Progress Energy

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AUG 28 2009

Serial: HNP-09-086
10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555-0001

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
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)

References:

1. Letter from R. J. Duncan to the Nuclear Regulatory Commission (Serial: HNP-08-061), "Request for License Amendment to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)," dated May 29, 2008

2. Letter from C. L. Burton to the Nuclear Regulatory Commission (Serial: HNP-08-113), "Supplement to Request for License Amendment to Adopt NFPA 805 Performance-Based Standards for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)," dated November 14, 2008

3. Letter from K. A. Harshaw to the Nuclear Regulatory Commission (Serial: HNP-08-121), "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)," dated December 11, 2008

4. Letter from M. Vaaler, Nuclear Regulatory Commission, to C. L. Burton, "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)," dated August 6, 2009

5. Letter from C. L. Burton to the Nuclear Regulatory Commission (Serial: HNP-09-084), "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)," dated August 13, 2009

Ladies and Gentlemen:

On August 6, 2009, the Harris Nuclear Plant (HNP) received a request from the NRC (Reference 4) for additional information needed to facilitate the review of the License

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Amendment Request to Adopt National Fire Protection Association Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants." HNP submitted this original request as Serial: HNP-08-061 (Reference 1) and supplemented via Serial: HNP-08-113 (Reference 2) and Serial: HNP-08-121 (Reference 3).

HNP's initial response to a portion of these questions was submitted August 14, 2009 (Reference 5). Enclosed with this current letter are HNP's second set of responses to the questions. Please note that HNP's response to RAI 1-5 contained in this submittal replaces the RAI 1-5 response submitted August 14, 2009 (Reference 5). HNP will provide responses to the remaining questions in September 2009.

In accordance with 10 CFR 50.91(b), HNP is providing the state of North Carolina with a copy of this response.

This document contains no new or revised regulatory commitments.

Please refer any questions regarding this submittal to Mr. Dave Corlett, Supervisor – Licensing/Regulatory Programs, at (919) 362-3137.

I declare under penalty of perjury that the foregoing is true and correct. Executed on
AUG 28 2009

Sincerely,

Christopher L. Burton

Christopher L. Burton
Vice President
Harris Nuclear Plant

CLB/kms

Enclosure

Cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP
Ms. B. O. Hall, N. C. DENR Section Chief
Mr. L. A. Reyes, NRC Regional Administrator, Region II
Ms. M. G. Vaaler, NRC Project Manager, HNP

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The U.S. Nuclear Regulatory Commission (NRC) staff has determined that it needs responses to requests for information in the following areas in order to continue its review of the subject request for the Shearon Harris Nuclear Power Plant, Unit 1 (HNP or Harris):

1. Programmatic Elements Related to the License Amendment Request (LAR)
2. Fundamental Fire Protection Program and Minimum Design Requirements
3. Meeting the Nuclear Safety Performance Criteria
4. Meeting the Radioactive Release Performance Criteria
5. Risk Assessments and Plant Change Evaluations
6. The NFPA 805 Monitoring Program
7. Program Documentation, Configuration Control and Quality Assurance

1. Please provide the following information relative to LAR programmatic elements:

HNP RAI 1-5

Attachment S, "Plant Modifications," of the Harris Transition Report includes the proposed installation of Incipient Fire Detection Systems to monitor incipient fire conditions in certain critical electrical cabinets in several fire areas as a way to reduce fire risk. FAQ 08-0046, "Incipient Fire Detection Systems," was created to address the use of these systems.

The NRC staff has developed an interim position on this FAQ that provides guidance with respect to how Incipient Fire Detection Systems (also called Very Early Warning Fire Detection Systems (VEWFDS)) may be credited in a Fire Probabilistic Risk Assessment (Fire PRA). In accordance with the NRC staff's interim position, there are numerous conditions that must be met for the staff to accept the full numerical credit provided for the installation of VEWFDS.

Regarding the proposed Incipient Fire Detection Systems to be installed at HNP:

a. *When modeling VEWFDS to monitor electrical/electronic cabinets, components that may rapidly degrade, such as electrical/electronic circuit boards that contain electrolytic capacitors, chart recorder drive motors, cooling fan motors, mechanical timers driven by electric motors, etc., should be excluded. Provide a description of the screening process used to inspect cabinets being monitored by the proposed VEWFDS to confirm that components that may degrade rapidly are properly addressed in the model.*

Response: The VEWFDS will be installed in select low voltage (< 120 VAC/125VDC) instrumentation and control cabinets. Most low voltage (~250 volts or less) electric and electronic components will degrade over a long period of time, with observable telltales that can be sensed by VEWFDS. Examples of these include terminal strips, cables, inter-panel wiring, electro-mechanical relays, transformers, switches, power supplies, amplifiers, bistables, controllers, manual automatic control stations, indicators, gauges, computers (NRC Draft Interim Position FAQ 08-0046). Each cabinet was opened and visually inspected to verify that a VEWFDS was applicable to the potential ignition sources and subsequent treatment in the Fire PRA. Because there is a possibility that a

fraction of the electrical cabinet components may exhibit a short incipient stage prior to flaming combustion, the Fire PRA uses a split fraction approach to account for these components. A sensitivity analysis with additional detail pertaining to the Fire PRA treatment of the VEWFDS will be included as part of the response to HNP RAI 5-33.

b. *Based on discussions with the licensee, the proposed VEWFDS at HNP is an aspirated system. For an aspirating system to function properly while monitoring the interior of an electrical/electronic control cabinet, the ventilation characteristics of the cabinet to be monitored must allow for the use of an aspirated VEWFDS (aspirated systems will not function properly in a tightly sealed cabinet). Provide a description of the cabinets to be monitored by the proposed VEWFDS and verify that no cabinets are tightly* sealed.

Response: Each cabinet was opened and visually inspected to ensure that there is adequate ventilation to allow for an aspirated VEWFDS system to function properly. None of the electrical cabinets that will have the system installed are air tight and all of them have ventilation to allow for dissipation of heat from normal operation. There will be proper functionality of the aspirated VEWFDS in the proposed cabinets.

c. *FAQ 08-0046 references Electric Power Research Institute (EPRI) document 1016735, "Fire PRA Methods Enhancements: Additions, Clarifications, and Refinements to EPRI 1011989," which includes a discussion on system availability and reliability of VEWFDS. EPRI 1016735 primarily has information on cloud chamber and laser aspirating detection systems. Provide a statement that the system being proposed for HNP is sufficiently similar to those described in EPRI 1016735 that the availability and reliability numbers provided in that document are also applicable for use at Harris.*

Response: The VEWFDS that is being designed for use at HNP was chosen in part because it has the longest operating history as identified in EPRI 1016735. The system is from the same OEM as the referenced cloud chamber technology systems in the EPRI report and the OEM provided system reliability is consistent with EPRI 1016735.

d. *Provide the following information related to the design, installation, and testing of the proposed VEWFDS at HNP:*

1) *What is the NFPA code of record (NFPA 76, "Standard for the Fire Protection of Telecommunications Facilities," NFPA 72, "National Fire Alarm Code," or other)?*

Response: The code of record being used in the development of Engineering Change, EC- 69501, is NFPA 72. The appropriate sections of NFPA 76 are being used for guidance to ensure that the VEWFDS meets the performance goals for proper credit in the Fire PRA.

2) *What training and qualification requirements will the installation technicians have to meet? Will the installation be performed by vendor certified technicians?*

Response: Training and qualification of installation technicians associated with the installation of VEWFDS at HNP will be in accordance with applicable HNP procedures for the conduct of maintenance and construction activities. Training requirements will be finalized and documented during the Engineering Change Process. Vendor support when provided will be in accordance with applicable NGG material and contract service procedures in place, and under the direction of the licensee. Final installation and commissioning of the system will be performed by site personnel with assistance and support of the vendor.

3) *What installation testing will be performed and to what standard?*

Response: Installation and testing will be in conformance with HNP's EC process and will be performed to both NFPA 72 and the OEM requirements.

4) *With regard to system sensitivity, how will the initial system Alert and Alarm settings be established? What steps will be taken to avoid spurious/nuisance alarms? After commissioning the VEWFDS, how will system Alert and Alarm setpoint changes be controlled?*

Response: Initial system Alert and Alarm setting will be determined for each detection zone as part of the installation/pre-operational testing based on ambient conditions present. Guidance from applicable NFPA and OEM associated with settings for alert and alarm obscuration levels will be utilized, and will be specified in EC-69501 for installation. Following installation, these Alert and Alarm settings will be maintained under the established plant configuration control process.

5) *What regular and preventive maintenance will be required for the VEWFDS?*

Response: Regular and preventative maintenance will be in accordance with OEM, NFPA 72, and HNP's preventative maintenance program. The VEWFDS design includes a continuously monitored Trouble annunciator, on the MCB, consisting of a circuit supervisory signal for faults in the detector(s), or a failure of one of the system modules. Any detector or system fault condition would be annunciated, investigated immediately, and appropriate compensatory measures implemented until the fault condition is corrected. In addition to the continuously monitored supervisory Trouble indication, the VEWFDS will receive quarterly surveillance testing and annual maintenance as recommended by the OEM.

6) *How often does the proposed VEWFDS require calibration?*

Response: The VEWFDS will be installed and calibrated according to OEM requirements. Regular NFPA 72 testing, OEM recommended maintenance and HNP preventative maintenance will ensure that the system is maintained and calibrated to respond to fire events appropriately. The manufacturer

recommended maintenance and calibration will be incorporated into the PM program during the Engineering Change process.

7) *Provide a description of the operator interface with the VEWFDS. How will Alerts and Alarms be annunciated, where will they be annunciated, and who will respond to the Alerts and Alarms?*

Response: The VEWFDS Fire Alarm Control Panel (FACP) will be connected to an Annunciator Window Box on the Main Control Panel in the Main Control Room to annunciate "trouble", "alert", and "alarm" conditions on individual windows. Control Room Operators will respond to these indications in accordance with plant operating procedures.

8) *Describe the configuration controls to be placed on the maintenance, preventive maintenance, and testing procedures for the proposed VEWFDS.*

Response: PM/testing of the VEWFDS will become part of the plant surveillance program, and subject to all requirements of the program. Any changes to the established PM/testing requirements must be processed through the HNP Configuration and Design Control process which includes Fire Protection engineer review.

e. *Provide a detailed description of the VEWFDS response procedure. What qualifications will be required for the initial responders?*

Response: Response to VEWFDS Alert and Alarm indications will be initiated by plant operators based upon annunciation in the Main Control Room (reference above response to RAI 1-5 d.7 above). Qualified on-shift Operations and/or Maintenance will respond to investigate Alert and Alarm indications without delay and will provide continuous attendance of the affected area until the condition is resolved. Responding personnel will have basic training in the use of a fire extinguisher and the expectation will be that if a developing fire is discovered, there will be an immediate action to suppress/control the fire. Additional indication of a fire will initiate response by the site fire brigade.

f. *Describe the process used to establish the human error probability (HEP) of a successful operator response to a VEWFDS Alert.*

Response: The probability of this event is a function of the plant procedures and training. The expectations for VEWFDS alarm response are consistent with other fire detection systems credited in NUREG/CR-6850 with a potentially negligible probability of failure to respond. A probability of 1E-03 is being applied to the event tree analysis as a screening value. A sensitivity analysis of the VEWFDS treatment in the Fire PRA is being conducted and will be included in a separate RAI response submittal.

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g. *Provide a description of the process that will be used to assure that VEWFDS Alerts and Alarms are responded to properly. Will the VEWFDS be included in the fire brigade training and drill process?*

Response: VEWFDS Alert and Alarm response will follow guidance provided in an Annunciator Panel Procedure (APP) developed as part of EC-69501, Design and Installation of Incipient Detection for NFPA 805. Review for inclusion of response actions into the applicable training program(s) is part of the EC process, which will include fire brigade training and drills as appropriate.

h. *Upon locating the associated cabinet during a VEWFDS Alert, describe the process that will be used to locate the degrading component/sub-component and mitigate the potential fire.*

Response: The VEWFDS will indicate an addressable alert signal that will identify a specific zone (bank of cabinets) that has a degrading component. The responding personnel will immediately utilize a portable VEWFDS locating device to isolate the search to one cabinet (in a zone) and a specific area within that source cabinet. The source cabinet will be continually monitored while the alert condition is investigated. In addition to the portable locating device, thermal imaging cameras may be used to assist the location of a hot spot and identify the cause of the alarm. The cabinet will be continuously attended until the degrading component is repaired, the cabinet is de-energized, or the Alarm is satisfactorily reset.

i. *Describe the tools and equipment required to locate the source of a VEWFDS Alert. Describe any controls that will be placed on the required tools and equipment.*

Response: Response by on-shift personnel during investigation of VEWFDS Alert or Alarm indications may include utilization of Incipient Fire Detection Pro-Locator (OEM name) Portable Detection Device to locate specific cabinet and internal component providing pre-ignition indication and/or use of thermal imaging equipment as necessary. The Pro-Locator device will be provided for use by on-shift personnel as part of the EC-69501 modification. Regular scheduled surveillance and PM will ensure that Pro-Locator equipment is available and functional at all times. Thermal Imaging Camera (TIC) equipment is maintained and available for use as a part of the existing plant fire brigade equipment and tools compliment.

j. *Describe the process that will be used to control the VEWFDS set point(s).*

Response: Any change to the VEWFDS setpoint(s) will be processed through the HNP Configuration and Design Control process, requiring an engineering review before alteration of a setpoint.

k. *On what periodicity will the system effectiveness be assessed with respect to the values assumed in the Fire PRA?*

Response: The VEWFDS performance will be assessed during the regular schedule surveillance and maintenance activities in accordance with the OEM recommended schedule and NFPA 72 required recurring testing.

l. *Describe how the plant monitoring program will maintain the VEWFDS within the Fire PRA-assumed values.*

Response: A monitoring program will be established to assess the performance of the fire protection program in meeting the performance criteria established in NFPA 805. The VEWFDS has been assigned an individual performance maintenance group (PMG) in the monitoring program to ensure that the VEWFDS will maintain a level of performance consistent with what is assumed in the Fire PRA. Establishment of the PMG criteria will be completed as part of program implementation (see LAR section 4.6 for NFPA 805 Monitoring).

m. *Describe the compensatory measures required to be established if the VEWFDS is out of service. How will these compensatory measures be controlled?*

Response: A fire watch will be maintained at the affected cabinets during the out of service time for any VEWFDS fire detection zone. Compensatory measures will be specified and controlled in plant procedures.

2. Please provide the following information regarding the fundamental fire protection program and the minimum design requirements:

HNP RAI 2-2

NFPA 805, Section 4.1, "Determination of Fire Protection Systems and Features – Methodology," states:

> *Once a determination has been made that a fire protection system or feature is required to achieve the performance criteria of Section 1.5, ["Performance Criteria,"] its design and qualification shall meet the applicable requirement of Chapter 3, ["Fundamental Fire Protection Program and Design Elements."]*

Section 4.8.1, "Results of the Fire Area-by-Fire Area Review," of the Harris Transition Report includes requirements to answer the questions "Suppression Required? (Yes/No)" and "Detection Required? (Yes/No)" for each fire area, the results of which are captured in Table 4-5, "Fire Area Compliance Summary."

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a. *When either the "Suppression Required? (Yes/No)" or "Detection Required? (Yes/No)" question is answered "Yes," what requirements apply with respect to the design and qualification of the system(s) in that fire area?*

Response: If a suppression or detection system is determined to be required by the deterministic or performance-based approach of NFPA 805 Chapter 4, it is also required to meet the requirements in NFPA 805 Chapter 3. Therefore, for the example of a sprinkler system, the requirements in NFPA 805 Section 3.9 would apply. The system would need to meet the applicable edition of NFPA 13, as well as the other applicable sections of 3.9. In the same manner, a detection system required for compliance with Chapter 4 would need to meet the requirements of NFPA 805 Section 3.8 in addition to the applicable edition of NFPA 72 (NFPA 72, 72D, 72E, etc).

b. *What quality requirements apply to a system that has been designated as requiring suppression and/or detection in Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," of the Harris Transition Report?*

Response: For existing systems that are currently in the scope of the FP-QA program, the system was installed in accordance with the QA requirements as delineated in the response to RAI 7-3. If there are any systems that are required that were not within the scope of the Quality Assurance Program at the time of transition, any future modifications will be considered within the scope of the program. The quality of the existing systems will be ensured to provide evidence the system will be able to meet its intended function.

c. *Section 4.8.1 of the Harris Transition Report includes a bullet under "Suppression Required? (Yes/No)" that states that systems required to meet NFPA 805 Chapter 4, "Determination of Fire Protection Systems and Features," performance-based compliance, including systems credited for defense-in-depth, are summarized in plant change evaluations. This statement implies that systems credited for defense-in-depth in plant change evaluations should be considered as required by NFPA 805 Chapter 4. If a system is required by NFPA 805 Chapter 4, its design and qualification would need to meet the applicable requirement(s) of NFPA 805 Chapter 3. Is this implication correct? If so, what design, qualification, and quality controls apply to fire detection and suppression systems that are credited for defense-in-depth in plant change evaluations?*

Response: Fire protection systems or features are required for NFPA 805 Chapter 4 compliance to achieve the performance criteria of Section 1.5 if the:

- Fire Protection Systems and Features are required to meet NFPA 805 Section 4.2.3, Deterministic Approach, or
- Fire Protection Systems and Features are required to meet NFPA 805 Section 4.2.4, Performance-Based Approach

A "Yes" in the "Suppression/Detection Required" fields in the B-3 tables and in Table 4-5 of the LAR indicates systems required to meet the deterministic approach of Section 4.2.3 of NFPA 805 or those systems credited with maintenance of HEMYC wrap.

Deterministic Approach

If a suppression or detection system is required to achieve the nuclear safety performance criteria of Section 1.5.1 of NFPA 805 using the deterministic approach, its design and qualification shall meet the appropriate sections of NFPA 805 Chapter 3.

1. Suppression and Detection System Required for Deterministic Compliance NFPA 805 Chapter 4 Section 4.2.3 Deterministic Approaches Requiring Suppression and Detection
   - Suppression and detection associated with 20 feet of horizontal separation with no intervening combustibles (Section 4.2.3.3(b)).
   - Suppression and detection associated with 1-hour rated ERFBS (Section 4.2.3.3(c)).
   - Suppression and detection installed in non-inerted containments. (Section 4.2.3.4(c)).

2. Required by Existing Exemption/Deviation
   In accordance with Figure 2.2 of NFPA 805, compliance with the existing licensing basis including approved exemption and deviation requests are considered compliance with the deterministic approach. Fire Protection systems and features that form the bases for acceptability of these existing compliance strategies are required to meet the nuclear safety performance criteria.

3. Required by Existing Engineering Equivalency Evaluation (EEEE)
   As allowed by Section 2.2.7 of NFPA 805, "...the user shall be permitted to demonstrate compliance with specific deterministic fire protection design requirements in Chapter 4 for existing configurations with an engineering equivalency evaluation." Fire Protection systems and features that form the bases for acceptability of these existing compliance strategies are required to meet the nuclear safety performance criteria.

Performance-Based Approach

If a suppression/detection system is required to achieve the nuclear safety performance criteria of Section 1.5.1 of NFPA 805 using the performance-based approach, its design and qualification shall meet the appropriate sections of NFPA 805 Chapter 3.

In accordance with NFPA Section 4.2.4.2, the "...use of fire risk evaluation for the performance-based approach shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins." If the fire protection system or feature is required to demonstrate the acceptability of risk or defense-in-depth, then it is required by Chapter 4. The following method is used to determine if a fire protection feature or system is required for the acceptability of risk or defense-in-depth.

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1. Acceptability of Risk

   A fire protection feature may be required for the 'acceptability of risk' in one of two ways.
   a. It is explicitly credited to reduce risk in the NFPA 805 transition change evaluation, or
   b. It is 'of higher significance' to the overall fire risk for the plant. Examples could include:
      - If the calculated risk (CDF/LERF) of system(s) in an area are above the established threshold.
      - If the system is determined to have a risk achievement worth (RAW) above the established threshold.

      This is determined during the expert panel review conducted as part of the plant monitoring scoping activities.

2. Defense-in-Depth

   In accordance with NFPA 805 Section 2.4.4, Plant Change Evaluation, "...The evaluation process shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins." NFPA 805 Section 4.2.4.2 refers to the acceptance criteria in this section. Therefore fire protection systems and features required to demonstrate an adequate balance of defense-in-depth are required by NFPA 805 Chapter 4. A new section of the LAR provides criteria for when a system or feature is required to achieve an adequate balance of defense-in-depth.

   Section 4.2.2 of NFPA 805 states that, "The performance-based approach shall be permitted to utilize deterministic methods for simplifying assumptions within the fire area." For fire areas that utilize performance-based approaches, but use deterministic methods for simplifying assumptions, the criteria specified for the "Deterministic Approach" was utilized to determine whether the fire protection system or feature was required.

<u>Summary</u>
If a fire protection system or feature is required to meet one of the following it is then required to meet the nuclear safety performance criteria and its design and qualification shall meet the appropriate sections of NFPA 805 Chapter 3:

- Fire Protection Systems and Features required to meet NFPA 805 Section 4.2.3, Deterministic Approach, or
- Fire Protection Systems and Features required to meet NFPA 805 Section 4.2.4, Performance-Based Approach

For those systems which meet one of the above criteria, design, qualification and quality controls would be as described in the responses to RAI 2-2a and 2-2b above. Systems/Features that do not meet one of the above criteria would not be considered a "required" system.

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Table 1 shows the approach to address the term "Required" system per the NFPA 805 requirements:

Category	**Required for Deterministic Compliance (NFPA 805 § 4.2.3)**			**Performance Based* Compliance (NFPA 805 § 4.2.4)**		**Loss Prevention**
Description	Required for Chapter 4 Separation Criteria	Required for NRC Approved Exemption / Deviation	Required for acceptability of existing compliance strategies in EEE	Determined to be of 'higher significance' by NFPA 805 Expert Panel	Required to maintain an adequate balance of Defense-in-Depth in Change Evaluation	Not Required to meet Deterministic or Performance Based Approach of NFPA 805
Required System	Yes	Yes	Yes	Yes	Yes	No

* The "Deterministic" criteria is used for systems/features in fire areas utilizing performance-based approaches with simplifying assumptions based on deterministic methods per Section 4.2.2 of NFPA 805.

HNP RAI 2-4

Some NFPA 805 Chapter 3 elements are complicated or have multiple/varied applications throughout the plant (e.g., Section 3.11.4, "Through Penetration Fire Stops," or Section 3.11.5, "Electrical Raceway Fire Barrier Systems"). This results in some elements requiring more than one compliance strategy entry to fully capture the licensee's compliance basis.

HNP's B-1 Table currently contains only one compliance statement for each NFPA 805 Chapter 3 element or sub-element. Where the licensee relies on more than one compliance strategy for a particular element or sub-element, the B-1 Table must fully capture all of the methods of compliance. Please ensure that where necessary, all of HNP's compliance strategies are captured in the B-1 Table.

In addition, the description of the B-1 Table methodology in Section 4.1, "Fundamental Fire Protection Program Elements and Minimum Design Requirements," of the Harris Transition Report should be updated to reflect any changes required by multiple compliance strategies. Also, please ensure that all aspects of each particular NFPA 805 Chapter 3 element or sub-element are addressed by the appropriate compliance statements.

Response: All compliance strategies are captured for chapter 3 sections. Those that are complicated or have multiple/varied applications have been addressed individually in Table B-1.

Section 4.1 of the LAR will also be revised to reflect the method for chapter 3 sections where multiple compliance statements are applicable. A revised version of LAR section 4.1 and Table B-1 will be submitted along with other LAR sections as described in the RAI response.

HNP RAI 2-5

Evaluations of HNP's compliance with several NFPA standards are referenced in a number of B-1 Table elements. A detailed summary of the results of each of these compliance evaluations should be provided in the LAR and appropriately referenced in the B-1 Table. These summaries may be compiled in a separate Attachment to the submittal, at the licensee's discretion.

At a minimum, each summary should include:

1. *A description of all evaluated conditions determined to be acceptable based on an engineering, compliance, or other type of evaluation, including:*

    - *A summary of each condition*
    - *A summary of the evaluation of each condition*
    - *A summary of the resolution of each condition*

2. *A description of all apparent code deviations, including:*

    - *A summary of each deviation*
    - *A summary of the evaluation of each deviation*
    - *A summary of the resolution of each deviation*

If the licensee wishes to treat these compliance evaluations in a similar fashion to EEEEs, the information submitted concerning the evaluations should be in alignment with HNP RAI 1-6.

Unless specifically limited by the NFPA 805 Chapter 3 element, compliance evaluations should be completed, at a minimum, for all power block areas. (Note that certain standards, such as NFPA 600, apply plant-wide by nature, and cannot be so limited.)

A partial list of the NFPA standards referenced in the LAR is:

- *NFPA 10* *Standard for Portable Fire Extinguishers*
- *NFPA 13* *Standard for the Installation of Sprinkler Systems*
- *NFPA 14* *Standard for the Installation of Standpipe and Hose Systems*
- *NFPA 20* *Standard for the Installation of Stationary Pumps for Fire Protection*
- *NFPA 24* *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*
- *NFPA 30* *Flammable and Combustible Liquids Code*
- *NFPA 37* *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*

- *NFPA 51B* *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*
- *NFPA 55* *Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders and Tanks*
- *NFPA 600* *Standard on Industrial Fire Brigades*
- *NFPA 72D&E* *National Fire Alarm Code & Standard on Automatic Fire Detectors*
- *NFPA 80* *Standard for Fire Doors and Other Opening Protectives*
- *NFPA 90A* *Standard for the Installation of Air-Conditioning and Ventilating Systems*

Response: FAQ 06-0008, NFPA Fire Protection Engineering Evaluation, Revision 9, as endorsed by the NRC in the closure memo dated March 12, 2009 (ML073380976), provides guidance on treatment of engineering evaluations. FAQ 06-0008 concludes that functional equivalency evaluations for all section of NFPA 805 Chapter 3 and "adequate for the hazard" analyses for sections 3.8, 3.9, 3.10, and 3.11 of NFPA 805 are allowed and do not require NRC approval following transition to NFPA 805. Since NRC approval is not required for these types of evaluations following transition, it is proposed that these evaluations do not need to be summarized/included in the LAR. NFPA code compliance evaluations referenced by calculation number and the calculations (code compliance evaluations) will be available for NRC review.

HNP RAI 2-7

In a number of B-1 Table entries in the Harris Transition Report, the licensee appears to be requesting to use performance based methods as a means of achieving compliance. If this is the case, specific NRC approval under 10 CFR 50.48(c)(2)(vii) or (c)(4) is required to be requested. However, specific approval would require a greater degree of detail and technical justification than is currently provided in the LAR. Under either scenario, the affected B-1 Table entries are not correctly stating compliance, and need to be addressed.

The NRC staff has identified the following B-1 Table entries where this appears to be the case:

- *3.3.1.2.(2), "Control of Combustible Materials," regarding the type(s) of fire-retardant plastic sheeting materials to be used in the power block*

- *3.3.1.2.(3), "Control of Combustible Materials," regarding the removal of waste, debris, scrap, packing materials, or other combustibles*

- *3.4.4, "Fire-Fighting Equipment"*

- *3.7, "Fire Extinguishers"*

The licensee should review the B-1 Table to identify any other instances of this condition and re-characterize the compliance statements for all affected entries. If specific NRC approval

under 10 CFR 50.48(c)(2)(vii) or (c)(4) is requested, the licensee should provide additional detail and technical justification for each request.

Response: All references to requesting performance-based methods have been removed from the compliance bases field and the correct compliance statement and compliance bases have been entered. The B-1 Table has been reviewed to identify all other instances where this may be the case and corrected as necessary. A revised version Table B-1 will be submitted along with other LAR sections as described in the RAI response.

HNP RAI 2-8

In accordance with NEI 04-02, Appendix B.1, "Transition of Fundamental Fire Protection Program and Design Elements," and as described in Section 4.1.1, "Overview of Evaluation Process," of the Harris Transition Report, for NFPA 805 Chapter 3 elements with a "Complies via Previous Approval" compliance strategy, the following details should be provided:

- *Appropriate excerpts from licensee or industry submittals regarding the issue for which previous approval is being claimed*
- *Appropriate excerpts from the NRC documents that provide formal approval of the fire protection system/feature for which compliance via previous approval is being claimed*

Appropriate references for both the submittal and approval documents are also required.

During its review of the Harris Transition Report, the NRC staff identified a number of B-1 Table entries where the above requirements were not met. The following matrix details the inadequacies that were identified during the staff review. The licensee should correct these discrepancies and ensure that there are no others contained in the B-1 Table.

Chapter 3 Element	*Identified Issue*
3.3.3 Interior Finishes	*Provide a correct submittal document reference.* *Provide a complete submittal document excerpt.* *Order the excerpts so that the submittal excerpt is followed by the approving document excerpt.*

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Chapter 3 Element	*Identified Issue*
3.3.4 Insulation Materials	*Provide a correct submittal document reference.* *Provide a correct reference for the approving NRC document.* *Provide submittal and approval document excerpts for each deviating detail.* *Correctly indicate which sections are quoted text.* *Order the excerpts so that the submittal excerpt is followed by the approving document excerpt.*
3.3.7 Bulk Flammable Gas Storage	*Provide a correct submittal document reference.* *Provide an unedited excerpt (or indicate changes) from the approving NRC document.* *Provide submittal and approval document excerpts for each deviating detail.* *Order the excerpts so that the submittal excerpt is followed by the approving document excerpt.*
3.3.7.1 Bulk Flammable Gas Location Requirements	*Provide submittal and approval document references.* *Reorder the excerpts so that the submittal excerpt is followed by the approving document excerpt.*
3.3.12 Reactor Coolant Pumps	*Reorder the excerpts so that the submittal excerpt is followed by the approving document excerpt.* *Provide a reference for ESR 97-00297.*
3.5.1 Water Supply Flow Code Requirements	*Provide an unedited excerpt (or indicate changes) from the approving NRC document.* *Provide a proper reference for the NRC Safety Evaluation (SE).* *Provide an excerpt from the submittal document.*

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Chapter 3 Element	*Identified Issue*
3.5.5 Water Supply Pump Separation Requirements	*Provide a submittal document reference.* *Provide a proper reference for the NRC SE.*
3.5.11 Water Supply Yard Main Maintenance Issues	*Provide a reference for the submittal document.* *Provide a correct reference for the approving NRC document.* *Provide an excerpt from the approving document for each deviating detail.* *Reorder the excerpts so that the submittal excerpt is followed by the approving document excerpt.*
3.5.14 Water Supply Control Valve Supervision	*Provide an unedited excerpt (or indicate changes) from the approving NRC document.* *Provide a submittal document reference.* *Provide an excerpt from the submittal document.*
3.5.15 Water Supply Hydrant Code Requirements	*Provide a correct approving document reference.* *Provide a correct approving document excerpt.* *Provide a submittal document reference.* *Provide an excerpt from the submittal document.*
3.6.1 Standpipe and Hose Station Code Requirements	*Provide correct references for the approving documents.* *Provide a correct reference for the approving document excerpt; this text does not appear in NUREG-1038, "Safety Evaluation Report related to the operation of the Shearon Harris Nuclear Power Plant, Unit No. 1," Supplement 4.* *Reorder the excerpts so that the submittal excerpt is followed by the approving document excerpt.*

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Chapter 3 Element	*Identified Issue*
3.6.4 Standpipe and Hose Station Earthquake Provisions	*Provide correct references for the approving documents.* *In the second approval document excerpt, clearly indicate which text constitutes the excerpt.* *Provide a reference for the submittal document (i.e., NLS-86-315).*
3.9.4 Fire Suppression System Diesel Pump Sprinkler Protection	*Provide an unedited excerpt (or indicate changes) from the approving NRC document.* *Provide a submittal document reference.* *Provide an excerpt from the submittal document.*
3.9.6 Fire Suppression System Valve Supervision	*Provide the correct Amendment number for the Final Safety Analysis Report (FSAR) reference.* *Provide a submittal document reference.* *Provide an excerpt from the submittal document.*
3.11.3 Fire Barrier Penetrations	*Provide correct submittal and approval document references.* *Provide submittal and approval document excerpts.*

Response: Compliance Statements which use "Complies via Previous Approval" were prepared in accordance with FPIP-0120, Rev. 4, Section 9.3.3 which states:

> "Enter an excerpt from the NRC document that provided the formal approval in the Compliance Basis field. If the excerpt which provided the formal approval does not contain sufficient details of the previous approval, provide an excerpt(s) of licensee or industry submittals regarding the issue for which previous approval is being claimed. Place the excerpt of the submittals before the excerpt of the formal approvals in the Compliance Basis field, if necessary."

Many excerpts from referenced NRC approval documents contain sufficient details of the fire protection system/feature for which it is approving. For the few cases where the approval was unclear, submittal documentation will be provided in Table B-1 for clarification, with placement

such that the submittal excerpt is followed by the approving excerpt. In all cases, proper reference documentation and details will be provided. Correct and complete excerpts will be provided with quotations clearly indicating the sections of quoted text. A revised version Table B-1 will be submitted along with other LAR sections as described in the RAI response.

HNP RAI 2-9

During its review of the B-1 Table in the Harris Transition Report, the NRC staff identified the following issues that are linked to specific B-1 Table elements. The licensee should review the LAR submittal and ensure that these and any similar conditions are resolved appropriately.

B-1 Table: Element 3.3.1.1 – General Fire Prevention Activities

NFPA 805, Section 3.3.1.1, states: "The fire prevention activities shall include but not be limited to the following program elements…" Please provide a compliance statement that addresses how the "but not be limited to" aspect of the NFPA 805 requirement is incorporated at HNP.

B-1 Table: Element 3.3.1.2 – Control of Combustible Materials

NFPA 805, Section 3.3.1.2, states: "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…" Please provide a compliance statement that addresses how the "but not be limited to" aspect of the NFPA 805 requirement is incorporated at HNP.

B-1 Table: Element 3.3.1.2.(5) – Regarding controls on the use and storage of flammable and combustible liquids

NFPA 805, Section 3.3.1.2(5), states: "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." Please identify in the B-1 Table entry which other NFPA standards were determined to be applicable, and provide references to code compliance calculations for these other applicable standards.

B-1 Table: Element 3.3.1.2.(6) – Regarding controls on the use and storage of flammable gases

NFPA 805, Section 3.3.1.2(6), states: "Controls on use and storage of flammable gases shall be in accordance with applicable NFPA standards." Please identify in the B-1 Table entry which NFPA standards were determined to be applicable, and provide references to code compliance calculations for these applicable standards.

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B-1 Table: Element 3.3.1.3.1 – Regarding the development of a hot work safety procedure

NFPA 805, Section 3.3.1.3.1, states: "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." Please provide a compliance statement that addresses HNP compliance with NFPA 241, as required by this section of NFPA 805.

B-1 Table: Element 3.3.8 – Bulk Storage of Flammable and Combustible Liquids

- *Please explain the relevance of including a statement regarding HNP's storage of flammable gases in the "Compliance Basis" field of this element, which deals with flammable and combustible liquids.*
- *Please explain the relevance of the Safety Evaluation Report (SER) open item ("page 266 SER, open item 109") referenced in the "Document Detail" field of this element.*

B-1 Table: Element 3.4.1 – On-Site Fire-Fighting Capability

- *Please provide point-by-point compliance statements for the subsections of this element.*

- *Provide a positive statement concerning which NFPA standard(s) HNP follows, given that the "Compliance Basis" field asserts that NFPA 1500, "Standard on Fire Department Occupational Safety and Health Program," and NFPA 1582, "Standard on Medical Requirements for Fire Fighters and Information for Fire Department Physicians," are "not applicable to HNP as defined within their respective scope statements."*

B-1 Table: Element 3.4.2 – Pre-Fire Plans

How do the existing yard pre-fire plan(s) and the new outside yard fire pre-plan developed as a result of radiological release transition activities factor into the list of pre-fire plans described by this element? Please reconcile the apparent disparity in the HNP B-1 Table.

B-1 Table: Element 3.4.2.1 – Pre-Fire Plan Contents

The "Compliance Basis" field for this element only describes what the pre-fire plans should contain. What information do the HNP pre-fire plans actually contain?

B-1 Table: Element 3.4.2.4 – Pre-Fire Plan Coordination Needs

The two paragraphs in the "Compliance Basis" field for this element are unclear and partially redundant. Please clarify this entry in the HNP B-1 Table.

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B-1 Table: Element 3.4.3.(a) – Regarding plant industrial fire brigade training

- *Section 4.1.1, "Overview of Evaluation Process," of the Harris Transition Report lists only five choices for compliance statements: "Complies", "Complies with Clarification", "Complies Via Previous NRC Approval", " Complies with Use of Existing Engineering Equivalency Evaluations", and "License Amendment Required." The statement in the "Compliance Statement" field of this element, "Complies with NFPA 600," is not one of the available choices. Please provide a correct compliance statement for this element.*

- *Provide point-by-point compliance statements and appropriate document references for the numbered subsections of this element. Compliance with all points is required.*

B-1 Table: Element 3.4.3.(c) – Regarding drills

Please provide point-by-point compliance statements and appropriate document references for the numbered subsections of this element. Compliance with all points is required.

B-1 Table: Element 3.5.2 – Water Supply Tank Code Requirements

- *Please ensure that the "Compliance Statement" field for this element is correct (i.e., what is the necessary clarification for the "Complies with Clarification" statement?).*

- *Please supplement the HNP B-1 Table entry to address the requirement listed in this element for separate and separated suctions for the water supply tanks.*

B-1 Table: Element 3.5.8 – Water Supply Pressure Maintenance Limitations

Please explain the relevance of including the Shearon Harris SER in the "Reference Document" field of this element in light of its "Complies" compliance statement. Also, is the page number included in the "Document Detail" field correct given that it is identical to the HNP FSAR document reference? Finally, please attempt to provide a title for NUREG-1083 so that the NRC staff can be assured that it is not being confused with NUREG-1038, "Safety Evaluation Report related to the operation of the Shearon Harris Nuclear Power Plant, Unit No. 1."

B-1 Table: Element 3.5.10 – Water Supply Yard Main Code Requirements

Please ensure that the compliance strategy for this element is correct (i.e., how does the Code Compliance Evaluation for NFPA 24-1977, "Standards for Outside Protection," relate to the "Complies" compliance statement?).

B-1 Table: Element 3.5.13 – Water Supply Header Options

- *This element, in part, states that "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 [American National Standards Institute] 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." Please address the seismic portion of this requirement and provide appropriate compliance information.

- *Please clarify the relationship of the first paragraph in the "Compliance Basis" field to the remainder of the section.*

B-1 Table: Element 3.5.15 – Water Supply Hydrant Code Requirements

This element, in part, states that "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 feet (305 meters) along the yard main system." Please address the "hose house" requirements and provide appropriate compliance information.

B-1 Table: Element 3.6.2 – Standpipe and Hose Station Capability Limitations

Please ensure that the compliance strategy for this element is correct (i.e., how does the Code Compliance Evaluation for NFPA 14-1976, "Standard for the Installation of Standpipes and Hose Systems," relate to the "Complies" compliance statement?).

B-1 Table: Element 3.6.3 – Standpipe and Hose Station Nozzle Restrictions

- *Please explain the "Reference Document" field entry for NFPA 14, or delete if in error.*
- *Please ensure that the compliance strategy for this element is correct (i.e., how does the Evaluation of NFPA 14 Deviations relate to the "Complies" compliance statement?).*

B-1 Table: Element 3.6.4 - Standpipe and Hose Station Earthquake Provisions

The excerpt from the background section of the deviation request included in the "Compliance Basis" field for this element references Section 9.5.15 of NUREG-1038; however, there is no such section contained in NUREG-1038. If this error is included as a part of the original submittal document for the deviation request, please provide an appropriate correction in the HNP B-1 Table entry. If not, correct the "Compliance Basis" entry accordingly.

B-1 Table: Element 3.7 – Fire Extinguishers

Please submit information related to the NFPA 10, "Standard for Portable Fire Extinguishers," code of record compliance evaluation, as described in HNP RAI 2-5, for all power block areas, including a justification for any unevaluated areas.

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B-1 Table: Element 3.8.1 – Fire Alarm

- *The "Compliance Basis" field for this element states, in part, that "alarm initiating devices credited within [NFPA 805] Chapter 4 to meet the Nuclear Safety Performance Criteria are installed in accordance with..." The requirements of this section are not limited to those devices required by or credited within NFPA 805 Chapter 4. The licensee should ensure that alarm initiating devices are installed in accordance with the appropriate NFPA code of record in all plant areas, and update the "Compliance Basis" field for this element accordingly.*

- *Please ensure that the compliance strategy for this element is correct (i.e., how do the Code Compliance Evaluations for NFPA 72E, "Standard on Automatic Fire Detectors," and NFPA 72D, "Standard for Proprietary Protective Signaling Systems," relate to the "Complies" compliance statement?).*

B-1 Table: Element 3.8.2 - Detection

Ensure that the compliance strategy for this element is correct (i.e., how do the Code Compliance Evaluations for NFPA 72E and NFPA 72D relate to the "Complies" compliance statement?).

B-1 Table: Element 3.9.1 – Fire Suppression System Code Requirements

The licensee states in the "Compliance Basis" field for this element that the suppression systems credited to meet the requirements of NFPA 805 Chapter 4 are identified in the individual Fire Safety Analysis calculations (FSAs). However, an NRC staff review of a sample of the FSAs indicates that there is no such differentiation between credited and non-credited suppression systems in the FSAs. HNP should reconcile this apparent discrepancy.

B-1 Table: Element 3.9.4 – Fire Suppression System Diesel Pump Sprinkler Protection

The licensee states in the "Compliance Basis" field for this element that the diesel driven fire pump is located outdoors. However, the provided previous approval excerpt states that the fire pumps are located in the emergency service water screening structure. In addition, the excerpt does not resolve the topic of this element, which is automatic sprinkler protection for diesel driven fire pumps. HNP should reconcile these apparent discrepancies.

B-1 Table: Element 3.11.1 – Building Separation

The exception to this element states that "where a performance-based analysis determines the adequacy of building separation, the requirements of 3.11.1 shall not apply." Does HNP utilize this exception? If so, please provide a detailed summary of the performance-based analysis.

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B-1 Table: Element 3.11.2 – Fire Barriers

- *Please ensure that the compliance strategy for this element is correct (i.e., how does the NRC SER contained in NUREG-1038 relate to the "Complies" compliance statement?).*

- *Please ensure that the section listed for LAP-83-479, "Point by Point Comparison of HNP with NUREG-0800, ["Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants,"]" in the "Document Detail" field is correct.*

B-1 Table: Element 3.11.3 – Fire Barrier Penetrations

- *What is the relationship between LAP-83-479, "Point by Point Comparison of HNP with NUREG-0800," and NLS-86-137, "Point by Point Comparison of HNP to Requirements of NUREG-0800?" Both are listed in the "Reference Document" field for this element.*

- *The "Compliance Basis" field is incorrect in stating that conformance with NFPA 101, "Life Safety Code," is not applicable for this element. The NRC did not take exception to the inclusion of this standard into the element when incorporating NFPA 805 into 10 CFR 50.48(c). Therefore, the provisions of NFPA 101 related to this element (i.e., the characteristics of passive fire barrier penetration protective devices [i.e., fire doors and dampers]) do apply. Please provide a compliance statement and strategy that address the requirements of NFPA 101 and correct the HNP B-1 table entry accordingly.*

B-1 Table: Element 3.11.4 – Through Penetration Fire Stops

The compliance statement for this element is "Complies via Previous Approval." However, the licensee also states that the characteristics of the actual penetration seal installations (i.e., the combustibility of the seal materials) do not match the previously approved configuration. This situation is not appropriate to the "Complies via Previous Approval" category. Please reconcile the apparent differences between the approved and installed penetration seal configurations and correct the HNP B-1 Table entry accordingly.

B-1 Table: Element 3.11.5 – Electrical Raceway Fire Barrier Systems (ERFBS)

The compliance statement for this element is "Complies with Clarification." However, the licensee is requesting specific approval to include/consider Meggitt Safety Systems Cable as an ERFBS, and references an earlier licensing action on the use of fire resistive cable. Please ensure that the compliance strategy for the Meggitt cable portion of HNP's compliance with this element is correct and fully captures all aspects of the issue.

Response: The specified B-1 elements identified in the RAI will be addressed through clarification in Table B-1. Individual resolutions are described below in the summary table and will be reflected in a revised version Table B-1 to be submitted along with other LAR sections as described in the RAI response.

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3.3.1.1	Item 1 has been expanded to include the minimum fire protection program elements as discussed in FAQ 06-0028.
3.3.1.2	Added statement "Compliance with procedures for the control of general housekeeping practices and the control of transient combustibles which are developed and implemented include but are not limited to the following:"
3.3.1.2(5)	No other NFPA standards were determined to be applicable based on the guidance in FAQ 06-0020.
3.3.1.2(6)	No other NFPA standards were determined to be applicable based on the guidance in FAQ 06-0020.
3.3.1.3.1	A compliance statement regarding NFPA 241 has been included in the Compliance Basis.
3.3.8	The reference to the storage of flammable gases in the Compliance Basis field has been removed. The reference to the SER open item has been removed and correct document details have been provided.
3.4.1	Point-by-point compliance statements have been provided for the subsections of this element FAQ 06-0007 has been referenced to provide a positive statement concerning which NFPA standards are applicable to HNP.
3.4.2	The disparity in the B-1 Table between the existing outside yard and new outside yard pre-plans have been corrected.
3.4.2.1	Correct documentation was provided which outlines the information that the pre-plans actually contain.
3.4.2.4	This entry has been clarified to remove the redundancy.
3.4.3.(a)	Correct compliance statements have been provided for all points of the section.
3.4.3.(c)	Point-by-point compliance statements have been provided for the subsections of this element.
3.5.2	The compliance basis has been reworded to include the necessary clarification.
3.5.8	References to the FSAR and NUREG-1038 have been removed and correct document details have been provided.
3.5.10	The compliance statement has been changed to "Complies with use of EEEE"
3.5.13	The seismic portion of this requirement has been addressed. The first paragraph in the "Compliance Basis" has been removed.
3.5.15	Hose houses have been addressed in this section.
3.6.2	The compliance strategy has been corrected to refer to "Complies with the use of EEEE"
3.6.3	The NFPA 14 reference document has been deleted.

3.6.4	The error with "Section 9.1.15" has been removed and the compliance basis entry has been corrected accordingly.
3.7	The compliance basis has been reworked to include a License Amendment Request for unevaluated areas.
3.8.1	The reference to "Chapter 4" credited devices has been removed and the code evaluations have been referenced for all plant areas. The compliance strategy has been corrected for this element.
3.8.2	The compliance strategy has been corrected for this element.
3.9.1	No changes were made to the B-1 Table.
3.9.4	NRC approval is requested for the lack of automatic sprinklers protecting the diesel-driven fire pump.
3.11.1	HNP does not utilize the exception, which is noted in the Compliance Basis
3.11.2	The references to NUREG-1038 and LAP-83-479 have been removed from the element.
3.11.3	The references to LAP-83-479 and NLS-86-137 have been removed from the element. The NFPA 101 provisions which relate to this element are now addressed in the Compliance Basis field.
3.11.4	The compliance strategy has been corrected for this element.
3.11.5	The compliance strategy has been corrected for this element.

HNP RAI 2-10

B-1 Table: Frequently Asked Questions (FAQs)

- *The use of, or reference to, FAQs in HNP B-1 Table elements with a "Complies" compliance statement is inappropriate. Elements that rely on or reference FAQs should use a different compliance strategy (e.g., "Complies with Clarification") and explain the relevance of the FAQ to the requirements/guidance in the element's "Compliance Basis" field. The following elements are examples identified during the review: 3.3.1.1.(1), 3.3.1.2.(5), 3.3.1.2.(6), 3.3.1.3.1, 3.3.11, and 3.4.2.1. The licensee should correct these discrepancies and ensure that there are no others contained in the HNP B-1 Table.*

- *A number of FAQs were withdrawn or changed substantially via the revision process since the HNP B-1 Table was first populated. Please ensure that the B-1 Table references/relies on only the correct/current, NRC accepted, version of any FAQs. Examples of changed or withdrawn FAQs used in the HNP B-1 Table include FAQ 06-0008, "NFPA 805 Fire Protection Engineering Evaluations," and FAQ 06-0025,*

"Scope and Content of Pre-Fire Plans." The licensee should correct these discrepancies and ensure that there are no others contained in the HNP B-1 Table.

Response: Elements that reference FAQs no longer utilize the "Complies" compliance statement. Instead, the "Complies with Clarification" statement has been applied. Table B-1 has been reviewed to ensure that there similar discrepancies have been corrected. Additionally, only currently approved FAQs have used for the basis when determining compliance. This will be reflected in a revised version Table B-1 to be submitted along with other LAR sections as described in the RAI response.

HNP RAI 2-11

B-1 Table: "Document Detail"

The purpose of the "Document Detail" field in the HNP B-1 Table is to help ensure traceability of HNP's licensing basis for each NFPA 805 Chapter 3 element. During its review, the NRC staff identified a number of issues concerning implementation of the "Document Detail" field. The licensee should review the HNP B-1 Table and ensure that these issues are resolved.

Typical problems identified in the "Document Detail" field of the HNP B-1 Table are as follows:

1. *Confusing or incomplete document detail entries exist in many HNP B-1 Table elements. It is often unclear which entry from the "Reference Document" field a particular "Document Detail" entry aligns with, and some "Reference Document" entries have no corresponding "Document Detail" entry at all. The following is a list of some of the elements that contain these deficiencies. The licensee should correct these deficiencies and ensure that there are no others contained in the HNP B-1 Table.*

- *3.3.1*
- *3.3.1.1.(2)*
- *3.3.1.1.(3)*
- *3.3.1.2.(2)*
- *3.3.1.2.(3)*
- *3.3.1.2.(4)*
- *3.3.1.2.(5)*
- *3.3.1.2.(6)*
- *3.3.1.3.1*
- *3.3.2*
- *3.3.3*
- *3.3.4*
- *3.3.5.2*
- *3.3.5.3*
- *3.3.6*
- *3.3.7.1*
- *3.3.7.2*
- *3.3.7.3*
- *3.3.8*
- *3.3.9*
- *3.3.10*
- *3.3.11*
- *3.3.12*
- *3.4.1*
- *3.4.2*
- *3.4.2.1*
- *3.4.2.2*
- *3.4.2.4*
- *3.4.3.(a)*
- *3.4.3.(c)*
- *3.4.4*
- *3.4.5.1*
- *3.4.5.2*
- *3.4.5.3*
- *3.4.6*
- *3.5.1*
- *3.5.2*
- *3.5.3*
- *3.5.5*
- *3.5.7*
- *3.5.8*
- *3.5.10*
- *3.5.11*
- *3.5.14*
- *3.5.15*

- *3.6.1*
- *3.6.2*
- *3.6.3*
- *3.6.4*
- *3.6.5*
- *3.8.1*
- *3.8.2*
- *3.9.1*
- *3.9.4*
- *3.9.6*
- *3.11.1*
- *3.11.3*
- *3.11.5*

Ensure that there is clarity in the "Document Detail" field entries throughout the HNP B-1 Table.

2. *"Section 9.5.1" appears in the document detail entries of a number of HNP B-1 Table elements in relation to references from the HNP FSAR and NUREG-1038. This is an insufficient level of detail for the HNP FSAR and NUREG-1038, since Section 9.5.1 represents the entire fire protection program in both these documents. In addition, document detail entries of "all" appear in some cases where a more specific section is called for. These issues might be resolved by including page numbers or specific subsection details in the affected "Document Detail" field entries. The following is a list of some of the elements that contain these deficiencies. The licensee should correct these deficiencies and ensure that there are no others contained in the HNP B-1 Table.*

- *3.2.2.1 Management Policy on Senior Management*
- *3.3.4 Insulation Materials*
- *3.3.5.1 Electrical Wiring Above Suspended Ceiling Limitations*
- *3.3.12 Reactor Coolant Pumps*
- *3.5.14 Water Supply Control Valve Supervision*
- *3.6.1 Standpipe and Hose Station Code Requirements*
- *3.6.3 Standpipe and Hose Station Nozzle Restrictions*
- *3.6.4 Standpipe and Hose Station Earthquake Provisions*
- *3.6.5 Standpipe and Hose Station Seismic Connection Limitations*
- *3.9.4 Fire Suppression System Diesel Pump Sprinkler Protection*
- *3.9.6 Fire Suppression System Valve Supervision*

Ensure that there is specificity in the "Document Detail" field entries throughout the B-1 Table. Please address these additional issues related to "Document Detail" field of the HNP B-1 Table.

- *3.3.2, "Structural:" What does "SER - SSER4" in the "Document Detail" field mean?*

- *3.4.3 (a), "Training and Drills," regarding plant industrial fire brigade training: Please explain the relevance of the FAQ 06-0007, "NFPA 805 Section 3.4.1, ["On-Site Fire-Fighting Capability,"] Specific Clarification," reference in the "Document Detail" field.*

- *3.5.2, "Water Supply Tank Code Requirements:" Please provide a correct document detail entry for NUREG-1083 and/or the HNP FSAR – page 9-21 is not in Section 9.5.1.*

- *3.6.5, "Standpipe and Hose Station Seismic Connection Limitations:" What does "P&L 4.0.24" in the "Document Detail" field mean?*

- *3.9.4, "Fire Suppression System Diesel Pump Sprinkler Protection:" Does "9-51" in the "Document Detail" field mean Page 9-51 of NUREG-1038?*

Response: Complete and clear reference documentation and associated document details have been provided throughout the B-1 Table, including the elements listed in Item 1, 2, and the specific elements after Item 2. This includes the use of Section and/or Page numbers as appropriate for the document. This will be reflected in a revised version Table B-1 to be submitted along with other LAR sections as described in the RAI response.

HNP RAI 2-12

Harris Transition Report and HNP B-1 Table: Quality Assurance

During its review of the HNP NFPA 805 LAR submittal, the NRC staff identified a number of typographical errors, formatting inconsistencies, and other apparent mistakes in the Harris Transition Report. The licensee should review the Harris Transition Report, correct any identified deficiencies, and ensure that there are no others contained in the submittal. The following are some examples identified by the NRC staff:

1. *Harris Transition Report Page 10 – Is the correct previously granted deviation document reference for item (8), regarding the requirements of NFPA 90A for providing fire dampers at exhaust and intakes at external walls, stairs, and roofs, NLS-86-139, as referenced in the text, or NLS-86-137, as referenced in the HNP B-1 Table?*

Response: The correct reference should be NLS-86-137. This correction will be detailed in response to RAI 2-13.

2. *Harris Transition Report Page 17 – The bullets under the "License Amendment Required" compliance statement entry are the same as those for the "Complies with Use of Existing Engineering Equivalency Evaluations (EEEEs)" compliance statement entry. Please ensure that the correct bullets are provided for each compliance statement.*

Response: Section 4.1 of the LAR will also be revised to reflect the current method or process for the compliance statement "License Amendment Required". A revised version of LAR section 4.1 will be submitted along with other LAR sections as described in the RAI response.

3. *Duplicate "Reference Document" field entries appear in a number of HNP B-1 Table elements. The following is a list of some of the elements that contain duplicate references. The licensee should correct these discrepancies and ensure that there are no other instances contained in the HNP B-1 Table.*

- 3.3.1.2.(6)
- 3.3.3
- 3.3.4
- 3.3.5.1
- 3.3.5.2
- 3.3.5.3

- 3.3.6
- 3.3.7.2
- 3.3.12
- 3.4.1
- 3.4.4
- 3.5.1
- 3.5.2
- 3.5.5
- 3.5.8
- 3.5.11
- 3.6.3
- 3.6.4
- 3.6.5
- 3.9.5
- 3.11.1
- 3.11.3

Response: Duplicate "Reference Document" field entries will be removed throughout Table B-1. This will be reflected in a revised version Table B-1 to be submitted along with other LAR sections as described in the RAI response.

4. *Incomplete "Reference Document" field entries for the HNP FSAR appear in a number of HNP B-1 Table elements. The following is a list of some of the elements that contain these incomplete references. The licensee should correct these discrepancies and ensure that there are no other instances contained in the HNP B-1 Table.*3.3.1

- 3.3.1.3.1
- 3.3.2
- 3.3.3
- 3.3.4
- 3.3.5.1
- 3.3.5.2
- 3.3.5.3
- 3.3.6
- 3.3.7
- 3.3.7.2
- 3.3.12
- 3.4.1
- 3.4.4
- 3.4.6
- 3.5.2
- 3.6.1
- 3.6.2
- 3.6.3
- 3.6.4
- 3.6.5
- 3.8.1
- 3.8.2
- 3.9.4
- 3.9.5
- 3.11.1
- 3.11.3

Response: "Reference Document" field entries are now complete with document number, title, and revision information, as appropriate, throughout the B-1 Table. This will be reflected in a revised version Table B-1 to be submitted along with other LAR sections as described in the RAI response.

5. *Additional identified deficiencies related to HNP B-1 Table references are listed in the following matrix. The licensee should correct these discrepancies and ensure that there are no other instances contained in the HNP B-1 Table.*

Chapter 3 Element	**Identified Issue**
3.3.1.1.(1) General Fire Prevention Activities	Please provide appropriate revision information for reference documents GNB07H, "HNP Site Specific Orientation," and GNR01N, "Plant Access Requalification."

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Chapter 3 Element	**Identified Issue**
3.3.1.2.(6) Control of Combustible Materials	Please provide a proper reference for the NFPA 51B, "Standard for Fire Prevention During Welding, Cutting, and Other Hot Work," evaluation if it is indeed the correct reference for this element; otherwise, provide a correct reference for this element.
3.3.7.1 Bulk Flammable Gas Location Requirements	Please provide titles or descriptions for reference documents AR 200493 and AR 206165. Please provide a reference for HNP's compliance with NFPA 55, "Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks."
3.3.8 Bulk Storage of Flammable and Combustible Liquids	Please provide a reference for HNP's compliance with NFPA 37, "Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines." Please provide a correct reference for LAP-83-306.
3.3.11 Electrical Equipment	Please provide a correct FAQ reference if FAQ 06-0024, "Adequate Clearance and Energized Electrical Equipment," is to be used to demonstrate compliance for this element.
3.4.2.2 Pre-Fire Plan Updates	Please provide appropriate revision information for reference document FPP-002, "Fire Emergency."
3.4.5.3 Security and Radiation Protection	Please provide appropriate revision information for the "HNP Physical Security and Safeguards Contingency Plan" reference.
3.5.2 Water Supply Tank Code Requirements	Please provide a proper reference for NUREG-1083.

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Chapter 3 Element	**Identified Issue**
3.5.7 Water Supply Pump Connection Requirements	Please provide titles or descriptions for reference documents 2165-S-0555, Revision 18, 2165-S-0556, Revision 13, and 2165-S-0557, Revision 7.
3.5.8 Water Supply Pressure Maintenance Limitations	Please provide a proper reference for NUREG-1083. Please explain the difference, if any, between the "Shearon Harris SER" and "NUREG-1038."
3.6.2 Standpipe and Hose Station Capability Limitations	Please provide correct NUREG-1038 references.
3.6.3 Standpipe and Hose Station Nozzle Restrictions	Please provide correct NUREG-1038 references.
3.6.5 Standpipe and Hose Seismic Connection Limitations	Please provide correct NUREG-1038 references.
3.7 Fire Extinguishers	Please provide appropriate revision information for the Fire Hazards Analysis (FHA) drawings referenced.

Response: Proper reference information has been provided for the items listed in the matrix. This will be reflected in a revised version Table B-1 to be submitted along with other LAR sections as described in the RAI response.

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HNP RAI 2-13

Section 2.2, "NRC Acceptance of HNP Fire Protection Licensing Basis," of the Harris Transition Report describes the state of NRC acceptance for HNP's current (pre-NFPA 805) fire protection licensing basis. However, the list of deviations previously granted by the NRC is incomplete.

Please provide the NRC disposition of the deviation identified as NLS-86-139, regarding the requirements of NFPA 90A, "Standard for the Installation of Air-Conditioning and Ventilating Systems," for providing fire dampers at exhaust and intakes at external walls, stairs, and roofs.

Response: The correct reference is NLS-86-137, which states in part, "C.5.a(4) Penetration openings for ventilation systems will be protected by fire dampers having a rating equivalent to that required of the barrier per NFPA-90A, "Air Conditioning and Ventilating Systems" with the following exceptions..."

This deviation was granted in NRC SER Supplement no. 4, section 9.5.1.7, which states in part, "Lack of fire-rated fire damper assemblies, door assemblies, and penetration seals in certain fire areas as described in section 9.5.1.4 above."

LAR section 2.2 will be revised to read, "8) In NLS-86-137 (and supplemental information in NLS-86-219), HNP noted a deviation to the requirements of NFPA-90A for providing fire dampers at exhaust and intakes at external walls, stairs, and roofs. Because these walls are not contiguous with fire areas, it was not necessary to provide fire dampers. The deviation was granted in NRC SER Supplement no. 4."

HNP RAI 2-15

Attachment L, "NFPA 805 Chapter 3 Requirements for Approval," of the Harris Transition Report discusses specific deviations from the requirements of NFPA 805, Section 3.5.16, regarding the dedication of the fire protection water supply system, and Section 3.6.5, regarding the cross-connections of the seismic hose stations, for which HNP is seeking approval.

- *Please provide a regulatory basis (i.e., 10 CFR 50.48(c)(2)(vii) or 10 CFR 50.48(c)(4)) and an appropriate regulatory justification for each of these deviations.*

- *In addition, the level of technical justification and detail provided for these two deviations from NFPA 805 is currently insufficient to form the basis for an NRC review and subsequent SE. For each element, HNP should provide a level of detail and technical justification equivalent to that submitted for stand-alone licensing actions.*

The NRC staff also has the following specific questions regarding the materials presented in Attachment L of the Harris Transition Report:

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1. *Element 3.5.16 - Do the terms "fire protection water demand" and "fire protection demand" indicate that during certain temporary plant evolutions as approved by the unit SCO, non-fire protection water flows are present from the fire protection system?*

2. *Element 3.5.16 - Exception No.1 to this element states that the "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." The licensee indicated that one aspect of the requested deviation falls within this approved exception (Le., makeup to the Non-Essential Services Chilled Water Expansion Tank). Please justify the inclusion of this aspect in the request for specific NRC approval given that it falls within the purview of the approved exception.*

3. *Element 3.6.5 – Please provide a title and detailed summary for calculation SW-0087.*

Response: A revised Attachment L is being provided in the supplement to the LAR to provide additional detail and associated regulatory basis.

1. The terms "fire protection water demand" and "fire protection demand" refer to the non-fire protection water flows from the fire protection system. This information will be clarified in the LAR.

2. The request for approval for the use of 10 GPM of makeup water to the Non-Essential Services Chilled Water Expansion Tanks is being removed from the LAR.

3. It has been determined that the fire water system as designed meets the requirements of Section 3.6.5 of NFPA 805. Accordingly, this request for relief is being withdrawn.

3. Please provide the following information concerning meeting the nuclear safety performance criteria:

HNP RAI 3-2

Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," of the Harris Transition Report lists both deterministic (per NFPA 805 Section 4.2.3, "Deterministic Approach") and performance based (per NFPA 805 Section 4.2.4, "Performance-Based Approach") sections of NFPA 805 as the post-transition regulatory basis for numerous fire areas. However, NFPA 805 Section 4.2.2, "Selection of Approach," states that either a deterministic or performance-based approach shall be selected. Therefore, listing both NFPA 805 sections does not meet this requirement. The licensee should correct these discrepancies throughout the HNP B-3 Table.

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Response: Areas listing both deterministic and performance based sections of NFPA 805 have been revised to list only performance based and note that deterministic elements are also used.

All areas in the B-3 Table that have both performance based and deterministic sections listed have been changed to: "NFPA 805 Section 4.2.4 Performance-based approach utilizing deterministic methods for simplifying assumptions"

HNP RAI 3-3

The HNP B-3 Table contains numerous open items that do not provide sufficient detail for the NRC staff to fully understand the issue or deficiency being described. For each Open Item or Variation from Deterministic (VFD) listed in the HNP B-3 Table, please provide the component affected, the potential impact on the ability to meet the nuclear safety performance criteria, and the disposition (modification, performance-based plant change evaluation, alternative risk-informed approach, etc.) of each item. Note that a cross reference to where the required information is available elsewhere in the LAR/Harris Transition Report is acceptable.

Response: Open Items resolutions in the B-3 Table have been re-written for clarity.

HNP RAI 3-4

Pages C-25 and C-26 of the HNP B-3 Table discuss Open Item 128 regarding valve 1AF-55, stating that the resolution of the open item is presented in Attachment 2 to HNP-M/MECH-1124. However, an NRC staff review of HNP-M/MECH-1124 during the onsite regulatory audit at HNP indicates that there is no Attachment 2. Please address or correct this apparent discrepancy.

Response: Components (Cables) Affected:
1AF-55 (1930F, 1930H)
1AF-74 (1932E, 1932F, 1932H)

EC 68645 removes 1AF-74 from the area, so a flow path of water to the C SG is assured. All other equipment necessary for Decay Heat removal from C SG is available. Therefore, operation of 1AF-55 will not be required since EC 68645 eliminates the VFD.

HNP RAI 3-5

A review of Attachment G, "Operator Manual Actions – Transition to Recovery Actions," of the Harris Transition Report indicates that the 1AF-55 valve has associated defense-in-depth (defense-in-depth) recovery actions. In addition, the "Disposition" column of Table G-2, "Disposition of Pre-Transition Operator Manual Actions," indicates that there is a modification

(Engineering Change (EC) 69501) that will make the recovery action for the 1AF-55 valve unnecessary. The modification cited is the installation of an Incipient Fire Detection System.

Please clarify in the HNP B-3 Table if the Incipient Fire Detection System modification is the intended disposition for Open Item 128, or revise the Fire Safety Analysis (FSA) calculation to provide a performance-based change evaluation justifying the as-is condition.

Response: This open item is resolved by EC 68645, which removes at risk cables for 1AF-74 from the area. This provides a deterministically compliant strategy for Decay Heat Removal for this area. Thus, the DID action for 1AF-55 in this area is being deleted.

HNP RAI 3-20

Several fire areas in the HNP B-3 Table identify the Method of Accomplishment for the RCS inventory control Performance Goal as maintaining the normal charging (or alternate charging) flowpath, and/or maintaining reactor coolant pump (RCP) seal integrity via seal injection.

The volume control tank (VCT) is the normal water supply to the charging pumps, and has a limited capacity without makeup. Without instrument air to throttle flow, it would be quickly depleted, potentially leading to damage of the running charging pumps. Spurious VCT isolation (e.g., from fire induced damage) would similarly damage running pumps.

It is apparent that the licensee is taking credit for new plant equipment (i.e., alternate seal injection) as a means of maintaining RCS inventory control; however, the associated information is not contained within the LAR. The licensee should 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 now being credited.

Response: As used in this context, the normal or alternate charging flow path pertains to those components downstream of the charging pumps. If instrument air is available, the normal (or alternate) charging path will be used. Otherwise, the high pressure injection lines will be used. The charging pump suction is always aligned to the RWST early in the scenario, and the VCT is isolated. In those cases where both 1CS-165 and 1CS-166 could be affected, either the risk-informed, performance based evaluation showed that the postulated damage would not occur, or, going forward, the ASI modification will ensure a backup means of RCS inventory control is available in the event the available charging pump is gas bound.

On a fire area basis, the means of ensuring the RCS inventory control, reactivity control (boration), and RCP seal integrity functions are being achieved is detailed in HNP-E/ELEC-0001.

The safe shutdown fault tree and compliance strategies demonstrate how the availability of at least one charging pump is being assured. The required suction and discharge flow paths are modeled, as is the required support equipment.

The new plant equipment for the ASI modification is not yet installed, and is therefore not credited in the current deterministic analysis. Its dual function is to maintain seal injection to ensure cooling to the RCP seals is always available (except for where the pump and diesel sit in 1-A-BAL-D and FPYARD), thereby preventing a RCP seal LOCA, and to provide a backup source of borated water for RCS inventory and reactivity control. In 1-A-BAL-D and FPYARD, thermal barrier cooling and the charging pumps are not affected.

HNP RAI 3-21

In reviewing several calculations for individual fire areas during the onsite regulatory audit at HNP (specifically, calculations HNP-M/MECH-1105 to 1127, 1179, and 1191), it was noted that some unprotected cables are dispositioned as "not within the zone of influence of a risk-significant fixed ignition source." Area diagrams are also provided which physically demonstrate the location of these unprotected cables.

However, there is not a one-to-one correspondence between the unprotected cables identified within the calculations and those identified in the associated area diagrams. Please provide a discussion of where the physical routing of unprotected cables in relation to fixed ignition sources, and the determination of the risk significance of those sources, is documented, especially if it is not entirely within these calculations and figures.

Response: The PSA walkdowns identified the targets (raceways) within the ZOI for each ignition source. The information was entered on spreadsheets and transferred to a database that is used to determine the impacts for specific fires. This information is documented in Calculation HNP-F/PSA-0078, Harris Fire PRA - Scoping Walkdown Calculation and HNP-F/PSA-0079, Harris Fire PRA – Quantification Calculation. If the cables of interest are not linked to any raceway targets, then they are determined to be outside of the ZOI for the sources. If a hot gas layer was projected, then all of the cables in the area were assumed to be impacted.

There was no attempt to show all cables on the FSA sketches or all ignition sources. Rather, only those that may be of specific concern were shown. If the cable was outside the ZOI of an ignition source, and a hot gas layer is not postulated, its precise physical location does not need to be shown, as it would only serve to unnecessarily clutter the drawing.

HNP RAI 3-22

In its review of the individual fire area calculations contained in the HNP B-3 Table during the onsite regulatory audit at HNP, the NRC staff noted numerous open items: 1) identified without

any specific resolution; 2) with a proposed (as opposed to already initiated) tracking EC; 3) with unclear statements regarding what a specific EC "should" accomplish (see Open Item 148); or 4) that include a statement that one or more ECs are "evaluating options" (see Open Item 18).

In addition, the NRC staff noted that several open items refer to "Attachment 2" of an associated calculation (as identified in the "Disposition" field) for disposition via a change evaluation, but the referenced attachment does not clearly identify or provide a relevant evaluation that is associated with the open item. Other open items have no EC or reference to a change evaluation, but include only a reference to an associated action request (AR).

The licensee should provide a single complete list identifying all remaining open items and their proposed resolution for NRC staff review. For open items that will not be completed by the time the HNP NFPA 805 LAR is approved, the licensee should propose a license condition in order to assure completion of the specific committed actions that ensure compliance with NFPA 805.

Response: The Open Item resolutions in the B-3 tables have been re-written for clarity. The FSAs will be re-written prior to implementation of the new program.

HNP RAI 3-23

The NRC staff review of the calculations provided by the licensee during the onsite regulatory audit at HNP has identified specific issues which the licensee should disposition:

a. *Table A2-3, "MT ERFBS – Fire Area 1-A-BAL-C," of calculation HNP-M/MECH-1105, Revision 1, identifies two cables as not meeting the NFPA 805 deterministic separation requirements: Cable 0333A and Cable 0310A.*

   Damage to Cable 0333A results in a loss of residual heat removal heat exchanger bypass flow; however, this would not appear to directly cause a loss of shutdown cooling capability, but only a loss of normal RCS cooldown control capability.

   Damage to Cable 0310A results in a loss of flow indication for the normal charging flowpath; however, per Attachment 1, "Fire Area 1-A-BAL-C – B-3 Table – Nuclear Safety Capability Assessment Summary," of HNP-M/MECH-1105, RCS inventory is controlled by the safety injection flowpath (valve 1SI-4), so it is unclear to the NRC staff why Cable 0310A is required for this area.

   Table A2-1, "Defense-in-Depth Impact Review," of calculation HNP-M/MECH-1105 presents the results of the fire risk analysis as less than 1E-7 (the threshold that requires NRC notification per the Fire Protection standard licensing condition), and therefore acceptable. However, there is no discussion of how the cause/effect relationship is actually modeled in the PRA for these two cables (i.e., what is assumed to be failed given a fire of sufficient intensity to damage these cables).

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Please provide a discussion to address the apparent issues outlined above.

Response: If instrument air is not lost, then the preferred makeup path would be via the normal path using 1CS-231 to control flow. The availability of FI-01 CS-0122A.1W enhances the ability to control flow using this path, although pressurizer level could also be used.

With instrument air available, crediting the MT wrap will also allow 1RH-20 to be operated from the control room to control cooldown rate once the plant is placed on RHR. This means of control would be preferable to controlling flow by manually adjusting 1RH-20 and 1RH-30.

MT ERFBS is credited for 115 minutes, in lieu of 3 hours per the deterministic requirement. The risk evaluation of plant changes were measured quantitatively for acceptability using the ΔCDF and ΔLERF criteria from Section 5.3.5 of NEI 04-02 and Regulatory Guide 1.205. The change in risk is below the RG 1.205 acceptance criteria. The change in risk due to the MT reduced rating has a negligible contribution to the change in CDF results. This is because the difference in the probability of non suppression between 115 and 180 minutes is low. The ΔCDF and ΔLERF results are lower than the threshold that requires NRC notification per the Fire Protection standard licensing condition included in RG 1.205. Change process targets associated with the MT ERFBS are not within the zone of influence of risk significant ignition sources and so are considered to be free of fire damage, and therefore, acceptable "as-is", with planned upgrades per EC 69765.

b. *Cable 0245D and Cable 0268C are identified in Figure A2-1, "Fire Area 1-A-BAL-C – Main Fire Scenarios," of calculation HNP-M/MECH-1105, Revision 1, as subjects of change evaluations. However, there is no disposition of these cables in Table A2-2, "Cables without ERFBS – Fire Area 1-A-BAL-C," or Table A2-3, "MT ERFBS – Fire Area 1-A-BAL-C." Table A2-2 does include additional cables not shown on Figure A2-1 for containment sump valves 1CT-102 and 1CT-71, which appear to be associated with Open Item 92; however, similar cable discussions for other open items (for example, Open Item 95 for valve 1SI-3, Open Item 96 for other containment sump valves, and Open Item 97 for valve 1SI-86) are not in the table.*

It is not clear to the staff what method is being used by the licensee to compile and present a complete list of noncompliance items for review and approval by the NRC. Accordingly, the licensee should specifically address the above discrepancies in calculation HNP-M/MECH-1105.

Further, if the above are indeed improper omissions of noncompliant items which require evaluation, then an extent of condition determination should be made and the results, along with any revised risk analyses, should also be provided.

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Response:

Table B-2 section 3.5.1.1 and RAI 3-16 describe the approach to this issue:

- Damage to 0245D is only a cable-to-cable hot short issue, and is therefore not a VFD.
- Damage to 0268C (1CS-278) is resolved with a CSD manual action, so it is also not a VFD.
- 1CT-102 and 1CT-71 are listed in Table A2-2, and were determined not to be in the ZOI of a risk significant ignition source. EC 54065 modified 1CT-71 and 1CT-102.
- Table A2-2 contains entries for 1SI-3, 1SI-86, 1SI-301, 1SI-311, and 1SI-323. None of the cables for these components is protected with MT ERFBS, so none are listed in Table A2-3.

It was never intended that the figure contain all of the cables addressed in the change evaluation. Those shown are based on the number of potentially affected cables in the area, the particular issue, and whether or not the issue was a VFD. No firm criteria were established and
the sketches intended for use as an aid only.

c. *Attachment 1, "Fire Area 1-A-BAL-E – B-3 Table – Nuclear Safety Capability Assessment Summary," of calculation HNP-M/MECH-1107, Revision 1, identifies that the Method of Accomplishment for RCS inventory control is via the safety injection flowpath (injection line 1SI-3 or 1SI-4).*

Open Item 170, which is applicable to this element, states that isolation of the VCT and alignment to the RWST is an action only required after boration for cold shutdown. However, if the emergency core cooling system (ECCS) flowrate through 1SI-3 or 1SI-4 is greater than the emergency boration and normal VCT makeup flowrates, it is plausible that the VCT could be rapidly emptied, and the charging pump suction starved unless the RWST supply valves were available and opened during hot standby.

Please provide a description of how the safety injection flowpath is successfully operated during hot standby conditions without the use of the RWST supply to the charging pump suction, as is implied by this open item.

Response: The high-head safety injection lines are not used without the RWST as a suction source. Calculation NAI-1344-001, PZR Drain Down, demonstrates that RCS makeup is not required for 2.8 hours (i.e., prior to emptying the Pressurizer) when the RCP seals are not damaged and letdown is isolated. In this area, thermal barrier cooling is unaffected and will be available to cool the RCP seals. Therefore, immediate closure of 1CS-165 or 1CS-166 is not required.

The change evaluation demonstrated that damage to both valves is not likely and an operator action to locally close one of the two valves is not required. If necessary, although not credited, the ASI Modification (EC 70350) provides an alternate makeup source independent of the RWST.

The delta-CDF for the area was < 1E-8, and the cables for 1CS-165 and 1CS-166 are not within the ZOI of a fixed ignition source. See response to B-3 table disposition for this open item.

d. *Attachment 1, "Fire Area 1-A-BAL-J – B-3 Table – Nuclear Safety Capability Assessment Summary," of calculation HNP-M/MECH-1109, Revision 1, identifies one of the Methods of Accomplishment for RCS inventory control and reactivity control as emergency boration via the RCP seal injection flowpath.*

Please provide an analysis, as available, demonstrating that adequate charging flow and boron concentration reach the reactor via this flowpath to support hot standby and cooldown to cold shutdown. If such an analysis is not available, the licensee should describe its basis for asserting that this flowpath is a success path for reaching a safe shutdown condition. Please note that this issue also applies to fire areas described in other calculations and should be addressed as appropriate.

Response: Using the seal injection flow path is a viable option to achieve cold shutdown. It may limit the cooldown rate, but note that Attachment 1 also points out that injection via 1SI-3 is available.

With the exception of the area containing 1SI-3 and 1SI-4, one of the two valves was available in all III.G.2 areas. Where 1SI-3 and 1SI-4 could be affected by a single fire (1-A-BAL-A3), the normal charging line is available.

Calculation HNP-F/NFSA-0171 demonstrates that the RWST Boron concentration is sufficient to maintain adequate shutdown reactivity to support cooldown to cold shutdown (200°F). With the RWST as the sole source of makeup water to account for RCS shrink, and letdown isolated, shutdown reactivity is maintained for the bounding case (i.e., the conclusions are not cycle dependent).

e. *Attachment 1, "Fire Area 1-G – B-3 Table – Nuclear Safety Capability Assessment Summary," of calculation HNP-M/MECH-1115, Revision 1, identifies the Method of Accomplishment for RCS inventory control as via the safety injection line, but for reactivity control as via the normal or alternate charging line. Please explain why two separate injection paths are being provided when only one should be needed, and describe the basis for HNP selecting this shutdown strategy.*

Response: Only one path is needed, and the plant may certainly be borated via the safety injection line. Boration via the normal charging line is provided as an operator option since it will allow better control of the amount of boron added to the RCS. Per

HNP-E/ELEC-0001, "With 1CS-235 or 1CS-238 available to isolate normal charging, and with 1SI-3 or 1SI-4 available for inventory control, the actions for 1CS-231 become cold shutdown actions used at the operator's discretion to more easily control boration from the boric acid tanks."

f. *Attachment 1, "Fire Area 1-A-BAL-A – B-3 Table – Nuclear Safety Capability Assessment Summary," of calculation HNP-M/MECH-1116, Revision 1, regarding Fire Area 1-A-BAL-A4, states that RCP seal integrity may be lost due to simultaneous loss of seal injection and seal cooling. Revision 0 of this calculation states that such a condition would not result in a catastrophic RCP seal failure and referred to exception EMERGENT-2007-005, but no further basis for disposition of this item was identified.*

Open Item 348 is included in Revision 1 to calculation HNP-M/MECH-1116, and continues to refer to exception EMERGENT-2007-005, but provides no further information regarding this issue. The disposition of the open item refers to Attachment 2 of HNP-M/MECH-1116. However, a review of Attachment 2 reveals that Cable 0970E, which could cause a loss of thermal barrier cooling if it were to fail during a fire, was added since Revision 0 to Table A2-3, "Cables without ERFBS – Fire Area 1-A-BAL-A," but no discussion of the zone of influence (ZOI) summary results is provided.
No other table entries in Attachment 2 (i.e., Table A2-3, Table A2-4, "MT ERFBS – Fire Area 1-A-BAL-A," or Table A2-5, "HEMYC ERFBS – Fire Area 1-A-BAL-A") appear to address the potential loss of RCP seal integrity. In addition, a review of the area diagram for this fire area does not identify any RCP seal integrity related items.

The licensee should identify where the disposition of this open item and the surrounding issue of RCP seal integrity is found within the documentation, and/or provide a detailed summary of the disposition of this item/issue in order to support the NFPA 805 transition.

Response: EC 70350 (ASI mod) which provides an alternate source of seal injection and RCS makeup in this area, resolves this issue.

g. *Open Item 70 in calculation HNP-M/MECH-1117, Revision 1, states that hot standby manual actions to preserve RWST inventory are considered acceptable based on time being available to complete the actions prior to depletion of the RWST inventory below what is required to support shutdown to cold shutdown conditions.*

However, the NRC staff notes that the potential for spurious actuation of containment sprays, which can rapidly deplete RWST inventory, should be evaluated in the fire analysis as it may negatively impact this item/issue. The licensee should 1) clarify whether this issue is currently evaluated in the associated HNP fire analysis, and 2) describe how HNP assures that containment spray operation cannot inadvertently occur and lead to a loss of required RWST inventory.

Response: Spurious containment spray is analyzed in the SSA and mitigating

actions are taken when necessary. This open item pertains to a loss of RWST inventory from the Containment Spray system via 1CT-50 (the containment spray pump could spuriously start and its associated discharge valve, 1CT-50, could spuriously open).

HNP Calculation HNP-M/MECH-1097, The Effect on RWST Level with an Inadvertent Start of Containment Spray, Rev. 0 (HNP-E/ELEC-0001, Rev. 3 reference A.32) documents the rate at which containment spray pump operation would deplete the RWST. The calculation shows that it would take about three hours to empty the RWST. Manual action feasibility reviews demonstrated that the required actions can always be completed before an unrecoverable condition is reached.

Additionally, in all areas but FPYARD and 1-A-BAL-D, where inadvertent CNMT spray cannot be caused by a fire, EC 70350 will provide another source of RCS Makeup and Seal Injection that is not dependent on the RWST.

h. *Open Item 191 in Attachment 1, "Fire Area 1-A-CSRA – B-3 Table – Nuclear Safety Capability Assessment Summary," of calculation HNP-M/MECH-1119, Revision 1, identifies that spurious closure of valve 1CS-165 may require the use of the 'C' centrifugal safety injection pump (noted as CSIPC).*

However, within the RCS inventory control Performance Goal section of this element, spurious closure of valve 1CS-165 refers only to Open Item 28 and Open Item 187, while Open Item 191 simply appears without a reference later in the element.

In addition, Open Item 191 provides various internal references to exceptions as part of the disposition for this item (i.e., ENG_REVIEW-103, EMERGENT-2007-05a, and ESFAS-CI-CSRA), as well as a reference to the change evaluations in Attachment 2, "Fire Area 1-A-CSRA – Scenario Discussions – Transition Change Evaluations," of HNP-M/MECH-1119, but does not provide a description or summary to clarify how these exceptions/evaluations address the associated issue. Please provide a discussion to address and/or disposition the apparent issues/items outlined above.

Response: Open Item 191 is included in the comments for RCS Inventory Control.

Components (Cables) Affected: 1CS-165 (0243D, 0243E)

This area is a "Transient No Storage" area. The only fixed ignition source near these cables is Aux Transfer Panel SA. EC 69501 adds Incipient Detection to Aux Transfer Panel SA. Based on EC 69501, these cables are not located within the ZOI of a risk significant fixed ignition source (HNP-M/MECH-1119, Attachment 2, Table A2-4).

In addition, if the running CSIP were to fail, EC 70350 provides an additional source of RCS makeup/seal injection.

i. *Table 3-3, "Defense-in-Depth Recovery Actions," of calculation HNP-M/MECH-1122, Revision 1, identifies that an action is required for Component EFSAS-SI to assure adequate defense-in-depth for the performance-based evaluation of this fire area.*

No specific recovery action is identified in Table 3-3, but it is stated that train 'A' reset is unavailable, and that specific equipment cannot be secured as it is inaccessible due to the location of the fire. Please clarify what is entailed in the associated action, and better describe this action in the appropriate documentation.

In addition, the NRC staff noted that there are similar "non-actions" contained elsewhere in the supporting calculations for other fire areas. For example, HNP-M/MECH-1123, Revision 1, includes in its Table 3-3 a requirement for an action associated with spurious closure of valve 1CS-166, but no action is specified. The licensee should evaluate the extent of condition of similar defense-in-depth "non-actions" in the supporting calculations for other fire areas, and ensure that each action is clearly specified.

Response: The actions are clearly specified in the safe shutdown analysis.
For the HNP-M/MECH-1122 Revision 1 (1-A-SWGRA) comment, actions are required to secure 1CS-CSIPA, 1RH-RHRA, 1AF-E003, and 1CT-E003. To ensure these pumps are de-energized, the SSA states that the operators may need to open the yard breakers and locally secure the Train A EDG. Note that some of the other listed DID recovery actions are in the fire area. None of these actions are time critical and only concern the fire-affected train. If the fire is in the switchgear, it will be de-energized as part of fire fighting activities.

In HNP-M/MECH-1123 Revision 1 (1-A-SWGRB), the action required for 1CS-166 would be to immediately secure the running charging pump, which may not happen in time. In Table A2-3, the cables for 1CS-166 are noted as being not within the ZOI of a risk significant ignition source.

In addition, if the credited CSIP were to be damaged, EC 70350 provides an additional source of RCS makeup/seal injection.

j. *Table A2-3, "Cables without ERFBS – Fire Area 1-A-SWGRB," of calculation HNP-M/MECH-1123, Revision 1, identifies numerous cases where a failure impact exists that could cause a performance goal of the element to not be met, as well as indicating that there are risk-significant fire scenarios which would cause the failure.*

The risk impact of these failures is not insignificant, and is not screened within the calculation. However, no defense-in-depth actions are identified regarding appropriate compensation for the loss of a performance goal in a higher risk scenario.

The specific affected cables are identified as Cable 0273C, Cable 0273D, Cable 0417E, and Cable 0419C. The licensee should further evaluate and describe how defense-in-depth is achieved and acceptable for these scenarios (i.e., identify the

alternate strategies assumed in the risk analyses to achieve safe shutdown), and/or provide a description of appropriate actions.

Response: Cables 0273C and 0273D could cause 1CS-182 to spuriously close, isolating the 1CS-CSIPA minimum flow line and resulting in a loss of the credited CSIP.

Cable 0417E results in the spurious opening of 1SI-301.

Cable 0419C results in the spurious opening of 1SI-311.

The concurrent opening of 1SI-301 and 1SI-311 could result in a loss of RWST inventory to the containment sump.

There are several modifications being implemented for this area, so no credited recovery actions are necessary. These planned modifications include:

EC 70350 – ASI modification
EC 68646 – Prevent High Energy Arcing Faults (thermal shields)
EC 69501 – Incipient detection in the Main Transfer Panel SB
EC 68648 – Prevent an AFW Isolation Signal
EC 68645 – Remove 1AF-74 cables from the fire area

k. *Open Item 128 in calculation HNP-M/MECH-1124, Revision 1, refers to Attachment 2, "Design Review Records," of this calculation for disposition, but Attachment 2 is simply the engineering review records for the calculation. Please provide an appropriate justification for disposition of the open item and update its associated documentation to adequately reflect the licensing basis.*

Response:

1-A-ACP – Open Item 128 of Table B-3 discusses an unallowable hot standby action on 1AF-55 to establish an AFW flow path.

EC 68645 removes the 1AF-74 cables from the area, providing a deterministic solution.

l. *Attachment 1, "Fire Area 12-A-CRC1 – B-3 Table – Nuclear Safety Capability Assessment Summary," of calculation HNP-M/MECH-1126, Revision 1, identifies that the Performance Goal for RCS inventory control is met, in part, by thermal barrier cooling of the RCP seals in order to maintain seal integrity, and refers to Open Item 101.*

Open Item 101 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. It is also stated that the actions are allowable under the current licensing basis (CLB) and are therefore not subject to a change evaluation. Finally, the open item states that the likelihood and consequences of a RCP seal loss of coolant accident (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 HNP-M/MECH-1126, which is simply the engineering review record for the calculation.

Given the above information, the NRC staff is unclear as to how this item is being addressed for compliance with NFPA 805. In addition, it is the staff's conclusion that the currently credited manual actions to assure the valves associated with RCP seal cooling remain open and unaffected by a fire are recovery actions, and that if the scope of the action is revised as proposed, then the previous approval is no longer applicable. In this situation, a risk assessment would be required to justify the use of performance-based compliance with NFPA 805 for these recovery actions. Accordingly, the licensee should revise its calculation and submit the appropriate information for staff review.

Response: EC 70350 will provide another source of RCS Makeup and Seal Injection that is not dependent on the CCW valves. As shown in Table G2 of Attachment G, actions to restore TB cooling will no longer be required.

m. *Open Item 346 in calculation HNP-M/MECH-1126, Revision 1, refers to a change evaluation and Attachment 2, "Record of Lead Review," of this calculation for disposition, but Attachment 2 is simply an engineering review record for the calculation. Please provide an appropriate justification for disposition of the open item and update its associated documentation to adequately reflect the licensing basis.*

Response: EC 70895 protects Turbine Driven AFW MOVs 1AF-137, 143 and 149 from fire damage in 12-A-CRC1 ensuring that following transfer, the valves are isolated from the 305 elevation and a clean fuse is available if the primary fuse has already been blown.

Components (Cables) Affected:
1AF-137 (1933F, 1933G, 1933H, 1935K)
1AF-143 (1934F, 1934G , 1934H, 1935K)
1AF-149 (1935F, 1935G , 1935H, 1935K)

HNP RAI 3-24

From the LAR, it appears the licensee is proposing to credit swing charging pumps, new alternate seal injection equipment, and other plant systems, structures and components (SSCs) not currently addressed in HNP's Technical Specifications (TS) as means of demonstrating compliance with NFPA 805, and/or as part of the overall transition process.

Please provide a comprehensive list of safe shutdown SSCs not currently addressed by an existing TS Limiting Conditions for Operation (LCO), and either propose a new TS LCO for each item or provide an acceptable alternative administrative control to assure availability of this equipment, including appropriate compensatory measures when the SSC is unavailable. The

licensee should also demonstrate that the requirements of 10 CFR 50.36(d)(2)(ii)(D) are satisfied for each SSC not proposed to be addressed by a TS LCO.

Response: Attachment 5 (Sound Powered Phones), Attachment 6 (SSD Emergency Lighting), and Attachment 7 (SSD Support Systems and Equipment) of FPP-013 track safe shutdown related equipment not covered by the HNP Technical Specifications (TS). FPP-013 will continue to track safe shutdown equipment not covered by TS.

Attachment 7 does include the 6.9 kV Transfer Switch for 1-C-CSIP-SAB.

Due to the ASI Pump/Diesel being available in all areas except for 1-A-BAL-D and FPYARD, no additional requirements on the C CSIP will be imposed.

HNP RAI 3-25

On page C-3 of the HNP B-3 Table (Fire Area 12-A-BAL – Reactor Auxiliary Building Units 1 and 2 Balance), Engineering Evaluation ESR 01-00144, "Fire Door Warping," relies on the fact that the subject stairwell(s) do not require a fire resistance rating. Are these stairwells used for egress to accomplish any NFPA 805 related recovery actions? If yes, please provide a technical justification to demonstrate that a warped fire door will not impact the ability of the operator(s) to complete the required action(s).

Response: This ESR evaluated four fire doors that were warped: 1FP-D1148, 1FP-D0016, 1FP-D0614, and 1FP-D0287. This ESR also evaluated 1FP-D1147, which is the opposite train door for 1FP-D1148.

1FP-D1147, and 1FP-D1148 are the doors that do not require a fire rating. These are doors that separate the top floor of the diesel generator building (A and B train) from the remainder of the building. These doors were purchased and installed as fire doors. The doors are at the top of stairs. The doors are not part of a stairwell and do not form any part of a fire barrier.

1FP-D0016, 1FP-D0614, and 1FP-D0287 were evaluated as equivalent to the tested configuration.

Door 1FP-D0287 is the door for this area. It forms part of the barrier between 1-A-BAL-D and 12-A-BAL. This door was evaluated as equivalent to the tested configuration. This door is not part of the walk path for any recovery action.

HNP RAI 3-26

On page C-4 of the HNP B-3 Table (Fire Area 12-A-BAL – Reactor Auxiliary Building Units 1 and 2 Balance), suppression is not credited for Fire Area 12-A-BAL. This appears to be inconsistent with the subsequent statement that detection is required for defense-in-depth in the

area of the MT wrap at the 286 foot elevation in Fire Zone 12-A-5-DIH. Would not the same statement be true regarding the use of suppression in this area? Please provide a justification for not requiring suppression, in addition to detection, for defense-in-depth in this fire area.

Response: Detection is required for defense-in-depth in the area. MT wrap is used on the 286' elevation in Fire Zone 12-A-5-DIH. Since MT wrap was originally HNP's credited Electrical Raceway Fire Barrier Systems (ERFBS) to be used in areas where suppression was not provided, no suppression is installed in this area. If suppression were installed, no change evaluation would be required, since the ERFBS would be a fully rated 1 hour barrier.

MT ERFBS is credited for 115 minutes, in lieu of 3 hours per the deterministic requirement. The risk evaluation of plant changes were measured quantitatively for acceptability using the ΔCDF and ΔLERF criteria from Section 5.3.5 of NEI 04-02 and Regulatory Guide 1.205. The change in risk is below the RG 1.205 acceptance criteria. The change in risk due to the MT reduced rating has a negligible contribution to the change in CDF results, based on the low difference in the probability of non suppression (between 115 and 180 minutes). The ΔCDF and ΔLERF results are lower than the threshold that requires NRC notification per the Fire Protection standard licensing condition included in RG 1.205. Change process targets associated with the MT ERFBS are not within the zone of influence of risk significant ignition sources and therefore are considered to be free of fire damage. They are considered acceptable "as-is", with planned upgrades per EC 69765.

HNP RAI 3-27

On page C-4 of the HNP B-3 Table (Fire Area 12-A-BAL – Reactor Auxiliary Building Units 1 and 2 Balance), the disposition of Open Item 82 indicates that modification EC 67743 will de-energize several breakers as a normal plant configuration in order to prevent spurious operation of valves that could result in the addition of reactor makeup water to the charging path, thereby diluting the boron concentration required for safe shutdown, as well as valves with the potential to inject nitrogen into the RCS via the seal injection path.

Would implementation of this modification mean that these valves could not be operated while the plant is in the normal power operating condition? If not, please describe the administrative controls that would be used when these valves are required to be energized during power operation to permit system functions, and how these controls continue to assure that the plant can be safely shutdown during such conditions.

Response: EC 67743 is complete. The only time the components 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 following the evolution.

The following are excerpts from EC 67743 for the required procedure changes.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
SECOND RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING LICENSE AMENDMENT REQUEST TO ADOPT
NFPA 805, "PERFORMANCE-BASED STANDARD FOR FIRE
PROTECTION FOR LIGHT WATER REACTOR GENERATING PLANTS"

OP-102 - Primary Makeup System: Revise valve lineup to make 1PM-86 normally closed. Add indication in accordance with AP-005 that closure of 1PM-86 is now a commitment. Reference Figure 4.

OP-107 - CVCS: Attachment 1 – Add indication in accordance with AP-005 that the normally off breaker position for 1FB-7 and 1FB-8 is now a commitment. See Figure 5.

OP-120.02.38 - Filter Backwash System Transfer Tanks: Revise valve lineup to make 1NI-104 normally closed. Add indication in accordance with AP-005 that closure of 1NI-104 is now a commitment.

OP-120.02.39 –

(1) Add indicator per AP-005 that leaving breakers off for 1FB-7 and 1FB-8 is now a commitment.
(2) Add steps to open 1PM-86 prior to backflush operations and then to re-close once backflush is complete. Add indicator per AP-005 that this position is a commitment.
(3) For backflush of the seal water return filter, add steps to open valve 1IA-171-I3 prior to backflush and then to re-close and vent once backflush is complete. Add indicator per AP-005 that this position is a commitment.

Although not credited as an additional Defense in Depth, EC 70350 provides an additional source of RCS makeup/seal injection in the event water flow to the seals is interrupted by diversion or injection of nitrogen.

Update B-3 table per Open Item 82 (Fire Area 12-A-BAL) as stated in Open Item Disposition.

Open Item 82 Disposition was revised as follows.

Components (Cables) Affected:
1FB-8 (9212H, 9212M)
1NI-107 (9212H, 9212M)
1NI-117 (9211B, 9211J)
1PM-103 (9211B, 9211J)
1PM-87 (9212H, 9212M)

EC 67743 is complete - Based on the current plant configuration, the only time the potential spurious actuations could occur is during filter backwash operations. The configuration is controlled by procedure to only align equipment to backwash filters (a short duration evolution) and to restore the normal configuration following the evolution.

As additional Defense in Depth, EC 70350 provides an additional source of RCS makeup/seal injection in the event water flow to the seals is interrupted.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
SECOND RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING LICENSE AMENDMENT REQUEST TO ADOPT
NFPA 805, "PERFORMANCE-BASED STANDARD FOR FIRE
PROTECTION FOR LIGHT WATER REACTOR GENERATING PLANTS"

HNP RAI 3-28

On page C-8 of the HNP B-3 Table (Fire Area 12-A-CR – Control Room, Reactor Auxiliary Building), two of the modifications (EC 54065 and EC 67772) cited as a means of correcting spurious actuation concerns for the control room utilize the installation of Meggitt fire rated cable. Elsewhere, the Harris Transition Report states that all cables that enter the control room terminate there (i.e., there are no cables that are routed through the control room that do not terminate within it). However, operating experience and ongoing analyses demonstrate that Meggitt cable is still vulnerable to spurious actuations at the termination points. Given this concern, please describe how the installation of Meggitt cable will aid in preventing spurious actuations within the Main Control Room.

Response:

Safety Injection Valves

Open item 51 Disposition was revised as follows:

Components (Cables) Affected:

1SI-3 (0408E, 0408L)
1SI-4 (0407E, 0407K)
1SI-52 (0440C, 0440G, 0456N)
1SI-86 (0441C, 0441H, 0456L)
1SI-107 (0439C, 0439H, 0456M)

Spurious opening of a High Head SI valve cannot run out a CSIP at normal plant pressure but could lead to solid plant conditions. Alternatively, if the VCT empties, the running CSIP could become gas bound. On transfer to the ACP, the CSIP is secured until the valve lineup can be verified.

EC 67772 installed Meggitt Cable from the Main Control Board (MCB) to termination points outside this fire area for the listed valves. Incipient detection (EC 69501) is being added to the MCB to reduce the probability/consequence of a fire in the MCB. EC 70350 provides an alternate source of seal injection on loss of seal injection flow (either due to CSIP failure or due to stopping the running CSIP.)

Containment Spray

Open item 326 Disposition was revised as follows:

Components (Cables) Affected:

1CT-102 (1040E, 1040F, 1040G, 1040H)
1CT-105 (1039E, 1039F, 1039G, 1039H)

EC 54065 is complete. This EC installed Meggitt Cable from the MCB to termination points outside this fire area. Incipient detection (EC 69501) is being added to the MCB to reduce the probability/consequence of a fire in the MCB. Inline valves for 1CT-102 and / or 1CT-105 were modified to get an auto shut signal on transfer to the ACP which blocks the drain path.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
SECOND RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING LICENSE AMENDMENT REQUEST TO ADOPT
NFPA 805, "PERFORMANCE-BASED STANDARD FOR FIRE
PROTECTION FOR LIGHT WATER REACTOR GENERATING PLANTS"

HNP RAI 3-29

On page C-8 of the HNP B-3 Table (Fire Area 12-A-CR – Control Room, Reactor Auxiliary Building), Open Item 53 involves spurious opening of the steam generator (SG) PORVs. The associated change evaluation references HNP-M/MECH-1127; however, SG PORVs are not discussed in the latest version (Revision 1) of HNP-M/MECH-1127.

Please explain where this open item has been addressed. One of the modifications (EC 62343) in Attachment S, "Plant Modifications," of the Harris Transition Report addresses spurious actuation of PORV 1MS-62 in the 12-A-CR and 12-A-CRC1 fire areas. Should the HNP B-3 Table entry for fire area 12-A-CR reference this modification for Open Item 53 as well?

Response: Only 1MS-62 is at risk for a fire in 12-A-CR (HNP-M/MECH-1127) or 12-A-CRC1 (HNP-M/MECH-1126) following transfer to the ACP. EC 62343 installs a switch that will allow SG PORV C to be failed closed from the ACP.

HNP-M/MECH-1126 and HNP-M/MECH-1127 will be revised to clarify that only C SG PORV is at risk.

See Open Item 35 in 12-A-CRC1 – discussed EC for SG PORVs.

EC 62343 is listed in the B-3 Table for C SG PORV, rather than its associated Engineering Change Request ECR 5588.

B-3 table Open Item 53 (in 12-A-CR) updated as follows.

Components (Cables) Affected:
1MS-62 (1256B, 1256G)

EC 62343 installs a switch that will allow SG PORV C to be failed closed from the ACP.

HNP RAI 3-30

On page C-9 of the HNP B-3 Table (Fire Area 12-A-CR – Control Room, Reactor Auxiliary Building), Open Item 54 references one modification (EC 68656) and two engineering change requests (ECR 5645 and ECR 5646) to address an unisolated control cable for valve 1AV-AH6B and the spurious operation of valves 1SW-1171 and 1SW-1204.

However, per the description in Attachment S of the Harris Transition Report, EC 68656 appears to only address the spurious actuation of valve 1SW-1204. Please provide assurance that the spurious actuation of valves 1AV-AH6B and 1SW-1171 is addressed appropriately in ECR 5645 and/or ECR 5646, or provide an alternative description to resolve this issue.

Response: The referenced ECRs are Engineering Change Requests, resulting in ECs.

1SW-1204 is addressed by EC 68656, completed July 13, 2009.

1AV-AH6B is addressed by EC 68660, completed July 27, 2008.

1SW-1171 is the A Train equivalent of 1SW-1204. Implementing EC 68656 for 1SW-1204 negates the need for modifying 1SW-1171.

These items are closed.

HNP RAI 3-31

Pages C-6 to C-9 of the HNP B-3 Table (Fire Area 12-A-CR – Control Room, Reactor Auxiliary Building), the FSA for the control room, HNP-M/MECH-1127, Revision 1, and pages G-12 to G-14 of Attachment G, "Operator Manual Actions – Transition to Recovery Actions," to the Harris Transition Report, continue to credit a 10 minute window for completion of control transfer from the control room to the auxiliary control panel (ACP) in the event of a control room fire.

In accordance with FAQ 06-0011, "[10 CFR Part 50, Appendix R] III.G.3 Transition," alternative shutdown areas should be transitioned using the performance-based approach. Per the Harris Transition Report, the HNP control room credits the performance-based approach in accordance with NFPA 805 Section 4.2.4. However, the use of a time frame negotiated under the previous licensing basis to implement alternative shutdown appears to be inconsistent with the wording and intent of NFPA 805. In addition, the qualitative justification for the 10 minute window provided in Attachment G of the Harris Transition Report is not sufficient to meet the NFPA 805 requirements for a performance-based approach.

Please 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 the justification, please address fires within electrical and control cabinets, as well as potential high energy arcing faults (HEAFs) in switchgear and associated bus ducts.

Response: No spurious actuation of components prior to 10 minutes was the original design basis for alternate shutdown.

The PSA took no credit for the ten minutes. If a component spuriously operated in the PSA, it was not recovered. The PSA also did not take any credit for alternate shutdown for a fire not in the Main Control Board itself.

For Alternate Shutdown, buses, pumps, fans and instrumentation were provided with alternate fuses or sources following transfer. This leaves valves, many of which do have their control circuits in the control room, isolated following transfer to the ACP. If the valve did not require operation, it was not necessarily redundantly fused with a separate control switch at the ACP (based on the assumption that it would not have spuriously actuated prior to transfer).

To reduce the risk due to a fire requiring evacuation of the Main Control Room, Incipient Detection per EC 69501 is being added to various high risk control boards and cabinets.

For the remaining high risk issues, HNP will do the following:

EC 70350 provides alternate seal injection and RCS makeup on loss of normal seal injection. The existing Recovery Actions with the CCW thermal barrier cooling valves will not be necessary. Therefore, if CCW is isolated to the RCP seals, RCP Seal integrity and RCS makeup are maintained.

EC 70895 protects Turbine Driven AFW MOVs 1AF-137, 143 and 149 from fire damage in 12-A-CRC1. Using the 10 minute rule, these valves would be unaffected. However, if the valves were to spuriously close prior to transfer, the valve control power fuses would be at risk and re-opening the valves from the ACP would not be possible. This EC adds a second fuse and eliminates the potential for a short that could damage the fuses following transfer. For additional defense in depth, this is being done on all three flow paths.

The following is added in the B-3 Table concerning the no spurious actuations prior to transfer and 10 minute discussion to the Fire Area Comments field for 12-A-CR, 12-A-CRC1 and 12-A-HV&IR:

> The original design basis for alternate shutdown assumed that no spurious actuations would occur prior to transfer of control to the ACP with transfer actions completed within 10 minutes.
>
> The PSA took no credit for this 10 minute period of no spurious actuations. In addition, if a component spuriously operated in the PSA, it was not recovered in the PSA with an OMA.

Open Items 51 (12-A-CR) and 351 (12-A-CRC1) were revised to discuss spurious SI valve opening before CSIP is secured at the ACP.

HNP RAI 3-32

On page C-12 of the HNP B-3 Table (Fire Area 12-A-CRC1 – Control Room Complex), Open Item 33 is being addressed by modification EC 54065, which proposes to install Meggitt fire rated cable to address spurious actuation of valves 1CT-102 and 1CT-105.

Do the cable runs for these valves terminate in Fire Area 12-A-CRC1? If yes, please note that operating experience and ongoing analyses demonstrate that Meggitt cable is still vulnerable to spurious actuations at the termination points. Given this concern, please describe how potential spurious actuations caused by fire damage to the cable termination points are being addressed.

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Response: EC 54065, which installed Meggitt Cable from the SSPS out of the area, has been implemented. Inline valves for 1CT-102 and / or 1CT-105 were modified to get an auto shut signal on transfer to the ACP which blocks the drain path and would terminate the draindown if it were occurring.

In addition, EC 69501 adds incipient detection to the SSPS cabinets, so the risk of a fire that could lead to this condition is reduced.

EC 70350 adds an alternate source of RCS Makeup and Seal Injection that will be available if the RWST were to drain.

B-3 table Open Item 33 Disposition updated as follows:

Components (Cables) Affected:
1CT-102 (1040H)
1CT-105 (1039H)

EC 54065 is complete. This EC installed Meggitt Cable from the MCB to termination points outside this fire area. Incipient detection (EC 69501) is being added to certain cabinets to reduce the probability/consequence of a fire. Inline valves for 1CT-102 and / or 1CT-105 were modified to get an auto shut signal on transfer to the ACP which blocks the drain path.

HNP RAI 3-33

Page C-12 of the HNP B-3 Table (Fire Area 12-A-CRC1 – Control Room Complex) references EC 68656, ECR 5645 and ECR 5646 as the basis for resolution of Open Item 345, which is nominally identical to Open Item 54, and addresses an unisolated control cable for valve 1AV-AH6B and the spurious operation of valves 1SW-1171 and 1SW-1204.

However, per the description in Attachment S of the Harris Transition Report, EC 68656 appears to only address the spurious actuation of valve 1SW-1204. Please provide assurance that the spurious actuation of valves 1AV-AH6B and 1SW-1171 is addressed appropriately in ECR 5645 and/or ECR 5646, or provide an alternative description to resolve this issue.

Response: 1SW-1204 is addressed by EC 68656, completed July 13, 2009.

1AV-AH6B is addressed by EC 68660, completed July 27, 2008.

1SW-1171 is the A Train equivalent of 1SW-1204. Implementing EC 68656 for 1SW-1204 negates the need for modifying 1SW-1171.

This item is closed.

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HNP RAI 3-34

On page C-12 of the HNP B-3 Table (Fire Area 12-A-CRC1 – Control Room Complex), Open Item 35 identifies that SG PORVs may be spuriously operated in this and other fire areas; modification EC 62343 is cited as the resolution. The description of EC 62343 in Attachment S of the Harris Transition Report only discusses PORV 1MS-62.

However, the wording of Open Item 35 implies there are other PORVs in other fire areas that are vulnerable to spurious actuation which are being addressed by EC 62343. Please clarify whether or not this is indeed the case, and if other PORVs are involved, address how the issue of spurious actuation is being resolved for each of them.

Response: 1MS-62 (SG PORV for C SG) is the only valve that is susceptible to spurious actuation in fire area 12-A-CRC1.

EC 62343 adds a switch at the ACP which can be used following transfer to fail the valve closed.

HNP-M/MECH-1126 (B-3 Table) will be revised.

B-3 table Open Item 35 Disposition updated as follows:

Components (Cables) Affected:

1MS-62 (1256C, 1256F, 1256G, 1834C, 1089Q)

EC 62343 installs a switch that will allow SG PORV C to be failed closed from the ACP.

HNP RAI 3-35

On page C-12 of the HNP B-3 Table (Fire Area 12-A-CRC1 – Control Room Complex), Open Item 37 does not clearly define the associated deficiency and states only that there are "emergent issues related to the chilled water system." In addition, the modification listed in the Change Evaluation/Modification Reference section (EC 64641) is not listed in Attachment S of the Harris Transition Report. Please provide the explicit details of the open item (i.e., what the deficient condition is) and either provide another reference for the modification, or add a description of modification EC 64641 to Attachment S of the Harris Transition Report.

Response: The deficient condition was that 1SW-1208, Service Water to WC-2 Chiller B-SB, was at risk for a fire in this area based on cable termination in an ARP without isolation. With the completion of EC 64641, this condition is corrected and 1SW-1208 is no longer affected by a fire in this area. This open item is closed.

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HNP RAI 3-36

Based on some of the descriptions of potential fire damage included on page C-14 of the HNP B-3 Table (Fire Area 12-A-HV&IR – Heating, Ventilating, and Instrument Repairs, Reactor Auxiliary Building), Fire Area 12-A-HV&IR appears to encompass control room ventilation equipment. Please clarify whether or not this equipment includes charcoal filters. If so, provide a description of any charcoal filters present in the fire area.

In addition, the suppression summary for this fire area states that suppression systems are installed but not required. If present, does the charcoal filter system include an installed suppression system? If yes, please provide a description of the suppression systems installed to address/protect the charcoal filters present in the fire area.

Response: There are Charcoal Filter trains associated with Control Room Ventilation in the area with suppression over these Charcoal Filter trains. HNP-M/MECH-1125 discusses this suppression system.

For the definition of required systems, see RAI 2-2 (this submittal).

HNP RAI 3-37

On page C-17 of the HNP B-3 Table (Fire Area 12-I-ESWPA – Emergency Service Water Intake Structure (Main Reservoir)), the Licensing Action field includes a "deviation from NUREG-0800, [Branch Technical Position] BTP Section C.5.a.(4) for fire dampers in exterior walls." From the associated discussion, it appears that this deviation is relying on tacit approval being carried forward from the original HNP SER (i.e., NUREG-1038) and its supplements. Please provide a valid, detailed technical justification for this deviation from the requirements of NFPA 90A.

Response: The justification for this deviation is based on spatial separation. There are no safe shutdown cables that could cause a loss of function routed in FPYARD near non-rated exterior walls or openings in walls of the Intake Structure (12-I-ESWPA, Emergency Service Water Intake Structure (Main Reservoir)).

The cables in FPYARD are either in Duct Banks, with openings only at Man Holes with concrete lids, are embedded in walls with no ignition source within the zone of influence at the exposed pull box (> 100 feet), are in the Switchyard, are transmission lines coming/going to Switchyard or are 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 Main/Startup and Unit Auxiliary Transformers. In the SSA, these transformers are included both in the Turbine Building and FPYARD for this reason.

The licensing basis statement in the B-3 Table was revised to read as follows:

> Since the barriers are not contiguous with fire areas, this was judged to be acceptable. The submittal letter was referenced in the SER Supplement 4, page 9-4, but this

particular deviation from NFPA 90A was not noted in the SSER. 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 FPYARD near non-rated exterior walls or openings in walls of the Intake Structure (12-I-ESWPA).

The cables in FPYARD are either in Duct Banks, with the only openings at Man Holes with concrete lids, are embedded in walls with no ignition source within the zone of influence at the exposed pull box (> 100 feet), are in the Switchyard, are transmission lines coming/going to Switchyard, or are 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 Main/Startup and Unit Auxiliary Transformers. In the SSA, these transformers are included both in the Turbine Building and FPYARD for this reason.

HNP RAI 3-38

On page C-17 of the HNP B-3 Table (Fire Area 12-I-ESWPA – Emergency Service Water Intake Structure (Main Reservoir)), the detection summary for this fire area states that detection is installed but not required. However, the FSA calculation for this area (HNP-M/MECH-1173) credits fire detection for defense-in-depth, which appears to be inconsistent. Please clarify what controls will be maintained on the fire detection system installed in this fire area post transition.

Response: Detection is not required to meet the nuclear safety performance criteria. RAI 2-2 (current submittal) further defines required systems and controls for DID.

HNP RAI 3-39

On page C-25 of the HNP B-3 Table (Fire Area 1-A-ACP – Auxiliary Control Panel Room), Open Item 10, which addresses adequate lighting along a required access path for Fire Area 1-A-BAL-C, references modification EC 1876 as the basis for resolution. However, EC 1876 is not listed in Attachment S to the Harris Transition Report.

In addition, it would appear that this open item should also include a reference to modification EC 58779, which deals with the availability of emergency lighting and states that additional lighting should be provided for Fire Area 1-A-ACP. Please verify that the correct modification(s) to address this issue have been included in Open Item 10 and provide/modify a description of the appropriate modification(s) in Attachment S to the Harris Transition Report.

Response: ECR 1876 is an Engineering Change Request (ECR) number corresponding to EC 58779. However, EC 58779 was reduced in scope and no longer addresses this specific open item. Portable lighting will be used to perform actions where fixed lighting is not provided.

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Attachment S is correct.

Update B-3 table per Open Item 10 as stated in Open Item Disposition.

The manual actions in BAL-C will no longer be required pending completion of EC 68645, which will allow 1AF-74 to be credited instead of 1AF-55 (and its associated manual actions). Also, since EC 67742 is complete, the manual action to de-energize the smoke purge fan is no longer needed.

HNP RAI 3-40

Several open items within the HNP B-3 Table address spurious actuation of Valve 1AF-55; however, the associated manual action to address potential fire damage to Valve 1AF-55, which is required to establish the credited path of auxiliary feedwater as well as hot standby decay heat removal, is listed as a defense-in-depth action and not a recovery action within the associated documentation. The basis for the acceptability of this condition is not apparent from the existing treatment of the spurious actuation of Valve 1AF-55 in the HNP B-3 Table or the associated FSA(s). Please provide the basis for acceptability of spurious actuation of Valve 1AF-55 and make the appropriate corrections to Attachment C of the Harris Transition Report.

Response: Components (Cables) Affected:
1AF-55 (1930F, 1930H)
1AF-74 (1932E, 1932F, 1932H)

EC 69501 adds incipient detection to the ACP, the only credible ignition source in the area.

EC 68645 removes 1AF-74 from the area so a flow path of water to the C SG is assured. All other equipment necessary for Decay Heat removal from C SG is available. 1AF-49 (inline flow control valve) is available to isolate flow to SG A if 1AF-55 fails. Therefore, 1AF-55 is no longer required.

Reference RAI 3-4 (current submittal), which discusses the same issue.

The B-3 table does not refer to Attachment 2 for this item since the item is deterministically compliant.

HNP RAI 3-41

On page C-27 of the HNP B-3 Table (Fire Area 1-A-BAL-A – Reactor Auxiliary Building Unit 1 – Lower Elevations), several entries for Fire Area 1-A-BAL-A are incomplete. No entries have been provided for Fire Zone, Description, Regulatory Basis, Phase, Performance Goal, Method of Accomplishment, or Reference Document. Please either update the HNP B-3 Table to

include the required information for Fire Area 1-A-BAL-A, or provide a cross-reference to where the information is located within the Harris Transition Report.

Response: 1-A-BAL-A is the Fire Area. 1-A-BAL-A1 – A4 are the four analysis areas that makeup 1-A-BAL-A. The B-3 Table should be updated in the general comment section (under Fire Area Comments Tab) to clarify that the specific information is contained in the B-3 Table for each analysis area.

This area is performance based with deterministic components.

The Fire Zone information to be added to the General comments field.

Added the following to the General Comments Field in the Fire Area Comments Tab:

> Fire Area 1-A-BAL-A is comprised of safe shutdown analysis areas 1-A-BAL-A1, 1-A-BAL-A2, 1-A-BAL-A3, and 1-A-BAL-A4. Each analysis area has its own B-3 table which discusses the applicable transition information.

HNP RAI 3-42

On page C-27 of the HNP B-3 Table (Fire Area 1-A-BAL-A – Reactor Auxiliary Building Unit 1 – Lower Elevations), the Engineering Evaluation field for the element includes an entry for the HNP-M/BMRK-0001-5, NFPA 72E Compliance Calculation. Based on the way this item is presented, it appears more appropriate to call it a licensing action rather than an engineering evaluation as it references prior NRC approval via an SER Supplement. Therefore, based on the overall approach being taken with regard to engineering evaluations, this evaluation may or may not be required to be included in the submittal. If the condition requiring this evaluation was approved via a previous licensing action, please revise the HNP B-3 Table accordingly.

Response: Delete HNP-M/BMRK-0001-5 from Engineering Evaluation tab under 1-A-BAL-A. This is already identified as a deviation to bring forward and is noted as applying to 1-A-BAL-A2 and A3 (see the B-3 Table for those analysis areas).

HNP RAI 3-43

On page C-29 (Fire Area 1-A-BAL-A1 – Reactor Auxiliary Building Unit 1 – Analysis Area A1) and page C-31 (Fire Area 1-A-BAL-A2 – Reactor Auxiliary Building Unit 1 – Analysis Area A2) of the HNP B-3 Table, the Fire Zone list includes Fire Area 1-A-BAL-A12: "Reactor Auxiliary Building Unit 1 – A1/A2 Buffer Zone."

However, a review of the area diagrams for Fire Zone 1-A-BAL-A1 and Fire Zone 1-A-BAL-A2 reveals that the two fire areas appear to be fairly well separated. Please provide a clarifying discussion of what the A1/A2 buffer zone entails and why it is necessary.

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Response: 1-A-BAL-A12 is the buffer zone between 1-A-BAL-A1 and 1-A-BAL-A2. These buffer zones establish the 20 ft separation described in HNP-E/ELEC-0001 as part of one of the three ways to deterministically comply with separation. This zone is by column and row, so the zone is not exactly 20 feet wide. While at least 20 feet, it may be significantly larger. The buffer zones were used in the analysis as a conservative feature to ensure components within the buffer zones or near the buffer zone "boundaries" were not credited without a clear and detailed review to ensure adequate separation did in fact exist.

HNP RAI 3-44

Attachment 2, "Fire Area 1-A-BAL-A – Scenario Discussions – Transition Change Evaluations," to calculation HNP-M/MECH-1116, Revision 1, lists Valve 1RH-63 as a potentially impacted component in Table A2-6, "Cables with Other Issues – Fire Area 1-A-BAL-A – Within the ZOI of an Ignition Source." However, Valve 1RH-63 is not listed as an open item in the HNP B-3 Table, or discussed elsewhere in the Harris Transition Report.

In safe shutdown calculation HNP-E/ELEC-0001, Revision 3, for fire zone 1-A-BAL-A2, Engineering Review statement ENG_REVIEW-042 states that "Valve 1RH-63 will remain available because 0330N, 0330P and 0330R have fault consequences of A (achieve) in RDM [Revised Design Methodology], which is the HNP licensing basis. This is based on the assumption of no inter-cable hot shorts as discussed in Supplemental SER 3, Section 9.5.1.4."

However, based on industry and NRC sponsored fire testing of cables, inter-cable hot shorts are required to be considered and the assumption of no inter-cable hot shorts can no longer be supported. Please explain how inter-cable hot shorts have been addressed for Valve 1RH-63 and update the appropriate section(s) of the Harris Transition Report accordingly.

Response: Cables 0330N, 0330P and 0330R have fault consequences of A (achieve) in RDM.

From RAI 3-16 (in previous submittal, dated August 13, 2009), the B-2 Table alignment statement concludes as follows:

> "Post transition analyses and modifications will consider inter-cable hot shorts to be a credible circuit failure mode, and the SSER 3 position will not be relied upon."

Note that the CLB position is used in the deterministic analysis based on the SER. Going forward, all applicable designs will consider cable-to-cable hot shorts as possible interactions, removing reliance on the SSER position. Reference RAI 3-16 and the updated B-2 Table Response.

For this area, these cables were not identified as risk significant in the PSA and the PSA did consider cable to cable hot shorts. Since the PSA took no credit for the position detailed in SSER 3 that cable to cable shorts need not be postulated.

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HNP RAI 3-45

There appears to be a discrepancy between Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," and Attachment Y, "NFPA 805 Transition Risk Insights," of the Harris Transition Report and calculation HNP-M/MECH-1116, Revision 1, in that Open Item 348 on page C-42 references Attachment 2 to HNP-M/MECH-1116, but Attachment 2 to HNP-M/MECH-1116, Revision 1, does not list anything in the ZOI Summary Results column regarding component 1CC-252. However, component 1CC-252 is listed on page Y-29 under VFDs for Fire Area 1-A-BAL-A, Cables without ERFBS, with "not within the ZOI of a risk-significant ignition source" as the entry under ZOI Summary. Please clarify which document/statement is correct, and address the final status/resolution for component 1CC-252.

Response: The final resolution is the incorporation of EC 70350 (ASI Diesel) which auto starts the ASI pump/diesel on loss of seal injection.

1CC-252 should be a VFD, since EC 70350 is a NFPA 805 EC. Attachment Y and Attachment 2 to HNP-M/MECH-1116 will be updated.

Open Item 348 Disposition has been revised as follows:

Components (Cables) Affected:

1CC-252 (0947H, MCC 1-4A11-3E) - Loss of thermal barrier cooling.

Numerous components in the seal injection flow path are also susceptible to cable damage.

EC 70350 will provide an additional source of RCS makeup/seal injection in the event water flow to the seals is interrupted.

HNP RAI 3-50

In Attachment F, "Fire-Induced Multiple Spurious Operations – Resolution Methodology," of the Harris Transition Report, on page F-1, the HNP process/results description for Step 2, "Conduct an expert panel to assess plant specific vulnerabilities (e.g., per NEI 00-01, Revision 1, Section F.4.2[, "Expert Panel Review"])," of the NEI 04-02 FAQ 07-0038, "Lessons Learned on Multiple Spurious Operations," guidance includes a discussion about a second expert panel that was conducted in March 2008.

Please provide a discussion of the expert panel results, including expert panel member experience and area(s) of expertise, a list of multiple spurious operations (MSOs) that were reviewed, and the source of the MSOs that were reviewed (e.g., plant unique issue identified by the expert panel, generic industry MSO lists, operating experience, industry guidance documents, etc.).

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Response: This information is contained in Attachment 3 to calculation HNP-F/PSA-0077.

HNP RAI 3-51

The current staff position with respect to the definition of "Primary Control Station" is as follows:

For components that have controls in the main control room, operation of that component from any other location would be considered a recovery action if such operation were needed to achieve the nuclear safety performance criteria. For components that do not have controls in the main control room, the primary control station is that location from which the component would normally be operated.

Therefore, the following applies to primary control stations:

1. *The control station for a system or component is considered to be primary if it is the location where that system or component is normally operated. This situation applies to various auxiliary systems that are normally operated at a local control station by in-plant operators. NFPA 805 allows the use of this equipment via the local control station without considering it a recovery action.*

2. *The controls for a system or component specifically installed to meet the "dedicated shutdown" option of 10 CFR Part 50, Appendix R, Section III.G.3, are also considered to be primary. A system or component that has been specifically installed under the dedicated shutdown concept is a system or component that is operated from a location outside the control room (normally the remote, or alternate, shutdown panel) and is fully separated from the fire area where its use is credited. Similar to the previous item, this system or component cannot be operated from the control room. Therefore, operation of dedicated shutdown equipment from the remote, or alternate, shutdown panel would not be considered a recovery action since this would be the primary control station.*

A special case exists for the controls of systems and components that have been modified to meet the "alternative shutdown" option of 10 CFR Part 50, Appendix R, Section III.G.3, to provide independence and electrical separation from the control room in order to address a fire-induced control room evacuation. (Note that this configuration is normally referred to as either a "remote shutdown panel" or "auxiliary shutdown panel.")

To be considered a primary control station as discussed above, the remote, or alternative, shutdown panel should meet the following criteria:

1. *The location should be considered as the primary command and control center when the main control room can no longer be used. The control room team will evacuate to this location and use its alternative shutdown controls to safely shut down the plant.*

2. *The location should have the requisite system and component controls, plant parameter indications, and communications so that the operator(s) can adequately and safely monitor and control the plant using the alternative shutdown equipment.*

3. *There should be more than one component being controlled from this location (i.e., a local control station provided to allow an individual component to be locally controlled, as in the local handwheel on a motor-operated valve, does not meet this definition).*

If all of the applicable criteria above have been met, the remote shutdown panel or auxiliary shutdown panel may be considered a "primary control station" under NFPA 805 requirements.

However, the definition of "primary control station" provided in Attachment G, "Operator Manual Actions – Transition to Recovery Actions," of the Harris Transition Report appears to potentially exclude what the NRC staff would consider to be valid recovery actions.

Using the definition of "primary control station" provided above, please re-evaluate the manual actions being taken at HNP, reclassify as recovery actions as needed, and then update the risk evaluations (both base Fire PRA and additional risk of recovery actions) as necessary.

Response: No Harris OMAs require re-evaluation based on the proposed primary control station definition provided in this RAI.

HNP RAI 3-55

In Attachment G of the Harris Transition Report, on page G-10, Table G-1, "Feasibility Criteria – Recovery Actions and Defense-in-Depth Actions (Based on NFPA 805, Appendix B.5.2(e)[, "Methodology Success Path Resolution Considerations" regarding recovery actions,] and NEI 04-02, Revision 1)," contains a footnote which states that for emergency lighting, tools and equipment, actions in the Fire Area, and time, the "feasibility criterion will be performed for time critical recovery and defense-in-depth actions (less than 2 hours)."

The NRC staff position on recovery actions is that all recovery actions must be shown to be feasible, including consideration of the time available to perform the action before the plant experiences a non-recoverable condition. If tools or other equipment are required to perform the recovery action, they must be on hand and available. Therefore, crediting recovery actions in a Fire Area will require a performance-based analysis to demonstrate that the actions can be reliably accomplished when needed without causing a life-threatening condition for the operator.

In accordance with the above, please provide a sufficient justification to demonstrate that recovery and defense-in-depth actions that are required after a 2 hour time period meet the feasibility criteria in Appendix B, "Nuclear Safety Analysis," of NFPA 805.

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Response: With the exception of 1-A-SWGRB, no current fire area timelines extend beyond two hours for hot standby actions. Following the completion of planned modifications, the timeline for this area will also be less than two hours.

Any DID actions that would be taken after two hours support cold shutdown only and were evaluated for feasibility against the applicable criteria. In these evaluations for cold shutdown actions, adequate time to complete the action was assumed available.

HNP RAI 3-56

In Attachment I, "Definition of Power Block," of the Harris Transition Report, the licensee requests specific approval of their definition of the power block. In order to correctly review this portion of the submittal, the NRC staff requests the following:

a. *Please provide a justification for excluding areas "K" and "M" of the Fuel Handling Building from the power block. The "Comments" section of Attachment I currently excludes these areas with no explanation or justification.*

   Response: The K and M buildings are parts of the RAB and Common Building for Units 3 and 4, which were never completed. There is no safe shutdown equipment in these areas. These are used as the TSC, Office areas, and the fire house.

b. *Please provide a justification for excluding the switchyard and other areas containing switchyard equipment from the power block. The description contained in Appendix I specifically mentions switchyard equipment as part of the power block.*

   Response: Attachment I does include switchyard equipment maintained by the station as part of the power block. Table I-1 will be updated to reflect that components in the Switchyard that are required to support the availability of offsite power are considered part of the power block.

c. *Please explain the position of the major station transformers in HNP's power block formulation. If these transformers are meant to be included in the general list of power block equipment, identify the building/fire area they are associated with. If this is not the case, please provide a justification for their exclusion.*

   Response: These components are in fire area FPYARD. Additionally, they are adjacent to the Turbine building and are treated as part of the Turbine Building in both the FHA and the SSA.

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HNP RAI 3-57

In Attachment X, "Fire PRA Quality," of the Harris Transition Report, on page X-1, the discussion under Determination of Capability Categories makes the statement that "internal flood (IF) is not required for the application." However, actuation of fire suppression water systems, either as a result of a fire or spuriously, can have a similar impact as IF from pipe and other equipment ruptures. Accordingly, please provide an explanation of how actuation of fire suppression water systems, either as a result of a fire or spuriously, was evaluated at HNP.

Response: For each fire area, HNP-E/ELEC-0001 contains a brief discussion of potential effects of fire suppression activities for inclusion in the B-3 table.

Flooding caused by the FP suppression is analyzed as part of NFPA 805 Chapter 3 transition. It was part of the original design criteria for the fire suppression system. Reference DBD-317, 4.4.3:

> "Floor drains sized to remove expected firefighting water flow without flooding safety-related equipment should be provided in those areas where fixed water fire suppression systems are installed. Floor drains should also be provided in other areas where hand hose lines may be used if such firefighting water could cause unacceptable damage to safety-related equipment in the area (see NFPA 92M, "Waterproofing and Draining of Floors").

This factored into the sizing for the pedestals and curbs around various areas and pieces of equipment.

HNP RAI 3-58

In Attachment Y of the Harris Transition Report, on page Y-85, modification EC 62343 is listed as the resolution for potential fire damage to three cables associated with pressurizer PORV 1RC-114. However, this conflicts with the information presented in Attachment S of the Harris Transition Report. Based on the discussion provided in Attachment S, EC 62343 appears to address potential spurious actuation of SG PORV 1MS-62. Accordingly, please provide a discussion on how potential fire damage to Cable 0149Q, Cable 0150E, and Cable 0310P is being addressed in the nuclear safety performance analysis.

Response: The pressurizer PORV can still be controlled by placing the MCB control switch in OPEN or SHUT as necessary. Damage to the cables can only cause spurious operation if the control switch is in AUTO.

Cable 0149Q is the transmitter input, so going to open or shut on MCB will isolate.

Cable 0150E provides the high pressurizer pressure input signal, so going to open or shut will also override this input.

Cable 0310P transfers the master pressure controller to the ACP, but has no impact on valve operation.

Since EC 62343 does not apply to this issue, references to this EC will be deleted from the table entries for Cables 0149Q, 0150E and 0310P.

HNP RAI 3-59

In Attachment Y of the Harris Transition Report, page Y-94 discusses VFD 1CS-166 for Cable 0245M and Cable 0245P regarding the volume control tank outlet valve. However, these cables are not similarly addressed anywhere in the HNP B-3 Table. Please clarify how this VFD is being addressed/resolved at HNP.

Response: 1-A-CSRB: Open Item 332 in Table B-3: The change evaluation is evaluating the significance of fire damage at the Meggitt cable termination points. Such damage could result in spurious actuations not currently addressed.

The issue of the Meggitt termination points is noted in HNP-M/MECH-1120, Tables 3-5 and A2-4. In this area, the Meggitt cables terminate in the Auxiliary Transfer Panel SB. EC 69501 installs incipient detection inside this cabinet. In addition, EC 70350 adds an alternate source of makeup in the event any fire does cause this valve to spuriously close, resulting in damage to the credited CSIP. These modifications resulted in the CDF being acceptable, as noted in HNP-M/MECH-1120.

Open Item 332 is now dispositioned as follows:

Components (Cables) Affected:

1CS-166, VCT outlet Valve (0245E, 0245M and 0245P)

Cables 0245M and 0245P are Megitt Cables that terminate in Aux Transfer Panel SB.

This area is a "Transient No Storage" area. The only fixed ignition source near these cables is Aux Transfer Panel SB. EC 69501 is adding incipient Detection to Aux Transfer Panel SB. Due to EC 69501, these cables are not located within the ZOI of a risk significant fixed ignition source (HNP-M/MECH-1120, Attachment 2, Table A2-4).

In addition, if the running CSIP were to fail, EC 70350 will provide an additional source of RCS makeup/seal injection.

HNP RAI 3-60

In Attachment Y of the Harris Transition Report, on page Y-109, the Overview of Changes section lists Valve 1AF-55 as one of the variances from deterministic separation requirements

addressed to resolve an associated OMA. However, Valve 1AF-55 is not listed in the table of VFDs provided for the associated fire area (1-A-SWGRB). Please clarify how the VFD for Valve 1AF-55 is being addressed/resolved at HNP.

Response: 1-A-SWGRB : Open Item 15 in Table B-3: Valve 1AF-55 is mentioned in the FSA but the cables do not appear in any of the Attachment 2 tables.

EC 69501 adds incipient detection to the Main Transfer Panel 1B-SB where cables for 1AF-55 terminate.

EC 68645 removes cables for 1AF-74 from the area so a flow path of water to the C SG is assured. This enables the C SG to be used for hot standby decay heat removal and cooldown to cold shutdown.

Therefore, 1AF-55 is no longer required to maintain Hot Standby.

Open Item 15 is now dispositioned as follows:

> Components (Cables) Affected:
> 1AF-55 (1930C, 1930D, 1930F, 1930G, 1930H)
> 1AF-74 (1932C, 1932D, 1932E, 1932F, 1932G, 1932H)
>
> EC 68645 removes cables for 1AF-74 from the area, so a flow path of water to the C SG is assured. All other requirements to use C SG for decay heat removal are met for this area. Therefore, 1AF-55 is no longer required to maintain Hot Standby.

HNP RAI 3-61

In Attachment Y of the Harris Transition Report, on page Y-109, the Overview of Changes section states that the variances described in HNP B-3 Table open items 15, 16, 19, and 147 are addressed. However, the HNP B-3 Table also lists open items 17, 18, and 148 associated with valve operation in Fire Area 1-A-SWGRB. These three open items appear to be addressed by either modifications or risk assessment as identified in the VFD lists provided for other fire areas. Please provide an explanation for why these three open items were not included in the Overview of Changes section for Fire Area 1-A-SWGRB.

Response: Since Open Items 17, 18, and 148 are resolved by modification, they are not included on the VFD list in Attachment Y. Updates to the B-3 table will reflect their closure.

HNP RAI 3-62

In Attachment Y of the Harris Transition Report, on page Y-119, the VFD list for Fire Area 12-A-CR identifies Valve 1CS-196 as a component that resides in the Main Control Room

fire compartment (FC) associated with the Main Control Board (FC02_MCB). Please provide a discussion of how NRC Information Notice 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire," was addressed for Valve 1CS-196. In this discussion, include justification for any reliance on the 10 minute exclusion window for spurious actuations.

Response: 1CS-196 does not rely on the 10 minute exclusion time to mitigate the Information Notice 92-18 concern. Reliance is based on EC 69501 (incipient detection), which reduces the probability of a fire in the MCR, and on EC 70350 (ASI diesel), which provides an alternate source of RCS Makeup and RCP Seal Injection if 1CS-196 (Charging Pump miniflow valve) is damaged and flow drops below 60 gpm, which could eventually lead to damage to the CSIP.

HNP RAI 3-63

There NRC staff has noted several discrepancies between the VFDs presented in Attachment Y and those presented (i.e., as open items) in Attachment C of the Harris Transition Report, in that not all fire areas containing VFDs have been adequately addressed in Attachment Y.

One example is Fire Area 12-A-CRC1. Attachment C lists open items 101, 33, 345, 346, 35, and 37 associated with this fire area. However, Attachment Y contains no discussion of Fire Area 12-A-CRC1 other than listing it in the tables that address CDF and LERF of fire sources.

In addition, Open Item 101 and Open Item 346 reference Attachment 2 to calculation HNP-M/MECH-1126. However, Revision 1 to calculation HNP-M/MECH-1126 deleted the original change evaluation discussion contained in Attachment 2 (replacing it with a "Record of Lead Review") stating that there were no VFDs remaining for the fire area.

Further, from review of Attachment S, "Plant Modifications," of the Harris Transition Report, it appears that modification EC 70895 will provide protection for Valve 1AF-143 (and others) in Fire Area 12-A-CRC1. If this modification is being performed to address Open Item 346, please revise Attachment C accordingly. Otherwise, provide the proper disposition for Open Item 346.

In addition, please 1) provide a discussion to address the remainder of the apparent issues outlined above, and 2) evaluate the extent of condition of similar VFD discrepancies in the supporting documentation for other fire areas, and ensure that each item is clearly specified.

Response: B-3 and Attachment Y have been reviewed for consistency. Note that not every open item is a VFD.

HNP RAI 3-68

In Attachment G of the Harris Transition Report, on page G-11, there is a discussion of how thermal-hydraulic (T-H) analyses are used in the feasibility evaluation for OMAs, both recovery

and defense-in-depth actions. Please provide a discussion of how the T-H analyses are used in the reliability evaluation for OMAs; or, if they are not used, provide the basis as to why not.

Response: The HNP T-H analyses were used in manual action feasibility in determining whether adequate time was available to complete the action before unrecoverable plant conditions or equipment damage could occur (deterministically). Where adequate time and margin could not be demonstrated, the action was not credited as a Required Action or DID action. The variance was then addressed via the modification process, a different compliance strategy, or through a risk-informed, performance based evaluation.

4. Please provide the following information concerning meeting the Radioactive Release Performance Criteria:

HNP RAI 4-1

The Radioactive Release Goal, as expressed through the Radioactive Release Objective and Performance Criteria, is one of the key public safety features of the NFPA 805 standard.

However, the material submitted regarding HNP's radioactive release transition, located in Section 4.4, "Radioactive Release Performance Criteria," and Attachment E, "NEI 04-02 Table G-1 – Radioactive Release Transition," of the Harris Transition Report, contains insufficient detail for the NRC staff to properly review this issue. Accordingly, the NRC staff requests the following information regarding the radioactive release transition process at HNP:

a. *Provide a summary description of how (i.e., list and/or describe the attributes, features, etc.) the screened-in pre-fire plans provide guidelines for the containment and monitoring of potentially contaminated fire suppression water and products of combustion. This should be done on a fire area basis, as appropriate.*

Response: The standardized fire pre-plan outline identifies typical fixed radiological hazards for each area. All HNP fire pre-plans were screened for applicability. Fire pre-plans that address areas where there is no possibility of radiological hazards were screened out from further review. Likewise, plant areas where radioactive materials are present or expected to be present were screened into the review. A summary cross-reference of fire compartment to, fire area to, fire pre-plans to plant fire areas, and radioactive release Input results is provided in the following table. This table has been included in a revision to section 4.4 of the LAR.

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Compartment	Fire Area	Fire Pre-Plan	Rad. Release Input
FC01	12-A-BAL	FPP-012-02-RAB 261 FPP-012-02-RAB 286	Screened In
FC02	12-A-CR	FPP-012-02-RAB 305-324	Screened In
FC03	12-A-CRC1	FPP-012-02-RAB 305-324	Screened In
FC04	12-A-HVIR	FPP-012-02-RAB 305-324	Screened In
FC05	12-I-ESWPA	FPP-012-08-SEC	Screened Out
FC06	12-I-ESWPB	FPP-012-08-SEC	Screened Out
FC07	12-O-TA	FPP-012-05-DFOSB	Screened Out
FC08	12-O-TB	FPP-012-05-DFOSB	Screened Out
FC09	1-A-190N	FPP-012-02-RAB 190-216	Screened In
FC10	1-A-190S	FPP-012-02-RAB 190-216	Screened In
FC11	1-A-216-MP	FPP-012-02-RAB 190-216	Screened In
FC12	1-A-216-SWT	FPP-012-02-RAB 190-216	Screened In
FC13	1-A-34-RHXA	FPP-012-02-RAB 261	Screened In
FC14	1-A-34-RHXB	FPP-012-02-RAB 261	Screened In
FC15	1-A-5-BATN	FPP-012-02-RAB 286	Screened In
FC16	1-A-ACP	FPP-012-02-RAB 286	Screened In
FC17	1-A-BAL-A	FPP-012-02-RAB 190-216 FPP-012-02-RAB 236 FPP-012-02-RAB 261	Screened In
FC18	1-A-BAL-B	FPP-012-02-RAB 261 FPP-012-02-RAB 286	Screened In
FC19	1-A-BAL-C	FPP-012-02-RAB 286	Screened In
FC20	1-A-BAL-D	FPP-012-02-RAB 236 FPP-012-02-RAB 261 FPP-012-02-RAB 286 FPP-012-02-RAB 305-324	Screened In
FC21	1-A-BAL-E	FPP-012-02-RAB 261	Screened In
FC22	1-A-BAL-F	FPP-012-02-RAB 236	Screened In
FC23	1-A-BAL-G	FPP-012-02-RAB 236	Screened In
FC24	1-A-BAL-H	FPP-012-02-RAB 236	Screened In
FC25	1-A-BAL-J	FPP-012-02-RAB 286	Screened In
FC26	1-A-BAL-K	FPP-012-02-RAB 261	Screened In
FC27	1-A-BATA	FPP-012-02-RAB 286	Screened In
FC28	1-A-BATB	FPP-012-02-RAB 286	Screened In
FC29	1-A-CSRA	FPP-012-02-RAB 286	Screened In
FC30	1-A-CSRB	FPP-012-02-RAB 286	Screened In
FC31	1-A-EPA	FPP-012-02-RAB 261	Screened In
FC32	1-A-EPB	FPP-012-02-RAB 261	Screened In
FC33	1-A-324-1	FPP-012-02-RAB 305-324	Screened In
FC34	1-A-SWGRA	FPP-012-02-RAB 286	Screened In

FC35	1-A-SWGRB	FPP-012-02-RAB 286	Screened In
FC36	1-C	FPP-012-01-CNMT	Screened In
FC37	1-D-DGA	FPP-012-04-DGB	Screened Out
FC38	1-D-DGB	FPP-012-04-DGB	Screened Out
FC39	1-D-DTA	FPP-012-04-DGB	Screened Out
FC40	1-D-DTB	FPP-012-04-DGB	Screened Out
FC41	1-G	FPP-012-07-TB	Screened In
FC42	1-O-PA	FPP-012-05-DFOSB	Screened Out
FC43	1-O-PB	FPP-012-05-DFOSB	Screened Out
FC44	5-D-BAL	FPP-012-04-DGB	Screened Out
FC45	5-F-BAL	FPP-012-03-FHB	Screened In
FC46	5-F-CHF	FPP-012-03-FHB	Screened In
FC47	5-F-FPP	FPP-012-03-FHB	Screened In
FC48	5-O-BAL	FPP-012-05-DFOSB	Screened Out
FC49	5-S-BAL	FPP-012-08-SEC	Screened Out
FC50	5-W-BAL	FPP-012-02-RAB 190-216 FPP-012-06-WPB	Screened In
FC51	CT-YARD	FPP-012-08-SEC	Screened Out
FC52	SI-YARD	FPP-012-08-SEC	Screened Out
FC53	SW-YARD	FPP-012-08-SEC	Screened Out
FC54	TR-YARD	FPP-012-08-SEC	Screened Out

b. *Provide a summary description of how (i.e., list and/or describe the attributes, features, etc.) the fire engineering controls provide for the containment and monitoring of potentially contaminated fire suppression water and products of combustion. This should be done on a fire area basis, as appropriate.*

Response: Existing engineering controls, such as use of forced air ventilation and the presence of damming (curbs) for fire suppression agent run-off were considered during review of fire pre-plans. Because radioactive release review considers impact from the fire suppression activities, consideration was provided where suppression activities could potentially adversely impact the engineering controls. The engineering controls in place under the fire protection program are maintained through the configuration control processes in place for plant changes.

Precautions were added to fire pre-plans to include provisions regarding containment and monitoring of smoke and fire suppression agent run-off for areas where radioactive materials are present or expected to be present (reference RAI 4-1(a) in this current submittal). This will provide necessary controls should installed engineering controls be challenged or impacted by fire suppression activities. No new engineering controls were identified or established as a result of this review.

Based on the above, the expert panel review determined Engineering Controls are adequate to ensure that radioactive materials (radiation) generated as a direct result of fire suppression activities are contained and monitored prior to release to unrestricted areas such that release would be as low as reasonably achievable and would not exceed applicable 10 CFR, Part 20 limits.

c. *Provide a summary description of how (i.e., list and/or describe the attributes, features, etc.) the fire brigade training materials provide instruction for the containment and monitoring of potentially contaminated fire suppression water and products of combustion. This should be done on a fire area basis, as appropriate.*

Response: HNP has completed transition of its fire brigade and site incident commander lesson plans to a fleet standard NFPA 600 compliant format to align with NFPA 805, section 3.4.1.

These lesson plans were under development at the time initial radioactive release review was conducted. Attributes are included within the new NFPA 600 lesson plans to address the NFPA 805 Radioactive Release objectives and performance criteria. Lesson plan topics are technical skill-set based rather than fire area specific. Discussion points were noted for the topics applicable to, or having potential impact to, radioactive release due to firefighting activities. Discussion points are included regarding containment and monitoring of potentially contaminated fire suppression agents and products of combustion for lessons plan topical areas:

- Safety and Orientation
- Personnel Protective Equipment
- Fire Hose, Nozzle, Streams, Foam
- Forcible Entry
- Ventilation
- Overhaul
- Fire Attack

d. *Provide the schedule for completion of the fire brigade training material changes.*

Response: Changes to fire brigade training lesson plans as noted in the initial radioactive release review have been completed and are presently in use.

e. *Expand upon, and provide technical justification for, the conclusions presented in Section 4.4 and Attachment E of the Harris Transition Report concerning radioactive release from containment during low power and shut down conditions.*

Response: During non-power operations containment openings are internal to the plant with the exception of the Containment Equipment Hatch. Closure of the Equipment Hatch for containment integrity during modes 5 & 6 is established via a detailed containment closure plan (reference OMM-031). When fuel is off-loaded, the closure

plan is in place with no specific response times. However, due to the absence of radioactive fuel during this period, typically secured installed equipment (i.e., reactor coolant pumps/motors), and a general heightened decontamination and personnel attendance/monitoring of containment, the overall potential for a fire with resulting radiological consequences to result is substantially reduced.

Additionally, based on the volume of containment for collection of smoke, and location of the equipment hatch in relation to the top of containment (~150' below top of dome), the potential for smoke migration to lower elevations was generally not considered creditable prior to containment and monitoring actions being put into place. Based on the above, radiation release to any unrestricted area due to the direct effects of fire suppression activities (but not involving fuel damage) is expected to be as low as reasonably achievable and not exceed applicable 10 CFR Part 20 Limits. These details have been included in a revision to LAR Attachment E, Table G-1.

f. *Explain why the original yard pre-fire plan was screened out of the review, and clarify whether, and on what schedule, the new version developed to address radioactive materials areas and other potentially contaminated storage areas will be re-reviewed.*

Response: Fire Pre-Plan FPP-012-08-SEC, Out Building Fire Pre-Plans, was screened out based on the identification or expectation of no radiological hazard within buildings or areas addressed by the document. During the screening process it was recognized that limited area(s) of the plant protected area were used for the storage of radioactive materials. These area(s) previously did not require a Fire Pre-Plan based on their exterior location outside plant safety-related areas.

To ensure the radiological release objective and performance criteria were met as required by NFPA 805, the review effort generated Open Item #9 to Table G-1 to address the need to develop Fire Pre-Plan guidance for outside yard areas to address Radioactive Materials Areas (RMAs) and Sea-land type containers. This guidance will be incorporated into a plant Fire Pre-Plan and available for fire brigade use by the scheduled program implementation date described in LAR section 5.4.

g. *Explain the implications of the fuel handling building's normal exhaust not being filtered.*

Response: The normal FHB ventilation is monitored but not filtered. Upon an increasing radiological activity indication, the normal FHB ventilation may be aligned to FHB Emergency Exhaust (reference DBD-304, Radiation Monitoring System and Gross Failed Fuel Detector). FHB Emergency Exhaust is monitored and filtered. These details have been included in a revision to LAR Attachment E, Table G-1.

i. *Describe any potential implications of there being floor drains that lead to monitored tanks only at the 240 foot elevation of the turbine building.*

Response: Elevation 240' houses the condensate polisher equipment, the only identified radioactive potential in this building. This area is physically isolated from the outside. Elevation 240' floor drains are associated with condensate polisher radiological potential route to the monitored tanks in the Waste Processing Building. All other floor drains are monitored via REM-01MD-3528, (ref. DBD-304, Radiation Monitoring System and Gross Failed Fuel Detector). In the event of high radioactive activity these are designed to divert water to the Waste Processing Building. These details have been included in a revision to LAR Attachment E, Table G-1.

j. Provide a reference where the results of the Radioactive Release reviews are Maintained at HNP.

Response: Results of the radioactive release reviews described above have been documented in summary format in Attachment E, Table G-1. Open Items identified in the review process have been incorporated into the indicated fire pre-plans and fire brigade training lesson plans as indicated in Attachment E, with the exception of Open Item #9 as described above. These results will be maintained post-transition by the established plant configuration control process (ref. ADM-NGGC-0106, Configuration Management Program Implementation). Output from the Radioactive Release review and Table G-1 has been incorporated into the Fire Safety Analysis (FSA) Calculations for the applicable Fire Area.

5. Please provide the following information concerning risk assessments and plant change evaluations:

HNP RAI 5-10

Section 4.0 of calculation HNP-F/PSA-0079, Revision 1, identifies assumptions used in the development and quantification of the Fire PRA model. Section 6.7, "Sources of Uncertainty," identifies sources of uncertainty and characterizes them as either conservative or not.

However, none of these assumptions or sources of uncertainty have been characterized as to whether they are key to the results contained in the HNP NFPA 805 application. In addition, appropriate sensitivity analyses have not been presented to determine the quantitative impact.

Accordingly, the licensee should provide 1) an evaluation of which assumptions and sources of uncertainty are considered to be key to the NFPA 805 application, and 2) appropriate sensitivity analyses of key assumptions and sources of uncertainty to demonstrate that they do not have a potentially significant impact on the results contained in the application.

Response: HNP-F/PSA-0079 is the baseline fire PRA quantification calculation. The key sources of uncertainty and sensitivity analyses for the application (NFPA-805) are addressed in

HNP-F/PSA-0081. In addition to completed sensitivity studies, others are being performed for group three RAIs.

HNP RAI 5-12

The delta-risk calculations presented in the HNP NFPA 805 application do not include any risk contributions from recovery actions, including those associated with control room abandonment scenarios such as the local actions required as a part of the safe shutdown methods (i.e., those not conducted at the main control panel). Please provide revised delta-risk calculations which include these recovery action contributions.

Response: Harris did not credit any recovery actions in the fire PRA. The cable for which a recovery action may have been credited was identified as a VFD and the risk is included in the change evaluation. The potential risk of the recovery action is bounded by the delta risk of the VFDs.

Functional failures due to fires in the MCR were not recovered by the use of alternate shutdown (ASD). ASD was only credited in the fire PRA for scenarios that required abandonment due to environmental impacts. Because remaining in the MCR in these conditions was assumed to be failure, the risk of alternate shutdown is always beneficial (i.e., no additional risk).

HNP RAI 5-16

Section 5.4.3, "Non-Suppression Probability," of calculation HNP-F/PSA-0079, Revision 1, 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, "Solving the Detection-Suppression Event Tree," of NUREG/CR-6850 states:

> *Prompt detection should be only credited when a continuous fire watch is assigned to an operation, or a high-sensitivity smoke detection system is installed. If a high-sensitivity smoke detection system is credited, the failure probability of the system should be considered. If in-cabinet smoke detection devices are installed in the electrical cabinet postulated as the ignition source, the analyst should assume that the fire will be detected in its incipient stage. This incipient stage is assumed to have a duration of 5 minutes. In order to account for these 5 minutes, the analysts should add them to the time to target damage (or, equivalently, add them 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.*

Given this limitation from NUREG/CR-6850 for taking into consideration the failure probability of the system when credit for high sensitivity smoke detection 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 (i.e., a probability of 0.0).

Response: This option was not used. Harris did not credit any highly sensitive detectors other than incipient detection, which is treated separately and does address detector reliability.

HNP RAI 5-17

Section 5.8.1, "Initial Qualitative Assessment (Step 1)," of calculation HNP-F/PSA-0079, Revision 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.

Response: Harris followed the standard practice for performing multi-compartment analysis as described in section 11.5.4.3, Step 3.c of NUREG/CR-6850. This analysis was peer reviewed with no significant items raised.

HNP RAI 5-18

Section 5.8.2, "Initial Ignition Frequency Assessment (Step 2)," of calculation HNP-F/PSA-0079, Revision 1, states that "if the multi-compartment ignition frequency is less than 1E-7 per year no further evaluation is performed."

Section 5.8.3, "Detailed Qualitative Assessment (Step 3)," of calculation HNP-F/PSA-0079, Revision 1, 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.

Response: The multi-compartment screening criterion is based on a simplified approach to the guidance provided in Section 11.5.4 of NUREG/CR-6850. Specifically, Section 11.5.4.4, Step 4c, allows a multi-compartment screening based on frequency of occurrence. The

frequency of occurrence is determined by multiplying the ignition frequency, combined severity factor and non-suppression probability, and the barrier failure probability.

The simplified methodology used in Section 5.8.2 the HNP-F/PSA-0079, Rev. 1, "Harris Fire PRA-- Quantification Calculation" does not take credit for combined severity factor and non-suppression probability of the exposing compartment. The simplified process also uses screening barrier failure rates that are approximately a decade larger than the barrier failure rates provided in Table 11-3 of NUREG/CR-6850. Given the conservative boundary failure rates and the absence of credit for severity factor and non-suppression probability, the simplified method applied a screening criteria of 1.0E-7 versus 1.0E-8. The results obtained are expected to produce acceptable risk insights.

HNP RAI 5-19

Section 6.4.1, "Risk Insights – FC35, "B" Switchgear Room," of calculation HNP-F/PSA-0079, Revision 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.

Response: Visual inspection of the HEAF sources suggest that the postulated HEAF blast would exit through the path of least resistance, in this case being the front hinged panel of the electrical cabinets in question. The construction of the top of the electrical cabinets is such that an explosive pressure wave that propagates vertically is not expected. Per Appendix M of NUREG/CR-68050, any unprotected cables in the first overhead cable tray will be ignited concurrent with the initial arcing fault, provided that this first tray is within 5' vertical distance from the top of the cabinet. To mitigate this, a modification is being installed to protect the overhead cable tray targets with a heat resistant barrier such that the fire/plume will be unable to compromise the circuits.

HNP RAI 5-23

Table 1, "PRA Circuit Resolution for All Areas Throughout HNP," of Attachment 6, "Circuit Analysis Probabilities," to calculation HNP-F/PSA-0079, Revision 1, lists direct current (DC) Cable 0250A and Cable 0251A as susceptible to intracable and intercable 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. (Note that this approach would apply throughout Attachment 6 wherever DC cable failures are assumed.)

Response: The applicability of the 0.6 cable probability to DC circuits is based on the guidance provided in Section 10.5.2, Step 2, Option #1, of NUREG/CR-6850. The guidance allows the use of Tables 10-1 through 10-5 for DC control circuits for SOVs. Appendix K, Section K.1 of NUREG/CR-6850 provides an example calculation for a DC control circuit for a SOV. Based on the current state of knowledge of DC testing, there no clear basis to deviate from the guidance provided in NUREG/CR-6850.

HNP RAI 5-24

Table 1 of Attachment 6 to calculation HNP-F/PSA-0079, Revision 1, identifies Cable 0156B and Cable 0156L as subject to intracable faults, but the failure probability given is zero, presumably due to the presence of a dedicated conduit (per the "PRA Circuit Resolution" field).

However, Tables 10-1 through 10-4 of NUREG/CR-6850 assign non-zero probabilities for intracable faults even when there is a conduit present. Accordingly, please provide a justification for the assignment of a zero failure probability to these cables. (Note that this issue would apply throughout Attachment 6 wherever there are similar assumptions.)

Response: These cables are for 1RC-114, which is a 125 VDC powered solenoid valve. They are shown on CWD 2166-B-401-0156. Table 1 is incorrect, as an intracable short cannot cause the spurious actuation.

Cable 0156B is routed in conduit 10156B, and is the only cable in that conduit. The cable contains four conductors, none of which are of the positive polarity during normal operation with the valve closed (three are of negative polarity, and the fourth is de-energized).

Cable 0156L is routed in conduit 10156L, and is the only cable in that conduit. The cable contains two conductors, one of which is of negative polarity and the other of which is de-energized.

Since these cables are routed in dedicated conduits, the assigned fault probability of zero is appropriate, and the results of the calculation have not been adversely impacted.

HNP RAI 5-25

Table 1 of Attachment 6 to calculation HNP-F/PSA-0079, Revision 1, identifies Cable 0330E and Cable 0330F as subject only to intercable faults, but the higher intracable 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 intracable failure probability to the intercable hot shorting for these cables. (Note that this issue would apply throughout Attachment 6 wherever there are similar assumptions.)

Response: These cables support the operation of 1RH-63, and are shown on CWD 2166-B-401-0330. This appears to have been a typographical error. An inter-cable short is required to spuriously actuate 1RH-63 for damage to either of these two cables, and the valve control circuit does have a CPT. This would lead to conservative results in the calculation.

HNP RAI 5-26

Section 9.9, "Solid-Bottom Cable Trays," of Attachment 16, "Fire Protection Initiatives Project (FPIP)-0150 – Ignition Source Characterization and Fire-Related Assumptions," to calculation HNP-F/PSA-0079, Revision 1, cites "engineering judgment" as the means of translating the test results from Reference 2.7 (NUREG/CR-0381, "A Preliminary Report on Fire Protection Research Program Fire Barriers and Fire Retardant Coatings Tests") 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.

Response: Calculation HNP-F/PSA-0079, Rev. 1, "Harris Fire PRA-- Quantification Calculation," Attachment 16, page 16 cited "Engineering judgment" as the means of translating the test results from Ref. 2.7 (NUREG/CR-0381, "A Preliminary Report on Fire Protection Research Program Fire Barriers and Fire Retardant Coatings Tests)" into the delay times for ignition of solid-bottom cable trays based on fire size.

NUREG/CR-0381 test data in conjunction with conclusions stated in NUREG/CR-6850 suggest that for qualified cable located in a solid-bottom tray, ignition of the cable is unlikely given the plausible fire exposures seen in a nuclear power plant. The delay being credited in the PRA analysis (HNP-F/PSA-0079, Rev. 1) is associated with *ignition* time, which is expected to be significantly longer than the time to damage IEEE-383 qualified cable in a solid bottom cable tray. Test #34 and #40 from NUREG/CR-0381 were selected in part when formulating the engineering judgment conclusion.

Sensitivities on the delay time for damage associated with solid bottom tray have been performed by setting the delay to 0 (no delay). HNP also credited a severity factor (SF) for solid bottom trays to prevent damage for low heat release rate fires. Sensitivity cases were performed based on eliminating this SF. In addition, a sensitivity analysis was performed by applying a time to damage, to external targets, of 30 minutes for vented electrical cabinet fires. The solid bottom tray severity factor was also set to one and no specific credit for solid bottom

tray delay was applied for this case. The resulting CDF and LERF values are presented in the following table.

Case	CDF	VFD dCDF	LERF	VFD dLERF
Solid bottom tray delay time set to 0	3.12E-05	No Increase	3.64E-06	No Increase
Solid bottom tray SF set to 1.0	3.22E-05	No Increase	3.88E-06	No Increase
Solid bottom tray delay time set to 0 and SF set to 1.0	3.47E-05	No Increase	4.56E-06	No Increase
Electrical Cabinet fire damage delay of 30 minutes, solid bottom tray delay time set to 0, and SF set to 1.0	2.47E-05	Reduced	2.57E-06	Reduced

Based on these results, the conclusions provided in the LAR remain valid.

Details of Analysis

Used the following spread sheets from the quantification and application calculations:
HNP_Eval_0079r1.xls
HNP_Eval_0079r1_lerf.xls
HNP_Eval_0081r1.xls
HNP_Eval_0081r1_lerf.xls

Solid bottom tray delay time set to 0

On the "Calc" sheet: Changed cell F30 was set to zero.

Solid bottom tray SF set to 1.0

On the "Calc" sheet: Changed cell D30 was set to 1.0.

Solid bottom tray delay time set to 0 and SF set to 1.0

On the "Calc" sheet: Changed cell F30 was set to zero.

On the "Calc" sheet: Changed cell D30 was set to 1.0.

Cabinet fire damage delay of 30 minutes, solid bottom tray delay time set to 0, and SF set to 1.0

On the "Calc" sheet: Changed cell F30 to "=IF(SolidBottom<>"Y",0,30)".

On the "Calc" sheet: Changed cell D30 was set to 1.0.

On the "Source_Data": set all source for the solid "Solid_Bottom" field to "N", then set all bin 15 sources "Solid_Bottom" field to "Y"

HNP RAI 5-29

Table 15.1, "Amended Summary of Assumptions and Sources of Uncertainty in the HNP Fire PRA," of Attachment 15, "Identification of Sensitivity Analyses for HNP NFPA 805 Change Evaluations," to calculation HNP-F/PSA-0081, Revision 1, 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."

Response:

(1) The HNP main control board analysis is based on the methodology presented in Appendix L of NUREG/CR-6850. The walkdowns conducted on the control board identified a very low quantity of exposed cables such that the standard treatment proposed by the guidance would generate conservative results regarding total CDF. Because the resultant total CDF is within the acceptable range, and there are very few VFDs associated with the MCB, this item was not identified as a key uncertainty (as

stated in the attachment). No additional insights that will influence the LAR conclusions are expected from performing a sensitivity analysis.

(2) In general, the statements regarding "no masking effects would be expected" are more appropriately stated as "the conclusions of the analysis supporting the HNP LAR are not expected to be impacted".

Items 16 and 17 are based on the methods presented in NUREG/CR-6850. As stated in Attachment 15, these items were not identified as key uncertainties. No additional insights that will change the LAR conclusions are expected from performing additional sensitivity analyses.

Item 18 is a conservative assumption and is discussed in more detail in the response to RAI 5-9.e (reference HNP-09-084, dated August 13, 2009). This item was not identified as a key uncertainty, and no additional insights that will change the LAR conclusions are expected from performing a sensitivity analysis.

Item 19 is addressed in the response to RAIs 5-26 and 5-39 (both included in this current submittal), which include sensitivity analyses.

Item 21: In most cases, attempting to determine the exact sequence of individual cable failures is not realistic or practical based on the current state of the art. Therefore, the more conservative assumption was made that the spurious events would occur prior to loss of power. This item was not identified as a key uncertainty, and no additional insights that will change the LAR conclusions are expected from performing a sensitivity analysis.

For item 22, the success criteria for a failed SG PORV is consistent with the internal events model based on automatic SG isolation. Currently, there is insufficient analysis to support changing it. This item was not identified as a key uncertainty, and no additional insights that will change the LAR conclusions are expected from performing a sensitivity analysis.

For item 23, an assumption was made not to fail the switchgear based on room heat up. Doing so would be crediting a failure that blocks potential spurious events. The assumption not to fail the power is conservative with regard to delta CDF and is consistent with the assumption for item 21. This item was not identified as a key uncertainty, and no additional insights that will change the LAR conclusions are expected from performing a sensitivity analysis.

(3) Plant partitioning does not add any significant uncertainties to the HNP fire PRA, particularly since compartment screening was not performed. An update to HNP-F/PSA-0081 will revise this statement.

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HNP RAI 5-31

Table 15.1 of Attachment 15 to calculation HNP-F/PSA-0081, Revision 1, 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.

Response

(1) Item 30 addresses the uncertainty associated with conservatisms in the development of the RCP Seal LOCA Model. HNP uses the consensus model provided for Westinghouse plants, and little benefit can be realized by performing additional sensitivity analyses for this item. Additional insights that will influence the LAR conclusions are not expected.

Item 32 addresses the uncertainty associated with not crediting qualified cable wrap in Fire Compartments BAL-A and BAL-B. This condition can occur when the wrapped cables are not required to be protected. In these cases, although the total CDF may be conservative, there are no VFDs associated with these cables which would impact the delta CDF. No additional insights that will change the LAR conclusions are expected from performing additional sensitivity analyses.

(2) Item 31 addresses the uncertainty associated with the exclusion of cable damage impacts to mitigation systems for induced tube rupture sequences in the fire-induced LERF model. Induced tube ruptures are modeled for HNP based on NUREG-1570 and these are included in the LERF for the fire PRA. Several sensitivities were performed for the internal events model. No additional insights that will change the LAR conclusions are expected from performing additional sensitivity analyses specifically for the fire PRA.

HNP RAI 5-34

Section 3.3.5.4, "Sensitivity Issue 13: Fire Brigade Response Time," of Attachment 16 to calculation HNP-F/PSA-0081, Revision 1, implies that the sensitivity calculation that is

performed only examines "one direction;" specifically, the difference between an unvarying case with and without VFDs 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.

Response: Sensitivities have been performed on the fire brigade response time and use of the FAQ 08-0050 method. The response times have been doubled for the first sensitivity and the manual suppression method was changed to the FAQ 08-0050 method for the second. The CDF and LERF values have been recalculated and are presented in the following table.

Case	CDF	VFD dCDF	LERF	VFD dLERF
Fire Brigade Time Doubled	3.57E-05	No Increase	4.32E-06	No Increase
FAQ 08-0050 Method	2.70E-05	No Increase	2.85E-06	No Increase

Details of Analysis

Used the following spread sheets from the quantification and application calculations:

HNP_Eval_0079r1.xls
HNP_Eval_0079r1_lerf.xls
HNP_Eval_0081r1.xls
HNP_Eval_0081r1_lerf.xls

Doubling Fire Brigade Time:

Added "*2" to formula in cell M20 on the "Calc" sheet

FAQ 08-0050:

Added "*0" to formula in cell M20 on the "Calc" sheet

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On the "Manual_Supp" sheet, the Manual NSP table was updated as follows:

MANUAL NSP		
Source	FC01_S0002	
HRR Case	1	
Suppression Term	**0.102**	
HRR Cases	**Term**	
1	0.102	Elec
2	0.102	Elec
3	0.102	Elec
4	0.102	Elec
5	0.102	Elec
6	0.102	Pump
7	0.102	Motor
8	0.126	Transient
9	0.188	Welding
10	0.074	Oil
11	0.074	Oil
12	0.067	All/Other
13	0.011	HEAF
14	0.025	T/G fires

HNP RAI 5-35

Section 4.6.2, "Overview of Post-Transition NFPA 805 Monitoring Program," of the Harris Transition Report, 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.

Response: Although the Fire PRA is the primary tool used to establish risk significance and performance criteria, some SSCs/fire protection program elements may not be amenable to risk measurement using the Fire PRA. In those cases, the Expert Panel will establish the performance criteria.

For example, fire brigade response is a programmatic element that is not amenable to risk measurement. Therefore, the Expert Panel will determine the performance criteria used to monitor fire brigade response.

The applicable paragraph under Section 4.6.2 will be modified as follows:

> "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~~. The performance criteria used should be availability, reliability, or condition monitoring, as appropriate."

HNP RAI 5-36

In Attachment X of the Harris Transition Report, the disposition for findings and observations (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 were 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.

Response: The F&O relates to statistical uncertainties. The modeled basic events include a parameter for incorporating the error factors. Due to software limitations with the methodology used to quantify the fire PRA, Harris did not perform an overall statistical uncertainty analysis such as that typically performed for internal events. The impact of this is not expected to influence the decisions related to this application.

HNP RAI 5-37

In Attachment X of the Harris Transition Report, 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, and include some version of the following statement:

> *The sensitivity and uncertainty of CDF and LERF are driven mostly by two factors much more important than the data uncertainty as discussed in the Harris Fire PRA Uncertainty analysis, these fire uncertainties are: 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 Harris 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 that intend to

employ the "going forward" Fire PRA. Accordingly, 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 in fire frequency, fire growth, severity factors, HRRs, and associated non-suppression probabilities be treated).

Response: HNP will continue to be involved with the issues surrounding fire PRA development and the associated uncertainties. Improvements in the methods and data developed through industry and regulatory efforts will be incorporated in future revisions to the HNP fire PRA. These improvements will be reflected in the "going-forward" applications.

HNP RAI 5-38

Section Y.1.1, "Important Fire Compartments," of Attachment Y, "NFPA 805 Transition Risk Insights," to the Harris Transition Report, states that for FC54, Transformer Yard, "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 FC54. (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.)

Response: In the case of the main transformers, the loss of one transformer is assumed to give a plant trip and the other two main transformers are assumed lost. There is adequate separation to justify that multiple transformer failures due to fire is not an issue. Attachment 26 of HNP-F/PSA-0079 provides additional discussion supporting the current analysis.

HNP RAI 5-39

Section Y.1.1 of Attachment Y to the Harris Transition Report, states that for FC03, PIC Cabinet Room, "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 has been performed within the PIC room to summarize the minimum fire size capable of damaging sensitive equipment. This information 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 in 12-A-CRC1, 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 PIC room.

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Response: The solid bottom trays are present in the current plant configuration. The method for crediting these trays is based primarily on the discussions in section Q.2.2 of NUREG/CR-6850. Additional detail is provided in HNP-F/PSA-0079. Sensitivities have been performed on the factors associated with solid bottom trays (reference RAI 5-26 response for details).