ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Thursday, February 12, 2009 2:21 PM
To: Getachew Tesfaye
Cc: NOXON David B (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 172 (1926), FSARCh. 19
Attachments: RAI 172 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 172 Response US EPR DC.pdf" provides a technically correct and complete response to the question.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 172 Question 19-270.

The following table indicates the respective pages in the response document, "RAI 172 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 172 — 19-270	2	3

This concludes the formal AREVA NP response to RAI 172, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Ronda Pederson
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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, January 14, 2009 9:42 AM
To: ZZ-DL-A-USEPR-DL
Cc: Hanh Phan; Theresa Clark; Edward Fuller; Lynn Mrowca; John Rycyna; Joseph Colaccino; Michael Miernicki; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 172 (1926), FSARCh. 19

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on January 9, 2009, and on January 13, 2009, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. 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: 214

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Subject: Response to U.S. EPR Design Certification Application RAI No. 172 (1926), FSARCh. 19
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From: Pederson Ronda M (AREVA NP INC)

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RAI 172 Response US EPR DC.pdf	140660	

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Response to

Request for Additional Information No. 172 (1926), Revision 0

1/14/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: 19

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1
(AP1000/EPR Projects) (SPLA)

Question 19-270:

FSAR Page 19.1-10 states that "However, in general, if a change(s) is estimated to increase the CDF to greater than 1.0E-06/yr, the model would be updated in a timely manner without waiting for the routine update cycle."

As mentioned in the ASME PRA Standard, "The PRA shall be maintained and upgraded, such that its representation of the as-built, as-operated plant is sufficient to support the applications for which it is being used." The PRA should be updated as frequently as necessary to ensure that the PRA remains an accurate representation of the risk. Thus, it would not be a good practice to accumulate a backlog of pending changes of such the effect is estimated to increase the CDF to greater than 1.0E-6/yr, which is nearly twice that of the estimated baseline EPR CDF.

Please justify setting the targeted effect to 1E-6/yr CDF.

Response to Question 19-270:

The intention of the 1.0E-06/yr threshold in U.S. EPR FSAR Tier 2, Section 19.1.2.4.1 *Description of PRA Maintenance and Update Program* was to indicate a quantitative backstop for the cumulative design changes that would trigger a PRA update without waiting for the routine update cycle.

The 1.0E-06/yr threshold was chosen because of its use in Regulatory Guide 1.174 as the region beyond which changes in risk stop being "very small changes"

As stated in Regulatory Guide 1.206 Section C.I.19.7, the PRA must be "maintained to ensure that it reasonably reflects as-designed, as-to-be-built, and as-to-be-operated conditions." Cumulative design changes that do not result in a core damage frequency (CDF) of 1.0E-06/yr or greater may also require a PRA update without waiting for the routine update cycle.

The determination of PRA "reasonableness" is summarized as follows:

- If the cumulative risk impact of the change(s) is more than 10 percent (either positive or negative) of the total CDF or large release frequency (LRF), then the PRA insights are assessed to see if they remain valid.
    - If the PRA insights are no longer valid, then the PRA is updated without waiting for the next routine update cycle.
    - If the cumulative impact of the change(s) is judged not to invalidate the PRA insights, then the PRA model will be revised at the next scheduled update.
- If the cumulative risk impact of the change(s) is not more than 10 percent (either positive or negative) of the total CDF or LRF, then the PRA model will be revised at the next scheduled update.

The U.S. EPR FSAR Tier 2, Section 19.1.2.4.1 will be revised to show that the Maintenance and Update Program is intended to also meet the Regulatory Guide 1.206 guidance and to provide further detail on the Maintenance and Update Program.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 19.1.2.4.1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

The PRA model credits the alternate feed from Division 1 to Division 2 and from Division 4 to Division 3 in SBO conditions and in non-SBO conditions. This change does not modify the availability of those functions or the context in which they will be performed, but modifies the way that they will be executed.

The failure probability of those functions, as modeled in the PRA, is dominated by human errors. Those human errors were assigned HEP values judged to be conservative for this alternate feed configuration. Therefore, this design change is judged not to have a significant impact on the current conclusions of the PRA.

6. Component cooling water (CCW) common header cooling to reactor coolant pump (RCP) thermal barriers – This design change consists of having one CCW common header cooling all four RCP thermal barriers, instead of each common header cooling two RCP thermal barriers. In case of a loss of cooling from one header, a manual switchover to the second header can be performed. This change has been quantitatively evaluated and results in a small decrease in seal LOCA contribution to internal event CDF. A larger decrease in internal fire and flood event CDF can be attributed to the conservative treatment of these events, which is likely to change as a result of more realistic fire and flood PRA updates. Overall, this design change is judged not to have a significant impact on the current conclusions of the PRA.

19.1.2.4.1 Description of PRA Maintenance and Update Program

The U.S. EPR PRA model and supporting documentation are maintained so that they continue to reflect the as-designed characteristics of the plant. Consistent with the ASME PRA Standard, Reference 5, and RG 1.200, a process is in place to perform the following as applicable to the certified design:

- Monitor PRA inputs and collect any new information relevant to the PRA.
- Maintain and upgrade the PRA to be consistent with the design.
- Consider cumulative impacts of pending changes when applying the PRA.
- Consider impacts of changes for previously implemented risk-informed decisions that used the PRA (e.g., RAP).
- Maintain configuration control of the computational methods used to support the PRA.
- Document the PRA model and processes.

19-270

To meet the guidance of Regulatory Guide 1.206, the PRA should be maintained to ensure that it reasonably reflects as-designed, as-to-be-built, and as-to-be-operated conditions. When reviewing pending design changes and proposed model improvements, the impact on the CDF and LRF are estimated. Based on the estimated impact, one of the following update approaches will be taken:

19-270

- If the effect of the change(s) since the last PRA model update are such that the PRA no longer reasonably reflects as-designed, as-to-be-built, and as-to-be-operated conditions, then ~~is judged to be safety significant,~~ a PRA model update is implemented ~~commensurate with the safety significance of the pending change~~ without waiting for the routine update cycle. ~~The significance of a pending change(s) and the urgency of its implementation within the PRA model are based on consideration of several change attributes including the level of complexity of the change, the ability to manage/control potential cumulative modeling impacts, and the estimated quantitative impact to the model risk results. The quantitative results could increase or decrease depending on the specific design change. However, in general, if a change(s) is estimated to increase the CDF to greater than 1.0E-06/yr, the model would be updated in a timely manner without waiting for the routine update cycle.~~ The reasonableness determination is summarized as follows:
  - If the cumulative risk impact of the change(s) is more than 10 percent (either positive or negative) of the total CDF or LRF, then the PRA insights are assessed to see if they remain valid.
  - If the PRA insights are no longer valid, then the PRA is updated without waiting for the next routine update cycle.
- If cumulative risk impact of the change(s) is judged not to invalidate the PRA insights, then the PRA model will be revised at the next scheduled update.
- A PRA model update may also be implemented without waiting for the next routine update cycle based on consideration of several change attributes, including the level of complexity of the change and the ability to manage/control potential cumulative modeling impacts.
- ~~If the effect of the change is judged not significant, the PRA model will be revised at the next scheduled update.~~
- ~~If the pending change does not impact the PRA, no further action is needed.~~

A COL applicant that references the U.S. EPR design certification will describe the applicant's PRA maintenance and upgrade program.

19.1.3 Special Design/Operational Features

The U.S. EPR is a 4590 MWt evolutionary pressurized water reactor (PWR) that combines proven technology with innovative system configurations to enhance safety. The EPR was originally developed through a joint effort between Framatome ANP and Siemens KWU in the 1990s by incorporating key technological and safety features from the French and German reactor fleets. The U.S. EPR version is an adaptation of the EPR to conform to U.S. codes, standards, and regulatory requirements. The design features that contribute to the low frequency of core damage and low frequency of large release compared to the current operating fleet of PWRs are described in the sections that follow.