From: Sreenivas, V
Sent: Monday, September 28, 2009 2:11 PM
To: 'david.heacock@dom.com'
Cc: 'Tom.Shaub@dom.com'; 'alan.price@dom.com'; Stang, John; Harrison, Donnie; Wilson, George; Goel, Vijay; Reece, James; Cotton, Karen
Subject: NORTH ANNA, UNIT 1 - One time Extension of the Completion Time for 1"J"-480 Volt AC Distribution Subsystem (ME1777) -Request for Information

ADAMSAccessionNumber: ML092740011

Dear Mr. Heacock:

By letter dated July 23, 2009 (Agencywide Documents and Access Management System Accession No. ML092050381), Virginia Electric and Power Company submitted a license amendment for North Anna Power Station, Unit 1. The proposed amendment will revise Technical Specification (TS) 3.8.9 Condition A, by adding a Note to allow a one-time 72 hour Completion Time to interrogate a failed breaker and the associated Unit 1 "J" 480 Volt emergency bus switchgear to ensure the emergency power system continues operation in a reliable condition for the remainder of the operating cycle.

To complete its review of the proposed modification and the TSs changes, the Nuclear Regulatory Commission staff requests the licensee's response to the following Request For Additional Information (RAI) questions:

Probabilistic Risk Assessment:

1. On page 4 of the submittal cover letter (and pages 3 &4), it was stated that "root cause evaluation of the breaker damage will be performed to establish if a common cause failure mode exists." Due to the relevance of this subject, please provide additional details about the status and results of the root cause evaluation, since the North Anna Probabilistic Risk Assessment (PRA) does not model common cause failure (CCF) in the electrical distribution system.

2. On page 10 (Section 6.1) it was stated that "the quantitative evaluation (internal events and flooding) was supplemented by a qualitative assessment of the impact of the proposed change on the external events contribution to risk. Please provide additional details about how the qualitative assessment was performed and the resulting changes and impacts of this qualitative assessment on the North Anna individual plant examination of external events (IPEEE) fire PRA.

3. On page 22, the discussion of human errors rightfully recognizes the difference between human error probability (HEP) rates for internal and fire induced scenarios. As a result internal events conditional core damage probabilities (CCDPs) were increased by a factor of 2 to 5 for the fire evaluation. However, Reference 1 indicates that, in case of HEPs modeled from internal events, a performance shaping factor of 5 to 10 was applied to all HEPs due to existing fire environment. Please explain the differences between the HEP rates used in North Anna internal events versus those used in the IPEEE fire evaluation. In addition, please clearly state the condition under which a CCDP is increase by a factor of 2 or a factor of 5 and if or how these factors relate to the IPEEE performance shaping factors.

4. The evaluation includes a claim that any change in human reliability analysis (HRA) rates that would impact the base case (no maintenance) and the 1J1 case are not expected to alter the results. Such a statement needs additional clarification or confirmation by a sensitivity analysis.

5. A factor of 2 to 5 was used as a multiplier of the internal events CCDP to account for the additional operator stress under fire condition. However, for some fire areas, the licensee used the North Anna Power Station (NAPS) IPEEE CCDP as an alternative to using the internal events CCDP, and used the same multipliers. Please provide more details about the basis of this change in methodology.

6. The second bullet on page 7 of attachment 5 talks about the identification of potential sensitivity studies that can be performed to ensure that the risk insights are not significantly affected. No information was provided to assess the key sources of uncertainties, key assumptions, modeling approximations, and current validity of the data used. Please provide this information. In addition, the use of factors of 2 in some cases and 5 in others indicates that the level of uncertainty may vary in the analyses. Further, unlike the internal events PRA, the IPEEE analysis was neither updated nor peer reviewed. No information was provided for the fire evaluation to assess the key sources of uncertainties, key assumptions, modeling approximations, and current validity of the IPEEE data used.

   Furthermore, the submittal did not mention any comments or conclusions that resulted from a self assessment or qualitative evaluation of the fire IPEEE PRA evaluations to ensure its use is appropriate for this application. Please provide additional information to help assure the robustness of the results of this evaluation.

7. The licensee's submittal describes how the risk assessment credits a local manual action inside the reactor containment building to locally open a motor-operated valve in the Residual Heat Removal (RHR) system suction piping for mitigation of a steam generator tube rupture (SGTR), with a 99% success probability. This action is also identified as described in the final safety analysis report (FSAR) Section 5.5.4.3.4. In fact, the action is only identified in the FSAR as a strategy to overcome certain single failures that would render the RHR system unavailable for decay heat removal due to the design of a single suction line from the reactor coolant system (RCS). The action is not described in detail, nor is the action identified as applicable during post-accident conditions such as might exist following a SGTR. The licensee needs to describe how it has assured that the valve in question would be accessible in a timely manner following a SGTR accident for the containment conditions that would exist where this action is being credited. Further, the licensee needs to provide a sensitivity analysis to demonstrate the significance of this manual action to the regulatory decision.

8. The licensee's submittal identifies that the PRA model used for this application is based on a March 2007 plant configuration, and identifies its processes for reviewing and updating the PRA model on a fixed schedule. However, the licensee has not described how it has assured that any plant changes implemented since the March 2007 date but not yet incorporated into the PRA model do not adversely impact the results of the analysis, as required by Regulatory Guide (RG) 1.200 Section 4.2. Similarly, the licensee is using an IPEEE fire PRA model, but has not described how it has assured that plant changes implemented since the IPEEE, especially changes that might alter the

fire protection boundaries and features of the plant, do not adversely impact the results of the fire analysis. Please address how the models reflect the current as-built and as-operated plant or describe and provide the results of sensitivity studies that address deviations from this condition.

9. The licensee's submittal describes in some detail the components impacted by the bus outage; however it is not clear from the description whether the high pressure and low pressure emergency core cooling system (ECCS) systems retain operability of at least one train without any operator intervention to open unpowered valves. Please describe the operation of these systems if they were actuated for an emergency during the bus outage.

10. The licensee's submittal identified that an industry peer review of the internal event model was conducted and all significant findings were resolved or confirmed not to impact this application. However, no details of the open findings have been provided to allow the staff to review the licensee's disposition, as specifically required by RG 1.200 Section 4.2. Please provide the disposition as it relates to this application of any existing open peer review findings.

11. The licensee's submittal refers to Section 3.4 of Attachment 5 for details on the PRA quality, but does not specifically reference Attachment E to Attachment 5, which includes a table of findings from the assessment conducted per RG 1.200. Please identify the relevance of Attachment E with regards to PRA quality for this application.

12. In the fire risk assessment, some scenarios apply a CCDP for a loss of offsite power. However, it is not stated how recovery of offsite power is treated, since for a fire-induced loss of offsite power (LOOP) recovery may not be possible. Please clarify how recovery of offsite power for fire scenarios was addressed in these calculations.

13. The licensee's submittal often refers to internal calculations that were reviewed to determine some relevant fact supporting its fire risk assessment. The licensee needs to submit sufficient summary information on the technical content of the relevant portions of these documents used to substantiate its conclusions to permit staff review.

<u>Technical Specifications and Electrical Engineering:</u>

The Nuclear Regulatory Commission staff had a conference call with your staff on September 9th, 2009 for clarification on technical information.

1. Commitment number 2 in the LAR states as follows:*"A root cause evaluation of the breaker damage will be performed to establish 1) if a common cause failure mode exists and 2) the extent of the condition. Based on the root cause evaluation results, the appropriate corrective actions will be taken."*
    a. Question 1 - Explain why the breaker has not been removed within the existing TS CT of eight hours for the MCC to perform a root cause analyses.

2. LAR Attachment 1, Discussion of Technical Specification Change, Section 2.0, Background, states as follows: *"Inspection and repair of the breaker and MCCs is estimated to take approximately fifty-two hours under the worst case scenario and consists of the following:"*

a. Question 2(a) – What MCC or breaker damage is the "worst case scenario" estimated 52 hour repair time based upon? Provide a timeline of the 52 - hour repair time.
b. Question 2(b) - If the "worst case scenario" is estimated to required 52 hours, what is the basis of the requested one-time extension of 72 hours?

3. LAR, Attachment 1, Discussion of Technical Specification Change, Section 2.0, Background states as follows:*"Inspection and repair of the breaker and MCCs is estimated to take approximately fifty-two hours under the worst case scenario and consists of the following:*

- *Perform emergency bus motor control center (MCC) inspection and cleaning"*
- *Megger the 1J 480V emergency bus*
- *If meggering is unsatisfactory, disconnect 1J1-2N*

Regarding inspection, cleaning, and meggering of the MCCs

a. Question 3 - Explain how meggering and cleaning of the MCCs is related to the failed breaker?

4. LAR, Attachment 1, Discussion of Technical Specification Change, Section 2.0 states:*"A simulator verification for reactor trip, steam generator tube rupture and large break LOCA was performed, which verified that safety functions were maintained for each accident"*

a. Question 4 - Explain the safety functions and how each was verified to be "maintained" by simulation for each accident and the simulated duration of each safety function verification.

5. LAR, Attachment 1, Discussion of Technical Specification Change, Section 2.0 states:*"Although there is no evidence of damage in the distribution subsystem that would question operability, Dominion plans to proactively de-energize the 480 Volt emergency distribution subsystem (MCCs 1J 1-2N and 2S) to 1) perform a thorough inspection of the MCCs to ensure that the emergency distribution subsystem is and continues to be in a reliable condition for the remainder of the operating cycle, and 2) interrogate the failed breaker for common cause and determine the extent of the condition."*

a. Question 5(a) – If there is no evidence of damage in the distribution subsystem that would question operability of the 480 volt emergency distribution subsystem, as stated above, how is the CRDM fan breaker failure related to the proposed complete cleaning, inspection, potential disconnecting of MCCs, and meggering activities of the 2N and 2s MCCs?
b. Question 5(b) - The LAR request for a One-Time extension of TS 3.8.9, Condition A, CT does not have a termination date. Explain why an open-ended (no time limit) request is required.
c. Question 5(c) - What is the date for the next scheduled North Anna Unit 1 refueling outage?
d. Question 5(d) - Explain why one-time extension activities, such as complete cleaning and meggering of the MCCs, is not considered routine MCC maintenance and is, therefore, being included as part of the proposed CT extension for "operational convenience?"

6. LAR, Attachment 1, Discussion of Technical Specification Change, 5.2 Limiting Conditions of Operation states:*"Forty-three of the 97 potentially de-energized loads would require entry into either a TS or Technical Requirements Manual (TRM) Limiting Condition for Operation (LCO), if they failed independent of de-energizing the MCCs*

1J1-2N and 2S. When the MCCs 1J1-2N and 2S are de-energized, none of the LCOs will be entered. Instead, LCO 3.0.6 will be entered for all components listed. The only exception to this will be LCO 3.4.11 for the PORV block valve (1-RC-MOV-1535)."

a. Question 6 - Explain why the only exception to the stated TS LCO 3.0.6 entry will be LCO 3.4.11 for the PORV block valve (1-RC-MOV-1535).

7. LAR, Attachment 1, Discussion of Technical Specification Change, 5.1.2, Auxiliary Feedwater states:
"Prior to beginning maintenance, an operator will be designated as the AFW valve operator and a sound-powered phone system will be utilized in the AFW pump house in order to provide direct communication with the control room. In the event of an AFW actuation, this operator will be deployed to the AFW pump house and will receive direct instruction from the Control Room regarding operation of these MOVs."
   a. Question 7(a) - What training will be provided to operators, such as the designated AFW valve operator, and/or other personnel required to perform potential manual actions identified by the proposed de-energizing of MCCs 1J1-2N and 2S?
   b. Question 7(b) - Will plant operators perform in-plant walk downs of the areas required by the identified manual operation to verify expeditious access, or other environmental constraints or limitations, to the AFW valves and any other identified manually operated equipment prior to de-energizing MCCs 1J1-2N and 2S?
   c. Question 7(c) - Will a similar "designated" operator and support personnel be established for the manual action identified in the LAR to operate the affected "J" train RHR suction MOV located in containment for the potential SGTR event?

8. LAR, Attachment 1, Discussion of Technical Specification Change**,** 6.2 Defense-In-Depth Assessment states the following:*"The proposed change to the CT maintains the system redundancy, independence, and diversity commensurate with the expected challenges to system operation. The opposite train of emergency power and the associated engineered safety equipment remain operable to mitigate the consequences of any previously analyzed accident." "Defenses against potential common cause failures are maintained and the potential for introduction of new common cause failure mechanisms is assessed. Defenses against common cause failures are maintained. The extended CT requested is not sufficiently long to expect new common cause failure mechanisms to arise. In addition, the operating environment and operating parameters for the emergency bus switchgear remains constant, therefore, new common cause failures modes are not expected. In addition, redundant and backup systems are not impacted by this change and no new common cause links between the primary and backup systems are introduced. Therefore, no new potential common cause failure mechanisms have been introduced by the proposed change. In a*ddition, the LAR describes a commitment which state as follows: *"2. A root cause evaluation of the breaker damage will be performed to establish 1) if a common cause failure mode exists and 2) the extent of the condition. Based on the root cause evaluation results, the appropriate corrective actions will be taken".*
   a. Question 8(a) - Explain how the proposed change to extend the TS LCO CT (8-hours) to 72- hours "maintains system redundancy and diversity."
   b. Question 8(b) - Explain how defenses against common causes are maintained since the root cause, and therefore the common cause, of the failed control rod drive fan breaker has not yet been performed and may affect as many as 133 breakers.

c. Question 8(c) - Of the 133 potentially impacted breakers, how many are utilized in the above referenced "redundant" systems and describe how defenses against potential common causes are maintained for these breakers.
d. Question 8(d) - Explain any compensatory actions taken to protect for a potential fire in the vulnerable areas of the redundant train.
e. Question 8(e) When was the last inspection, complete cleaning, and meggering performed on the redundant emergency MCCs ("H") and what, if any, any problems identified.

9. LAR, Attachment 1, Discussion of Technical Specification Change**,** 1.0 Introduction, states the following:*"Although the operability of MCCs 1J1-2N / 2S is not in question, Dominion requests an expedited review to provide an opportunity to interrogate the damaged breaker and to fully investigate the extent of condition to ensure continued bus reliability"*

a. Question 9 - Explain why a small fire related to a MCC breaker failure requires an extensive investigation of 2 emergency MCCs in their entirety in an expedited manner?

10. Section 5.1.1.1, "Low Head Safety Injection," provides the following compensatory actions for ECCS equipment that will be disabled due to de-energizing of the MCC 1J1-2N and 2S: *"Following an actuation of the ECCS, the "H" and "J" bus Low Head Safety Injection (LHSI) suction headers are swapped over from the Refueling Water Storage Tank (RWST) to the containment sump to provide long-term cooling. However, the "J" bus MOVs in the flow path between the RWST and containment will be de-energized and unable to realign. To prevent damage, the "J" bus LHSI pump (1-SI-P-1 B) will be secured when the RWST level reaches 15%.*

a. Question 10 - What is the time required for the RWST to reach 15% for the worst case postulated scenario.

11. TS 3.8.9, Condition A, Required Action A.1,"Note" state as follows: *"Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sourcesoperating," for DC train(s) made inoperable by inoperable distribution subsystem(s)."*

a. Question 11 - Confirm that no DC trains are made inoperable by the proposed de-energizing of MCC 1J1-2N and 2S.

Please provide response to these RAI by October 30th, 2009. If you have any questions, please contact me at (301) 415-2597.

Sincerely,

VSreenivas

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