

June 5, 2017

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 17-079A
NAPS/DEA R0
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
ASME SECTION XI INSERVICE INSPECTION PROGRAM
PRA INFORMATION TO SUPPORT PROPOSED
INSERVICE INSPECTION ALTERNATIVES N1-I4-NDE-010 AND N2-I4-NDE-005

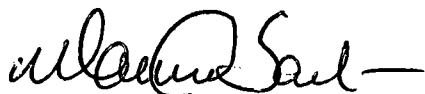
By letter dated March 27, 2017, Virginia Electric and Power Company (Dominion Energy Virginia) submitted proposed inservice inspection (ISI) alternatives N1-I4-NDE-010 and N2-I4-NDE-005 for North Anna Power Station (NAPS) Units 1 and 2, respectively. The proposed alternatives would extend the interval for reactor vessel nozzle welds, Category B-F pressure retaining welds from 10 years to 20 years in accordance with WCAP-17236-NP-A, Revision 0, Risk-Informed Extension of the Reactor Vessel Nozzle Inservice Inspection Interval. Dominion requested approval of the proposed alternatives by March 1, 2018.

In a May 22, 2017 telecon, the NRC requested information regarding the technical adequacy of the PRA Model used to prepare proposed ISI alternatives N1-I4-NDE-010 and N2-I4-NDE-005 be submitted to support review and approval of the proposed Reactor Vessel Nozzle Weld Examinations Extensions.

Attachment 1 provides Dominion Energy Virginia's response to NRC's request for PRA information to support alternatives N1-I4-NDE-010 and N2-I4-NDE-005 for NAPS Units 1 and 2. A table of Supporting Requirements that were not met for Capability Category II during the North Anna Power Station (NAPS) 2013 Full Peer Review and a table of Findings from the NAPS 2013 Full Peer Review are included in Attachment 1.

If you have any questions, please contact Ms. Diane Aitken at (804) 273-2694.

Sincerely,



Mark Sartain
Vice President Nuclear Engineering and Fleet Support

This letter contains no NRC commitments.

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NRR

Attachments

1. North Anna PRA Model Technical Adequacy Assessment

cc: U.S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Avenue, NE Suite 1200
Atlanta, GA 30303-1257

Mr. J. E. Reasor, Jr.
Old Dominion Electric Cooperative
Innsbrook Corporate Center
4201 Dominion Blvd.
Suite 300
Glen Allen, Virginia 23060

NRC Senior Resident Inspector
North Anna Power Station

Mr. James R. Hall
NRC Senior Project Manager-North Anna
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O-8 G9A
11555 Rockville Pike
Rockville, Maryland 20852-2738

Ms. K. R. Cotton-Gross
NRC Project Manager-Surry
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O-8 G9A
11555 Rockville Pike
Rockville, Maryland 20852

ATTACHMENT 1

NORTH ANNA PRA MODEL TECHNICAL ADEQUACY ASSESSMENT

**VIRGINIA ELECTRIC AND POWER COMPANY
(DOMINION ENERGY VIRGINIA)
NORTH ANNA POWER STATION UNITS 1 AND 2**

North Anna PRA Model Technical Adequacy Assessment

A review has been performed to assess the technical adequacy of the NAPS-R07e PRA model used to prepare proposed ISI alternatives N1-I4-NDE-010 and N2-I4-NDE-005. North Anna PRA model NAPS-R07e is an interim model revision of NAPS-R07 PRA model with an effective date of June 17, 2016 which was used to support this assessment. North Anna PRA Model Notebook MC.1, Rev. 3 documents the NAPS-R07e PRA model changes and quantification results. PRA Model Notebooks are used to review and approve interim changes to Dominion Energy Virginia PRA models between issuances of PRA Models of Record.

PRA models are maintained and updated under a PRA configuration control program in accordance with Dominion Energy Virginia procedures and ASME/ANS PRA standard requirements. Plant changes are reviewed, including physical and procedural modifications and changes in performance data, and the PRA model is periodically updated to reflect such changes.

The NAPS-R07 PRA model underwent a full scope peer review led by Westinghouse in 2013. During the peer review, the North Anna model was reviewed against the requirements in ASME/ANS PRA standard, RA-Sa-2009 and Reg. Guide 1.200, Rev. 2. The review included a total of 316 numbered supporting requirements (SRs) for internal events and internal flooding in nine technical elements and 10 configuration control SRs. Eleven of the SRs were determined to be not applicable (N/A) to the North Anna PRA. 292 SRs were rated as SR Met, Capability Category (CC) II, or greater. Three SRs were rated as Category I and 20 SRs were Not Met. In the course of this review, 72 Facts and Observations (F&Os) were prepared, including 35 suggestions, 35 findings, and 2 best practices.

The 2013 peer review team concurred with the closure of peer review F&Os that were generated prior to the 2013 peer review. Therefore, this assessment does not consider peer review F&Os generated prior to the 2013 peer review.

The SRs that did not meet CC II in the 2013 Peer Review were reviewed for their impact to this application (proposed ISI alternatives N1-I4-NDE-010 and N2-I4-NDE-005). Table 1 contains the results of this review. All SRs **not** listed in Table 1 were concluded to meet CC II or higher by the 2013 Peer Review. Based on the result of the review of PRA Standard SRs, the CC II SRs that were not met have no impact on this application and no additional sensitivity studies are required to be performed.

Table 1 - NAPS R07e Supporting Requirements: CCII Not Met

SR	CC II Met?	Impact to Application
AS-A10	No	None. This issue has been resolved in the PRA model that was used to support this application.
AS-B6	No	None. A review was performed to evaluate coincident maintenance that would include identification of dependencies among plant alignments. No such dependencies were identified.
AS-C1	No	None. This SR was considered Not Met due to a need to enhance documentation. A documentation enhancement that would facilitate emergent risk informed applications will not significantly impact the quantifications performed to support this application.
DA-B2	No	None. This issue has been resolved in the PRA model that was used to support this application.
DA-C14	No	None. This issue has been resolved in the PRA model that was used to support this application.
DA-D8	No	None. This issue has been resolved in the PRA model that was used to support this application.
HR-D3	No	None. This SR was considered Not Met due to a need to enhance documentation related to following the guidelines of NUREG-0700. The North Anna PRA uses the HRA Calculator software which adheres to the guidelines of NUREG-0700. Clarification to the basis of adherence to NUREG-0700 will not impact the quantification of LOCA sequences which was performed to support this application.
HR-G3	No	None. This SR was considered Not Met due to a need to enhance documentation. The documentation of quality of operator training for HFES will not significantly impact the quantification of LOCA sequences which was performed to support this application.
HR-G6	No	None. This SR was considered Not Met due to a need to enhance documentation. An additional survey to review HEP consistency will not significantly impact the quantification of LOCA sequences which was performed to support this application.
HR-I3	No	None. This SR was considered Not Met due to a need to enhance documentation. The documentation of additional sources of uncertainty will not significantly impact the quantification of LOCA sequences which was performed to support this application.
IE-A6	No	None. This issue has been resolved in the PRA model that was used to support this application.

Table 1 - NAPS R07e Supporting Requirements: CCII Not Met

SR	CC II Met?	Impact to Application
IE-C3	No	None. The application only quantified LOCA sequences. There is no impact to the application from this SR not meeting Capability Category II.
IFPP-B3	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
IFQU-A6	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
IFSN-A10	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
IFSN-A14	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
IFSN-A16	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
IFSN-A5	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
IFSO-A5	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
IFSO-B3	No	None. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding SR not meeting Capability Category II.
LE-G1	No	None. This SR was considered Not Met due to a need to enhance documentation. Development of a peer review SR road map will not impact the quantifications performed to support this application.
QU-B5	No	None. This issue has been resolved in the PRA model that was used to support this application.

Table 1 - NAPS R07e Supporting Requirements: CCII Not Met

SR	CC II Met?	Impact to Application
SY-C1	No	None. This SR was considered Not Met due to a need to enhance documentation. Enhancement of the dependency matrix documentation will not significantly impact the quantifications performed to support this application.

The 'Finding' level F&Os identified during the 2013 Peer Review were reviewed for their impact on this application. The results of the 'Finding' review is documented in Table 2. The table includes 'Finding' level F&Os from the peer review on the North Anna PRA model that were open. Some of these F&Os have been resolved in interim model revisions since the peer review. The findings that remain unresolved were reviewed for their impact on their potential impact on the quantification of LOCA sequences that were performed to support this application. The review of open peer review findings determined that none of the findings have an impact on this application or require additional sensitivity studies to be performed.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
AS-A10-01	<p>Discussion: Differences in transient initiating event group are not clearly described impact of the loss of condenser vacuum which affects steam dump capability and operability of main feed water and the spurious SI which challenges PORV open. Loss of condenser vacuum is not explicitly modeled and is treated as a transient with MFW, which affect steam dump capability and main feedwater. Spurious SI event increases RCS pressure and subsequently open a PORV when operator fails to terminate the SI. Basis for Significance: General transient event tree logic should capture the differences.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2.</p>	<p>None. This issue has been resolved.</p>
AS-B6-01	<p>Discussion: No discussion could be identified in the AS calculation and supporting information with respect to plant configurations and maintenance practices creating dependencies among various system alignments. PENDING - confirm this to be the case when reviewing system notebooks. (Ref. Assessment of NAPS Peer Review F&Os - TPJ.xlsx) Basis for Significance: System alignments could have an impact on the risk profile if unique plant configurations or maintenance practices are used.</p>	<p>Unresolved.</p>	<p>A review was performed to evaluate coincident maintenance that would include identification of dependencies among plant alignments. No such dependencies were identified.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
AS-C1-01	Discussion: Accident sequence analysis is a key element of PRA to integrate many other elements of PRA, but accident sequence notebook needs to improve for further application and update. For instance, operator actions are generally described without specific governing procedures and basic event name modeled in HRA. Observations in AS-C2 provide more specific examples. Observations in AS-C1-02 and AS-C2-01 and 02 provide more specific examples. Basis for Significance: This would facilitate emergent risk informed applications using documents with better traceability.	Unresolved.	This is a documentation issue. A documentation enhancement that would facilitate emergent risk informed applications will not significantly impact the quantifications performed to support this application.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
AS-C2-01	<p>Discussion: 1. Inconsistent documentation for mitigation tops with designators (e.g., -LATE, -EARLY, etc.). Additionally, some of the mitigation top discussions are inappropriate for the initiator being discussed OR the cross reference to the applicable mitigation top discussion is invalid. For example, for the LOOP initiator, the BAF mitigation top discusses the failure of MFW, even though MFW is not used in the LOOP event tree.</p> <p>2. Accident sequence notebook does not include a description of the accident progression for each sequence or group of similar sequences.</p> <p>3. Operator action is described in the accident sequence notebook, but there is limited timing information and no link with HRA information. Basis for Significance: This would improve traceability of accident sequence model and facilitate further risk informed applications.</p>	Unresolved.	<p>This is a documentation issue. Increased gate name consistency and the improvement of traceability between an accident sequence analysis and HRA analysis will not impact the quantifications performed to support this application.</p>
DA-B2-01	<p>Outliers with zero demands are included in groups with frequently-tested components.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2.</p>	<p>None. This issue has been resolved.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
DA-C14-01	<p>Discussion: Coincident maintenance events for intersystem events have not been looked at. Need to evaluate historical maintenance schedules to detect patterns of typical maintenance combinations and then add these identified coincident maintenance events to the model. Basis for Significance: These events could have an impact on the annual risk results. Some plants have experienced a significant impact to their results form including such events in the model.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2. NAPS-DA.6 revised.</p>	<p>None. This issue has been resolved.</p>
DA-D8-01	<p>Discussion: No discussion of evaluation of the impact of plant modifications on the data could be found in any of the below:</p> <ul style="list-style-type: none"> -GARD on Data (2061, 2063) -Data Calculation and Supporting Analyses - SY.3 System Notebooks <p>Therefore this SR is considered to be Not Met Basis for Significance: This item could change the results from the PRA.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2. NAPS-DA.2, Rev 6 issued.</p>	<p>None. This issue has been resolved.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
DA-D8-02	<p>Discussion: No discussion of evaluation of the impact of plant modifications could be found in any of the below:</p> <ul style="list-style-type: none"> -GARD on Data (2061, 2063) -Data Calculation and Supporting Analyses - System Notebooks Basis for Significance: Data could be impacted by a plant mod and effect risk results 	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2. NAPS-DA.2, Rev 6 issued.</p>	<p>None. This issue has been resolved.</p>
HR-D3-01	<p>Discussion: The additional NRC notes adds a requirement for adherence to NUREG-0700, Human-System Interface Design Review Guidelines. The basis for stating that no cases were identified where the quality is lacking needs to reference NUREG-0700 as the process for validating the quality of the man-machine interface. Basis for Significance: Additional NRC requirement to go from Cat. I to Cat. II.</p>	<p>Unresolved.</p>	<p>This is a documentation issue. The North Anna PRA uses the HRA Calculator software which adheres to the guidelines of NUREG-0700. Clarification to the basis of adherence to NUREG-0700 will not impact the quantification of LOCA sequences which was performed to support this application.</p>
HR-G2-01	<p>Discussion: Dependency not assessed for recoveries credited in post-initiators using the CBDTM method. Basis for Significance: Potential to underestimate human error probabilities.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2.</p>	<p>None. This issue has been resolved.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
HR-G3-01	Discussion: Cat. II requires an evaluation of the quality of operator training on the HFE of interest, including whether the training is classroom training or simulator training and the frequency of such training. The frequency field in the HRA Calculator was not filled out for the NAPS post initiator HFEs. Basis for Significance: Provides documentation for the quality of operator training for the HFE of interest.	Unresolved.	This is a documentation issue. The documentation of quality of operator training for HFEs will not significantly impact the quantification of LOCA sequences which was performed to support this application.
HR-G6-01	Discussion: HR-G6 requires a check of the consistency of the post-initiator HEP quantifications. The instructions are to review the HFEs and their final HEPs relative to each other to check their reasonableness given the scenario context, plant history, procedures, operational practices, and experience. HR.2 states that an operator survey, which collects operator response times, was performed to meet this requirement. However, the surveys do not really check the consistency of the HEP quantifications. Basis for Significance: Confirm that quantifications are reasonable.	Unresolved.	This is a documentation issue. An additional survey to review HEP consistency will not significantly impact the quantification of LOCA sequences which was performed to support this application.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
HR-G7-01	Discussion: There were some cases of unanalyzed dependency combinations found in the cutsets of cutset file U1-CDF-Avg Maintenance-R07.cut. Examples include cutsets 3119, 22480, 22642, 22643, 22868, 23050. The applicable truncation limits used in the dependency analysis need to adjust to eliminate unanalyzed combos in the cutsets. Basis for Significance: Some cutsets may have higher failure probabilities than presently quantified.	This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2.	None. This issue has been resolved.
HR-I3-01	Discussion: NAPS HR.1, HR.2, HR.3 section 2.3 and HR.4 section 5 addresses assumptions and uncertainties. Only source of model uncertainty listed is lack of ERO credit which in reality can be accounted for using the recoveries available in the HRA calculator. NUREG/CR-1278 lists sources of uncertainty which could be referenced. Basis for Significance: Need better documentation of sources of uncertainty.	Unresolved.	This is a documentation issue. The documentation of additional sources of uncertainty will not significantly impact the quantification of LOCA sequences which was performed to support this application.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IE-A6-01	<p>Discussion: Common cause and routine system alignments are generally appropriately considered for complicated safety system initiating event fault trees. However, for other systems (notably, electrical systems) there is no discussion or evidence of a review for initiators due to common cause of electrical systems nor due to routine system alignments. GARD NF-AA-PRA-101-204C identifies that transformers, battery chargers, and inverters are candidates for common cause. These common cause failures are modeled in the core damage mitigation fault trees. However, these common cause failures are not considered as initiating events, particularly for RSST 4KV transformers, vital inverters, and 125VDC battery chargers. Also, for example, unavailability of a backup battery charger may drive a plant shutdown given loss of the normally operating charger.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2.</p>	<p>None. This issue has been resolved.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IE-A6-01 (cont'd.)	In addition, could not find a discussion of why common cause blockage of service water travelling screens was not considered. Basis for Significance: IE-A6 CAT II requires a systematic evaluation of initiating events, including events resulting from multiple failures resulting from common cause or from routine system alignments. Notebook IE.1 says that due to the independency of busses, the loss of more than one bus at a time is assessed as negligible frequency, however this statement does not consider common cause. No evidence of a systematic evaluation is evident.		
IE-C1-01	Discussion: Plant specific-only data is used for some initiating events. Initiating event SPUR-SIS has only one failure, but there is no justification for not incorporating generic data. Basis for Significance: Initiating event SPUR-SIS uses plant-specific data, but not justification made that there is adequate plant-specific data to characterize the parameters.	Unresolved.	The application only quantified LOCA sequences. There is no impact to the application from findings related to non-LOCA initiating events.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IE-C3-01	Discussion: Many recovery actions are credited in SSIE fault trees. No discussion or analysis was found to justify these credits. Basis for Significance: SR IE-C3 requires justification for credited recoveries in initiating events. These recoveries are also used in the post-initiating event mitigation tree.	Unresolved.	The application only quantified LOCA sequences. There is no impact to the application from findings related to non-LOCA initiating events.
IFPP-B1-01	Discussion: It is suggested to add an overall site layout drawing into the IF.1A notebook with the other individual building level layout drawings to aid in reader understanding of the buildings' relationships to each other and a table of such buildings and their disposition in the flooding study (i.e. include/retain, screened, etc.) prior to or in conjunction with the Appendix R information being used as a flooding study input. Basis for Significance: Deemed a finding for document enhancement due to the inability to perform as detailed a review as could be possible given documentation updates. The flooding notebooks seem to present the results more so than the starting point through the endpoint with some discussion given in Section 2.1 of the IF.1A notebook related to using Appendix R information and the overall process.	Unresolved.	This is a documentation issue. The quantification performed to support this application only included LOCA sequences, so there is no impact to the application from this internal flooding finding.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IFPP-B3-01	<p>Discussion: No discussion is given in the various internal flooding notebooks with regard to the plant partitioning process or conclusions as what sources of uncertainty may be present or may have been introduced as part of the partitioning task. Assumptions are given in Section 2.3 of the IF.1B notebook related to flood area definitions; though no discussion of their potential impacts to the analysis are given. Sources of uncertainty related to the flooding initiating events pipe mode are included in Section 6.0 of the IF.2 notebook and repeated in Section 2.0 of the QU.4 notebook (with no other internal flooding related uncertainties added in this QU.4 notebook) while Section 5.0 of the IF.3 notebook indicates that sensitivities related to internal flooding are contained in the QU notebooks, though only sensitivity cases related to HEP and CCF values were noted which contained the overall internal flooding events in the sensitivity case model quantifications. Basis for Significance: The SR was deemed 'not met' thus a finding level is appropriate.</p>	Unresolved.	<p>The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IFQU-A6-01	<p>Discussion: While the flooding-specific HFES are developed with detailed assessments, several of the noted items in the SR were not accounted for.</p> <p>Items noted from review of SR IFQU-A6:</p> <p>(b) The impact of the flooding on cues that the control room uses for a non-flooding HFES is not discussed in the supporting spreadsheet of the internal flooding HRA notebook for internal events HFES used in the flooding analysis.</p> <p>(a) The impact of the flooding on additional workload and stress in the control room uses for a non-flooding HFES is not discussed in the supporting spreadsheet of the internal flooding HRA notebook for internal events HFES used in the flooding analysis. In addition, the stress levels for the flooding-specific events were evaluated at low stress levels, which is inconsistent with the intent of the SR...</p>	Unresolved.	The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IFQU-A6-01 (cont'd.)	In addition, there appears to be inconsistent timings for the HEPs defined between the HRA calculator inputs and the NOTEBK-PRA-NAPS-IF.2 for time to perform the action (which is usually 1 minute less than the time to damage) being noted in the NOTEBK-PRA-NAPS-IF.2 notebook and the time to damage being used in the HRA calculator. This slight difference is not expected to cause significant changes, but should be reviewed for consistency and updated as needed. Basis for Significance: The SR was deemed 'not met' thus the level of finding is appropriate.		
IFQU-A9-01	Discussion: One internal flooding source system, firewater, was noted as not always failed when its piping is the flooding source. Credit of the alternate pump cooling from firewater is still possible under flooding initiating events from firewater piping. Basis for Significance: Revision of the PRA model is required, thus a level of finding is deemed appropriate.	Unresolved.	The quantification performed to support this application only included LOCA sequences, so there is no impact to the application from this internal flooding finding.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IFQU-B1-01	<p>Discussion: Several internal flooding HRA documentation inconsistencies were noted during review.</p> <p>Examples include:</p> <ul style="list-style-type: none"> -the HRA notebook NOTEBK-PRA-NAPS-HR.10 and the internal flooding notebook NOTEBK-PRA-NAPS-IF.2 do not list the same set of flooding-specific HFEs -all of the HFEs listed in the HRA notebook NOTEBK-PRA-NAPS-HR.10 do not appear in the PRA model, event REC-FLD-ABSWLL appears as a flag event -the internal flooding notebook NOTEBK-PRA-NAPS-IF.2 presents HFE HEP-ISO-TBSWLL which is not contained in the HRA calculator which does contain event REC-FLD-TBSWLL, however, neither event appears in the PRA model. Basis for Significance: Information is needed in the flooding/HRA notebooks, thus a finding rather than a small item that would warrant a suggestion. 	Unresolved.	<p>This is a documentation issue. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IFSN-A5-01	<p>Discussion: The critical height of all PRA-related SSCs is not given in an easy to identify single location such as the table listing of PRA-related SSCs within the various internal flood areas. In addition, the critical height is not always defined in the other sections of the internal flooding notebooks such as walkdowns or area scenario discussions, only for the end-state important SSCs. Basis for Significance: SR requires spatial location of SSCs which was not consistently done.</p>	Unresolved.	<p>The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.</p>
IFSN-A8-01	<p>Discussion: Assumptions of doors failing without allowing water accumulation may be a beneficial failure for the flood room/area where the accumulation would not occur due to the assumption of the door failing open immediately. Basis for Significance: Potential non-conservatism without significant analysis to ensure treatment is okay.</p>	Unresolved.	<p>The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IFSN-B2-02	Discussion: The included pipe break flow rates do not always include a calculation for the full diameter break size, and in addition, there is no consideration of pump run out flow rate comparison to the calculated break flow rate in the various internal flooding notebooks. Also, the flooding flow rate used to determine the consequential impacts for each flooding area should be listed in the area scenario discussions. Basis for Significance: Information is needed in the flooding notebooks, thus a finding rather than a small item that would warrant a suggestion.	Unresolved.	The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.
IFSO-A4-01	Discussion: Inadvertent actuation of fire protection system outside of Aux Building not modeled or screened. Inadvertent actuation of fire protection system inside of Aux Building not discussed. Basis for Significance: SR specifically calls for inadvertent actuation to be considered.	Unresolved.	The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
IFSO-A5-01	<p>Discussion: The capacities of various sources are limited by an assumption that all flood isolations could be performed within 60 minutes. No basis is given for this assumption, and the potential of all scenarios using a purely assumptive basis for such inherent screening of potential impacts should also model non-isolated scenarios for the same pipe break source. Also, the treatment is inconsistent with an IF HFE that is evaluated past 60 minutes.</p> <p>This F&O applies to the following SRs: IFSO-B1, IFQU-A6, IFQU-A5, IFSN-A9, IFSN-A15, IFSN-A16, IFSN-A10, IFSN-A14, and IFSN-B2. Basis for Significance: This assumption greatly impacts the risk from internal floods. REC-FLD-IRR has available time of 84 minutes, yet still analyzed for failure probability.</p>	Unresolved.	The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.
IFSO-B3-01	Discussion: There is no uncertainty analysis related to flood sources. Basis for Significance: Missing uncertainty analysis. SR unmet.	Unresolved.	This is a documentation issue. The application only quantified LOCA sequences. There is no impact to the application from this internal flooding finding.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
LE-G1-01	<p>Discussion: There is no adequate roadmap that facilitates peer review of the Level 2/LERF documentation. This is exacerbated by the significant reliance on historical documents going back to the original IPE report. Basis for Significance: There are several dated self-assessment documents. For LE, about 1/3 of the SRs do not have any discussion of how the SR is met and where the documentation can be found. Moreover, because of the conversion of the Volume numbers (e.g. LE.2 to LE.1), there is additional confusion added for LE. Many of the referenced sections in the self-assessment (e.g., Section 5.4.1 of LE.1 (old LE.2)) appear to no longer exist. Finally, unlike the other technical elements that have completely revised the analysis, the Level 2 relies significantly on historical documents including the 20 year old IPE, SM-1243 and SM-1464.</p>	Unresolved.	<p>This is a documentation issue. Development of a peer review SR road map will not impact the quantifications performed to support this application.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
QU-B5-01	<p>Discussion: Section 3.2 of fleet wide PRA procedure NF-AA-PRA-28 describes method to break the circular logic appropriately and table 3 in SY.2 attachment lists circular logic break gates, but further review of the logic indicates the circular logic is not handled properly.</p> <p>A Gate 2-EP-CB-12A-LC "NO ELECTRIC POWER 125 V DC BUS 2-I (U2 ESGR) (CIRC LOGIC BREAK)" is modeled under EDG 2H. The 125V DC power supply with circular logic break is supplied power only from battery under LOOP condition which is required the EDG. However the battery power is ANDed with battery charger failures as below:</p> <p>2-EP-CB-12A-PS-LC AND 2-BY-BC-2-I-FAIL 2-BY-BC-2C-I-FAIL 2-BY-B-2-I Basis for Significance: Improper breaking of circular logics would result in improper accident sequence evaluation.</p>	<p>This PRACC item was addressed in the NAPS-R07c interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 1.</p>	<p>None. This issue has been resolved.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
QU-B8-01	Discussion: NASP PRA developed logic to eliminate mutually exclusive situations to correct cutsets containing mutually exclusive events. However a mutually exclusive logic "U1-EVENTS-NO-AUTO-PRZ-PRES-NX" may delete LOSC sequence because the logic produces U12-LOSS-SW-EVENTS*LOSCS combination. This logic seems to delete LOSCS logic associated with total loss of SW event which results in loss of RCP seal cooling and injection. Basis for Significance: Incorrect mutually exclusive logic deletion may result in improper accident sequence evaluation.	This PRACC item was addressed in the NAPS-R07c interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 1.	None. This issue has been resolved.
QU-F5-01	Discussion: Quantification code limitations are stated as being contained in the user manuals to the various software codes and there is no discussion provided in the .NOTEBK-PRA-NAPS-QU.1 or QU.2 notebooks. Basis for Significance: Finding based on need for actual information in the notebook(s).	Unresolved.	This is a documentation issue. The inclusion of specific software limitations in Dominion PRA Documentation will not impact the quantifications performed to support this application.

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
SC-B1-01	<p>Discussion: The large break LOCA success criterion used in the PRA appears to be inconsistent with the Chapter 14 UFSAR analysis. Basis for Significance: For large LOCA, NAPS SC.1 R 3, Section 5.2.2, Table 5.2-2 shows for the injection phase that 2/2 accumulators on intact loops and 1 of 2 LHSI pumps are needed. The basis is stated to be the UFSAR. However, the large break LOCA analysis in Chapter 14/15 of the UFSAR is based on the most limiting single failure, typically, an emergency diesel generator. The UFSAR thus may credit charging flow (of the order of 650 gpm). Therefore, the success criterion that is assumed in the PRA may be a smaller set of equipment than the analysis on which it is supposedly based, without justification for excluding the charging pump.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2.</p>	<p>None. This issue has been resolved.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
SY-A14-01	<p>Discussion: There was no evidence that plugging of manual valves was considered for instances where an exposure time is valid. For example, if a manual valve is normally open in a standby train, it is susceptible to plugging over an exposure time between system alignment rotations (could be every 2 weeks). Applying an exposure to the manual valve plugging failure data may result in a failure probability higher than check valve fails closed failure probability (which is currently modeled). This could be a significant contributor for RHR HX and pump manual valves that could have a very long exposure rate between tests or alignments</p> <p>Basis for Significance: The generic assumption about plugging of manual valves does not provide evidence that plugging was considered over the exposure time for the standby trains. The system notebooks did not seem to provide any sort of modeling notes on this topic either. If using the SY-A15 screening, it should be documented that this case meets SY-A15. This could be a significant contributor for RHR HX and pump manual valves that could have a very long exposure rate between tests or alignments.</p>	<p>This PRACC item was addressed in the NAPS-R07d interim model update as documented in NAPS PRA Model Notebook MC.1, Rev. 2.</p>	<p>None. This issue has been resolved.</p>

Table 2 - NAPS R07e 'Finding' Level F&Os

F&O	Summary of Finding	Resolution	Impact on Application
SY-C1-01	<p>Discussion: The dependency matrix appears to address dependency for front-line systems and mechanical support systems, but appears incomplete for electrical support systems. For example, no dependency is listed for 125VDC panel 2-BY-B-2-II or MCC 2-EP-MCC-2A1-2. In some instances the support system gate is provided, in other instances only the system name is provided. Basis for Significance: This issue made it difficult to assess the completeness of the dependency analysis. This issue made it difficult to assess the completeness of the identification of the systems needed to provide or support the safety functions contained in the accident sequence analysis.</p>	Unresolved.	<p>This is a documentation issue. The examples identified are modeled correctly but the associated documentation requires additional detail. The improvement of the dependency matrix documentation will not significantly impact the quantifications performed to support this application.</p>