ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Thursday, September 23, 2010 6:07 PM
To: Tesfaye, Getachew
Cc: GARDNER Darrell (AREVA)
Subject: FW: RAI 351, Q 09.02.05-26 DRAFT response
Attachments: RAI 351 question 26 9-23-10.doc; RAI 351, Q09.02.05-26 MU T049.pdf

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Sent: Thursday, September 23, 2010 4:54 PM
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Subject: RAI 351, Q 09.02.05-26 DRAFT response

Darrell,

Attached are the DRAFT response to RAI 351 Question 09.02.05-26 and markup. This is for first round review by NRC.

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From: BRYAN Martin (EXTERNAL AREVA)

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Request for Additional Information No. 351(4112, 4163), Revision 1

01/15/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.02.05 - Ultimate Heat Sink
SRP Section: 09.05.01 - Fire Protection Program

Application Section: FSAR Chapter 9

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

Question 09.02.05-26:

Follow-up to RAI 175, Question 9.2.5-08:

General Design Criteria (GDC) 44 requires that “A system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided.” This function must also be met in the event of a loss of off-site power and a single failure. The staff noted that assurance of separation between safety and non-safety portions of the system is therefore necessary for compliance with GDC 44.

Final Safety Analysis Report (FSAR) Figures 2.7.11-1 (Tier 1) and 9.2.1-1 (Tier 2) show a safety/ non-safety-related interface at the outlet of safety-related cooling tower blowdown motor operated isolation valve 30PEB10/20/30/40 AA016 (typical) and emergency blowdown motor operated isolation valve 30PEB10/20/30/40 AA003. Further no mention of automatic isolation of the normal blowdown path was located by the staff in either FSAR Tier 1 Section 2.7.11 or Tier 2, Section 9.2.5 of the ultimate heat sink (UHS). This question also relates to Regulatory Position C.1 of RG 1.27, “Ultimate Heat Sink for Nuclear Power Plants”

The staff noted that it was likely that the normal cooling tower basin blowdown path will be open on more than one train during plant operation. Describe the prevention of the continued loss of basin water volume through this line in case of an accident when basin makeup may be unavailable for the first 72 hours. Describe in the FSAR if the blowdown valve automatically closes or is manually closed.

Based on the staff’s review of the applicant's response to RAI 9.2.5-08 (ID1817/6802) AREVA #175, Supplement 2, the following were determined as unresolved and needed further clarification/resolution by the applicant.

With regard to isolation of makeup water, the applicant’s description appears to attribute automatic isolation of the normal non-safety related makeup water path on DBA initiation to the “ESW emergency makeup water system.” The staff finds this terminology confusing since the normal and emergency makeup water flow paths are each provided with independent safety-related motor- operated isolation valves; 30PED10/20/30/40 AA019 (normal makeup) and AA021 (emergency makeup). For example, the proposed markup for U.S. EPR Tier 1 Section 2.7.11 states;

"The ESW emergency makeup water system and blowdown system isolation valves provide automatic isolation of the tower basins under DBA conditions to prevent loss of tower water inventory."

The staff found the above terminology is unclear since it is the “normal” non-safety-related makeup path that is subject to automatic isolation while the “emergency” makeup path is normally closed. The applicant is therefore requested to clarify the response and both associated FSAR markups to eliminate this confusion.

Also, the staff noted that guidance provided in SRP 14.3, Appendix C, paragraph II.B “System Specific ITAAC Entries,” Subparagraph vii “Initiation Logic,” may apply to these valves, which function to automatically isolate NSR piping on a safety injection signal. The subject SRP 14.3 guidance includes the following:

"If a system/component has a direct safety function it typically receives automatic signals to perform some action. This includes start, isolation, etc. The system ITAAC capture these aspects related to the direct safety function."

Accordingly, the applicant is also requested to address the need for system ITAAC in U.S. EPR FSAR Tier 1 Section 2.7.11 for confirmation of the automatic NSR piping isolation function of the subject valves on a safety injection signal.

Response to Question 09.02.05-26:

Refer to the response to RAI 345, Question 09.02.01-43 that indicates the valves that receive a signal to automatically align upon receipt of a safety injection signal.

Refer to the response to RAI 351 Question 09.02.05-22, concerning the addition of valves 30PEB10/20/30/40AA004, Filter Emergency Blowdown Isolation Valve.

Concerning the need for additional ITAAC, the valves that receive a signal to automatically align upon receipt of a safety injection signal are identified in U.S. EPR FSAR Tier 1, Tables 2.7.11-1 and 2.7.11-2. As indicated in Item 7.3 of U.S. EPR Tier 1, Table 2.7.11-3, these valves can perform the function listed in U.S. EPR Tier 1, Table 2.7.11-1 under system operating conditions, which includes safety injection.

ESWS valves operation is verified through Tier 2 Section 14.2 Test 048.

U.S. EPR FSAR Tier 2, Section 14.2.12.5.8, Ultimate Heat Sink (Test #049) will be revised to add Test Method 3.8 – "Demonstrate that the UHS starts automatically in response to a protection signal and applicable realignments are performed in a satisfactory manner".

Surveillance 3.7.8.2 for ESWS and Surveillance 3.7.19.5 for UHS verifies proper automatic operation of each valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal. Thus, each ESWS valve and each UHS valve response to actuation signal is verified through ITAAC and periodically through a surveillance requirement.

Concerning unclear terminology, refer to the response to RAI 397, Question 09.02.05-36 that describes the emergency makeup water system.

FSAR Impact:

The U.S. EPR FSAR Tier 2, Section 14.2.12.5.8, Ultimate Heat Sink (Test #049) will be revised as described in the response and indicated in the attached markup.

3.3.1 During normal operation.

3.3.2 During emergency operation.

3.4 Demonstrate that UHS blowdown flow rate meets design flow requirements.

3.4.1 During normal operation.

3.4.2 During emergency operation.

3.5 Demonstrate the operation of UHS level and temperature instruments and alarms.

3.6 Check electrical independence and redundancy of power supplies for safety-related functions by selectively removing power and determining loss of function.

3.7 Demonstrate that the chemical treatment system functions as designed.

3.7.1 Injection flow rate to UHS.

3.7.2 Interlocks with UHS blowdown.

4.0 DATA REQUIRED

4.1 UHS makeup and blowdown flow rates.

4.2 Valve performance data, where required.

4.3 Valve position indication.

4.4 Temperature and relative humidity trend data.

4.5 Setpoints at which alarms and interlocks occur.

4.6 Cooling fan air flow rates.

5.0 ACCEPTANCE CRITERIA

5.1 The UHS meets design requirements (refer to Section 9.2.5):

5.1.1 Verify that control logic starts forced draft fans and aligns critical components for UHS operation for the entire design range.

5.1.2 Verify that valve performance tests (e.g., valve position response of valves to loss of motive power, thrust, stroke time) meet design requirements.

5.1.3 Verify that UHS makeup flow rate meets design flow requirements.

5.1.4 Verify that UHS blowdown flow rate meets design flow requirements.

5.1.5 Verify that the operation of UHS level and temperature instruments and alarms meet design requirements.

5.1.6 Verify that the UHS tower bypass function meets design requirements.