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Path Forward for ANP-10284, "U.S. EPR Instrumentation and Control Diversity and Defense-in-Depth (D3) Methodology Topical Report" (TAC No. MD5884)

Ref. 1: Letter, Getachew Tesfaye (NRC) to Ronnie L. Gardner (AREVA NP Inc.), "AREVA NP, Inc. – Review Status of the U.S. EPR Instrumentation and Control Diversity and Defense-in-Depth [D3] Methodology Topical Report – ANP-10284 (TAC No. MD5884)," January 8, 2009.

Ref. 2: Letter, Sandra M. Sloan (AREVA NP Inc.) to Document Control Desk (NRC), "U.S. EPR Instrumentation and Controls Topical Reports," NRC:09:004, January 23, 2009.

In a letter to AREVA NP Inc. (AREVA NP) dated January 8, 2009 (Reference 1), the NRC staff provided preliminary results and status of the review of "U.S. EPR Instrumentation and Control Diversity and Defense-in-Depth (D3) Methodology Topical Report" (ANP-10284). In a meeting on January 15, 2009, the NRC staff and AREVA NP discussed the information provided in Reference 1. Based on the information provided by the NRC staff in Reference 1 and discussed on January 15, 2009, AREVA NP provided a proposed path forward for the D3 topical report in Reference 2. Subsequently, AREVA NP and the NRC staff conducted telephone calls on January 27, February 9, February 11, and February 25, to discuss the proposed path forward for this topical report. Based on those discussions, this letter provides the revised path forward AREVA NP will follow to support the NRC review of the subject of instrumentation and control (I&C) diversity and defense-in-depth for the U.S. EPR design certification.

AREVA NP will address each of the issues identified in Reference 1 according to the actions and schedule described in Attachment A to this letter.

AREVA NP will revise the D3 topical report to incorporate changes associated with responses to Requests for Additional Information (RAIs) provided to the NRC to date. In addition, the revised report will include the qualitative D3 analysis described in the "Actions" section of Attachment A, Item #2. AREVA NP will then reissue the revised report as a technical report rather than a topical report in May 2009. In the correspondence transmitting the technical report AREVA NP will state that it no longer requests the NRC issue a separate safety evaluation report, but rather requests that the NRC incorporate the review of the report into the overall evaluation of I&C diversity and defense-in-depth in the safety evaluation report for the U.S. EPR FSAR in a manner consistent with other reports which are incorporated by reference in the U.S. EPR FSAR.

AREVA NP INC.

An AREVA and Siemens company

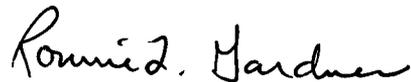
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AREVA NP appreciates the opportunity to receive direct, coordinated feedback from the NRC staff involved in the review of U.S. EPR I&C topical reports, as exemplified by the interactions supporting identification of a path forward for issues associated with I&C diversity and defense-in-depth.

Future correspondence regarding ANP-10284 and issues related to diversity and defense-in-depth for the U.S. EPR design certification should be directed to Ms. Sandra M. Sloan, Regulatory Affairs Manager for New Plants.

Sincerely,



Ronnie L. Gardner, Manager
Corporate Regulatory Affairs
AREVA NP Inc.

Enclosure

cc: G. Tesfaye
Docket No. 52-020

ATTACHMENT A

Path Forward to Address Items Identified in January 8, 2009 Letter from NRC to AREVA NP Inc. Regarding D3 Topical Report

The purpose of this paper is to provide a path forward for those areas identified by the NRC as having insufficient information, as stated in the January 8, 2009 letter to AREVA NP Inc. (AREVA NP) regarding the D3 topical report. The paper addresses the twelve bulletized items in the attachment to the NRC letter and the three issues enumerated in the paragraph following the bulletized list.

Item #1

- Diversity between Echelons of Defense:

The TR does not specify the diverse actuation system (DAS) platform specifications or provide a NUREG/CR-6303 Guideline 2 diversity analysis between the DAS and the Protection System (PS).

Current Status:

Section 4.6 of the D3 topical report identifies specific attributes that should be evaluated to determine diversity from the TELEPERM XS (TXS) platform.

FSAR Tier 2, Section 7.1.1.4.6 contains the requirement for the PAS hardware and software (DAS is a subsystem of the PAS) to be diverse from TXS.

FSAR Tier 1, Section 2.4.9. ITAAC commitment 3.2 addresses diversity of PAS from the PS.

Actions:

Revise FSAR Tier 2, Section 7.8 to contain a list of specific attributes that support a determination of adequate diversity, similar to the current list in Section 4.6 of topical. This list will be provided in a proposed FSAR change to be submitted by the end of May 2009, and will serve as Tier 2 supporting information for the existing ITAAC.

AREVA NP understands that new NRC staff guidance will be issued in the near future addressing specific characteristics that support a determination of adequate diversity. The list of diversity attributes that will be added to FSAR rev. 1 may need to be revised in the future to accommodate the pending staff guidance.

Item #2

- BTP 7-19 Points 2 & 3 of the NRC Four-point position on D3 for ALWRs:

The TR did not provide the plant response calculated using best-estimate analyses for each anticipated operational occurrence (AOO) and each postulated accident (PA) in the design basis occurring in conjunction with each single postulated common-cause failure to demonstrate that adequate diversity and adequate protection exists.

Current Status:

BTP 7-19 points 2 & 3 are partially addressed by completion of a qualitative analysis in accordance with D3 topical report Section 4.2. Results of this analysis are summarized in FSAR Tier 2, Section 7.8.2.2.6. The DAS functions described in FSAR Tier 2 Section 7.8.1.2 are based on the results of this analysis. These functions are also identified in FSAR Tier 1, Table 2.4.9-2 and commitment 3.3 in the same section.

To completely address BTP 7-19 points 2 & 3, the analysis described in D3 topical report Section 4.4 must be performed. This analysis has not yet been completed.

Actions:

AREVA NP will submit the qualitative analysis that has been performed as a technical report to NRC by the end of May, 2009. This will assist the review staff in understanding the basis for the DAS functions included in the FSAR.

AREVA NP will provide the results of the confirmatory analysis, and any resulting modifications to DAS functions, to the NRC by the end of November, 2009.

AREVA NP proposes that U.S. EPR conformance to BTP 7-19 points 2 & 3 be carried as an open item until the results of the confirmatory analysis are provided.

Item #3

- The TR did not describe how the DAS is designed such that its actuation signals and its initiation of protective functions do not interfere with the PS actuation process or actuation safety functions before the PS.

Current Status:

Information related to this issue is currently included in FSAR Sections 7.1 and 7.8, but not identified as specifically addressing this point.

Actions:

FSAR Tier 2, Section 7.8 will be revised to specifically address this point in a proposed FSAR change to be submitted by the end of May 2009.

Item #4

- The TR did not identify the selection of DAS automatic and manual actuated functions.

Current Status:

The automatic DAS functions are described in FSAR Tier 2 Section 7.8.1.2. The automatic DAS functions are also identified in FSAR Tier 1, Table 2.4.9-2 and commitment 3.3 in the same section.

No manual functions are currently credited for BTP 7-19 points 2 and 3.

The manual DAS functions to address BTP 7-19 point 4 are described in FSAR Tier 2, Section 7.8.1.2.16.

Actions:

Clarify in Tier 2, Section 7.8 that no manual controls are credited for BTP 7-19 points 2 and 3. This clarification will be made in a proposed FSAR change to be submitted by the end of May 2009.

Item #5

- The TR did not address the quality assurance aspects of the design and development process for DAS software and hardware.

Current Status:

This is addressed under "Quality Requirements" in FSAR Tier 2, Section 7.1.1.4.6.

This has been addressed in multiple RAI responses against both the D3 topical report and FSAR Tier 2.

FSAR Tier 1, Section 2.4.9 includes DAS software and hardware development life cycles and corresponding ITAAC commitment.

Actions:

AREVA NP will review the RAI responses and the FSAR sections mentioned above. If any additional information should be added to the FSAR to completely address the issue, it will be added in a proposed FSAR change to be submitted by the end of May 2009.

Item #6

- The TR did not establish or describe the applicant's commitment to test the DAS in accordance with the guidance provided in Generic Letter 85-06 and its enclosure titled "QA Guidance for Non-safety-related ATWS Equipment" to ensure availability.

Current Status:

This issue has been addressed in an RAI response against FSAR Tier 2, Section 7.8.

Actions:

AREVA NP will review the RAI response mentioned above. If any additional information should be added to the FSAR to completely address the issue, it will be added in a proposed FSAR change to be submitted by the end of May 2009.

Item #7

- The TR did not describe the type of environment DAS equipment would be installed in or the requisite assurance commitments necessary to show that the DAS equipment is able to operate in the environment that would occur during normal plant operation, including AOOs.

Current Status:

This issue is not specifically addressed in the FSAR.

Actions:

This issue will be addressed in a proposed FSAR change to be submitted by the end of May 2009, by modification to Tier 2, Section 7.8.

Item #8

- The TR does not directly address how the DAS actuation status of the systems and components actuated by DAS is confirmed

Current Status:

This issue is not specifically addressed in the FSAR.

Actions:

This issue will be addressed in a proposed FSAR change to be submitted by the end of May 2009, by modification to Tier 2, Section 7.8.

Item #9

- The TR does not describe the architectural aspects of the DAS and how it interfaces with other parts of the U.S. EPR I&C system. Specifically, an adequate description of electrical isolation (isolation devices), communications independence, and physical separation between the DAS and the PS is needed.

Current Status:

This is currently addressed in various places in FSAR Tier 2, Sections 7.1 and 7.8 as well as in multiple responses to FSAR and D3 topical report RAls.

Actions:

The information required to address this issue will be consolidated and included in a proposed FSAR change to be submitted by the end of May 2009, by modification to Tier 2, Sections 7.1 and 7.8.

Item #10

- The TR did not provide an evaluation of design features to reduce the effects of spurious trips and actuations.

Current Status:

This issue is not specifically addressed in the FSAR.

Actions:

This issue will be addressed in a proposed FSAR change to be submitted by the end of May 2009, by modification to Tier 2, Section 7.8.

Item #11

- The TR did not address assurance of DAS completion of protective actions.

Current Status:

This issue is not specifically addressed in the FSAR.

Actions:

This issue will be addressed in a proposed FSAR change to be submitted by the end of May 2009, by modification to Tier 2, Section 7.8.

Item #12

- The TR did not provide an analysis of monitoring or display communication failures or faulty signals and commands that are transmitted to other systems or to the plant data network.

Current Status:

The NRC clarified this item via email on 2/13/09. The clarified item reads as follows:

“The topical report did not address failures of monitoring or display systems that could influence the functioning of the RTS or ESFAS. If plant monitoring system failure induces operators to attempt to operate the plant outside safety limits or in violation of the limiting conditions of operation, the analysis should demonstrate that such operator-induced transients will be compensated for by protection system function (Reference NUREG-0800, Standard Review Plan, Branch Technical Position 7-19 (Revision 5), Item B.3.5, page BTP 7-19-6).”

This issue is currently addressed in FSAR Section 7.1 and 7.8.

Actions:

AREVA NP will review the FSAR sections mentioned above. If additional information should be added to the FSAR to completely address the issue, it will be added in a proposed FSAR change to be submitted by the end of May 2009.

Item #13

In addition to the items listed above, the information provided by AREVA NP indicated that manual initiation of diverse actuation is performed at the component level versus the system level. This concept is inconsistent with NRC staff guidance and position that indicates a need for system-level manual actuation. Therefore the staff does not find the component-level manual actuation acceptable.

Current Status:

AREVA NP identified deviation from BTP 7-19 point 4 in both the D3 topical report and the FSAR.

Actions:

AREVA NP is evaluating possible design modifications to address this concern. By the end of July, 2009 AREVA NP will provide information to fully address this issue.

Item #14

Furthermore, the Priority Actuation and Control System Module (AV42) is a common element for both safety-related engineered safety features actuation and the DAS signals. AREVA NP proposed that the AV42 is not susceptible to a software CCF. However, the NRC staff did not find the AV42 as proposed in TR ANP-10273P acceptable. Therefore, AREVA NP would need to propose an acceptable design with regards to the AV42.

Current Status:

AREVA NP plans to develop design ITAAC to address the relevant issues associated with the AV42 such that Phase 2 of the design certification review can proceed, with the intent to resolve the associated technical issues so the design ITAAC can be removed and replaced by approved design information by the end of Phase 4.

Actions:

Modifications to the FSAR to address the AV-42 issues, such as use of design ITAAC, will take into account D3-related requirements. Associated proposed changes to the FSAR will be submitted by the end of May 2009.

Item #15

Finally, TR ANP-10284 does not clearly indicate how 10 CFR 50.62, "Requirements for Reduction of Risk From Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants," is met. While the NRC staff found some elements of the design may be used to address 10 CFR 50.62, the TR did not clearly address this requirement.

Current Status:

This is currently addressed in FSAR Tier 2, Section 7.8.2.1.3.

Actions:

AREVA NP will review the pertinent information in ANP-10284 and incorporate into the FSAR as necessary to augment the information currently provided in the FSAR. This issue will be addressed in a proposed FSAR change to be submitted by the end of May 2009, by modification to Tier 2, Section 7.8.2.1.3.