NRR-PMDAPEm Resource

From: Wilkins, Lynnea
Sent: Thursday, November 14, 2013 4:27 PM
To: Van Der Kamp, David (dwvande@nppd.com)
Cc: Victor,, Wiilliam R.- Strategic Initiatives (wrvicto@nppd.com); Burkhardt, Janet; Robinson, Jay
Subject: Cooper Nuclear Station: Round 2 RAIs Re: NFPA-805 LAR (ME8551)

Dave,

By letter dated April 24, 2012, as supplemented by letters dated July 12 and August 23, 2012, and January 14, February 12, March 13, and June 13, 2013. Nebraska Public Power District, (NPPD) submitted a license amendment request (LAR) to transition the fire protection licensing basis at the Cooper Nuclear Station, from Title 10 of the Code of Federal Regulations (CFR), Section 50.48(b), to 10CFR50.48(c), National Fire Protection Association Standard NFPA 805 (NFPA 805).

The Nuclear Regulatory Commission NRC staff has reviewed the information provided by the NPPD and also conducted an audit from October 1 to October 5, 2012. The NRC staff has determined that additional information specified in the attached Request for Additional Information (RAI) is needed for the staff to complete its evaluation. In addition, please note that review efforts on this LAR are being continued and additional RAIs may be forthcoming.

Based on discussions with Bill Victor and others on November 14, 2013, it was agreed that a response to the RAIs found below will be provided in accordance with the following schedule:

30 Day Response	60 Day Response
PRA RAI 02.c.01	PRA RAI 02.h.01
PRA RAI 02.f.01	PRA RAI 03.01 (a)
PRA RAI 02.f.i.01	PRA RAI 11.01 (b)
PRA RAI 02.o.01	PRA RAI 11.01 (c)
PRA RAI 03.01 (b)	PRA RAI 14.01 (a)
PRA RAI 03.01 (c)	PRA RAI 14.01 (b)
PRA RAI 04.01	PRA RAI 14.01 (c)
PRA RAI 11.01 (a)	PRA RAI 14.01 (d)
PRA RAI 16.01 (a)	PRA RAI 16.02 (a)
PRA RAI 16.01 (b)	PRA RAI 16.02 (b)
PRA RAI 16.01 (c)	PRA RAI 16.02 (c)
PRA RAI 16.01 (d)	PRA RAI 16.02 (d)
PRA RAI 19.01 (a)	PRA RAI 35 (a)
PRA RAI 19.01 (b)	PRA RAI 35 (b)
PRA RAI 24.01	PRA RAI 35 (c)
PRA RAI 27.01	PRA RAI 40
PRA RAI 29.01	
PRA RAI 36	
PRA RAI 37	
PRA RAI 38	
PRA RAI 39	

Should the NRC determine that the RAIs found below are no longer necessary prior to the dates found above, the request will be withdrawn. Please contact me if circumstances result in the need to revise the requested response dates.

Thanks
Lynnea

Lynnea Wilkins, Project Manager
Fort Calhoun Station, Unit 1
Cooper Nuclear Station
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Phone: 301-415-1377

LICENSE AMENDMENT REQUEST TO ADOPT

NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805

PERFORMANCE-BASED STANDARD FOR FIRE PROTECTION FOR LIGHT WATER

REACTOR GENERATING PLANTS

COOPER NUCLEAR STATION

(TAC NO. ME8551)

PRA RAI 02.c.01

The licensee's response to PRA RAI-02.c dated January 14, 2013 (ADAMS Accession No. ML13018A006) states "The exceptions to setting HEP to 1.0 when all instrumentation is impacted by a fire are the EOP actions to depressurize the PRV and initiate low pressure injection. If the PRV level is unknown, which could be the case for fire impacted RPV level instruments, the operators are instructed to depressurize and flood the core using any low pressure Emergency Core Cooling System (ECCS) and alternate injection alignments. For those fire zones where all RPV level instrumentation was failed, the human error probability associated with "Minimum Instrumentation Available" was used for the actions to depressurize the RPV and use low pressure systems to flood the core. In this case, the minimum instrumentation needed is actually none." Provide the procedural steps that would direct the operator to depressurize and flood after fire-induced failure of the RPV level instrumentation. Also provide justification for not using an HEP of 1.0 using NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Analysis Guidelines - Final Report" guidance provided, for example in section B.5.1, "Instrumentation," or from NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," Volumes 1 and 2, and Supplement 1."

PRA RAI 02.f.01

PRA RAI-02f involved a Fact and Observation (F&O) against FSS-H5. The licensee's response to PRA RAI-02.f.ii dated January 14, 2013 (ADAMS Accession No. ML13018A006) equates sensitive plant equipment to "solid-state control components". In addition, the response to fire modeling (FM) RAI-02.c dated February 12, 2013 (ADAMS Accession No. ML03051A539) identifies Fire Zones 3A, 3B, 8A, 8B, 8C, 8D, 8G, 8H, 9A, and 13B as the only ones containing sensitive equipment considered by the detailed fire modeling analyses.

Please describe the process by which sensitive components or devices were identified, selected, and located, and summarize what components or devices were included as sensitive electronics.

PRA RAI 02.f.i.01

The licensee's response to PRA RAI-02.f.i dated January 14, 2013 (ADAMS Accession No. ML13018A006) states that open-back MCBs and other open back MCR electrical panels were walked down to confirm that there were no cable runs between adjacent panels, with the exception of MCR Panels 9-2 and 9-21. Clarify if the vented cable run atop the MCBs has been included as a target in the MCR risk analysis, and if so, discuss how NUREG/CR-6850 guidance was used. In the response, specifically address how the vented cable run, and associated contained cables, was treated as both a target and as a potential means of fire spread. If the impacts on MCR risk of the cables contained within the vented cable run have not been addressed, include the effects in the composite analysis requested in RAI-40.

PRA RAI 02.h.01

RAI-02h involved an F&O against QU-E3. The licensee's response to PRA RAI-02.h dated January 14, 2013 (ADAMS Accession No. ML13018A006) indicates that statistical propagation of parametric uncertainty has not been performed and the response's qualitative factor of 5 to 10 overestimation of the estimated results appears to be some measure of perceived conservatism in the analyses. The Capability Category II (CC-II) for QU-E3 supporting requirement (SR) addresses the uncertainty interval around the estimated value taking into account the state-of-knowledge correlations. Describe how the effect of propagating parametric uncertainty on the change in risk estimate was evaluated. In addition, clarify if statistical propagation of parametric uncertainty would cause the risk estimates to increase beyond the Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Rev. 2, acceptance guidelines; and if not, provide an explanation.

PRA RAI 02.o.01

In a letter dated January 14, 2013 (ADAMS Accession No. ML13018A006) the licensee responded to PRA RAI 02.o and described a method by which human error probability (HEP) dependencies were identified and quantified in addressing F&O 2-15 against HR-G7. The steps in the methodology, according to the response, involve using only a finite number of cutsets to identify and evaluate HEP dependencies. That is, only a certain number of top cutsets for the fire scenarios are used in the HEP dependency analysis. This process may result in a significant number of cutsets not being part of the HEP dependency analysis, and potentially significantly underestimating risk by not adjusting a large number of HEPs for dependency in the cutsets which were not in the top cutsets selected. Provide a discussion as to how those cutsets not selected for HEP dependency analysis were treated for HEP dependency. If those unselected cutsets were not assigned a screening HEP floor, use a floor of 1E-5 unless a lower value can be justified, consistent with NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Analysis Guidelines - Final Report" guidance, in quantifying those cutsets and provide the results of the requantification. Alternatively, show that the unselected cutsets are not significant for the National Fire Protection Association Standard 805, (NPFA 805) License Amendment Request (LAR) for transition or post-transition.

PRA RAI 03.01

Section 2.4.3.3 of NFPA 805 states that the probabilistic risk assessment (PRA) approach, methods, and data shall be acceptable to the NRC. RG 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," identifies NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," Volumes 1 and 2, and Supplement 1," as documenting a methodology for conducting a fire PRA (FPRA) and endorses, with exceptions and clarifications, NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)," Rev. 2, as providing methods acceptable to the staff for adopting a fire protection program consistent with NFPA-805. Additional information is requested on the main control room (MCR) risk analysis.

LAR Attachment W indicates that a conditional core damage probability/conditional large early release probability (CCDP/CLERP) equivalent to shutting down from the alternate shutdown (ASD) panel is assumed for those sequences involving failure of the incipient detection system to notify operators, failure of operators to respond to alert, or failure of operators to respond from the MCR.

a. For each of these failure paths, justify the use of a CCDP/CLERP associated with MCR abandonment.

b. For the scenario in which operators fail to respond from the MCR, provide justification that failure of associated MCR and local recovery actions (RAs) may be further mitigated by use of the ASD path.

c. For the scenario in which the incipient detection system fails to notify operators, clarify how operators are made aware of a fire in Relay Panels 9-32 and 9-33.

PRA RAI 04.01

In a letter dated January 14, 2013 (ADAMS Accession No. ML13018A006) the licensee responded to PRA RAI-04 and provided additional justification for the use of 69 kW transient fires in Fire Zones 8A and 9A. In particular, the response stated that "the transient fire history was reviewed, and a transient fire has not occurred in these fire areas". The response to fire protection engineering (FPE) RAI-08 discusses "enhanced transient and combustible controlled zones" in Fire Zones 8A and 9A as well as selected areas of Fire Zones 2C, 3C, and 3D. The response to FM RAI-02b indicates that reductions in HRR are made for transient fires in Fire Zones 8B, 8C, 8E, 8F, 8G, and 8H (i.e., 142 kW 75th percentile HRR).

a. Discuss the results of a review of records related to violations of the transient combustible controls not just the lack of fires. This review may include both internal plant records (e.g., condition reports) and NRC inspection records (e.g., by residents or during triennials).

b. Provide justification for the use of 142 kW transient fires in Fire Zones 8B, 8C, 8E, 8F, 8G, and 8H, and any others where the 142 kW transient fire is used. In the response, specifically address the specific attributes and considerations applicable to the location, plant administrative controls, the results of a review of records related to violations of transient combustible controls (not just the lack of fires), and any other key factors for this reduced fire size. If the heat release rate (HRR) cannot be justified using the guidance criteria, discuss the impact on the analysis using acceptable methods.

PRA RAI 11.01

Section 2.4.3.3 of NFPA 805 states that the PRA approach, methods, and data shall be acceptable to the NRC. RG 1.205 identifies NUREG/CR-6850 as documenting a methodology for conducting a FPRA and endorses, with exceptions and clarifications, NEI 04-02, Rev. 2, as providing methods acceptable to the staff for adopting a fire protection program consistent with NFPA-805. Additional information is requested for transient fires.

a. Address frequently asked question (FAQ) 12-0064, "Hot Work/Transient Fire Frequency Influence Factors" (ADAMS Accession No. ML12346A488) guidance for the MCR analysis and for other fire areas with respect to transient and hot work in physical analysis units (PAUs).

   i. It is not clear if transients due to hot work were evaluated in the MCR analysis. Confirm that transient fires, hot work fires, and transient fires caused by hot work are postulated in all fire areas, including the MCR, unless such fires may be precluded as stipulated within the FAQ.

   ii. More generally, discuss how the FAQ guidance is applied to the FPRA.

   iii. Provide the impact on the risk results (i.e., core damage frequency (CDF), large early release frequency (LERF) , delta (Δ) CDF, Δ LERF) if the method for applying influence factors is not in accordance with the guidance in the FAQ.

b. In a letter dated March 13, 2013 (ADAMS Accession No. ML13080A266) the licensee responded to PRA RAI-11b and assessed the risk impact of postulating seven new transient fire scenarios at the main control board (MCB) and MCR electrical cabinet 'pinch points"; however, no additional information is provided for these scenarios to sufficiently evaluate the acceptability of risk results provided. In light of this, address the following:

   i. Describe the fire frequency apportioning methodology used for transient fires in the MCR.

   ii. Justify that these fires were, at a minimum, placed at "pinch points" that bound the risk associated with transient fires.

c. Confirm that the availability of mechanical ventilation was considered for those transient scenarios affecting equipment that is assumed to lead to MCR HVAC failure.

PRA RAI 14.01

In a letter dated January 14, 2013 (ADAMS Accession No. ML13018A006) the licensee responded to PRA RAI-14 and provided justification of a value of 0.1 to represent the failure to reach safe shutdown using alternate means. The justification largely consists of a qualitative argument that the feasibility assessment and the seven considerations identified in NUREG-1921 are addressed for alternate shutdown. A quantitative assessment of the failure of alternate shutdown is not presented. It appears from the response that this single HEP value of 0.1 is used for every MCR abandonment scenario.

a. Describe whether there are any values other than 0.1 used to characterize the HEP following MCR abandonment and whether the 0.1 also represents the CCDP. In addition, describe the CLERP.

b. If any values other than 0.1 are used, (e.g., 1.0), provide the other values, a characterization of the scenarios where these values are used, and a summary of how each value is developed. This information should include explanations of how the following scenarios are addressed.

   i. Scenarios where fire induced spurious actuations of equipment can affect the preferred shutdown path.

   ii. Scenarios where the fire could cause recoverable failures to the preferred shutdown path. If every such failure, absent recovery, is assumed to immediately fail the success path, provide confirmation.

   iii. Scenarios with fire induced failures unrelated to the preferred success path. Such failures can complicate the efforts to shut down the plant through, for example, spurious operations of unrelated equipment to the success path. If every such failure is assumed immediately fail the success path, please confirm this.

c. If no values other than 0.1 are used, explain how scenarios characterized under b.i, b.ii, and b.iii (above) are included in the MCR abandonment evaluations.

d. The fire risk evaluations (FREs) should be performed consistent with FAQ 07-0030, "Establishing Recovery Actions" (ADAMS Accession No. ML110070485), and FAQ 08-0054, "Demonstrating Compliance with Chapter 4 of National Fire Protection Association 805" (ADAMS Accession No. ML110140183) guidance. Note that FAQ 08-0054 provides guidance on the additional risk of RAs for alternative or dedicated shutdown. Discuss the FRE method followed from these FAQs for the MCR FREs, and explain how the compliant case is defined.

PRA RAI 16.01

In a letters dated January 14, 2013 (ADAMS Accession No. ML13018A006) and February 12, 2013 (ADAMS Accession No. ML03051A539) the licensee responded to PRA RAI-16 and provided a high-level description of the methodology used to determine the changes in risk reported in the LAR Attachment W, Table W-2, as clarified in the licensees July 12, 2012 letter (ADAMS Accession ML12202A042). The staff's review of the

response has determined that additional information is needed to evaluate the results in LAR Attachment W, Table W-2.

The response to PRA RAI 16 part d) defines the Post-NFPA 805 case baseline as that which includes plant modifications (hardware and procedural) aimed at resolving selected variance from deterministic requirements (VFDRs) and additional modifications beyond those addressing VFDRs.

RG 1.205 position 2.2.4.3 notes that the risk of the plant at the point of full implementation of NFPA 805 is that after completing all plant modifications and changes that the licensee has committed to make during transition. Since the "beyond compliance modifications" are being credited to contribute to a negative total delta risk for the transition, such credited modifications should be part of the commitment to make the transition.

a. Provide a complete list of the "beyond compliance" modifications credited in LAR Attachment W, Table W-2. Confirm the beyond compliance modifications which will be part of the baseline risk post-transition are included in the commitments for transition.

b. The partial list of modifications identified in part d) of the response to PRA RAI 16 notes "establishing transient free zones." SR IGN-A9 requires a non-zero fire ignition frequency for PAUs regardless of administration controls. Confirm that "transient free zones" does not correspond to a zero transient fire ignition frequency. If it does, please discuss how this will be made consistent with SR IGN-A9.

c. Since the fire area transition delta-risk calculation uses the Pre-NFPA 805 compliant case, the Pre-NFPA 805 plant FPRA model should credit current plant modifications and not the planned post-transition modifications. Provide confirmation that this is the case.

d. Discuss whether each if the modifications in LAR Attachment S are related to addressing VFDRs, or are "beyond compliance" modifications such as the incipient detection modification (S-2.4).

PRA RAI 16.02

FAQ 08-0054 (ADAMS Accession No. ML110140183), discusses evaluating the additional risk of RAs and includes options to evaluate the change in risk associated with a VFDR and associated RAs. As discussed in the LAR, for Fire Area RB-A, cable damage to M923 represents two separate VFDRs: RBA-02 and RBA-03. Cable damage to M923 would result in failure of more than one PRA target. However, neither RBA-02 or RBA-03 included all failed equipment due to loss of the cable, and therefore their FREs do not appear to correspond to a physical event. The FPRA must be of sufficient technical adequacy to evaluate fire scenarios for use in performing FREs. Therefore, address the following:

a. The FRE for failure of this cable should be re-evaluated unless justification can be provided such that the cause and affect of the cable failure is accounted for in the analysis.

b. Consider if there are other VFDRs for which the FREs do not accurately model the physical impact of the fire, and re-evaluate or provide justification for those also.

c. If any LAR results change as a result of parts a or b, discuss their impact.

d. Confirm that FAQ 08-0054 (ADAMS Accession No. ML110140183), and FAQ 07-0030 (ADAMS Accession No. ML110070485), guidance related to calculating both change in risk and the additional risk of RAs was followed. If not, provide justification for any differences and provide an assessment of the impact on the reported risk results of following the FAQ guidance.

PRA RAI 19.01

In a letter dated January 14, 2013 (ADAMS Accession No. ML13018A006) the licensee responded to PRA RAI-19. The staff noted that the response does not seem to be consistent with the related implementation item 3-30 that was added to LAR Attachment S, Table S-3. While Item S-3.30 commits to verifying the validity of changes in risk following the implementation of Table S-2 modifications, it does not address Table S-3

implementation items, and does not explain what values (e.g., individual modifications, modifications type, total modifications, etc.) will be compared to what other values in order to verify the validity of the change in risk calculations. In addition, Item S-3.30 states that if the verification effort determines that the as-built risk metrics have changed, the revised risk metrics are evaluated against the proposed license condition requirements in the new licensee condition 2.C(4). The new licensee condition is to be used to support changes to the plant after transition, and has no role in the transition evaluations. Similar change in risk verification implementation items have been developed and approved for previous NFPA-transition requests, please consider these previous items.

a. Since there are implementation items in LAR Attachment S, Table S-3 which are modeled in and can affect the FPRA, the license condition verification activity should also include S-3 modifications as appropriate. If S-3 modifications are not included, provide justification why they should be treated differently than S-2 modifications.

b. You reported a total additional risk from additional RAs of 1.12E-5/year and 3.97E-6/year for CDF and LERF respectively. These values are above the guidelines for acceptable increases in risk in RG 1.174. RG 1.205 Position 2.2.4.2 states that, "If the additional risk associated with previously approved RAs is greater than the acceptance guidelines in RG 1.174, then the net change in total plant risk incurred by any proposed alternatives to the deterministic criteria in NFPA 805, Chapter 4 (other than the previously approved recovery actions), should be risk-neutral or represent a risk decrease". Application of this guidance to RAs in general (i.e., not solely to previously approved RAs) indicate that the proposed additional risk of RAs will be acceptable if the total change risk is risk-neutral or represents a risk decrease. Your current transition change in risk estimates represent a risk decrease indicating the additional risk of RAs somewhat exceeding the acceptance guidelines should be acceptable. Define the acceptance guidelines that will be used to determine the acceptability of the transition change in risk if the validity evaluation indicates that the as-built facility results differ from the results reported in the LAR.

PRA RAI 24.01

In a letter dated November 14, 2013 (ADAMS Accession No. ML12312A281), the staff issued PRA RAI-24 and requested information on the technical basis for including new success criteria in the FPRA for the residual heat removal service water (RHRSW) booster pumps. This success path will involve operator actions to open service water valve(s) which close on loss of the service water booster pumps due to an interlock. Confirm that this has been considered in modeling the new success criteria for the FPRA.

PRA RAI 27.01

In a letter dated January 14, 2013 (ADAMS Accession No. ML13018A006), the licensee responded to PRA RAI-27 and discussed that air accumulators are credited as a back-up source of instrument air to manipulate valves associated with the hard pipe vent system. Air accumulators could be an important consideration in the successful operation of the hard pipe vent system, given that the instrument air (IA) system cables were not traced and may be modeled by exclusion for this system. Discuss important FPRA assumptions in crediting them, for example, the ability to manipulate the air accumulators for the modeled mission times.

PRA RAI 29.01

In a letter dated January 14, 2013 (ADAMS Accession No. ML13018A006) the licensee responded to PRA RAI-29b and indicated that an HEP of 0.1 was chosen for HFE PCV-XHE-FO-AOV. Given that a detailed analysis of this action was not performed for the FPRA, provide further justification for this HEP, including why the internal events PRA (IEPRA) HEP value is applicable. In addition, discuss how this action relates to human factors evaluation (HFE) PCV-XHE-FO-HPV, clarifying how they both are credited in the FPRA. Further, the response to PRA RAI 29c (ADAMS Accession No. ML13018A006) appears to indicate that valves associated with PCV-XHE-FO-HPV for the hard pipe vent can be manipulated from the MCR. However, some of the valves are air operated valves (AOVs). Provide clarification regarding if there are cases where the AOVs cannot be used from the CR and if these cases are treated in the FPRA model.

PRA RAI 35

Section 2.4.3.3 of NFPA 805 states that the PRA approach, methods, and data shall be acceptable to the NRC. RG 1.205 identifies that recovery actions must be addressed. The NRC staff's sample review of FREs noted that some HRA basic events appear to be credited; however do not appear in the LAR, Attachment G as credited recovery actions.

a. A review of the FRE for RB-M suggests that the recovery of SW-MOV-M089B may be a credited RA for VFDR RBM-07; however, neither LAR Table G-1 (including revisions made in response to SSD RAI-09) nor LAR Table B-3 credit the recovery of SW-MOV-M089B as a RA for VFDR RBM-07. Confirm whether or not the recovery of SW-MOV-M089B is a RA that should be in Table G-1. If it is a RA, clarify if it is reflected in LAR Attachment W, or provide updated results if necessary.

b. A review of FREs for RBK-04 and TBA-05 appear to credit EAC-XHE-FI-SWEDG1 and SWS-XHE-FI-SWPACOMA; however, according to LAR Table G-1 and LAR Table B-3, no RAs are credited to meet RG 1.174 risk acceptance guidelines or defense-in-depth (DID) criteria for VFDRs RBK-04 and TBA-05. Clarify if these actions are credited in the LAR Attachment W results, and provide updated results if necessary.

c. Explain the cause of these apparent discrepancies and confirm that LAR Table G-1, as supplemented by the response for safe shutdown analysis (SSD) RAI-09, is a complete list of RAs for the LAR, (i.e., it includes RAs which may or may not be credited in the FPRA in performing the FREs.)

PRA RAI 36

In a letter dated February 12, 2013 (ADAMS Accession No. ML03051A539) the licensee responded to RRA RAI-13 and PRA RAI-15 and stated that corrections were made to the FPRA model after the LAR submittal for several scenarios in Fire Area TB-A and RB-FN (via RAI 16e); however, the changes made are not identified. In the responses to PRA RAI 13 and PRA RAI 15, the pre-sensitivity study results would seem to correspond to the original LAR Attachment W evaluations after the corrections were made to the fire model. Comparison of the total delta CDF in attachment W (-8.71E-06) with the total pre-sensitivity study delta CDF in RAI 15 (-1.2E-05) indicates an additional decrease in risk caused by the corrections. Conversely, the response to PRA RAI16e (February 12, 2013, ADAMS Accession No. ML03051A539) states that changes in the evaluation for RB-FN caused the delta CDF to change from -1.24E-07 to 1.59E-07, an increase of 2.83E-07. Provide a description of the corrections made and an explanation for the changes.

PRA RAI 37

Section 2.4.3.3 of NFPA 805 states that the PRA approach, methods, and data shall be acceptable to the NRC. Containment overpressure (COP) is an important consideration in the plant response, and is also related to some VFDRs. The staff is requesting clarification on the FPRA modeling of COP. Address the following:

a. Discuss the system assumptions made in the FPRA and FREs given loss of COP.

b. Provide a comprehensive discussion on how the timing of the COP analysis in CNS PSA-007 is consistent with human reliability analysis (HRA) modeling of containment isolation (e.g., CNT-XHE-FO-L2ISL and CNT-XHE-FO-L2ISO), and other possible F PRA modeling related to loss of COP and timing of containment isolation actions (e.g., COP is not adversely affected by the spurious opening of containment vents that last up to 1 hour).

c. Describe whether cable tracing was performed for cables which may result in potential containment bypass pathways as a result of a fire. If not, describe whether these cables were modeled in the FPRA by exclusion. If so, discuss the consistency of the fire impact on the bypass pathway with the COP analysis in CNS PSA-007.

PRA RAI 38

Describe whether the FPRA considers the heat contribution from fires to heat loads in the room in order to determine that sufficient heating ventilation and air conditioning system (HVAC) cooling is available. If not considered, provide justification that it is not important for the application.

PRA RAI 39

The NRC staff's review of the detailed HRA identified observations which need clarification or resolution. These observations are discussed below.

- There appears to be inconsistencies in the detailed HRA and its applicability to the fire scenarios to which it is mapped. An example is the basic event EAC-XHE-FI-BUS1G which is mapped to a fire scenario in VFDR RBFN-3 which involves fire-related damage to both 4kv buses. Potential inconsistencies in this detailed HRA are:
    - The HEP does not appear to be reflective of the complexity of the fire scenario to which it is mapped due to the small failure probability associated with the complex scenario.
    - May not consider the dependency on needing to recover BUS1F.
    - Assumptions in the detailed HRA appear to be different from the VFDR RBFN-3; and,
    - Detailed HRA applicable fire areas and the VFDR fire areas appear not to match.
- Detailed HEPs may be optimistic given the extent of fire damage. In the above scenario two 4kv buses experience the fire affects, yet the success path is recovered with a relatively small failure probability for EAC-XHE-FI-BUS1G. Other detailed HRA showing possible optimistic HEPs are EAC-XHE-FI-SWEDG1 and SW-XHE-FI-SWACOMA which are mapped to fire scenarios in TBA-5. These are field actions to be taken within five minutes. Such HEP may reflect a belief that there is no delay due to uncertainty in travel time, or in implementing emergency operating procedures (EOPs) if applicable.
- Timing assumed in the detailed HEP may be optimistic. For example, EAC-XHE-FI-BUS1F1G says both buses 1F and 1G will be recovered in 12 minutes which includes travel and manipulation time. This is comparable to recovery of offsite power due to plant-centered random loss of offsite power even though it is mapped to a fire scenario in which the fire affects two 4 kv buses

Review the observations identified above for the identified examples as well as for other detailed HRA basic events to ensure the detailed HRAs performed have a justifiable technical basis. Discuss:

a. The results of the review

b. Justification that the timing associated with the detailed HEP analyses is reasonable or bounding for the fire scenarios to which it is mapped.

c. The process by which the manipulation times were increased from the times used in the IEPRA and the extent to which the manipulation times for risk-significant actions were verified in the context of the fire scenarios to which they were applied.

For detailed HEPs for which the timing does not have a justifiable technical basis, assign a screening HEP using acceptable HEP screening guidance, and discuss the impact of this sensitivity analysis on the LAR results.

PRA RAI 40

The NRC staff identified several methods and weaknesses used in the FPRA that have not been accepted by the staff. RAIs were provided about these methods and weaknesses and the responses have been reviewed.

The staff has concluded that some of these methods and weaknesses are unacceptable in that justification does not seem to be technically available (e.g., credit for control power transformers is not supported by experiments).

Unacceptable methods and weaknesses:

- Transient fire influence factors (LAR Supplement dated July 12, 2012)
- Treatment of kerite cables (PRA RAI-02b)
- Addition of Fire Area DW (PRA RAI-32)
- Corrections associated with Fire Area TB-A (PRA RAI-36).
- Corrections associated with Fire Area RB-FN (PRA RAI-16e)
- Credit for control power transformers (PRA RAI-15)
- Changes to the recovery actions (PRA RAI-34)

The following methods and weaknesses have been identified, but the NRC Staff review is continuing with additional RAIs and further supporting information being requested. Alternatively, any of these methods and weaknesses may be replaced with a method or model previously accepted by the NRC by modifying the FPRA.

Methods and weaknesses still under review:

- Use of probabilities less than 1E-5 as the floor HEP screening value (PRA-02-01)
- Credit for minim instrumentation after loss of RPV level instrumentation (PRA RAI 02c-01)
- Estimate of CCDPs including vented cable run atop the MCBs (PRA RAI 02f(i)-01)
- Use of less than 317KW for transient fires (PRA RAI 04-01)
- Estimate of HEP/CCDPs following MCR abandonment (PRA RAI 11-01, 14-01)

a) Please provide the results of a composite analysis that shows the integrated impact on the fire risk CDF,LERF, ΔCDF, ΔLERF) after replacing all the unacceptable methods and weaknesses with acceptable ones. As the review process is concluded, additional changes to replace any method or weakness still under review that are determined to be unacceptable may be required. In this composite analysis, for those cases where the individual issues have a synergistic impact on the results, a simultaneous analysis must be performed. For those cases where no synergy exists, a one-at-a-time analysis may be done. In the response, explain how the RG 1.205 risk acceptance guidelines are satisfied for the composite analysis and, if applicable, a description of any new modifications or operator actions being credited to reduce delta risk and the associated impacts to the fire protection program.

b) If any of the unacceptable methods or weaknesses will be retained in the PRA that will be used to estimate the change in risk of post transition changes to support self-approval, please explain how the quantitative results for each future change will account for the use of the unacceptable method or weakness.

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From: Wilkins, Lynnea

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Recipients:
"Victor,, Wiilliam R.- Strategic Initiatives (wrvicto@nppd.com)" <wrvicto@nppd.com>
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"Burkhardt, Janet" <Janet.Burkhardt@nrc.gov>
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