AREVAEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Thursday, August 26, 2010 12:13 PM
To: Tesfaye, Getachew
Cc: ROMINE Judy (AREVA); WILLIFORD Dennis (AREVA); PATTON Jeff (AREVA); RYAN Tom (AREVA); SANDERS Harris (AREVA); GARDNER Darrell (AREVA); TUTTLE Eileen (AREVA)
Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 402(4675), FSARCh. 9
Attachments: RAI 402 Supplement 1 Response US EPR DC - DRAFT.pdf

Getachew,

Attached are draft responses to questions 9.01.01-37 and 43. I am working to get you additional drafts as soon as I can to support an earlier final date than provided yesterday. Let me know if the staff has questions on these responses or if they can be sent as final.

Thanks,

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: BRYAN Martin (External RS/NB)
Sent: Wednesday, August 25, 2010 12:51 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WILLIFORD Dennis (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 402(4675), FSARCh. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 402 Response US EPR DC.pdf," provides a schedule since a technically correct and complete response to the RAI 402 questions is not provided.

The following table indicates the respective pages in the response document, "RAI 402 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

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A complete answer is not provided for 27 the 27 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 402 — 09.01.01-26	October 14, 2010
RAI 402 — 09.01.01-27	October 14, 2010
RAI 402 — 09.01.01-28	October 14, 2010
RAI 402 — 09.01.01-29	October 14, 2010
RAI 402 — 09.01.01-30	October 14, 2010
RAI 402 — 09.01.01-31	October 14, 2010
RAI 402 — 09.01.01-32	October 14, 2010
RAI 402 — 09.01.01-33	October 14, 2010
RAI 402 — 09.01.01-34	October 14, 2010
RAI 402 — 09.01.01-35	October 14, 2010
RAI 402 — 09.01.01-36	October 14, 2010
RAI 402 — 09.01.01-37	September 24, 2010
RAI 402 — 09.01.01-38	October 14, 2010
RAI 402 — 09.01.01-39	October 14, 2010
RAI 402 — 09.01.01-40	October 14, 2010
RAI 402 — 09.01.01-41	October 14, 2010
RAI 402 — 09.01.01-42	October 14, 2010
RAI 402 — 09.01.01-43	September 24, 2010
RAI 402 — 09.01.01-44	October 14, 2010
RAI 402 — 09.01.01-45	October 14, 2010
RAI 402 — 09.01.01-46	October 14, 2010
RAI 402 — 09.01.01-47	October 14, 2010
RAI 402 — 09.01.01-48	October 14, 2010
RAI 402 — 09.01.01-49	October 14, 2010
RAI 402 — 09.01.01-50	October 14, 2010
RAI 402 — 09.01.01-51	October 14, 2010
RAI 402 — 09.01.01-52	October 14, 2010

Sincerely,

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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, July 26, 2010 12:38 PM
To: ZZ-DL-A-USEPR-DL
Cc: Patel, Amrit; VanWert, Christopher; Lu, Shanlai; Donoghue, Joseph; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 402(4675), FSARCh. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on May 5, 2010, and discussed with your staff on June 21, 2010. Further discussions took place on July 21, 2010, regarding the proprietary content of the draft RAI. Drat RAI Questions 09.01.01-28, 09.01.01-31, 09.01.01-33, 09.01.01-35, 09.01.01-36, 09.01.01-38, 09.01.01-40, 09.01.01-41, 09.01.01-45, 09.01.01-46, 09.01.01-47, 09.01.01-50, and 09.01.01-51 were modified as a result of those discussions. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 1885

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB7107580AA9)

Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 402(4675), FSARCh. 9
Sent Date: 8/26/2010 12:12:43 PM
Received Date: 8/26/2010 12:12:46 PM
From: BRYAN Martin (EXTERNAL AREVA)

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

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Files	**Size**	**Date & Time**
MESSAGE	5346	8/26/2010 12:12:46 PM
RAI 402 Supplement 1 Response US EPR DC - DRAFT.pdf	427879	

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

Response to

Request for Additional Information No. 402(4675), Revision 0

7/26/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.01.01 - Criticality Safety of Fresh and Spent Fuel Storage and Handling
Application Section: 9.1.1 (Technical Report TN-Rack.0101, Rev 0)

QUESTIONS for Reactor System, Nuclear Performance and Code Review (SRSB)

Question 09.01.01-37:

Describe axial blanket usage in more detail. The description should address the range of permitted blanket enrichments, range of blanket dimensions, usage of Gd in blankets, etc.

Response to Question 09.01.01-37:

Information on the geometry design and usage of blankets and gadolinia in the blankets is presented in U.S EPR FSAR Tier 2, Section 4.2.2.8 and Section 4.3.2. Axial blankets are used to reduce leakage and increase neutron economy in the core. Blanket enrichments generally range from natural enrichment (0.72 wt% U-235) to a low enrichment (≤2.50 wt% U-235). Core designs that do not use blankets are also used where the enrichment at the top and bottom of the core can be as high as 4.95 wt% U-235. AREVA's experience indicates that low enriched blankets provide the best fuel cycle economy. Therefore, low enriched blankets (2.00 – 2.30 wt% U-235) were used in the fuel cycle designs considered for the first three cores and equilibrium cycles.

Gadolinia rods are not required in the blanket region as the core power at the top and bottom of the core is low and peaking is not a consideration in the blanket region. Gadolinia rods are not used in the blanket regions.

For the U.S. EPR core designs, the size and enrichments of the blankets were optimized for the core design. It was found that an eight inch blanket at the top of the core and a six inch blanket at the bottom of the core provide the optimum stability for normal core operations. The blanket enrichments were selected to provide improved neutron economy without being too low in enrichment to cause peaking to occur in the cutback regions of the core. The cutback region is a six inch zone between the blanket and the assembly central zone which contains no gadolinia rods. Use of blanket enrichments of 2.00 wt% U-235 in low enriched assemblies, 2.10 or 2.20 wt% U-235 in medium enriched assemblies, and 2.30 wt% U-235 in high enriched assemblies accomplished the goals previously stated.

AREVA has many years of experience designing cores that use blanket enrichments with no blankets or with low enriched blankets. Many of the current core designs now use low enriched blankets. Typical blanket lengths range from three inches to six inches. This experience was the basis for the blanket design used in the U.S. EPR.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 09.01.01-43:

If it is considered permissible for an assembly to be moved next to the spent fuel storage racks during normal operations; therefore this configuration should be evaluated as a normal condition. Confirm that controls are implemented to prevent movement of one or more assemblies next to the spent fuel storage racks. If such control is not intended, amend the criticality analysis to consider this additional normal condition/configuration. Note that such revision may also impact analysis of abnormal conditions.

Response to Question 09.01.01-43:

The spent fuel machine is the primary equipment used for inserting and removing fuel assemblies in/from the spent fuel storage racks. The authorized locations for fuel assembly hoisting by the spent fuel machine are defined during the pre-operational testing (see U.S EPR FSAR Tier 2, Section 14.2, Test #038). The spent fuel machine control system includes an interlock which allows vertical movement of a fuel assembly only at the authorized locations during normal operation. The spent fuel machine is provided with an arrangement for emergency shutdown from the control desk. These features will prevent the spent fuel machine from lowering the fuel assembly at an unauthorized location during normal operations. The spent fuel machine is described in U.S. EPR FSAR Tier 2, Section 9.1.4.

The auxiliary crane is used to move spent fuel assemblies to/from the spent fuel storage rack cells that are not accessible by the spent fuel machine or used to move spent fuel assemblies to/from the spent fuel storage rack cells as a backup to the spent fuel machine. All movements of the auxiliary crane for handling fuel assemblies to/from the spent fuel storage rack cells are performed under operator control and the auxiliary crane can be stopped on demand using an emergency stop button. The auxiliary crane is provided with a position measuring arrangement to limit the translation. The auxiliary crane has a load measuring arrangement which stops the hoisting operation in the event of an unacceptable load. These design features combined with appropriate crane operating procedures will prevent the auxiliary crane from lowering a fuel assembly next to the spent fuel storage racks during normal operations. The auxiliary crane is described in U.S. EPR FSAR Tier 2, Section 9.1.5.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.