not within the ZOI of an ignition [redacted] (Cables [redacted], [redacted], 1256C, and [redacted]), or are not within the ZOI of a significant ignition source (Cables [redacted], [redacted], and [redacted]) To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
323	The concurrent spurious opening of [redacted] and [redacted] could result in a loss of RWST inventory to the containment sump. This issue is being addressed in the change evaluation for this fire area.	[redacted] [redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. If the RWST were to drain, modifications per EC 70350 would provide an alternate source of RCS makeup that would not require the RWST.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
324	The EC is evaluating the potential loss of all RWST level indication.	[redacted] [redacted]	The change evaluation showed that the affected cables are not within the zone of influence of an ignition source (Cable [redacted]), or are not within the ZOI of a significant ignition source (Cable [redacted]). To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
334	Cable [redacted] can cause the trip coil for the normal supply breaker to Switchgear [redacted] to fail, thereby preventing it from tripping, and potentially leading to an overload condition on Emergency Diesel [redacted]. There are also numerous other issues with train [redacted] electrical power in this fire area, which are being addressed in the associated change evaluation	[redacted]	None of the power cables for Bus [redacted] loads pass through area [redacted]. Accordingly, a fire in analysis area [redacted] will not result in a fault on Bus [redacted], and the tripping of Breaker [redacted] or Breaker [redacted] will not be required. Therefore, Cable [redacted] is not required to remain free of fire damage to ensure that Breaker [redacted] can be tripped. The change evaluation showed that Cable [redacted] is not within the zone of influence of a significant ignition source, and that Cable [redacted] is not within the zone of influence of a fixed ignition source. Thus, Breaker [redacted] remains available given a fire in this area.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources and (2) the routing of all the [redacted] load power cables, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
335	The change evaluation for this fire area is addressing the potential loss of all RCP seal cooling.	[redacted] [redacted]	The change evaluation will be updated to show that Cable [redacted] is not within the zone of influence of a fixed ignition source. The change evaluation will also be updated to show that Cable [redacted] is in the ZOI of the Fire Area [redacted] space heater panel ([redacted]), which is located at plan points [redacted] (however, this is not a significant ignition source). To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. EC 70350 will provide an alternate source of seal injection for this fire area.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable. Updating the change evaluation to document that Cable [redacted] is not within the ZOI of a fixed ignition source, and that Cable [redacted] is not within the ZOI of a significant ignition source is an implementation item (SE Section 2.9; Item 17).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
347	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	The change evaluation demonstrated that the HEMYC™ ERFBS as tested provide adequate protection, as detailed below. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low.	Based on (1) the HEMYC™ ERFBS fire barrier not being within the zone of influence of a significant ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 347	**- CONTINUED -** The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	**(continued)** [redacted]	The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	**- CONTINUED -** Based on (1) the HEMYC™ ERFBS fire barrier not being within the zone of influence of a significant ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
356	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of an ignition source (Cables [redacted] and [redacted]), or are not within the ZOI of a significant ignition source (Cable [redacted]). To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.
369	The cables associated with [redacted] train ESW run embedded in this area. These cables can be demonstrated to be embedded deep enough for a 1-hour fire rating. However, a 3-hour fire rating is required.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source.	Based on the relationship between the target(s) and the zone of influence of the ignition sources, the NRC staff finds this VFDR acceptable.
372	This fire area credits hot standby actions to manually fail open [redacted] and [redacted], in order to allow full chilled water flow to [redacted] (switchgear room [redacted] cooler) and [redacted] (switchgear room [redacted] cooler), respectively.	[redacted]	The affected cables are not within the zone of influence of an ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
100	Multiple spurious actuations could result in cross-connecting the chilled water headers, thereby placing the system at risk. The hot standby manual action credited for [redacted] and [redacted] supports use of the credited train A chiller. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	This issue is due to the potential for multiple spurious actuation of [redacted] and [redacted], or [redacted] and [redacted]. One of the four valves must be closed in order to isolate the chilled water headers. The change evaluation showed that Cable [redacted] is not within the ZOI of an ignition source. The change evaluation will be updated to show that Cable [redacted] is not within the ZOI of a significant ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. Accordingly, [redacted] will remain free of fire damage, and the compliance strategy will be revised to close [redacted] from the control room in order to split the chilled water headers.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable. Updating the change evaluation to document that Cable [redacted] is not within the zone of influence of a significant ignition source and revising the compliance strategy (as well as the associated operator procedure) is an implementation item (SE Section 2.9; Item 18).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
120	The corrective action reference (AR) is addressing the potential loss of all pressurizer heaters in this fire area, as is the associated change evaluation.	[redacted]	This is the same deficiency identified in area [redacted]. The area where the deficiency exists is actually [redacted], but it is brought into area [redacted] through the additional 20-foot buffer area. The change evaluation showed that the affected cables are not within the zone of influence of an ignition source. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.
123	Exception [redacted] is applied to [redacted] and [redacted] because they can spuriously operate in this fire area.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of an ignition source (Cables [redacted] and [redacted]), or are not within the ZOI of a significant ignition source (Cable [redacted]). To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
325	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	The change evaluation demonstrated that the HEMYC™ ERFBS as tested provide adequate protection, as detailed below. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low.	Based on (1) the barrier fire duration being based on appropriate testing, (2) the proposed modifications to bring the fire barrier up to the tested configuration, and (3) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 325	**- CONTINUED -** The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	**(continued)** [redacted]	The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	**- CONTINUED -** Based on (1) the barrier fire duration being based on appropriate testing, (2) the proposed modifications to bring the fire barrier up to the tested configuration, and (3) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
340	Both [redacted] and [redacted] are potentially inoperable in this fire area. One must be closed in order to isolate the volume control tank. If a manual action is required, it would be considered unallowable under the current licensing basis and a change evaluation would be required.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source (Cable [redacted]), or are not within the ZOI of an ignition source (all others). The change evaluation will be updated to show that Cable [redacted] is not within the ZOI of a significant ignition source. To reduce the probability that a transient could impact the cable, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the creation of a transient combustible exclusion zone, and (3) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, the NRC staff finds this VFDR acceptable. Updating the change evaluation to document that Cable [redacted] is not within the ZOI of a significant ignition source is an implementation item (SE Section 2.9; Item 19).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
317	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	The change evaluation demonstrated that the HEMYC™ ERFBS as tested provide adequate protection, as detailed below. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low.	Based on (1) the barrier fire duration being based on appropriate testing, (2) the proposed modifications to bring the fire barrier up to the tested configuration, and (3) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 317	**- CONTINUED -** The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	**(continued)** [redacted]	The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	**- CONTINUED -** Based on (1) the barrier fire duration being based on appropriate testing, (2) the proposed modifications to bring the fire barrier up to the tested configuration, and (3) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
371	[redacted] may spuriously close if the fire is located in the breaker for this valve. This could potentially damage the credited charging pump. This issue is being addressed in the change evaluation for this fire area.	[redacted]	This is the [redacted] train VCT outlet valve. The potential for any cable being damaged outside of the MCC was eliminated by installing Meggitt cable in order to protect all of the target conductors. Inside the MCC, the potential for damage to the target cables was reduced by running Meggitt cable down past the top row of breakers such that the cables are not at risk except from a fire in this column below the breaker or in the breaker cubicle. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, this component is susceptible to spurious actuation only from a fire in its breaker cubicle or the column below the breaker. The change evaluation will be updated to reflect that this configuration provides adequate defense-in-depth and safety margin. In the event the valve spuriously closes, the running CSIP could be damaged. EC 70350 will provide seal injection and RCS makeup if the running CSIP is damaged.	Based on (1) the installed Meggitt cable, (2) the analysis performed by the licensee which demonstrates that only fires in the breaker cubicle or the column below the breaker can cause spurious actuation of [redacted], and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable. Updating the change evaluation to reflect that this configuration provides adequate defense-in-depth and safety margin is an implementation item (SE Section 2.9; Item 20).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
373	The hot standby manual action credited for [redacted] is required to establish a flow path for charging pump minimum-flow. This flow path is required for the credited train [redacted] charging pump. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	The change evaluation showed that the affected cable is not within the zone of influence of a significant ignition source. EC 71147 is installing Meggitt cable down past the top row of breakers in order to limit the potential for spurious actuation of the valve's breaker and associated MCC stack. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, this component is susceptible to spurious actuation only from a fire in its breaker cubicle or the column below the breaker. To reduce the probability that a transient could impact the cable, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. EC 70350 will provide seal injection and RCS makeup if the running CSIP is damaged.	Based on (1) the installed Meggitt cable, (2) the analysis performed by the licensee which demonstrates that only fires in the breaker cubicle or the column below the breaker can cause spurious actuation of [redacted], (3) the creation of a transient combustible exclusion zone, (4) a calculation demonstrating that a chiller lube oil fire will not create a hot gas layer, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
142	The hot standby manual action credited for [redacted] is required to establish a flow path for charging pump minimum-flow. This flow path is required for the credited train [redacted] charging pump. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	The change evaluation showed that the affected cable is not within the zone of influence of a fixed ignition source. The change evaluation will be updated to show that the cable is not within the zone of influence of a significant ignition source. EC 71147 is installing Meggitt cable down past the top row of breakers in order to limit the potential for spurious actuation of the valve's breaker and associated MCC stack. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, this component is susceptible to spurious actuation only from a fire in its breaker cubicle or the column below the breaker. To reduce the probability that a transient could impact the cable, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL. EC 70350 will provide seal injection and RCS makeup if the running CSIP is damaged.	Based on (1) the installed Meggitt cable, (2) the analysis performed by the licensee which demonstrates that only fires in the breaker cubicle or the column below the breaker can cause spurious actuation of [redacted], and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable. Updating the change evaluation to document that Cable [redacted] is not within the ZOI of a significant ignition source is an implementation item (SE Section 2.9; Item 21).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
318	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	The change evaluation demonstrated that the HEMYC™ ERFBS as tested provide adequate protection, as detailed below. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low.	Based on (1) the barrier fire duration being based on appropriate testing, (2) the proposed modifications to bring the fire barrier up to the tested configuration, and (3) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 318	**- CONTINUED -** The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	**(continued)** [redacted]	The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed. To reduce the probability that a transient could impact these cables, a transient combustible exclusion zone was created. In addition, a calculation documents that a chiller lube oil fire in Fire Area [redacted] will not result in an HGL.	**- CONTINUED -** Based on (1) the barrier fire duration being based on appropriate testing, (2) the proposed modifications to bring the fire barrier up to the tested configuration, and (3) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is 6.45E-8 (ΔCDF) and 5.41E-9 (ΔLERF).

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	[redacted]	Open the door for the [redacted] battery room.
[redacted]	EMERGENCY BORATION FLOW ISOLATION VALVE	Locally fail open [redacted] by shutting [redacted] in Fire Zone [redacted] and venting the [redacted] air filter. Unlock and open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP [redacted] TO RHR PUMP [redacted]	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	RHR PUMP MOTOR	Open the door for the [redacted] RHR pump, then stage the temporary 10000 cubic feet per minute (CFM) fan and ducting.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Pull the solid state protection system (SSPS) fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	Yes	52769 & 63858 & ESR 99-00395	Yes	Yes	Yes (I, T)	Yes (I,T)	Yes (I,T)	Yes (I,T)	52769 & 63858 & ESR 99-00395	Yes (I,T)	Yes (I,T)
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	Yes (I)	Yes	Yes	Yes	ESR 99-00395	No	Yes
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	Yes	ESR 99-00395	No	Yes	Yes (I, T)	Yes (I,T)	Yes (I,T)	Yes (I,T)	ESR 99-00395	No	Yes (I,T)
[redacted]	[redacted]	[redacted]	Yes	Yes	Yes	No	-	No	Yes	Yes (I, T)	Yes (I,T)	Yes (I,T)	Yes (I,T)	ESR 99-00395	No	Yes (I,T)

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Nine previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Thirty-one variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or the storm drainage system, as detailed in HNP FSAR Section 9.3.3. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited one previously approved deviation from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward this deviation, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.c, in Fire Area [redacted] for alternate or dedicated shutdown capability.	In the event of a fire in Fire Area [redacted], [redacted], or [redacted], the MCR does not need to be evacuated. However, the use of a non-safety-related dedicated HVAC unit to cool the PIC room is required. With the dedicated HVAC unit running, shutdown is otherwise normal. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the continued availability of a dedicated HVAC unit to provide cooling to the PIC room, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
161	The concurrent spurious opening of [redacted] and [redacted] could lead to runout of the credited CSIP. Based on the current deterministic analysis, only CSIP [redacted] is credited in Fire Area [redacted]. This issue is being addressed in the change evaluation for this fire area.	[redacted] [redacted]	EC 67772 eliminated the potential for cable damage outside the MCC to cause a spurious actuation by installing Meggitt cable as a means of protecting the target conductors. Inside the MCC, the potential for multiple safety injection (SI) valve actuations was addressed by relocating the supply breakers out of the same vertical stack (i.e., move breaker for [redacted] from cubicle [redacted] to [redacted]), by relocating the breakers out of the top row of the MCC, and by running Meggitt cable down past the top row of breakers such that the cables are not at risk except for a single breaker. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, one of the MOV circuits will remain free of fire damage in the event of a fire in MCC [redacted]. The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin.	Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 161	**- CONTINUED -** The concurrent spurious opening of [redacted] and [redacted] could lead to runout of the credited CSIP. Based on the current deterministic analysis, only CSIP [redacted] is credited in Fire Area [redacted]. This issue is being addressed in the change evaluation for this fire area.	(continued) [redacted] [redacted]	Spurious opening of a high head SI valve cannot cause runout of a CSIP at normal plant pressure, but could lead to solid plant conditions. Should either [redacted] or [redacted] spuriously open, the running CSIP can be secured. The spuriously opened valve could then be manually closed using portable lighting. EC 70350 will provide an additional source of RCS makeup/seal injection.	**- CONTINUED -** Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
358	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	This fire area is a transient no storage location. The change evaluation will be updated to show that the affected cable is not within the zone of influence of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources and (2) the fact that the fire area has been designated as a transient combustible exclusion zone, the NRC staff finds this VFDR acceptable. Updating the change evaluation to document that the affected cable is not within the ZOI of a significant fixed ignition source is an implementation item (SE Section 2.9; Item 22).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
89	AFW to all steam generators could be lost if all three motor driven AFW pump supply valves ([redacted], [redacted], and [redacted]) spuriously shut and if turbine driven AFW pump is unavailable. The MOVs for the motor driven AFW pump are normally open. The hot standby manual action credited for [redacted] supports use of the credited train (train [redacted] motor driven AFW pump supplying steam generator [redacted]). Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	Inside MCC [redacted], fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. In addition to the top section, a postulated fire would not affect more than a single stack of cubicles in an MCC. This is documented in a site-specific calculation. EC 71147 will eliminate the potential for a fire in MCC [redacted] to simultaneously damage all three MOV control circuits by running Meggitt cables into the top of the MCC, down past the top row of breakers, and terminating at the respective cubicles. This will provide a 3-hour rated control cable for the "open" and "shut" signals before entering the respective cubicle. (Note that the breaker for [redacted] is in the top row, as well as in the same vertical stack as the breaker for [redacted].	Based on (1) the installed Meggitt cable, (2) the relative location of the breakers in the MCC, (3) the fire model analysis performed by the licensee indicating that at least one motor driven AFW pump MOV will remain available, and (4) the fact that the fire area has been designated as a transient combustible exclusion zone, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 89	- CONTINUED - AFW to all steam generators could be lost if all three motor driven AFW pump supply valves ([redacted], [redacted], and [redacted]) spuriously shut and if turbine driven AFW pump is unavailable. The MOVs for the motor driven AFW pump are normally open. The hot standby manual action credited for [redacted] supports use of the credited train (train [redacted] motor driven AFW pump supplying steam generator [redacted]). Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	(continued) [redacted]	Thus, at least one motor driven AFW pump MOV would remain free of fire damage in the event of a fire in MCC [redacted]. For a fire in MCC [redacted] all three motor driven AFW pump MOVs remain available. This fire area is a transient no storage location. The change evaluation (Calculation HNP-M/MECH-1105, Attachment 2, Table A2-2) showed that cables outside MCC [redacted] for [redacted], [redacted], and [redacted] are not within the zone of influence of a significant ignition source. The turbine driven AFW pump would also be available unless there was (1) a prolonged loss of both battery chargers (and associated cables) for Bus [redacted], (2) loss of the [redacted] train ventilation via [redacted] and associated components, or (3) closure of fire dampers which are located in the area. (Note that the battery chargers are fed from MCC [redacted] and MCC [redacted], so both will not be at risk simultaneously.)	- CONTINUED - Based on (1) the installed Meggitt cable, (2) the relative location of the breakers in the MCC, (3) the fire model analysis performed by the licensee indicating that at least one motor driven AFW pump MOV will remain available, and (4) the fact that the fire area has been designated as a transient combustible exclusion zone, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
90	Exception [redacted] is applied to [redacted] in this fire area and concerns steam tunnel ventilation. AR 172299 and AR 169835 are tracking this issue.	[redacted]	Steam tunnel ventilation would only be needed if it is necessary to manually open [redacted] or block [redacted]. This fire area is a transient no storage location. The change evaluation showed that Cable [redacted] is not within the zone of influence of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources and (2) the fact that the fire area has been designated as a transient combustible exclusion zone, the NRC staff finds this VFDR acceptable.
92	Spurious operation of [redacted] and / or [redacted] could result in the loss of RWST inventory to the containment sump. EC 54065 is addressing this issue.	[redacted]	Fire damage could spuriously open [redacted] and drain the RWST. The inline valve, [redacted], which could be shut to block the flow path, was fed from MCC [redacted], the same MCC that supplied [redacted]. As such, a fault in the bucket for [redacted] could spuriously open [redacted] as well as cause the bus to fail, thereby preventing the remote operation of [redacted]. EC 54065, which is complete, ran Meggitt cable to the MCC to prevent a fire outside the MCC from spuriously opening [redacted]. In addition, the breaker for [redacted] was relocated to a different bus in the same area ([redacted]).	Based on (1) the installed Meggitt cable, (2) the relocation of the breaker for [redacted] to a different bus, (3) the calculation performed by the licensee indicating that a fire occurring an MCC bucket will not impact adjacent cabinets, (4) the relationship between the target(s) and the zone of influence of the ignition sources, (5) the fact that the fire area has been designated as a transient combustible exclusion zone, and (6) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 92	**- CONTINUED -** Spurious operation of [redacted] and / or [redacted] could result in the loss of RWST inventory to the containment sump. EC 54065 is addressing this issue.	[redacted]	A site-specific calculation provides an analysis which determines that a fire occurring in an MCC bucket will not impact adjacent cabinets. Thus, either [redacted] or [redacted] will remain free of fire damage to prevent draining the RWST. The change evaluation also showed that outside of the associated MCC, the affected cables for [redacted] are not within the ZOI of a significant fixed ignition source. This fire area is a transient no storage location, so the probability of a transient fire is reduced. If the RWST were to drain, modifications per EC 70350 would provide an alternate source of RCS makeup that would not require the RWST.	**- CONTINUED -** Based on (1) the installed Meggitt cable, (2) the relocation of the breaker for [redacted] to a different bus, (3) the calculation performed by the licensee indicating that a fire occurring an MCC bucket will not impact adjacent cabinets, (4) the relationship between the target(s) and the zone of influence of the ignition sources, (5) the fact that the fire area has been designated as a transient combustible exclusion zone, and (6) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
93	The potential exists in this fire area for a steam generator PORV to spuriously open, resulting in an uncontrolled steam release and plant cooldown.	[redacted]	This fire area is a transient no storage location, so the probability of a transient fire is reduced. The change evaluation showed that the affected cables are not within the zone of influence of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources and (2) the fact that the fire area has been designated as a transient combustible exclusion zone, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
95	Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation (Reference [redacted]). AR 159304 (EC 58779) and AR 80304 document inadequate task lighting at [redacted] and [redacted]. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is available, such that the running charging pump could be secured in order to prevent solid plant conditions, thereby allowing more time to close [redacted]. A hydraulic study is needed to specify the time available to adequately perform this manual action.	[redacted] [redacted]	EC 67772 eliminated the potential for cable damage outside the MCC to cause a spurious actuation by installing Meggitt cable as a means of protecting the target conductors. Inside the MCC, the potential for multiple safety injection (SI) valve actuations was addressed by relocating the supply breakers out of the same vertical stack (i.e., move breaker for [redacted] from cubicle [redacted] to [redacted]), by relocating the breakers out of the top row of the MCC, and by running Meggitt cable down past the top row of breakers such that the cables are not at risk except for a single breaker. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, one of the MOV circuits will remain free of fire damage in the event of a fire in MCC [redacted].	Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 95	**- CONTINUED -** Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation (Reference [redacted]). AR 159304 (EC 58779) and AR 80304 document inadequate task lighting at [redacted] and [redacted]. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is available, such that the running charging pump could be secured in order to prevent solid plant conditions, thereby allowing more time to close [redacted]. A hydraulic study is needed to specify the time available to adequately perform this manual action.	(continued) [redacted] [redacted]	The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin. Should either [redacted] or [redacted] spuriously open, the running CSIP can be secured. The spuriously opened valve could then be manually closed using portable lighting. EC 70350 will provide an additional source of RCS makeup/seal injection.	**- CONTINUED -** Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
96	Exception [redacted] is applied to [redacted]. EC 71147 was written to address the potential for spurious opening of [redacted] and [redacted] or [redacted] and [redacted], which could result in the loss of RWST inventory to the containment sump.	[redacted]	This fire area is a transient no storage location. The change evaluation showed that the affected cables outside MCC [redacted] are not within the zone of influence of a significant fixed ignition source. Inside MCC [redacted], fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. In addition to the top section, a postulated fire would not affect more than a single stack of cubicles in an MCC. This is documented in a site-specific calculation. EC 71147 will eliminate the potential for a fire in MCC [redacted] to cause multiple spurious actuations of [redacted] and [redacted]. This will be accomplished by relocating the breaker for [redacted] out of the top row of the MCC (i.e., from cubicle [redacted] to [redacted]), as well as by running Meggitt cables into	Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 96	- CONTINUED - Exception [redacted] is applied to [redacted]. EC 71147 was written to address the potential for spurious opening of [redacted] and [redacted] or [redacted] and [redacted], which could result in the loss of RWST inventory to the containment sump.	(continued) [redacted]	the top of the MCC, down past the top row of breakers, and terminating at the respective cubicles. This will provide a 3-hour rated control cable for the "open" and "shut" signals before entering the respective cubicle. Thus, one circuit will remain free of fire damage in the event of fire in the column of the other breaker's cubicle. In addition, EC 70350 would provide seal injection and RCS makeup from a source independent of the RWST.	- CONTINUED - Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
97	Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation. ARs 134694 and 137435 address this issue. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is available, such that the running charging pump could be secured in order to prevent solid plant conditions, thereby allowing more time to close [redacted].	[redacted]	EC 67772 eliminated the potential for cable damage outside the MCC to cause a spurious actuation by installing Meggitt cable as a means of protecting the target conductors. Inside the MCC, the potential for multiple safety injection (SI) valve actuations was addressed by relocating the supply breakers out of the same vertical stack (i.e., move breaker for [redacted] from cubicle [redacted] to [redacted]), by relocating the breakers out of	Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 97	- CONTINUED - Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation. ARs 134694 and 137435 address this issue. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is available, such that the running charging pump could be secured in order to prevent solid plant conditions, thereby allowing more time to close [redacted].	[redacted] [redacted] [redacted]	the top row of the MCC, and by running Meggitt cable down past the top row of breakers such that the cables are not at risk except for a single breaker. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, one of the MOV circuits will remain free of fire damage in the event of a fire in MCC [redacted]. The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin. Should either [redacted] or [redacted] spuriously open, the running CSIP can be secured. The spuriously opened valve could then be manually closed using portable lighting. EC 70350 will provide an additional source of RCS makeup/seal injection.	- CONTINUED - Based on (1) the installed Meggitt cable, (2) the relocation of the breakers out of the top row of the MCC, (3) the fire model analysis performed by the licensee, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	EMERGENCY BORATION FLOW ISOLATION VALVE	Locally fail open [redacted] by shutting [redacted] in Fire Zone [redacted] and venting the [redacted] air filter. Unlock and open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP [redacted] TO RHR PUMP [redacted]	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I)**	No	**Yes**	No	No	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- One previously approved deviation from the pre-transition fire protection requirements was evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Nine variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:
  - On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.
  - Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.
  - Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that the fire area is virtually devoid of combustibles and ignition sources, such that fire suppression activities are not anticipated, and would not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

The licensee did not credit any previously approved deviations from the deterministic fire protection requirements for this fire area.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
170	The only issue in this area is closing either [redacted] or [redacted] in order to prevent introduction of the VCT cover gas to the suction of the [redacted] pumps.	[redacted]	[redacted] and [redacted] are the [redacted] valves; failure of these cables could prevent closing of these valves. The change evaluation showed that the affected components and cables are not within the zone of	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources and (2) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 170	**- CONTINUED -** The only issue in this area is closing either [redacted] or [redacted] in order to prevent introduction of the VCT cover gas to the suction of the [redacted] pumps.	(continued) [redacted]	influence of a fixed ignition source and will remain free of fire damage. In addition, EC 70350 will provide another source of RCS makeup and seal injection that is not dependent on the CSIP.	**- CONTINUED -** Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources and (2) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
316	The MT™ ERFBS is credited as a 3-hour fire barrier in this area, but is not a fully rated 3-hour fire barrier. The MT™ ERFBS does not provide a 3-hour fire barrier for protection of power Cables [redacted], [redacted], and [redacted] in Conduit [redacted].	[redacted]	The change evaluation demonstrated that the MT™ ERFBS as tested provide adequate protection. The affected cables are not within the zone on influence of a fixed ignition source. Accordingly, the associated MT™ barrier is acceptable because it is not subject to fire damage. The MT™ ERFBS is credited for 115 minutes (1 hour and 55 minutes), in lieu of the 3 hours necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205.	Based on (1) the MT™ ERFBS fire barrier not being within the zone of influence of a fixed ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 316	- CONTINUED - The MT™ ERFBS is credited as a 3-hour fire barrier in this area, but is not a fully rated 3-hour fire barrier. The MT™ ERFBS does not provide a 3-hour fire barrier for protection of power Cables [redacted], [redacted], and [redacted] in Conduit [redacted].	(continued) [redacted]	The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the MT™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 115 min. and 3 hours being low. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the MT™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69765 will modify the MT™ ERFBS consistent with the tested configuration for the fire resistance assumed.	- CONTINUED - Based on (1) the MT™ ERFBS fire barrier not being within the zone of influence of a fixed ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is less than or equal to 1.0E-09 (ΔCDF) and less than 1.0E-10 (ΔLERF).

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I)**	**Yes**	No	**Yes**	**52769**	**Yes**	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Based on the information provided in the LAR as supplemented:

- No previously approved deviations from the pre-transition fire protection requirements were identified by the licensee.
- Two variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).
- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.
- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:
  - On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.
  - Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.
  - Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the floor drainage transfer tank or the storm drainage system, as detailed in HNP FSAR Section 9.3.3. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited three previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800 BTP CMEB 9.5-1, Section C.5.b(2), for providing full area wide suppression and detection.	The deviation was approved based on low combustible loading in the fire area, the lack of concentrations of cable trays, and the existing protection provided for the safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
NRC Approval of Meggitt Safety Systems Cable.	The NRC issued a license amendment approving the use of Meggitt Safety Systems fire resistive cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
155	Spurious operation of [redacted] and / or [redacted] could result in the loss of RWST inventory to the containment sump. EC 54065 is addressing this issue. In addition, AR 159304 (EC 58779) and AR 80304 document inadequate task lighting for [redacted] and [redacted], which will require manual shutting if [redacted] and / or [redacted] spuriously open.	[redacted]	Fire damage could spuriously open [redacted] and drain the RWST. The inline valve, [redacted], which could be shut to block the flow path, was fed from MCC [redacted], the same MCC that supplied [redacted]. As such, a fault in the bucket for [redacted] could spuriously open [redacted] as well as cause the bus to fail, thereby preventing the remote operation of [redacted].	Based on (1) the installed Meggitt cable, (2) the relocation of the power supply for Valve [redacted], (3) the calculation performed by the licensee indicating that a fire occurring an MCC bucket will not impact adjacent cabinets, (4) the routing of the [redacted] cables, (5) the fact that the fire area has been designated as a transient combustible exclusion zone, and (6) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 155	- CONTINUED - Spurious operation of [redacted] and / or [redacted] could result in the loss of RWST inventory to the containment sump. EC 54065 is addressing this issue. In addition, AR 159304 (EC 58779) and AR 80304 document inadequate task lighting for [redacted] and [redacted], which will require manual shutting if [redacted] and / or [redacted] spuriously open.	(continued) [redacted] [redacted]	EC 54065, which is complete, ran Meggitt cable to the MCC to prevent a fire outside the MCC from spuriously opening [redacted]. In addition, the breaker for [redacted] was relocated to a different bus in the same area ([redacted]). A site-specific calculation provides an analysis which determines that a fire occurring in an MCC bucket will not impact adjacent cabinets. Thus, either [redacted] or [redacted] will remain free of fire damage to prevent draining the RWST. The change evaluation also showed that outside of the associated MCC, the affected cables for [redacted] do not reside in Fire Area [redacted]. This fire area is a transient no storage location, so the probability of a transient fire is reduced. If the RWST were to drain, modifications per EC 70350 would provide an alternate source of RCS makeup that would not require the RWST.	- CONTINUED - Based on (1) the installed Meggitt cable, (2) the relocation of the power supply for Valve [redacted], (3) the calculation performed by the licensee indicating that a fire occurring an MCC bucket will not impact adjacent cabinets, (4) the routing of the [redacted] cables, (5) the fact that the fire area has been designated as a transient combustible exclusion zone, and (6) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
157	Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action was previously proposed to mitigate the spurious actuation. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is not available, such that the running charging pump is required to maintain RCP seal integrity. A hydraulic study is needed to specify the time available to adequately perform this manual action. EC 67772 is evaluating a modification that would preclude the spurious operation of [redacted] in this area.	[redacted] [redacted] [redacted]	EC 67772 eliminated the potential for cable damage outside the MCC to cause a spurious actuation by installing Meggitt cable as a means of protecting the target conductors. Inside the MCC, the potential for multiple safety injection (SI) valve actuations was addressed by relocating the supply breakers out of the same vertical stack (i.e., move breaker for [redacted] from cubicle [redacted] to [redacted]), by relocating the breakers out of the top row of the MCC, and by running Meggitt cable down past the top row of breakers such that the cables are not at risk except for a single breaker. EC 71147 will move the breaker for [redacted] to a lower cubicle in its stack.	Based on (1) the installed Meggitt cable, (2) the relocation of the supply breakers out of the same vertical stack, (3) the fire model analysis performed by the licensee which demonstrates that two of the three MOV circuits will remain free of fire damage, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 157	**- CONTINUED -** Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action was previously proposed to mitigate the spurious actuation. Because this action is not associate with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is not available, such that the running charging pump is required to maintain RCP seal integrity. A hydraulic study is needed to specify the time available to adequately perform this manual action. EC 67772 is evaluating a modification that would preclude the spurious operation of [redacted] in this area.	(continued) [redacted] [redacted] [redacted]	Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, at least two of the three MOV circuits will remain free of fire damage in the event of a fire in MCC [redacted]. The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin. Should either [redacted], [redacted], or [redacted] spuriously open, the running CSIP can be secured. The spuriously opened valve could then be manually closed using portable lighting. EC 70350 will provide an additional source of RCS makeup/seal injection.	**- CONTINUED -** Based on (1) the installed Meggitt cable, (2) the relocation of the supply breakers out of the same vertical stack, (3) the fire model analysis performed by the licensee which demonstrates that two of the three MOV circuits will remain free of fire damage, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
159	Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation. AR 159304 (EC 58779) and AR 80304 document inadequate task lighting at [redacted] and [redacted]. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is not available, such that the running charging pump is required to maintain RCP seal integrity. A hydraulic study is needed to specify the time available to adequately perform this manual action. EC 67772 is evaluating a modification that would preclude spurious operation of this valve for a fire anywhere except at the valve breaker. At most, one of the valves ([redacted], [redacted], or [redacted]) may need to be manually closed.	[redacted]	EC 67772 eliminated the potential for cable damage outside the MCC to cause a spurious actuation by installing Meggitt cable as a means of protecting the target conductors. Inside the MCC, the potential for multiple safety injection (SI) valve actuations was addressed by relocating the supply breakers out of the same vertical stack (i.e., move breaker for [redacted] from cubicle [redacted] to [redacted]), by relocating the breakers out of the top row of the MCC, and by running Meggitt cable down past the top row of breakers such that the cables are not at risk except for a single breaker. EC 71147 will move the breaker for [redacted] to a lower cubicle in its stack.	Based on (1) the installed Meggitt cable, (2) the relocation of the supply breakers out of the same vertical stack, (3) the fire model analysis performed by the licensee which demonstrates that two of the three MOV circuits will remain free of fire damage, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 159	**- CONTINUED -** Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation. AR 159304 (EC 58779) and AR 80304 document inadequate task lighting at [redacted] and [redacted]. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is not available, such that the running charging pump is required to maintain RCP seal integrity. A hydraulic study is needed to specify the time available to adequately perform this manual action. EC 67772 is evaluating a modification that would preclude spurious operation of this valve for a fire anywhere except at the valve breaker. At most, one of the valves ([redacted], [redacted], or [redacted]) may need to be manually closed.	(continued) [redacted] [redacted] [redacted]	Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, at least two of the three MOV circuits will remain free of fire damage in the event of a fire in the column of one breaker's cubicle. The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin. Should either [redacted], [redacted], or [redacted] spuriously open, the running CSIP can be secured. The spuriously opened valve could then be manually closed using portable lighting. EC 70350 will provide an additional source of RCS makeup/seal injection.	**- CONTINUED -** Based on (1) the installed Meggitt cable, (2) the relocation of the supply breakers out of the same vertical stack, (3) the fire model analysis performed by the licensee which demonstrates that two of the three MOV circuits will remain free of fire damage, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
160	Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is not available, such that the running charging pump is required to maintain RCP seal integrity. A hydraulic study is needed to specify the time available to adequately perform this manual action. EC 67772 is evaluating a modification that would preclude spurious operation of this valve for a fire anywhere except at the valve breaker. At most, one of the valves ([redacted], [redacted], or [redacted]) may need to be manually closed.	[redacted]	EC 67772 eliminated the potential for cable damage outside the MCC to cause a spurious actuation by installing Meggitt cable as a means of protecting the target conductors. Inside the MCC, the potential for multiple safety injection (SI) valve actuations was addressed by relocating the supply breakers out of the same vertical stack (i.e., move breaker for [redacted] from cubicle [redacted] to [redacted]), by relocating the breakers out of the top row of the MCC, and by running Meggitt cable down past the top row of breakers such that the cables are not at risk except for a single breaker. EC 71147 will move the breaker for [redacted] to a lower cubicle in its stack.	Based on (1) the installed Meggitt cable, (2) the relocation of the supply breakers out of the same vertical stack, (3) the fire model analysis performed by the licensee which demonstrates that two of the three MOV circuits will remain free of fire damage, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 160	**- CONTINUED -** Exception [redacted] addresses the potential for [redacted] to spuriously open, which could fill the pressurizer, thereby resulting in a solid RCS. A new manual action is proposed to mitigate the spurious actuation. Because this action is not associated with the credited train, it is considered to be for the fire affected train, and would therefore be considered allowable under the current licensing basis. Thermal barrier cooling is not available, such that the running charging pump is required to maintain RCP seal integrity. A hydraulic study is needed to specify the time available to adequately perform this manual action. EC 67772 is evaluating a modification that would preclude spurious operation of this valve for a fire anywhere except at the valve breaker. At most, one of the valves ([redacted], [redacted], or [redacted]) may need to be manually closed.	(continued) [redacted] [redacted] [redacted]	Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, at least two of the three MOV circuits will remain free of fire damage in the event of a fire in the column of one breaker's cubicle. The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin. Should either [redacted], [redacted], or [redacted] spuriously open, the running CSIP can be secured. The spuriously opened valve could then be manually closed using portable lighting. EC 70350 will provide an additional source of RCS makeup/seal injection.	**- CONTINUED -** Based on (1) the installed Meggitt cable, (2) the relocation of the supply breakers out of the same vertical stack, (3) the fire model analysis performed by the licensee which demonstrates that two of the three MOV circuits will remain free of fire damage, (4) the results of the change evaluation concluding that the change is acceptable from a risk, defense-in-depth, and safety margin standpoint, and (5) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
327	[redacted] may spuriously close if the fire is located in the breaker for this valve. This could potentially damage the credited charging pump. This issue is being addressed in the change evaluation for this fire area.	[redacted]	This is the [redacted] train VCT outlet valve. The potential for any cable being damaged outside of the MCC was eliminated by installing Meggitt cable in order to protect all of the target conductors. Inside the MCC, the potential for damage to the target cables was reduced by running Meggitt cable down past the top row of breakers such that the cables are not at risk except from a fire in this column below the breaker or in the breaker cubicle. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. Thus, this component is susceptible to spurious actuation only from a fire in its breaker cubicle or the column below the breaker. The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin. In the event the valve spuriously closes, the running CSIP could be damaged. EC 70350 will provide seal injection and RCS makeup if the running CSIP is damaged.	Based on (1) the installed Meggitt cable, (2) the fire model analysis performed by the licensee which demonstrates the reduced potential for damage to the target cables, and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
4	Cables [redacted] and [redacted], which supply power to [redacted], run embedded in this area. The degree of embedment was determined to be acceptable. For emergency service water, the change evaluation is addressing the lack of fire wrap on two junction boxes in the [redacted] area. Redundant components to these junction boxes are located in the [redacted] area ([redacted]). Either normal service water or ESW should be available to supply the ESW header and cool the required loads. This also applies to several other components related to ESW, including [redacted].	[redacted]	Although Cables [redacted] and [redacted], which supply power to [redacted], run through embedded conduit in this fire area and have a fire resistance rating of 3 hours, the conduit terminates at an unprotected junction box at one end ([redacted]), and at an MT™-wrapped box at the other end ([redacted]). The other affected cables have similar routing. The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source.	Based on (1) the power feed cables being run in embedded conduit with a fire resistance rating of 3 hours and (2) the fact that none of the cables are within the zone of influence of a significant ignition source, the NRC staff finds this VFDR acceptable.
5	[redacted] and [redacted] could spuriously open, resulting in the loss of RWST inventory to the containment sump. This issue is being addressed in the change evaluation for this fire area.	[redacted]	The affected cables enter the MCC from the floor, so are only at risk inside the MCC. Fire modeling demonstrated that any non-fire rated cable in the top cable run and in the first row of the MCC could be damaged. This is documented in a site-specific calculation. The components' breaker cubicles are not in the same	Based on (1) the fire modeling calculation performed by the licensee which demonstrates that one of the valves will remain free of fire damage, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 5	- CONTINUED - [redacted] and [redacted] could spuriously open, resulting in the loss of RWST inventory to the containment sump. This issue is being addressed in the change evaluation for this fire area.	(continued) [redacted] [redacted]	column and are not located in the top row. Thus, one cubicle will remain free of fire damage in the event of a fire in the column of the other breaker's cubicle. This fire area is a transient no storage location. The change evaluation also showed that this configuration provides adequate defense-in-depth and safety margin. In addition, EC 70350 would provide seal injection and RCS makeup from a source independent of the RWST.	- CONTINUED - Based on (1) the fire modeling calculation performed by the licensee which demonstrates that one of the valves will remain free of fire damage, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open 1RH-40 in Fire Zone 1-C.
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling 1RH-20 (58) and 1RH-30 (66) per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling 1RH-20 (58) and 1RH-30 (66) per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize 1SI-246, at breaker 1A21-SA-5C (RAB 286). Locally shut 1SI-246:004 in Fire Zone 1-C.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize 1SI-247, at breaker 1B21-SB-5C (RAB 286). Locally shut 1SI-247 in Fire Zone 1-C.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize 1SI-248, at breaker 1A21-SA-3D (RAB 286). Locally shut 1SI-248:004 in Fire Zone 1-C.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area 12-A-CRC1 within two hours to prevent a spurious engineered safety features actuation system (ESFAS) signal.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area 12-A-CRC1 within two hours to prevent a spurious ESFAS signal.
[redacted]	-----	Reset safety injection from the main control room, pull the SSPS fuses at the SSPS Cabinets in Fire Area 12-A-CRC1, and mitigate spurious safety actuations per the emergency operating procedures (EOP) network.
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I)**	No	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I)**	No	**Yes**	No	No	**Yes**
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Three previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Seven variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — The fire area was evaluated using a qualitative fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that due to the lack of combustibles and ignition sources in this fire area, significant fire suppression activities are not anticipated. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.b(2)(a), for not providing a 3-hour fire barrier between redundant equipment.	The deviation was approved based on low fuel loading and limited access to the area in question. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from the requirement to provide an automatic fire detection and suppression system throughout the fire area (note that Fire Area [redacted] was originally part of Fire Area [redacted])	The deviation was approved based on low combustible loading in the fire area and the existing fire protection features. In the original submittal and HNP Supplemental SER, NUREG-1038, Supplement 2, all of Fire Area [redacted] is referred to as a dedicated shutdown area, which does not require area wide suppression. This was also noted in HNP Supplemental SER, Supplement 3. Note that since the new Fire Area [redacted] does contain redundant trains of equipment, the original deviation may have been applicable to Section C.5.b(2)(b) of NUREG-0800, BTP CMEB 9.5-1. However, the same submittal also requested a deviation from the requirement to provide a 3-hour fire rated barrier between redundant components, which addresses this issue for Fire Area [redacted]. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
6	In this area, all three SG PORVs could spuriously actuate.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of an ignition source. There are no fixed ignition sources in this area, and no transient ignition sources are determined to be significant (greater than or equal to 1.00E-08/year CDF).	Based on the relationship between the target(s) and the zone of influence of the ignition sources the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of this VFDR is less than or equal to 1.0E-09 (ΔCDF) and less than 1.0E-10 (ΔLERF).

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Reset safety injection from the main control room, pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted], and mitigate spurious safety actuations per the emergency operating procedures (EOP) network.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	No	No	No	No	No	No

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Two previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- One variation from the deterministic requirements was identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — The fire area was evaluated using a qualitative fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the storm drainage system. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance goals.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
NRC Approval of Meggitt Safety Systems Cable.	The NRC issued a license amendment approving the use of Meggitt Safety Systems fire resistive cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.c, for both trains of cables in the [redacted] rooms.	The deviation was approved based on the train [redacted] cables being protected by a 1-hour rated fire barrier with an automatic detection and suppression system. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on (1) the installed HEMYC™ ERFBS, (1) the establishment of the fire barrier rating based on required fire testing, and (3) the determination that the fire area is acceptable from a risk, defense-in-depth, and safety margin standpoint, the NRC staff finds this deviation acceptable.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
183	The hot standby manual action credited for [redacted] supports use of the credited train [redacted] motor driven AFW pump which supplies steam generator [redacted]. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
187	Fire damage to cables serving [redacted] and [redacted] may cause them to spuriously close, potentially resulting in a loss of RCP thermal barrier cooling. As discussed in Open Item 28, RCP seal injection may also be lost. This issue is being addressed in the change evaluation for this fire area.	[redacted] [redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, EC 70350 will provide seal injection should these valves spuriously close.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
188	Exception [redacted] identifies the potential for loss of Switchgear Room [redacted] in Fire Area [redacted]. [redacted] This issue is being addressed in the change evaluation for this fire area.	[redacted]	[redacted] is the temperature control valve for [redacted], which provides area cooling for the cable spreading room. This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
190	Exception [redacted] is applied to [redacted] and [redacted] and addresses their potential spurious opening, which could result in uncontrolled steam release and RCS cooldown.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.
191	[redacted] may spuriously close in this fire area, possibly resulting in damage to the running charging pump and loss of seal injection. Loss of seal cooling and the necessity of using CSIP [redacted] may result. (Reference Exception [redacted] and Exception [redacted]. Also reference Exception [redacted] for direction on re-initiating lost RCP seal cooling.)	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, if the running CSIP were to fail, EC 70350 will provide an additional source of RCS makeup and seal injection.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
193	Cable damage may cause the spurious opening of [redacted] and [redacted], which could result in the loss of RWST inventory to the containment sump.	[redacted]	The issue is possible multiple spurious opening of [redacted] and [redacted]. This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, EC 70350 will provide seal injection and RCS makeup from a source independent of the RWST.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
24	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near the HEMYC™ ERFBS is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], (4) the barrier fire duration being based on appropriate testing, (5) the proposed modifications to bring the fire barrier up to the tested configuration, and (6) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 24	- CONTINUED - The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	(continued) [redacted]	This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed.	- CONTINUED - Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], (4) the barrier fire duration being based on appropriate testing, (5) the proposed modifications to bring the fire barrier up to the tested configuration, and (6) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
25	Because all three pressurizer PORVs are potentially affected by a fire in this area, a credited means of plant depressurization has not been identified. At least one PORV and its associated block valve should be available.	[redacted]	Cables [redacted], [redacted], [redacted], [redacted], and [redacted] are not VFDRs; they are deterministically compliant. Damage to the cables for [redacted] may be bypassed by placing the control switch in SHUT, and, when needed, in OPEN (i.e., only manual control remains available). This fire area is a transient no storage location. The only fixed ignition source near the HEMYC™ ERFBS is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables for [redacted] (Cables [redacted], [redacted], and [redacted]) not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
28	The flow paths for thermal barrier cooling and seal injection are both potentially affected in this area. As discussed in Open Item 187, RCP thermal barrier cooling may be lost. The change evaluation is determining whether a single credible fire can potentially damage the valves supporting both paths.	[redacted]	Cable damage could cause [redacted] or [redacted] to spuriously close, thereby resulting in the loss of the running CSIP due to isolation of the VCT, and/or loss of the flow path for charging pump minimum-flow, respectively. This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, if the running CSIP were to fail, EC 70350 will provide an additional source of RCS makeup and seal injection.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
359	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.
360	Cable damage may cause the spurious actuation of [redacted] and Containment Spray Pump [redacted], which could result in actuation of the containment spray system.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is 2.07E-9 (ΔCDF) and less than 1.0E-10 (ΔLERF).

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	EMERGENCY BORATION FLOW ISOLATION VALVE	Locally fail open [redacted] by shutting [redacted] in Fire Zone [redacted] and venting the [redacted] air filter. Unlock and open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Pull the solid state protection system (SSPS) fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	**Yes**	**ESR 99-00395**	**Yes**	**Yes**	**Yes (I, T, AS)**	No	No	**Yes (I,T)**	**ESR 99-00395**	**Yes (I,T, AS)**	**Yes (I,T, AS)**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I)**	No	No	No	-	No	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	
AS	Abbreviation for Air Sampling Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Two previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

- Eleven variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of floor drainage systems. Floor water surcharge is estimated to be insignificant since excess water can overflow to adjacent areas. Runoff is directed to the storm drainage system. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance goals.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted]-A-CSRB Deviations

Based on the information provided in the LAR, the licensee credited two previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
NRC Approval of Meggitt Safety Systems Cable.	The NRC issued a license amendment approving the use of Meggitt Safety Systems fire resistive cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.c, for both trains of cables in the [redacted] rooms.	The deviation was approved based on the train [redacted] cables being protected by a 1-hour rated fire barrier with an automatic detection and suppression system. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on (1) the installed HEMYC™ ERFBS, (1) the establishment of the fire barrier rating based on required fire testing, and (3) the determination that the fire area is acceptable from a risk, defense-in-depth, and safety margin standpoint, the NRC staff finds this deviation acceptable.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
117	The hot standby manual action credited for [redacted] is required to establish a flow path for the charging path minimum flow. This flow path is required for the credited train [redacted] charging pump. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, if the running CSIP were to fail, EC 70350 will provide an additional source of RCS makeup and seal injection.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
13	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near the HEMYC™ ERFBS is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a negligible contribution to the change in CDF results.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], (4) the barrier fire duration being based on appropriate testing, (5) the proposed modifications to bring the fire barrier up to the tested configuration, and (6) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 13	- CONTINUED - The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	(continued) [redacted]	This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed.	- CONTINUED - Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], (4) the barrier fire duration being based on appropriate testing, (5) the proposed modifications to bring the fire barrier up to the tested configuration, and (6) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
140	The hot standby manual action credited for [redacted] supports use of the credited train [redacted] motor driven AFW pump, which supplies steam generator [redacted]. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, if the running CSIP were to fail, EC 70350 will provide an additional source of RCS makeup and seal injection.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
304	Cable damage may cause the spurious actuation of [redacted], which could result in an uncontrolled RCS cooldown.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
305	The combined head vent and steam space vent valve ([redacted]) may spuriously operate concurrently with the reactor vessel head vent line isolation valve ([redacted]) or pressurizer steam space vent isolation valve B ([redacted]).	[redacted]	The issue is possible multiple spurious opening of [redacted] in conjunction with [redacted] or [redacted]. This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.
307	Cable damage may cause the spurious opening of [redacted] and [redacted], which could result in the loss of RWST inventory to the containment sump. ECR 2169 is tracking this issue.	[redacted]	The issue is possible multiple spurious opening of [redacted] and [redacted]. This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, EC 70350 will provide seal injection and RCS makeup from a source independent of the RWST.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
310	All wide range RCS pressure indication may be lost in this fire area.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.
332	The change evaluation is addressing the significance of fire damage at the Meggitt cable termination points. Such damage could result in spurious actuations not currently addressed.	[redacted]	Cables [redacted] and [redacted] are Meggitt cables that terminate in Auxiliary Transfer Panel [redacted]. This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source. In addition, if the running CSIP were to fail due to spurious closure of [redacted], EC 70350 will provide alternate seal injection and RCS makeup.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], and (4) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
361	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.
362	Cable damage may cause the spurious actuation of [redacted] and Containment Spray Pump [redacted], which could result in actuation of the containment spray system.	[redacted]	This fire area is a transient no storage location. The only fixed ignition source near these cables is Auxiliary Transfer Panel [redacted]. EC 69501 will install a VEWFDS in Auxiliary Transfer Panel [redacted], which will render the affected cables not within the ZOI of a significant fixed ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the proposed installation of a VEWFDS in Auxiliary Transfer Panel [redacted], the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is 1.05E-08 (ΔCDF) and 2.23E-10 (ΔLERF).

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	RCS LOOP [redacted] TO RHR PUMP [redacted]	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted]C.
[redacted]	-----	Pull the solid state protection system (SSPS) fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	**Yes**	**ESR 99-00395**	**Yes**	**Yes**	**Yes (I, T, AS)**	No	No	**Yes (I,T)**	**ESR 99-00395**	**Yes (I,T, AS)**	**Yes (I,T, AS)**
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I)**	No	No	No	-	No	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
T	Abbreviation for Thermal Detection	
AS	Abbreviation for Air Sampling Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Two previously approved deviations from the pre-transition fire protection requirements were evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

- Ten variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant electrical equipment subject to water damage is protected by four-inch floor pedestals (except for the pressurizer heater distribution panel, which is raised 2.25 inches). The air handling unit motors are totally enclosed and mounted on eight inch steel supports that are mounted on a six inch concrete base. Curbs six inches high are provided at the two access openings, which are protected by 3-hour fire rated doors, in order to prevent water from flowing into or out of this fire area. These curbs also prevent the potential spread of flammable liquids from adjacent fire areas. Damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of a floor drainage system. The accumulation of water on the floor is estimated to be insignificant. Runoff is directed to the floor drain transfer tank. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

The licensee did not credit any previously approved deviations from the deterministic fire protection requirements for this fire area.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
172	Exception [redacted] is applied to [redacted] and [redacted] and addresses their potential spurious opening, which could result in uncontrolled steam release and RCS cooldown.	[redacted]	This fire area is a transient no storage location. The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources and (2) the fact that the fire area has been designated as a transient combustible exclusion zone, the NRC staff finds this VFDR acceptable.
176	Exception [redacted] is applied to [redacted]. Cable damage may cause the spurious opening of [redacted] and [redacted], which could result in the loss of RWST inventory to the containment sump. This issue is being addressed in the change evaluation for this fire area.	[redacted]	This fire area is a transient no storage location. The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source. In addition, EC 70350 will provide seal injection and RCS makeup from a source independent of the RWST.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
295	The issue is the potential multiple spurious opening of either [redacted] or [redacted], concurrent with the spurious opening of the RCS head vent valves ([redacted]). The HEMYC™ ERFBS credited in this fire area for [redacted] is not a fully rated 1-hour fire barrier.	[redacted] [redacted] [redacted]	This fire area is a transient no storage location. The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source. For [redacted], Cable [redacted] (Conduit [redacted]) is wrapped with HEMYC™, which is not a fully rated 1-hour fire barrier. The containment penetration junction box ([redacted]), located on the containment wall, is unwrapped. In addition, the RCS head vents are designed to limit the mass flow rate of reactor coolant through the vessel head vent to less than the makeup capacity of a single charging/safety injection pump in the event of a line break or inadvertent operation.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the fact that the fire area has been designated as a transient combustible exclusion zone, (3) the designed mass flow limit to less than the makeup capacity of a single charging/safety injection pump, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.
[redacted]	-----	Pull the solid state protection system (SSPS) fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.
[redacted]	-----	Pull the SSPS fuses at the SSPS Cabinets in Fire Area [redacted] prior to loss of DC power.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	**Yes**	**ESR 99-00395**	**Yes**	**Yes**	**Yes (T)**	No	No	**Yes**	**ESR 99-00395**	**Yes**	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
T	Abbreviation for Thermal Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Performance-Based Compliance with NFPA 805 Section 4.2.4

Based on the information provided in the LAR as supplemented:

- No previously approved deviations from the pre-transition fire protection requirements were identified by the licensee.
- Three variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).
- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.
- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:
  - On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.
  - Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.
  - Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that plant electrical equipment subject to water damage is protected by four-inch floor pedestals (except for the pressurizer heater distribution panel, which is raised 2.25 inches). The air handling unit motors are totally enclosed and mounted on eight inch steel supports that are mounted on a six inch concrete base. Curbs six inches high are provided at the two access openings, which are protected by 3-hour fire rated doors, in order to prevent water from flowing into or out of this fire area. These curbs also prevent the potential spread of flammable liquids from adjacent fire areas. Damage to plant areas and equipment from the accumulation of water discharged from sprinkler systems and hose lines is minimized by the provision of a floor drainage system. The accumulation of water on the floor is estimated to be insignificant. Runoff is directed to the floor drain transfer tank. Therefore, fire suppression activities are not expected to adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

The licensee did not credit any previously approved deviations from the deterministic fire protection requirements for this fire area.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
180	Exception [redacted] is applied to [redacted] and addresses its potential spurious opening, which could result in uncontrolled steam release and RCS cooldown.	[redacted]	The change evaluation showed that the affected cables and associated [redacted] are not within the zone of influence of a significant ignition source.	Based on the relationship between the target(s) and the zone of influence of the ignition sources, the NRC staff finds this VFDR acceptable.
363	The potential exists for loss of RCP seal integrity due to the simultaneous loss of seal injection and seal cooling.	[redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source.	Based on the relationship between the target(s) and the zone of influence of the ignition sources, the NRC staff finds this VFDR acceptable.
364	The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted] [redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source. The HEMYC™ ERFBS is credited for 25 minutes, in lieu of the 1 hour necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the HEMYC™ ERFBS reduced rating has a	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 364	- CONTINUED - The HEMYC™ ERFBS credited in this area is not a fully rated 1-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	(continued) [redacted] [redacted]	negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 25 minutes and 60 minutes being low. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the HEMYC™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69764 will modify the HEMYC™ ERFBS to be consistent with the tested configuration for the fire resistance assumed.	- CONTINUED - Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.
8	The 1-hour rated ERFBS on Cable [redacted] for [redacted] may not be adequate. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted] [redacted] [redacted]	The change evaluation showed that the affected cables are not within the zone of influence of a significant ignition source.	Based on the relationship between the target(s) and the zone of influence of the ignition sources, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	EMERGENCY BORATION FLOW ISOLATION VALVE	Locally fail open [redacted] by shutting [redacted] in Fire Zone [redacted] and venting the [redacted] air filter. Unlock and open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP [redacted] TO RHR PUMP [redacted]	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	**Yes**	No	No	No	No	**Yes**	**Yes (T)**	No	No	No	No	**Yes**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
T	Abbreviation for Thermal Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- No previously approved deviations from the pre-transition fire protection requirements were identified by the licensee.
- Four variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).
- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:
  - On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.
  - Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.
  - Credited ERFBS were documented on a fire area basis, verified to be installed consistent with tested configurations and rated accordingly, and evaluated using a fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that this fire area does not have an installed automatic suppression system. In the event of a fire requiring the use of a manual hose station, accumulated water can migrate to adjacent areas equipped with floor drains. Drainage into the adjacent areas will not damage safety-related equipment. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited six previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a(4), for fire dampers in exterior walls.	Based on the barriers not being contiguous with fire areas, the original deviation was judged to be acceptable. The submittal letter was referenced in the HNP Supplemental SER, NUREG-1038, Supplement 4, Page 9-4, but this particular deviation from NFPA 90A was not noted specifically in NUREG-1038, Supplement 4. It is being included here to ensure it remains part of the HNP licensing basis. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from the requirement to provide a 3-hour rated fire barrier for Cable [redacted].	The deviation was approved based on the cable being routed within a dedicated conduit, such that spurious operation could only occur if an external voltage source was applied (external to the conduit). In the revised analysis for the fire area, redundant valves are also available to prevent an open vent path from occurring. As such, there is no current need for this deviation. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the redundant valves available to prevent an open vent path, as well as the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
NRC Approval of Meggitt Safety Systems Cable.	The NRC issued a license amendment approving the use of Meggitt Safety Systems fire resistive cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, regarding building design in the [redacted].	The design and protection of the [redacted] are in accordance with Section C.5.a of NUREG-0800, BTP CMEB 9.5-1.	This deviation corrected an editorial error in one of the original SERs for HNP. The [redacted] are currently compliant with the BTP CMEB 9.5-1 guidance.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.7.e, for the requirements in specific plant areas, namely the [redacted].	Although floor drains have not been provided in the [redacted], water resulting from the use of a manual hose station can migrate into adjacent areas that are equipped with floor drains. In addition, curbing is installed to keep the redundant [redacted] from flooding. Therefore, the design of the [redacted] in order to prevent flooding due to water resulting from the use of a manual hose station complies with Section C.7.e of NUREG-0800, BTP CMEB 9.5-1.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
1	Cables [redacted] and [redacted], which supply power to MCC [redacted], are embedded in this fire area. However, the depth of embedment may not provide adequate protection.	[redacted]	The change evaluation showed that Cable [redacted] is within embedded conduit in the floor that has been evaluated as being protected by a 2-hour fire rating. Attachment 3 of IMC 0609, Appendix F, states that "components and cables protected by a non-degraded fire barrier with a minimum fire endurance rating of two hours will be assumed to be invulnerable to fire damage unless a high-hazard fire source (e.g., a large oil spill or oil-filled transformer) is identified that can result in a direct flame impingement exposure to the fire barrier."	Based on (1) the types of equipment present in this fire area, (2) the types of fires expected in this area, and (3) the absence of a high-hazard fire source, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 1	- CONTINUED - Cables [redacted] and [redacted], which supply power to MCC [redacted], are embedded. However, the depth of embedment may not provide adequate protection.	(continued) [redacted]	This use of this assumption is consistent for this fire area since there are no large oil filled devices in the [redacted]. Fire modeling for this area assumes a number of high energy arcing faults followed by smaller residual cabinet fires, but no large oil fires. Therefore, these embedded conduits are assumed free from fire damage.	- CONTINUED - Based on (1) the types of equipment present in this fire area, (2) the types of fires expected in this area, and (3) the absence of a high-hazard fire source, the NRC staff finds this VFDR acceptable.
2	Cables supporting ESW components are embedded in this fire area. However, the depth of embedment may not provide adequate protection.	[redacted] [redacted]	The change evaluation showed that Cable [redacted] is within embedded conduit in the floor that has been evaluated as being protected by a 2-hour fire rating. Attachment 3 of IMC 0609, Appendix F, states that "components and cables protected by a non-degraded fire barrier with a minimum fire endurance rating of two hours will be assumed to be invulnerable to fire damage unless a high-hazard fire source (e.g., a large oil spill or oil-filled transformer) is identified that can result in a direct flame impingement exposure to the fire barrier."	Based on (1) the types of equipment present in this fire area, (2) the types of fires expected in this area, and (3) the absence of a high-hazard fire source, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 2	- CONTINUED - Cables supporting ESW components are embedded in this fire area. However, the depth of embedment may not provide adequate protection.	(continued) [redacted] [redacted]	Cable [redacted] was determined to be protected by an embedded depth qualified for a 1-hour fire rating. This conduit is embedded in the floor and passes between several ignition sources. Based on this configuration, the only means by which a fire would be expected to challenge an object embedded in the floor would be via a radiant heat flux imposed on the floor, since the convective plume would tend to rise toward the ceiling. This would present a much less severe challenge to the embedded raceway. This use of this assumption is consistent for this fire area since there are no large oil filled devices in the [redacted]. Fire modeling for this area assumes a number of high energy arcing faults followed by smaller residual cabinet fires, but no large oil fires. Therefore, these embedded conduits are assumed free from fire damage.	- CONTINUED - Based on (1) the types of equipment present in this fire area, (2) the types of fires expected in this area, and (3) the absence of a high-hazard fire source, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
365	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	The change evaluation showed that Cables [redacted], [redacted] ,and [redacted] are not within the zone of influence of a significant ignition source, but Cable [redacted] is within the ZOI of Distribution Panel [redacted] ([redacted]). The actions necessary to de-energize the heaters (or the upstream bus) are not time critical. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the associated actions not being time critical, and (3) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is zero.

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.
[redacted]	-----	Pull the solid state protection system (SSPS) fuses at the SSPS Cabinets in Fire Area [redacted] within two hours to prevent a spurious ESFAS signal.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	-----	EMERGENT – Fire Area [redacted] is not accessible for manual actions to trip [redacted], [redacted], [redacted], or [redacted]. To de-energize the Train [redacted], an operator may need to open yard breakers and/or disconnects and locally trip the Train [redacted] emergency diesel generator. Train [redacted] reset is available from the main control room.
[redacted]	PRESSURIZER HEATER BACKUP GROUP [redacted] POWER PANEL SUPPLY BREAKER ([redacted])	Damage to this cable may cause heater group [redacted] to spuriously operate. Remove control power fuses and open breaker [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted] or at the heater panel in Fire Area [redacted].
[redacted]	PRESSURIZER BACKUP HEATER GROUP [redacted] POWER PANEL SUPPLY BREAKER ([redacted])	Damage to this cable may cause loss of control of heater group [redacted]. Remove control power fuses and open breaker [redacted] at 480V Auxiliary Bus [redacted] in Fire Area [redacted] or at the heater panel in Fire Area [redacted].
[redacted]	PRESSURIZER HEATER CONTROL GROUP [redacted] POWER PANEL SUPPLY BREAKER ([redacted])	Damage to this cable may cause loss of control of heater group [redacted]. Remove control power fuses and open breaker [redacted] at 480V Auxiliary Bus [redacted] in Fire Area [redacted] or at the heater panel in Fire Area [redacted].

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?					Detection Provided?	Detection Required System?				
				S	D	E	R	C		S	D	E	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	No	No	**Yes (I, AS)**	No	**Yes (I)**	No	**Yes (I,AS)**	**Yes (I,AS)**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
AS	Abbreviation for Air Sampling Detection	

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Six previously approved deviation from the pre-transition fire protection requirements was evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

- Three variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — The fire area was evaluated using a qualitative fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Fire Area [redacted]

The licensee analyzed this fire area using the fire risk evaluation approach in accordance with NFPA 805 Section 4.2.4.2, but also applied deterministic simplifying assumptions in order to credit those portions of the facility design that meet the deterministic requirements of NFPA 805 Section 4.2.3. The licensee identified the structures, systems, and components (SSCs) necessary to meet the nuclear safety performance criteria (NSPC) in this fire area.

Evaluation of Fire Suppression Effects on the Nuclear Safety Performance Criteria for Fire Area [redacted]

The licensee stated in LAR Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," that this fire area does not have an installed automatic suppression system. In the event of a fire requiring the use of a manual hose station, accumulated water can migrate to adjacent areas equipped with floor drains. Drainage into the adjacent areas will not damage safety-related equipment. Therefore, fire suppression activities will not adversely affect achievement of the nuclear safety performance criteria.

Based on the information provided by the licensee in the NFPA 805 LAR, the NRC staff finds the licensee's evaluation of fire suppression effects on the NSPC acceptable because the results of the licensee's analysis indicate that fire suppression activities will not adversely impact achievement of the nuclear safety performance criteria.

Fire Area [redacted] Deviations

Based on the information provided in the LAR, the licensee credited five previously approved deviations from the existing fire protection requirements. The licensee utilized the process described in LAR Section 4.2.2.2.2, "Results of the Licensing Action Review," to carry forward these deviations, which requires a determination of the basis of acceptability and a determination that the basis of acceptability is still valid.

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, in that not all penetrations are sealed with equivalently rated fire damper assemblies, door assemblies, or seals.	The deviation was approved based on the conditions on either side of the penetrations, the installed fire protection features, and the physical separation of redundant safe shutdown equipment. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Deviation	Basis and Continuing Validity	Evaluation
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a, for special purpose doors.	The deviation was approved based on the door's substantial construction, multiple-point locking mechanism, the lack of a fire exposure threat to the doors, and, where listed in the table attached to the original deviation, installed suppression and/or detection systems. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.a(4), for fire dampers in exterior walls.	Based on the barriers not being contiguous with fire areas, the original deviation was judged to be acceptable. The submittal letter was referenced in the HNP Supplemental SER, NUREG-1038, Supplement 4, Page 9-4, but this particular deviation from NFPA 90A was not noted specifically in NUREG-1038, Supplement 4. It is being included here to ensure it remains part of the HNP licensing basis. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
NRC Approval of Meggitt Safety Systems Cable.	The NRC issued a license amendment approving the use of Meggitt Safety Systems fire resistive cable. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the previous staff approval of this deviation and the statement by the licensee that the basis remains valid, the NRC staff finds this deviation acceptable.
Deviation from NUREG-0800, BTP CMEB 9.5-1, Section C.5.c, in Fire Area [redacted] for alternate or dedicated shutdown capability.	In the event of a fire in Fire Area [redacted], [redacted], or [redacted], the MCR does not need to be evacuated. However, the use of a non-safety-related dedicated HVAC unit to cool the PIC room is required. With the dedicated HVAC unit running, shutdown is otherwise normal. The conditions forming the basis for the previous NRC staff approval of this deviation have not changed.	Based on the continued availability of a dedicated HVAC unit to provide cooling to the PIC room, the NRC staff finds this deviation acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Variations from the Deterministic Requirements (VFDRs)

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
14	The MT™ ERFBS is credited as a 3-hour fire barrier in this area, but is not a fully rated 3-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	[redacted]	The change evaluation demonstrated that there is no MT™ ERFBS that falls within the ZOI of a significant ignition source. The MT™ ERFBS are therefore only subject to the potential impacts of a hot gas layer. There is no fire scenario considered capable of challenging the system's minimum performance based on a fire rating of 1 hour 55 minutes; therefore, no damage is assumed to occur to the protected circuits. The MT™ ERFBS is credited for 115 minutes (1 hour and 55 minutes), in lieu of the 3 hours necessitated by the deterministic requirements. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205.	Based on (1) the MT™ ERFBS fire barrier not being within the zone of influence of a signifcant ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
(continued) 14	- CONTINUED - The MT™ ERFBS is credited as a 3-hour fire barrier in this area, but is not a fully rated 3-hour fire barrier. The change evaluation process is determining whether the installed fire barriers provide an adequate level of protection for the hazards in the fire area.	(continued) [redacted]	The associated change in risk is below the RG 1.205 acceptance criteria. As such, the change in risk due to the MT™ ERFBS reduced rating has a negligible contribution to the change in CDF results. This is due to the difference in the probability of non suppression between 115 min. and 3 hours being low. The delta-CDF and delta-LERF results are lower than the threshold which requires NRC notification per the standard fire protection license condition included in RG 1.205. The change process targets associated with the MT™ ERFBS are not within the zone of influence of significant ignition sources and so are considered to be free of fire damage, and therefore considered acceptable "as-is." EC 69765 will modify the MT™ ERFBS consistent with the tested configuration for the fire resistance assumed.	- CONTINUED - Based on (1) the MT™ ERFBS fire barrier not being within the zone of influence of a signifcant ignition source, (2) the barrier fire duration being based on appropriate testing, (3) the proposed modifications to bring the fire barrier up to the tested configuration, and (4) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
147	The hot standby manual action credited for [redacted] is required to establish a flow path for the charging path minimum flow. This flow path is required for the credited train [redacted] charging pump. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted]	The change evaluation showed that Cable [redacted] is not within the ZOI of a significant ignition source. Cables [redacted] and [redacted] are within the ZOI of the [redacted] Transformer ([redacted]), the [redacted] 480V Auxiliary Switchgear ([redacted]), and the [redacted] Multiplexer Unit ([redacted]). EC 68646 is adding thermal shields above [redacted] in order to reduce the overall risk in this fire area. In addition, if the running CSIP were to fail, EC 70350 will provide an additional source of RCS makeup and seal injection.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the proposed installation of thermal shields above [redacted], and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
15	The required manual action for [redacted] is a part of the credited train and is necessary to establish hot standby decay heat removal. Under the current licensing basis, this action is considered unallowable and a change evaluation is required.	[redacted] [redacted]	EC 68645 will remove the cables for [redacted] from the area, such that a flow path of water to the [redacted] SG is assured. All other requirements to use the [redacted] SG for decay heat removal are met for this area. Therefore, [redacted] will no longer be required to maintain hot standby.	Based on the proposed installation of EC 68645, a flow path of water to the [redacted] steam generator will be assured. Accordingly, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
16	[redacted] may spuriously close due to concurrent intra-cable hot shorts on Cable [redacted] and Cable [redacted], or due to an inter-cable hot short on Cable [redacted]. This could result in a loss of suction to the running charging pump and unrecoverable pump damage. This issue is being addressed in the change evaluation for this fire area.	[redacted]	The change evaluation showed that the cables for [redacted] are not within the zone of influence of a significant ignition source. EC 68646 is adding thermal shields above four ignition sources that could lead to a hot gas layer. In addition, EC 70350 will provide altemate RCS makeup capability in the event that [redacted] spuriously closes and disables the running CSIP.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) , the proposed installation of thermal shields above the four ignition sources that could lead to a hot gas layer, and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.
19	Cable damage may cause the spurious opening of [redacted] and [redacted], which could result in the loss of RWST inventory to the containment sump. This issue is being addressed in the change evaluation for this fire area.	[redacted] [redacted]	The change evaluation showed that except for Cables [redacted] and [redacted], the affected cables are not within the ZOI of a significant ignition source. Cables [redacted] and [redacted] are within the ZOI of the [redacted] Transformer ([redacted]), the [redacted] 480V Auxiliary Switchgear ([redacted]), Distribution Panel [redacted] ([redacted]), Sequencer Panel [redacted] ([redacted]), and other significant sources. EC 68646 is adding thermal shields above [redacted] in order to reduce the risk in the fire area. In addition, if the RWST were to drain, EC 70350 will provide an additional source of RCS makeup and seal injection.	Based on (1) the relationship between the target(s) and the zone of influence of the ignition sources, (2) the proposed installation of thermal shields above [redacted], and (3) the commitment to install the alternate seal injection system, the NRC staff finds this VFDR acceptable.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

HNP's Open Item No.	VFDR Description	Component (Cables)	Disposition	NRC Evaluation
367	This fire area credits hot standby actions to manually de-energize pressurizer heaters that have the potential to operate spuriously due to cable damage.	[redacted]	The change evaluation showed that the affected cables terminate in Transfer Panel [redacted] ([redacted]). Cables [redacted] and [redacted] terminate in the [redacted] 480V Auxiliary Switchgear ([redacted]). Cable [redacted] is within the ZOI of the [redacted] Multiplexer Unit ([redacted]). The actions necessary to de-energize the heaters (or the upstream bus) are not time critical. The risk evaluation for plant changes in this area was assessed quantitatively for acceptability using the delta-CDF and delta-LERF criteria from NEI 04-02, Section 5.3.5, and RG 1.205. The associated change in risk is below the RG 1.205 acceptance criteria.	Based on (1) the associated actions not being time critical and (2) the calculated change in risk meeting the associated acceptance requirements, the NRC staff finds this VFDR acceptable.

The fire risk evaluation for this fire area determined that the additional risk incorporated because of these VFDRs is 1.05E-06 (ΔCDF) and 4.78E-08 (ΔLERF).

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Recovery Actions (RAs)

The licensee did not identify any recovery actions required for this fire area.

Recovery Actions Credited for Defense-in-Depth (RA-DID)

Component ID	Component Name	Licensee's Description of Action
[redacted]	PRESSURIZER HEATER BACKUP GROUP [redacted] POWER PANEL SUPPLY BREAKER ([redacted])	Damage to this cable may cause heater group [redacted] to spuriously operate. Remove control power fuses and open breaker [redacted] at 480V Emergency Bus [redacted] in Fire Area [redacted] or at the heater panel in Fire Area [redacted].
[redacted]	EMERGENCY BORATION FLOW ISOLATION VALVE	Locally fail open [redacted] by shutting [redacted] in Fire Zone [redacted] and venting the [redacted] air filter. Unlock and open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP [redacted] TO RHR PUMP [redacted]	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION ([redacted])	Manually open [redacted] in Fire Zone [redacted].
[redacted]	RCS LOOP TO RHR PUMP [redacted] ISOLATION VALVE ([redacted]) CIV	Manually open [redacted] in Fire Zone [redacted].
[redacted]	HEAT EXCHANGER [redacted] BYPASS FLOW CONTROL	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.
[redacted]	HEAT EXCHANGER [redacted] FLOW CONTROL ([redacted])	Manually control RHR flow by locally throttling [redacted] and [redacted] per existing procedures.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

Component ID	Component Name	Licensee's Description of Action
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	ACCUMULATOR [redacted] DISCHARGE VALVE	De-energize [redacted], at breaker [redacted] ([redacted]). Locally shut [redacted] in Fire Zone [redacted].
[redacted]	-----	Pull the solid state protection system (SSPS) fuses at the SSPS Cabinets in Fire Area [redacted] within two hours to prevent a spurious ESFAS signal.
[redacted]	-----	EMERGENT – Fire Area [redacted] is not accessible for manual actions to trip [redacted]. De-energize [redacted] at MCC [redacted], Compartment [redacted], in Fire Zone [redacted]. Then verify closed or manually close [redacted] in Fire Zone [redacted]. Train [redacted] reset is available from the main control room, and Train [redacted] containment spray should be mitigated per the emergency operating procedures (EOP) network. Trip [redacted] from the main control room.
[redacted]	-----	EMERGENT – Fire Area [redacted] is not accessible for manual actions to trip [redacted], [redacted], [redacted], or [redacted]. To de-energize the Train [redacted], an operator may need to open yard breakers and/or disconnects and locally trip the Train [redacted] emergency diesel generator. Train [redacted] reset is available from the main control room.
[redacted]	-----	Align [redacted] pumps to [redacted] pump using [redacted], [redacted] Section 8.1. 2 MOVs to be opened and a tell-tale drain valve to be shut – not necessary until 12 hours after the event.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

The licensee stated in the NFPA 805 LAR that defense-in-depth recovery actions are not credited in the fire safety analysis and/or change evaluation as a part of the risk determination for any fire area. The nuclear safety and radioactive release performance goals, objectives, and criteria of NFPA 805 are met without these actions. However, DID-RAs are retained to meet the requirements for defense-in-depth and are therefore considered part of the RI/PB FPP, which necessitates that these actions would be subject to a plant change evaluation if subsequently modified or removed.

Fire Detection and Suppression Systems Required to Meet the Nuclear Safety Performance Criteria

The licensee performed an evaluation of the fire detection and suppression systems in these fire areas. The results of the evaluation were documented in LAR Table 4-8-1, "Required Suppression Systems," and Table 4-8-2, "Required Detection Systems." The applicable portions of LAR Tables 4-8-1 and 4-8-2 have been included below.

Fire Area	Fire Zone	Zone Description	Automatic Suppression Provided?	Suppression Required System?						Detection Provided?	Detection Required System?					
				S	D	E	EC	R	C		S	D	E	EC	R	C
[redacted]	[redacted]	[redacted]	No	No	No	No	-	No	No	**Yes (I, AS)**	No	**Yes (I)**	**Yes (I)**	**ESR 99-00395**	**Yes (I, AS)**	**Yes (I, AS)**

Legend:

S	Abbreviation for Separation	Systems required for NFPA 805 Chapter 4 separation criteria
D	Abbreviation for Deviation	Systems required for NRC approved exemptions and deviations
E	Abbreviation for EEEEs	Systems required for the acceptability of existing compliance strategies using EEEEs (Left column documents if required, right column documents the engineering change (EC))
R	Abbreviation for Risk	Systems determined to be of 'higher significance' by the NFPA 805 Expert Panel
C	Abbreviation for Change Evaluation	Systems required to maintain an adequate balance of defense-in-depth for change evaluations
I	Abbreviation for Ionization Detection	
AS	Abbreviation for Air Sampling Detection	

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Conclusion for Fire Area [redacted]

The licensee utilized the fire risk evaluation performance-based approach to demonstrate the ability to meet the NFPA 805 nuclear safety performance criteria for this fire area. A fire risk evaluation in accordance with NFPA 805 Section 4.2.4.2, in conjunction with deterministic methods for simplifying assumptions, was used in applying this approach.

Based on the information provided in the LAR as supplemented:

- Five previously approved deviation from the pre-transition fire protection requirements was evaluated and found to be valid and applicable under the NFPA 805 RI/PB fire protection program.

- Six variations from the deterministic requirements were identified, evaluated through the performance of a plant change evaluation (fire risk evaluation), and found to meet the risk acceptance criteria, as well as the requirements for defense-in-depth and safety margins (see Section 3.4 of this safety evaluation for a detailed discussion of the NRC staff's review of the adequacy of the fire risk evaluation method used at HNP).

- This fire area did not require the use of recovery actions to meet the nuclear safety performance criteria.

- Fire protection SSCs were evaluated in accordance with NFPA 805 Chapter 4 to determine which, if any, were required to meet the nuclear safety performance criteria. This evaluation included:

  — On a fire zone basis, the fire detection and suppression systems required to meet the nuclear safety performance criteria were documented.

  — Fire area boundaries were defined using 3 hour rated walls, ceilings, and floors, including fire barriers, fire barrier penetrations, and through penetration fire stops.

  — The fire area was evaluated using a qualitative fire risk evaluation that demonstrated the ability to meet the acceptance criteria for risk, defense-in-depth, and safety margins.

Based on the information provided in the LAR as supplemented, the NRC staff finds that Fire Area [redacted] meets the nuclear safety goals, objectives, and performance criteria of NFPA 805.

~~OFFICIAL USE ONLY – SECURITY-RELATED INFORMATION~~

References for Attachment D

1. Regulatory Guide 1.205, “Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants,” Revision 1, U. S. Nuclear Regulatory Commission, Washington, DC, December 2009 [ADAMS Accession No. ML092730314]

2. 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, U. S. Nuclear Regulatory Commission, Washington, DC, November 2002 [ADAMS Accession No. ML023240437]

3. Letter from Robert J, Duncan, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-08-061), dated May 29, 2008, “Request For License Amendment To Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)” [Agencywide Document Access and Management System (ADAMS) Accession Nos. ML081560641 (letter), ML081840706 (public transition report), ML090500552 & ML091480650 (public attachments), and ML081560644 (non-public transition report and attachments)]

4. Letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-08-113), dated November 14, 2008, “Supplement to Request for License Amendment to Adopt NFPA 805 Performance-Based Standards for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)” [ADAMS Accession Nos. ML083240593 (letter) and ML083240594 (non-public enclosures)]

5. Letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-08-121), dated December 11, 2008, “Supplement 2 to Request for License Amendment to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)” [ADAMS Accession Nos. ML083510191 (letter) and ML083510192 (non-public enclosures)]

6. Letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-09-084), dated August 13, 2009, “Response to Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC NO. MD8807)” [ADAMS Accession No. ML092320120]

7. Letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-09-086), dated August 28, 2009, “Second Response to Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC NO. MD8807)” [ADAMS Accession No. ML092580661]

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

8. Letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-09-094), dated October 9, 2009, “Third Response to Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC NO. MD8807)” [ADAMS Accession Nos. ML092940499 (letter), ML092940500 (non-public transition report, part 1), and ML092940501 (non-public transition report, part 2)]

9. Letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-10-008), dated February 4, 2010, “Response to Second Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC NO. MD8807)” [ADAMS Accession Nos. ML100500540 (letter) and ML100500541 (enclosure)]

10. Letter from John C. Warner, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-10-040), dated April 5, 2010, “Response to Third Round of Requests for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC NO. MD8807)” [ADAMS Accession Nos. ML100990363 (letter) and ML100990364 (non-public enclosure)]

11. Letter from Christopher L. Burton, Progress Energy, to the U. S. Nuclear Regulatory Commission (Serial HNP-10-064), dated June 9, 2010, “Additional Items Related to License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC NO. MD8807)” [ADAMS Accession No. ML101670181]

12. Letter from Marlayna Vaaler, U.S. Nuclear Regulatory Commission, to Christopher L. Burton, Progress Energy, dated August 6, 2009, “Shearon Harris Nuclear Power Plant, Unit 1 - Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC No. MD8807)” [ADAMS Accession No. ML092170715]

13. Letter from Marlayna Vaaler, U.S. Nuclear Regulatory Commission, to Christopher L. Burton, Progress Energy, dated January 14, 2010, “Shearon Harris Nuclear Power Plant, Unit 1 - Second Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC No. MD8807)” [ADAMS Accession No. ML100130254]

14. Letter from Marlayna Vaaler, U.S. Nuclear Regulatory Commission, to Christopher L. Burton, Progress Energy, dated March 9, 2010, “Shearon Harris Nuclear Power Plant, Unit 1 - Discussion of Clarification Questions Related to the License Amendment Request to Adopt National Fire Protection Association Standard 805, ‘Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants’ (TAC No. MD8807)” [ADAMS Accession No. ML100600987]

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Attachment E: Radioactive Release Table

In order to assess whether the HNP fire protection program to be implemented under NFPA 805 meets the radioactive release performance criteria, the licensee established an expert panel to review the existing HNP fire pre-plans and fire brigade training materials. Fire pre-plans that address fire areas where there is no possibility of radioactive materials being present were screened from further review. All other fire pre-plans were reviewed to ascertain whether existing engineering controls are adequate to ensure that radioactive materials (contamination) generated as a direct result of fire suppression activities are contained and monitored before release to unrestricted areas, such that the release would meet the NFPA 805 radioactive release performance criteria.

The licensee's review determined that existing engineering controls, such as curbs and forced air ventilation, were adequate to meet the NFPA 805 radioactive release requirements. In addition, the licensee updated each of the fire pre-plans addressing fire areas where radioactive materials may be present to include provisions for containment and monitoring of smoke and fire suppression agent runoff should the effectiveness of the installed engineering controls be challenged or impacted by fire suppression activities.

This attachment contains Table 3.6-1, "HNP Fire Areas and Their Compliance with the NFPA 805 Radioactive Release Performance Criteria," which summarizes, for each fire pre-plan, (1) the fire areas included in the pre-plan, (2) the engineered controls used to minimize radioactive releases generated from the combustion of radioactive materials or from fire suppression activities, and (3) the NRC staff evaluation of the adequacy of these engineered controls.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.6-1: HNP Fire Areas and Their Compliance with the NFPA 805 Radioactive Release Performance Criteria

Fire Pre-Plan	Fire Area(s)	Screened Out	Engineered Controls		NRC Staff Evaluation
			Suppression Water	Combustion Products	
FPP-012-01-CNMT	1-C	No	During Plant Operation: Floor drains which route to monitored floor drain tanks. No release paths from containment. During NPO: Floor drains which route to monitored floor drain tanks.	During Plant Operation: Sealed containment building in accordance with technical specifications such that there are no release paths from containment. During NPO: The licensee used a combination of engineered controls and administrative controls to provide reasonable assurance that the radioactive release performance criteria are being met. A more detailed discussion of the licensee's approach to addressing radioactive release with regard to the containment building equipment hatch is provided in SE Section 3.6.	As long as fuel is in containment, including during NPO, it is protected by the systems required to meet the nuclear safety performance criteria. During NPO, for a fire in an open containment not involving fuel, release of radioactive material outside of the containment from contaminated smoke migration is expected to be insignificant because (1) the volume of the containment building is sufficiently large to contain the smoke generated from any credible fire, (2) significant ignition sources such as the reactor coolant pumps and their associated oil supply are not operated when the core has been offloaded and the equipment hatch is open, and (3) heightened personnel monitoring of containment reduces the potential for a fire that will result in radiological consequences. Based on its evaluation, the NRC staff finds the licensee's approach acceptable to meet the radioactive release performance criteria.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.6-1: HNP Fire Areas and Their Compliance with the NFPA 805 Radioactive Release Performance Criteria

Fire Pre-Plan	Fire Area(s)	Screened Out	Engineered Controls		NRC Staff Evaluation
			Suppression Water	Combustion Products	
FPP-012-02-RAB190-216	1-A-190N 1-A-190S 1-A-216-MP 1-A-216-SWT 1-A-BAL-A 5-W-BAL	No	Floor drains which route to monitored floor drain tanks.	Normal ventilation and emergency exhaust are monitored and filtered.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.
FPP-012-06-WPB	5-W-BAL	No	Floor drains which route to monitored floor drain tanks.	Normal ventilation is monitored and filtered. Note: no emergency exhaust.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.
FPP-012-02-RAB 261	12-A-BAL 1-A-BAL-B 1-A-BAL-D 1-A-34-RHXA 1-A-34-RHXB 1-A-BAL-A 1-A-BAL-E 1-A-BAL-K 1-A-EPA 1-A-EPB	No	Floor drains which route to monitored floor drain tanks.	Normal ventilation and emergency exhaust are monitored and filtered.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.6-1: HNP Fire Areas and Their Compliance with the NFPA 805 Radioactive Release Performance Criteria

Fire Pre-Plan	Fire Area(s)	Screened Out	Engineered Controls		NRC Staff Evaluation
			Suppression Water	Combustion Products	
FPP-012-02-RAB 286	12-A-BAL 1-A-BAL-B 1-A-BAL-D 1-A-5-BATN 1-A-ACP 1-A-BAL-C 1-A-BAL-J 1-A-BATA 1-A-BATB 1-A-CSRA 1-A-CSRB 1-A-SWGRA 1-A-SWGRB	No	Floor drains which route to monitored floor drain tanks.	Normal ventilation and emergency exhaust are monitored and filtered.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.
FPP-012-02-RAB 305-324	12-A-CR 12-A-CRC1 12-A-HVIR 1-A-BAL-D 1-A-324-1	No	Floor drains which route to monitored floor drain tanks.	Normal ventilation and emergency exhaust are monitored and filtered.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.
FPP-012-05-DFOSB	12-O-TA 12-O-TB	Yes	N/A	N/A	These fire areas have no radiological hazards.
FPP-012-08-SEC	12-I-ESWPA 12-I-ESWPB 5-S-BAL CT-YARD SI-YARD SW-YARD TR-YARD	Yes	N/A	N/A	These fire areas have no radiological hazards.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.6-1: HNP Fire Areas and Their Compliance with the NFPA 805 Radioactive Release Performance Criteria

Fire Pre-Plan	Fire Area(s)	Screened Out	Engineered Controls		NRC Staff Evaluation
			Suppression Water	Combustion Products	
FPP-012-02-RAB 236	1-A-BAL-A 1-A-BAL-D 1-A-BAL-F 1-A-BAL-G 1-A-BAL-H	No	Floor drains which route to monitored floor drain tanks.	Normal ventilation and emergency exhaust are monitored and filtered.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.
FPP-012-07-TB	1-G	No	The only radioactive material in the turbine building is associated with the condensate polishing equipment. Floor drains from the condensate polishing area (elevation 240 feet) are routed to monitored tanks in the waste processing building.	The condensate polishing area is physically isolated from the outside, with ventilation routed to the turbine building vent stack for monitoring prior to release. Potential sources of radioactivity are generally contained within steel vessels and piping which are not expected to be breached as a result of firefighting activities.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, as well as the limited radioactive material available for release, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.
FPP-012-05-DFOS	1-O-PA 1-O-PB 5-O-BAL	Yes	N/A	N/A	These fire areas have no radiological hazards.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

Table 3.6-1: HNP Fire Areas and Their Compliance with the NFPA 805 Radioactive Release Performance Criteria

Fire Pre-Plan	Fire Area(s)	Screened Out	Engineered Controls		NRC Staff Evaluation
			Suppression Water	Combustion Products	
FPP-012-04-DGB	1-D-DGA 1-D-DGB 1-D-DTA 1-D-DTB 5-D-BAL	Yes	N/A	N/A	These fire areas have no radiological hazards.
FPP-012-03-FHB	5-F-BAL 5-F-CHF 5-F-FPP	No	Floor drains which route to monitored floor drain tanks.	Normal ventilation for the fuel handling building (FHB) is unfiltered but monitored. If necessary, the FHB ventilation can be aligned to the FHB emergency exhaust, which is both filtered and monitored.	Based on the availability of engineered controls for both smoke and fire suppression agent runoff, the NRC staff concludes that the licensee's approach is acceptable to meet the NFPA 805 radioactive release performance criteria.

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~