ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Thursday, September 23, 2010 6:04 PM
To: Tesfaye, Getachew
Cc: GARDNER Darrell (AREVA)
Subject: FW: RAI 351 Q 09.02.05-28 DRAFT response
Attachments: RAI 351 Q28 MUs.pdf; RAI 351 Q 28 Inserts ITAAC 9-22-10.doc; RAI 351 Q 28 DRAFT Response HEE 9-23-10.doc

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: EDWARDS Harold (EP/PE)
Sent: Thursday, September 23, 2010 5:27 PM
To: GARDNER Darrell (RS/NB); BRYAN Martin (External RS/NB)
Cc: HARTSELL Jody (EP/PE); HUDDLESTON Stephen (EP/PE); BRYANT Chad (EP/PE); BALLARD Bob (EP/PE); KOWALSKI David (RS/NB)
Subject: RAI 351 Q 09.02.05-28 DRAFT response

Darrell,

Attached are the DRAFT response to RAI 351 Question 09.02.05-28, markups and inserts. This is for first round review by NRC.

Harold E. Edwards (Gene), PE

Advisory Engineer

AREVA NP Inc.
7207 IBM Drive, CLT 3C

Charlotte, North Carolina 28262

Phone: 704-805-2340

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From: BRYAN Martin (EXTERNAL AREVA)

Created By: Martin.Bryan.ext@areva.com

Recipients:
"GARDNER Darrell (AREVA)" <Darrell.Gardner@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	995	9/23/2010 6:04:31 PM
RAI 351 Q28 MUs.pdf	215096	
RAI 351 Q 28 Inserts ITAAC 9-22-10.doc	29760	
RAI 351 Q 28 DRAFT Response HEE 9-23-10.doc	49216	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

3.11 Deleted.

3.12 ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 is designed in accordance with ASME Code Section III requirements.

3.13 ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 is installed in accordance with an ASME Code Section III Design Report.

3.14 Pressure boundary welds in ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 are in accordance with ASME Code Section III.

3.15 ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 retains pressure boundary integrity at design pressure.

3.16 ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 is installed and inspected in accordance with ASME Code Section III requirements.

3.17 Components listed in Table 2.7.11-1 as ASME Code Section III are installed in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays and Controls

4.1 Displays listed in Table 2.7.11-2— Essential Service Water System Equipment I&C and Electrical Design are retrievable in the main control room (MCR) and the remote shutdown station (RSS) as listed in Table 2.7.11-2.

4.2 The ESWS equipment controls are provided in the MCR and the RSS as listed in Table 2.7.11-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.7.11-2 responds to the state requested by a test signal.

4.4 If one ESWS pump (30PEB10/20/30/40 AP001) fails during normal operation, a switchover to the other ESWS train is carried out automatically for the entire cooling train and is initiated by the CCWS Switchover sequence.

4.5 A spurious closure of the ESWS pump discharge valve (30PEB10/20/30/40 AA005) results in a switchover to the other ESWS train automatically for the entire cooling train and is initiated by the CCWS Switchover sequence.

4.6 Deleted.

4.7 Deleted.

5.0 Electrical Power Design Features

5.1 The components designated as Class 1E in Table 2.7.11-2 are powered from the Class 1E division as listed in Table 2.7.11-2 in a normal or alternate feed condition.

5.2 Valves listed in Table 2.7.11-2 fail as-is on loss of power.

5.3 Deleted.

Table 2.7.11-3—Essential Service Water System ITAAC (6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.14	Pressure boundary welds in ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 are in accordance with ASME Code Section III.	Inspections of pressure boundary welds verify that welding is performed in accordance with ASME Code Section III requirements.	ASME Code Section III Data Reports exist and conclude that pressure boundary welding for ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 has been performed in accordance with ASME Code Section III.
3.15	ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 retains pressure boundary integrity at design pressure.	Hydrostatic tests will be performed on the as-built system.	For ESWS piping shown as ASME Code Section III on Figure 2.7.11-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
3.16	ESWS piping shown as ASME Code Section III on Figure 2.7.11-1 is installed and inspected in accordance with ASME Code Section III requirements.	An inspection of the as-built piping will be performed.	For ESWS piping shown as ASME Code Section III on Figure 2.7.11-1, N–5 Data Reports exist and conclude that installation and inspection are in accordance with ASME Code Section III requirements.
3.17	Components listed in Table 2.7.11-1 as ASME Code Section III are installed in accordance with ASME Code Section III requirements.	An inspection of ASME Code Data Reports will be performed.	ASME Code Section III N-5 Data Reports exist and conclude that components listed as ASME Code Section III in Table 2.7.11-1 have been installed in accordance with ASME Code Section III requirements.
4.1	Displays exist or can be retrieved in the MCR and the RSS as identified in Table 2.7.11-2.	Tests will be performed for the retrievability of the displays in the MCR or the RSS as listed in Table 2.7.11-2.	a. The displays listed in Table 2.7.11-2 as being retrieved in the MCR can be retrieved in the MCR. b. The displays listed in Table 2.7.11-2 as being retrieved in the RSS can be retrieved in the RSS.

UHS cooling tower fill is constructed of ceramic tile, supported on reinforced concrete beams. Spray piping and nozzles are fabricated of corrosion resistant materials (e.g., stainless steel, bronze). UHS cooling tower internals are seismically designed and supported to withstand a safe shutdown earthquake (SSE). Passive failures of the cooling tower spray or fill systems are considered extremely unlikely due to their materials of construction, supporting systems and Seismic Category I design.

To prevent the entrainment of debris from the UHS cooling tower, each cell of the UHS cooling tower includes a debris screen located between the cooling tower internals and the ESW pump.

To account for potential interference effects of the cooling towers, an inlet wet bulb correction factor is used. As part of addressing Item 2.0-1 of Table 1.8-2, the COL applicant that references the U.S. EPR design certification will evaluate their site-specific conditions of orientation (with respect to wind direction), location, wind velocity, and direction to determine a wet bulb correction factor to account for interference effects.

To account for potential recirculation effects of the cooling towers, an inlet wet bulb correction factor is used. As part of addressing Item 2.0-1 of Table 1.8-2, the COL applicant that references the U.S. EPR design certification will evaluate their site-specific location to determine a wet bulb correlation factor to account for recirculation effects.

Each cooling tower basin is sized to provide for a minimum 72-hour supply of cooling water to the associated ESW division under design basis accident (DBA) conditions assuming loss of normal makeup water capability.

9.2.5.3.2 Piping, Valves, and Fittings

System materials are selected that are suitable to the site location, UHS fluid properties and site installation. System materials that come into contact with one another are chosen to minimize galvanic corrosion. All safety-related piping, valves, and fittings are in accordance with ASME Code Section III, Class 3 (Reference 1).

Inservice testing of valves will be performed as described in Section 3.9.6.3. Leakage rates for boundary isolation valves that require testing are based on ASME OM Code, Subsection ISTC (Reference 2).

9.2.5.3.3 Cooling Tower Basin

The 72-hour basin water volume is the minimum water volume that must be present in a basin to accommodate system water inventory losses experienced in the basin due to ultimate heat sink (UHS) tower operation under the worst case environmental

RAI 351 Question 09.02.05-28 Inserts

U.S. EPR FSAR Tier 1, Section 2.7.11:

INSERT 1

3.X The UHS fans are capable of withstanding the effects of tornado including differential pressure effects, overspeed, and the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard).

U.S. EPR FSAR Tier 1, Table 2.7.11-3:

INSERT 2

3.X	The UHS fans are capable of withstanding the effects of tornado including differential pressure effects, overspeed, and the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard).	a. Analyses will be performed to demonstrate that the UHS fans are capable of withstanding the effects of tornado including differential pressure effects, overspeed, and the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard).	a. A report exists and concludes that the UHS fans are capable of withstanding the effects of tornado including differential pressure effects, overspeed, and the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard). Methods to be used to protect the UHS fans will be identified and described in the report.
		b. Inspections will be performed of the UHS fans and other equipment located within the cooling tower structure to verify that the components are installed as specified on the construction drawings and deviations have been reconciled to the tornado analysis report.	b. Inspection reports exist and conclude that the UHS fans and other equipment located within the cooling tower structure are installed as specified on the construction drawings and deviations have been reconciled to the tornado analysis report.

U.S. EPR FSAR Tier 2, Section 9.2.5.3.1:

INSERT 3

The UHS fans are designed to withstanding the effects of tornado including differential pressure effects, overspeed, and the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard).

Response to

Request for Additional Information No. 351, Supplement 2

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 09.02.05-28:

Follow-up to RAI 175, Question 9.2.5-11:

General Design Criteria (GDC) 44 requires systems to transfer heat from structures, systems, and components important to safety to a ultimate heat sink under accident conditions. Fermi 2, as part of their design bases, has a nitrogen brake system to prevent overspeed from the design basis tornado. During a design basis tornado, the brake will engage and disengage a number of times. Since two groups of fan are provided for each safety related cooling tower and each cooling tower is divisionally separated, provide justification that a safety related fan braking system is not required for the design basis tornado.

Based on the staff's review of the applicant's response to RAI 9.2.5-11 (ID1817/6806) AREVA #175, Supplement 1, the following were determined as unresolved and needed further clarification/resolution by the applicant.

The applicant's response indicated that the specific method to be used to protect the UHS (i.e., cooling tower fans) from the effects of tornado will be determined in coordination with the cooling tower manufacturer later in the design process. In addition to the impact of tornado on the cooling tower fans, especially differential pressure effects, the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard) needs to be addressed as well. Consequently, this item will remain open pending submittal of the information that was requested and a schedule for providing this information needs to be established.

Response to Question 09.02.05-28:

As indicated on U.S. EPR FSAR Tier 2, Figure 3.8-101, Essential Service Water Building Section A-A and Figure 3.8-102, Essential Service Water Building Section B-B, the UHS cooling tower fans are enclosed within the Essential Service Water Building and protected by a missile shield above the fans. Figure 3.8-102 shows missile protected air intakes that cause the intake air to make multiple turns before entering the fill area of the cooling tower. In case of tornado, these building features and the cooling tower fill and drift eliminators would cause resistance to high air flow that could affect the fans.

ITAAC Item No. 3.X will be added to Tier 1 Section 2.7.11.3 and Table 2.7.11-3 to confirm that the UHS cooling tower fans are protected from the effects of tornado including differential pressure effects, overspeed, and the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard). An analysis will be completed by qualified individuals with the results documented in a report. Specific methods to be used to protect the UHS fans will be identified and described in the report.

U.S. EPR FSAR Tier 2, Section 9.2.5.3.1 will be revised to indicate that the UHS cooling tower fans are designed to withstand the effects of tornado including differential pressure effects, overspeed, and the impact of differential pressure effects on other equipment located within the cooling tower structure (e.g., capability to function, potential to become missile/debris hazard).

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.7.11 and Tier 2, Section 9.2.5.3.1 will be revised as described in the response and indicated in the attached markup.