

## ArevaEPRDCPEm Resource

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**From:** BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]  
**Sent:** Wednesday, November 10, 2010 2:10 PM  
**To:** Tesfaye, Getachew  
**Cc:** DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); LENTZ Tony (EXTERNAL AREVA)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386, FSAR Ch. 14, Supplement 7  
**Attachments:** RAI 386 Supplement 7 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 24 questions in RAI No. 386 on June 3, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, and Supplement 6 responses to RAI No. 386 were sent on July 15, 2010, August 12, 2010, August 26, 2010, September 9, 2010, September 22, 2010, and October 25, 2010, respectively, to provide a revised schedule.

The attached file, "RAI 386 Supplement 7 Response US EPR DC.pdf" provides technically correct and complete responses to nine questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 345 Questions 14.02-157, 14.03.02-48, and 14.03.08-3.

The following table indicates the respective pages in the response document, "RAI 386 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

| Question #            | Start Page | End Page |
|-----------------------|------------|----------|
| RAI 386 — 14.02-153   | 2          | 2        |
| RAI 386 — 14.02-154   | 3          | 3        |
| RAI 386 — 14.02-155   | 4          | 4        |
| RAI 386 — 14.02-157   | 5          | 5        |
| RAI 386 — 14.02-160   | 6          | 6        |
| RAI 386 — 14.03.02-46 | 7          | 7        |
| RAI 386 — 14.03.02-47 | 8          | 8        |
| RAI 386 — 14.03.02-48 | 9          | 10       |
| RAI 386 — 14.03.08-3  | 11         | 11       |

The schedule for the remaining 15 questions has not changed and is provided below.

| Question #            | Response Date    |
|-----------------------|------------------|
| RAI 386 — 14.02-149   | December 7, 2010 |
| RAI 386 — 14.02-150   | December 7, 2010 |
| RAI 386 — 14.02-151   | December 7, 2010 |
| RAI 386 — 14.02-152   | December 7, 2010 |
| RAI 386 — 14.02-156   | December 7, 2010 |
| RAI 386 — 14.02-158   | December 7, 2010 |
| RAI 386 — 14.02-159   | December 7, 2010 |
| RAI 386 — 14.03.02-44 | December 7, 2010 |
| RAI 386 — 14.03.02-45 | December 7, 2010 |
| RAI 386 — 14.03.02-49 | December 7, 2010 |

|                       |                  |
|-----------------------|------------------|
| RAI 386 — 14.03.02-50 | December 7, 2010 |
| RAI 386 — 14.03.02-51 | December 7, 2010 |
| RAI 386 — 14.03.03-37 | December 7, 2010 |
| RAI 386 — 14.03.03-46 | December 7, 2010 |
| RAI 386 — 14.03.08-2  | December 7, 2010 |

Sincerely,

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](mailto:Martin.Bryan.ext@areva.com)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Monday, October 25, 2010 1:22 PM  
**To:** 'Getachew.Tesfaye@nrc.gov'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386, FSAR Ch. 14, Supplement 6

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 24 questions in RAI No. 386 on June 3, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, and Supplement 5 responses to RAI No. 386 were sent on July 15, 2010, August 12, 2010, August 26, 2010, September 9, 2010, and September 22, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the response to the questions.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

| <b>Question #</b>     | <b>Response Date</b> |
|-----------------------|----------------------|
| RAI 386 — 14.02-149   | December 7, 2010     |
| RAI 386 — 14.02-150   | December 7, 2010     |
| RAI 386 — 14.02-151   | December 7, 2010     |
| RAI 386 — 14.02-152   | December 7, 2010     |
| RAI 386 — 14.02-153   | December 7, 2010     |
| RAI 386 — 14.02-154   | December 7, 2010     |
| RAI 386 — 14.02-155   | December 7, 2010     |
| RAI 386 — 14.02-156   | December 7, 2010     |
| RAI 386 — 14.02-157   | December 7, 2010     |
| RAI 386 — 14.02-158   | December 7, 2010     |
| RAI 386 — 14.02-159   | December 7, 2010     |
| RAI 386 — 14.02-160   | December 7, 2010     |
| RAI 386 — 14.03.02-44 | December 7, 2010     |
| RAI 386 — 14.03.02-45 | December 7, 2010     |

|                       |                  |
|-----------------------|------------------|
| RAI 386 — 14.03.02-46 | December 7, 2010 |
| RAI 386 — 14.03.02-47 | December 7, 2010 |
| RAI 386 — 14.03.02-48 | December 7, 2010 |
| RAI 386 — 14.03.02-49 | December 7, 2010 |
| RAI 386 — 14.03.02-50 | December 7, 2010 |
| RAI 386 — 14.03.02-51 | December 7, 2010 |
| RAI 386 — 14.03.03-37 | December 7, 2010 |
| RAI 386 — 14.03.03-46 | December 7, 2010 |
| RAI 386 — 14.03.08-2  | December 7, 2010 |
| RAI 386 — 14.03.08-3  | December 7, 2010 |

Sincerely,

Martin (Marty) C. Bryan  
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702 561-3528 cell  
[Martin.Bryan.ext@areva.com](mailto:Martin.Bryan.ext@areva.com)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Wednesday, September 22, 2010 12:31 PM  
**To:** Tesfaye, Getachew  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386, FSAR Ch. 14, Supplement 5

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 24 questions in RAI No. 386 on June 3, 2010. Supplement 1, Supplement 2, Supplement 3, and Supplement 4 responses to RAI No. 386 were sent on July 15, 2010, August 12, 2010, August 26, 2010, and September 9, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the response to the questions.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

| Question #          | Response Date    |
|---------------------|------------------|
| RAI 386 — 14.02-149 | October 28, 2010 |
| RAI 386 — 14.02-150 | October 28, 2010 |
| RAI 386 — 14.02-151 | October 28, 2010 |
| RAI 386 — 14.02-152 | October 28, 2010 |
| RAI 386 — 14.02-153 | October 28, 2010 |
| RAI 386 — 14.02-154 | October 28, 2010 |
| RAI 386 — 14.02-155 | October 28, 2010 |
| RAI 386 — 14.02-156 | October 28, 2010 |
| RAI 386 — 14.02-157 | October 28, 2010 |
| RAI 386 — 14.02-158 | October 28, 2010 |
| RAI 386 — 14.02-159 | October 28, 2010 |

|                       |                  |
|-----------------------|------------------|
| RAI 386 — 14.02-160   | October 28, 2010 |
| RAI 386 — 14.03.02-44 | October 28, 2010 |
| RAI 386 — 14.03.02-45 | October 28, 2010 |
| RAI 386 — 14.03.02-46 | October 28, 2010 |
| RAI 386 — 14.03.02-47 | October 28, 2010 |
| RAI 386 — 14.03.02-48 | October 28, 2010 |
| RAI 386 — 14.03.02-49 | October 28, 2010 |
| RAI 386 — 14.03.02-50 | October 28, 2010 |
| RAI 386 — 14.03.02-51 | October 28, 2010 |
| RAI 386 — 14.03.03-37 | October 28, 2010 |
| RAI 386 — 14.03.03-46 | October 28, 2010 |
| RAI 386 — 14.03.08-2  | October 28, 2010 |
| RAI 386 — 14.03.08-3  | October 28, 2010 |

Sincerely,

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---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Thursday, September 09, 2010 2:30 PM  
**To:** 'Tefaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386, FSAR Ch. 14, Supplement 4

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 24 questions in RAI No. 386 on June 3, 2010.

AREVA NP Inc. provided technically correct and complete draft responses to 11 of the 24 questions in "RAI 386 Supplement 1 Response – DRAFT.pdf" on July 8, 2010. A revised schedule was provided in Supplement 1 on July 15, 2010, in Supplement 2 on August 12, 2010, and in Supplement 3 on August 26, 2010. To allow time for interaction between AREVA and the NRC staff, a revised schedule for submittal of final responses is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

| Question #          | Response Date    |
|---------------------|------------------|
| RAI 386 — 14.02-149 | October 28, 2010 |
| RAI 386 — 14.02-150 | October 28, 2010 |
| RAI 386 — 14.02-151 | October 14, 2010 |
| RAI 386 — 14.02-152 | October 14, 2010 |
| RAI 386 — 14.02-153 | October 28, 2010 |
| RAI 386 — 14.02-154 | October 28, 2010 |

|                       |                    |
|-----------------------|--------------------|
| RAI 386 — 14.02-155   | October 28, 2010   |
| RAI 386 — 14.02-156   | October 14, 2010   |
| RAI 386 — 14.02-157   | October 28, 2010   |
| RAI 386 — 14.02-158   | October 14, 2010   |
| RAI 386 — 14.02-159   | October 14, 2010   |
| RAI 386 — 14.02-160   | October 28, 2010   |
| RAI 386 — 14.03.02-44 | September 23, 2010 |
| RAI 386 — 14.03.02-45 | September 23, 2010 |
| RAI 386 — 14.03.02-46 | October 28, 2010   |
| RAI 386 — 14.03.02-47 | October 28, 2010   |
| RAI 386 — 14.03.02-48 | October 28, 2010   |
| RAI 386 — 14.03.02-49 | September 23, 2010 |
| RAI 386 — 14.03.02-50 | September 23, 2010 |
| RAI 386 — 14.03.02-51 | September 23, 2010 |
| RAI 386 — 14.03.03-37 | September 23, 2010 |
| RAI 386 — 14.03.03-46 | October 28, 2010   |
| RAI 386 — 14.03.08-2  | September 23, 2010 |
| RAI 386 — 14.03.08-3  | September 23, 2010 |

Sincerely,

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**From:** BRYAN Martin (External RS/NB)  
**Sent:** Thursday, August 26, 2010 8:27 PM  
**To:** 'Tefsaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386, FSAR Ch. 14, Supplement 3

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 24 questions in RAI No. 386 on June 3, 2010.

AREVA NP Inc. provided technically correct and complete draft responses to 11 of the 24 questions in "RAI 386 Supplement 1 Response – DRAFT.pdf" on July 8, 2010. A revised schedule was provided in Supplement 1 on July 15, 2010 and in Supplement 2 on August 12, 2010. To allow time for interaction between AREVA and the NRC staff, a revised schedule for submittal of final responses is provided in this e-mail.

The schedule for technically correct and complete responses has been revised and is provided below:

| Question # | Response Date |
|------------|---------------|
|------------|---------------|

|                       |                    |
|-----------------------|--------------------|
| RAI 386 — 14.02-149   | September 9, 2010  |
| RAI 386 — 14.02-150   | September 9, 2010  |
| RAI 386 — 14.02-151   | October 14, 2010   |
| RAI 386 — 14.02-152   | October 14, 2010   |
| RAI 386 — 14.02-153   | September 9, 2010  |
| RAI 386 — 14.02-154   | September 9, 2010  |
| RAI 386 — 14.02-155   | September 9, 2010  |
| RAI 386 — 14.02-156   | October 14, 2010   |
| RAI 386 — 14.02-157   | September 9, 2010  |
| RAI 386 — 14.02-158   | October 14, 2010   |
| RAI 386 — 14.02-159   | October 14, 2010   |
| RAI 386 — 14.02-160   | September 9, 2010  |
| RAI 386 — 14.03.02-44 | September 23, 2010 |
| RAI 386 — 14.03.02-45 | September 23, 2010 |
| RAI 386 — 14.03.02-46 | September 9, 2010  |
| RAI 386 — 14.03.02-47 | September 9, 2010  |
| RAI 386 — 14.03.02-48 | September 9, 2010  |
| RAI 386 — 14.03.02-49 | September 23, 2010 |
| RAI 386 — 14.03.02-50 | September 23, 2010 |
| RAI 386 — 14.03.02-51 | September 23, 2010 |
| RAI 386 — 14.03.03-37 | September 23, 2010 |
| RAI 386 — 14.03.03-46 | September 9, 2010  |
| RAI 386 — 14.03.08-2  | September 23, 2010 |
| RAI 386 — 14.03.08-3  | September 23, 2010 |

Sincerely,

Martin (Marty) C. Bryan  
U.S. EPR Design Certification Licensing Manager  
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Tel: (434) 832-3016  
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[Martin.Bryan.ext@areva.com](mailto:Martin.Bryan.ext@areva.com)

---

**From:** BRYAN Martin (EXT)  
**Sent:** Thursday, August 12, 2010 6:02 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony F (EXT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386, FSAR Ch. 14, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 24 questions in RAI No. 386 on June 3, 2010. A revised schedule was provided in Supplement 1 on July 15, 2010.

AREVA NP Inc. provided technically correct and complete DRAFT responses to 7 of the 24 questions in "RAI 386 Supplement 1 Response – DRAFT.pdf" on July 8, 2010. To allow time for interaction between AREVA and the NRC staff, a revised schedule for submittal of final responses for these 7 questions is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

| <b>Question #</b>     | <b>Response Date</b> |
|-----------------------|----------------------|
| RAI 386 — 14.02-149   | September 9, 2010    |
| RAI 386 — 14.02-150   | September 9, 2010    |
| RAI 386 — 14.02-151   | August 26, 2010      |
| RAI 386 — 14.02-152   | August 26, 2010      |
| RAI 386 — 14.02-153   | September 9, 2010    |
| RAI 386 — 14.02-154   | September 9, 2010    |
| RAI 386 — 14.02-155   | September 9, 2010    |
| RAI 386 — 14.02-156   | August 26, 2010      |
| RAI 386 — 14.02-157   | September 9, 2010    |
| RAI 386 — 14.02-158   | August 26, 2010      |
| RAI 386 — 14.02-159   | August 26, 2010      |
| RAI 386 — 14.02-160   | September 9, 2010    |
| RAI 386 — 14.03.02-44 | August 26, 2010      |
| RAI 386 — 14.03.02-45 | August 26, 2010      |
| RAI 386 — 14.03.02-46 | August 26, 2010      |
| RAI 386 — 14.03.02-47 | August 26, 2010      |
| RAI 386 — 14.03.02-48 | August 26, 2010      |
| RAI 386 — 14.03.02-49 | August 26, 2010      |
| RAI 386 — 14.03.02-50 | August 26, 2010      |
| RAI 386 — 14.03.02-51 | August 26, 2010      |
| RAI 386 — 14.03.03-37 | August 26, 2010      |
| RAI 386 — 14.03.03-46 | August 26, 2010      |
| RAI 386 — 14.03.08-2  | August 26, 2010      |
| RAI 386 — 14.03.08-3  | August 26, 2010      |

Sincerely,

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](mailto:Martin.Bryan.ext@areva.com)

---

**From:** BRYAN Martin (EXT)  
**Sent:** Thursday, July 15, 2010 1:03 PM  
**To:** 'Tesyfaye, Getachew'  
**Cc:** DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); LENTZ Tony F (EXT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386, FSAR Ch. 14, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 24 questions in RAI No. 386 on June 3, 2010.

AREVA NP Inc. provided technically correct and complete DRAFT responses to 7 of the 24 questions in RAI No. 386 on July 8, 2010. To allow additional time for interaction between AREVA and the NRC staff, a revised schedule for submittal of final responses for these 7 questions is provided in this e-mail (386-14.02-149, 150, 153, 154, 155, 157 and 160).

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

| <b>Question #</b>     | <b>Response Date</b>   |
|-----------------------|------------------------|
| RAI 386 — 14.02-149   | <b>August 12, 2010</b> |
| RAI 386 — 14.02-150   | <b>August 12, 2010</b> |
| RAI 386 — 14.02-151   | August 26, 2010        |
| RAI 386 — 14.02-152   | August 26, 2010        |
| RAI 386 — 14.02-153   | <b>August 12, 2010</b> |
| RAI 386 — 14.02-154   | <b>August 12, 2010</b> |
| RAI 386 — 14.02-155   | <b>August 12, 2010</b> |
| RAI 386 — 14.02-156   | August 26, 2010        |
| RAI 386 — 14.02-157   | <b>August 12, 2010</b> |
| RAI 386 — 14.02-158   | August 26, 2010        |
| RAI 386 — 14.02-159   | August 26, 2010        |
| RAI 386 — 14.02-160   | <b>August 12, 2010</b> |
| RAI 386 — 14.03.02-44 | August 26, 2010        |
| RAI 386 — 14.03.02-45 | August 26, 2010        |
| RAI 386 — 14.03.02-46 | August 26, 2010        |
| RAI 386 — 14.03.02-47 | August 26, 2010        |
| RAI 386 — 14.03.02-48 | August 26, 2010        |
| RAI 386 — 14.03.02-49 | August 26, 2010        |
| RAI 386 — 14.03.02-50 | August 26, 2010        |
| RAI 386 — 14.03.02-51 | August 26, 2010        |
| RAI 386 — 14.03.03-37 | August 26, 2010        |
| RAI 386 — 14.03.03-46 | August 26, 2010        |
| RAI 386 — 14.03.08-2  | August 26, 2010        |
| RAI 386 — 14.03.08-3  | August 26, 2010        |

Sincerely,

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](mailto:Martin.Bryan.ext@areva.com)

---

**From:** BRYAN Martin (EXT)  
**Sent:** Thursday, June 03, 2010 7:02 PM  
**To:** 'Tesfaye, Getachew'



**Cc:** DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); LENTZ Tony F (EXT); RYAN Tom (AREVA NP INC)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 386(4306,4418,4532,4349,2666,4512,4341), FSAR Ch. 14

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 386 Response US EPR DC.pdf" provides a schedule since a technically correct and complete response to the 24 questions is not provided.

The following table indicates the respective pages in the response document, "RAI 386 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

| <b>Question #</b>     | <b>Start Page</b> | <b>End Page</b> |
|-----------------------|-------------------|-----------------|
| RAI 386 — 14.02-149   | 2                 | 2               |
| RAI 386 — 14.02-150   | 3                 | 3               |
| RAI 386 — 14.02-151   | 4                 | 4               |
| RAI 386 — 14.02-152   | 5                 | 5               |
| RAI 386 — 14.02-153   | 6                 | 6               |
| RAI 386 — 14.02-154   | 7                 | 7               |
| RAI 386 — 14.02-155   | 8                 | 8               |
| RAI 386 — 14.02-156   | 9                 | 9               |
| RAI 386 — 14.02-157   | 10                | 10              |
| RAI 386 — 14.02-158   | 11                | 11              |
| RAI 386 — 14.02-159   | 12                | 12              |
| RAI 386 — 14.02-160   | 13                | 13              |
| RAI 386 — 14.03.02-44 | 14                | 15              |
| RAI 386 — 14.03.02-45 | 16                | 16              |
| RAI 386 — 14.03.02-46 | 17                | 17              |
| RAI 386 — 14.03.02-47 | 18                | 18              |
| RAI 386 — 14.03.02-48 | 19                | 19              |
| RAI 386 — 14.03.02-49 | 20                | 20              |
| RAI 386 — 14.03.02-50 | 21                | 21              |
| RAI 386 — 14.03.02-51 | 22                | 22              |
| RAI 386 — 14.03.03-37 | 23                | 23              |
| RAI 386 — 14.03.03-46 | 24                | 24              |
| RAI 386 — 14.03.08-2  | 25                | 26              |
| RAI 386 — 14.03.08-3  | 27                | 27              |

A complete answer is not provided for the 24 questions. The schedule for a technically correct and complete response to these questions is provided below.

| <b>Question #</b>   | <b>Response Date</b> |
|---------------------|----------------------|
| RAI 386 — 14.02-149 | July 15, 2010        |
| RAI 386 — 14.02-150 | July 15, 2010        |
| RAI 386 — 14.02-151 | August 26, 2010      |
| RAI 386 — 14.02-152 | August 26, 2010      |
| RAI 386 — 14.02-153 | July 15, 2010        |

|                       |                 |
|-----------------------|-----------------|
| RAI 386 — 14.02-154   | July 15, 2010   |
| RAI 386 — 14.02-155   | July 15, 2010   |
| RAI 386 — 14.02-156   | August 26, 2010 |
| RAI 386 — 14.02-157   | July 15, 2010   |
| RAI 386 — 14.02-158   | August 26, 2010 |
| RAI 386 — 14.02-159   | August 26, 2010 |
| RAI 386 — 14.02-160   | July 15, 2010   |
| RAI 386 — 14.03.02-44 | August 26, 2010 |
| RAI 386 — 14.03.02-45 | August 26, 2010 |
| RAI 386 — 14.03.02-46 | August 26, 2010 |
| RAI 386 — 14.03.02-47 | August 26, 2010 |
| RAI 386 — 14.03.02-48 | August 26, 2010 |
| RAI 386 — 14.03.02-49 | August 26, 2010 |
| RAI 386 — 14.03.02-50 | August 26, 2010 |
| RAI 386 — 14.03.02-51 | August 26, 2010 |
| RAI 386 — 14.03.03-37 | August 26, 2010 |
| RAI 386 — 14.03.03-46 | August 26, 2010 |
| RAI 386 — 14.03.08-2  | August 26, 2010 |
| RAI 386 — 14.03.08-3  | August 26, 2010 |

Sincerely,

Martin (Marty) C. Bryan  
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**From:** Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]  
**Sent:** Tuesday, May 04, 2010 1:52 PM  
**To:** ZZ-DL-A-USEPR-DL  
**Cc:** Keim, Andrea; Rasmussen, Richard; Dehmel, Jean-Claude; Bernal, Sara; Roach, Edward; Jeng, David; Hawkins, Kimberly; Ng, Ching; Dixon-Herrity, Jennifer; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource  
**Subject:** U.S. EPR Design Certification Application RAI No. 386(4306,4418,4532,4349,2666,4512,4341), FSAR Ch. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 6, 2010, and discussed with your staff on May 4, 2010. Drat RAI Question 14.03.02-47 was modified as a result of that discussion. 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



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**Response to**

**Request for Additional Information No. 386(4306, 4418, 4532, 4349, 2666, 4512, 4341), Supplement 7**

**5/4/2010**

**U.S. EPR Standard Design Certification**

**AREVA NP Inc.**

**Docket No. 52-020**

**SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants**

**SRP Section: 14.03.02 - Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria**

**SRP Section: 14.03.03 - Piping Systems and Components - Inspections, Tests, Analyses, and Acceptance Criteria**

**SRP Section: 14.03.08 - Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria**

**Application Section: SRP 14.02 (NUREG 0800)**

**QUESTIONS for Quality and Vendor Branch 2 (ESBWR/ABWR) (CQVB)**

**QUESTIONS for Health Physics Branch (CHPB)**

**QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)**

**QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)**

**Question 14.02-153:****Follow-up to RAI 313, Question 14.02-132**

Based on RAI 14.02-132 response the staff finds the inclusion of Test No. 193 in the response to Test No. 93 is not correct given that Test No. 193 addresses only the integrity of the bioshield during power ascension and not the adequacy of the radwaste "Drum Store" and "Tubular Shaft Store" located in the Radwaste Bldg. FSAR Section 12.3.2.2, as referenced in Test No.193, describes design criteria for the adequacy of the shielding based on design features and modeling, and does not address testing. Accordingly, the response to Test No. 93 should be revised to include provisions that confirm the integrity of the concrete shielding for the "Drum Store" and "Tubular Shaft Store" located in the Radwaste Bldg.

**Response to Question 14.02-153:**

The Response to RAI 313, Question 14.02-132 should be revised as follows:

**Revised Response to Question 14.02-132:**

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #093 were revised in U.S. EPR FSAR Revision 2 to include the subsystems described in U.S. EPR FSAR Tier 2, Section 11.4.2.3.1.

The solid waste storage support systems are tested in the following tests:

- Test #080, "Radioactive Waste Building Ventilation System."
- Test #093, "Solid Waste Storage System."
- Test #094, "Radioactive Concentrates Processing System – Solid Waste."
- Test #098, "Equipment and Floor Drainage System."
- Test #129, "Process Information and Control System."
- Test #193, "Low Power Biological Shield Survey."

U.S. EPR FSAR Tier 2, Section 14.2, Test #093 was revised in U.S. EPR FSAR Revision 2 to clarify the following:

- Test Method: A new item "Verify the integrity of the concrete shielding for the Drum Store and Tubular Shaft Store located in the Radwaste Building" was added.
- Acceptance Criteria: A new item "The concrete shielding associated with the solid waste management system meets design requirements" was added.

**FSAR Impact:**

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

**Question 14.02-154:**

**Follow-up to RAI 313, Question 14.02-133**

In response to RAI 14.02-133, a review of components listed in Section 3.0 of revised test abstract No. 94 indicates that the "Drum Measuring Device" is not included in the equipment listing, given the description of FSAR Section 11.4.2.3.2. Note that this equipment is not listed in FSAR Table 11.5-1 since it is not part of the liquid and gaseous process and effluent monitoring system. Accordingly, the response to Test No. 94 should be revised to include this piece of equipment and associated criteria.

**Response to Question 14.02-154:**

U.S. EPR FSAR Tier 2, Section 14.2, Test #094 was revised in U.S. EPR FSAR Revision 2 to clarify the following:

- Test Method: A new item "Drum Measuring Device" was added.

**FSAR Impact:**

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

**Question 14.02-155:**

**Follow-up to RAI 313, Question 14.02-134**

Based on RAI 14.02-134 response, a review of components listed in Section 3.0 of revised test abstract No. 95 indicates that the "Evaporator Column" is not included in the equipment listing, given the description of FSAR Section 11.2.2.4.2.1. Accordingly, the response to Test No. 95 should be revised to include the Evaporator and Evaporator Column since the FSAR makes a technical distinction in their descriptions.

**Response to Question 14.02-155:**

U.S. EPR FSAR Tier 2, Section 14.2, Test #095 was revised in U.S. EPR FSAR Revision 2 to clarify the following:

- Test Method: A new item "Evaporator Column" was added.

**FSAR Impact:**

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



**Question 14.02-157:****Follow-up to RAI 313, Question 14.02-138**

The response to RAI 14.02-138 refers to actions and activities that are associated with COL holder activities in concluding that the instrumentation used to meet the RCPB leakage rate TS need not be considered in the ITP. The focus of the RAI is on the inclusion of tests and definition of test criteria that confirm the operation of the instrumentation used to meet the associated TS. The fact that this instrumentation is used to comply with a TS does not give it special exemption for being excluded in the ITP. In this context, the RAI identifies a concern that is no different than those applied to any other rad monitoring instrumentation, e.g., see the test methods and acceptance criteria stated in Test No. 92, as revised by a similar type of RAI.

**Response to Question 14.02-157:****Revised Response to Question 14.02-138:**

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #172 was reviewed and the relationship to Technical Specification (TS) 3.4.12 and 3.4.14 were examined. Plants typically perform a test periodically to meet the surveillance requirements described in TS 3.4.12 and rely on the instrumentation described in TS 3.4.14 to monitor signs of reactor coolant system (RCS) leakage between TS 3.4.12 surveillances. During hot functional (pre-core) testing, there are no radiological restrictions on personnel monitoring of the RCS pressure boundary, and the instrumentation described in TS 3.4.14 is not applicable.

U.S. EPR FSAR Tier 2, Section 14.2.12, Test #172 is a pre-core test that would be performed during hot functional testing (HFT). The appropriate reference for tests during this time is RG 1.68, Appendix A.2.d, Final Test of the Reactor Coolant System to Verify that System Leak Rates are within Limits. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #172 meets the requirements of Appendix A.2.d and is similar to a plant test used to satisfy TS SR 3.4.12.1, which is a water balance as described in the Technical Specifications. U.S. EPR FSAR Tier 2, Section 14.2.12, Test #172 is performed during HFT conditions because the water densities in the systems connected to the RCS vary based on temperature and pressure. This test is performed again during power ascension to verify RCS leakage after fuel load.

The appropriate reference for measuring RCS leakage by radiological methods is described in RG 1.68, Appendix A.5.o, Calibrate Instrumentation and Demonstrate the Proper Response of Reactor Coolant Detection Systems, if not Previously Demonstrated. The instrumentation used to perform this function is calibrated and preoperational tested in U.S. EPR FSAR Tier 2, Section 14.2.12, Test #143. The missing step is to "demonstrate the proper response of reactor coolant detection systems and the instrumentation's response conforms with the operational range stated in Section 5.2.5.5.3." This will be accomplished by comparing the calculated leakage in U.S. EPR FSAR Tier 2, Section 14.2.12, Test #187 with the indication produced by the radiation monitors.

**FSAR Impact:**

U.S. EPR FSAR Tier 2, Section 14.2, Test #187 will be revised as described in the response and indicated on the enclosed markup.

**Question 14.02-160:**

**Follow-up to RAI 330, Question 14.02-144**

The response to RAI 330 question 14.02-144 related to Test #143, the term safety related was added to the prerequisite section. The term adds some confusion as to which radiation monitors are safety-related or how the radiation monitors are part of the safety-related monitoring system. Regulatory Guide 1.206 Part, C.I.14.2.12, Individual Test Descriptions, states that the COL applicant's test abstracts should emphasize SSCs and design features which meets any of the eight criteria. Criterion (6) states that SSC's and design features which "process, store, control, measure, or limit the release of radioactive materials." Since the installed radiation monitoring system measures and limits the release of radioactive materials by warning workers of dose rate increases, the staff finds the added term of safety-related misleading.

**Response to Question 14.02-160:**

U.S. EPR FSAR Tier 2, Section 14.2, Test #143 was revised in U.S. EPR FSAR Revision 2 to remove the term "safety-related".

**FSAR Impact:**

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

**Question 14.03.02-46:****Follow-up to RAI 230, Question 14.03.02-25**

In Revision 1 to U.S EPR FSAR, Tier1, Item 2.2 in Table 2.1.1-8 for the Reactor Building addresses prevention of water ingress into the core melt spreading area. Under the "Acceptance Criteria" column, it references a watertight door shown in Figure 2.1.1-4. However, the door is not shown in the referenced figure. In **RAI 230, Question 14.03.02-25** the staff requested that the figure be corrected. In response to the staff request, the applicant stated that the water tight door identified in U.S. EPR FSAR Tier 1, Section 2.1.1, Item 2.2 and Table 2.1.1-8, Item 2.2 is not a safety-significant design feature and should not be included as part of the ITAAC item. Therefore, it stated that the reference to the watertight door would be removed from U.S. EPR FSAR Tier 1, Section 2.1.1, Item 2.2 and Table 2.1.1-8, Item 2.2. In SRP Section 14.3, Appendix C.I.A.iii, Item (6) it states that severe accident features should be described in the design description, and the basic configuration ITAAC should verify that they exist. The staff notes that other severe accident features have been included in the ITAAC tables, such as the concrete support structures that limit the downward expansion of the lower head. Since the watertight door is a feature intended to mitigate a severe accident the staff is requesting that the applicant include it in the design description and its existence be confirmed by ITAAC.

**Response to Question 14.03.02-46:**

The watertight door that was originally noted in U.S. EPR FSAR Tier 1, Table 2.1.1-8, Item 2.2 is not a feature that is intended to mitigate a severe accident. The entire watertight barrier around the core melt spreading area is the safety-significant feature intended to mitigate a severe accident as currently identified in U.S EPR FSAR Tier 1, Table 2.1.1-8, Item 2.2. However, it is important that any doors or penetrations within the water ingress barrier are watertight to confirm that this barrier performs its safety-significant function. Therefore, the Acceptance Criteria for this ITAAC was revised in U.S. EPR FSAR Revision 2 to include confirmation that doors or penetrations within the water ingress barrier are watertight.

**FSAR Impact:**

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

**Question 14.03.02-47:****Follow-up to RAI 230, Question 14.03.02-29**

In **RAI 230, Question 14.03.02-29**, the staff requested that a requirement for a final inspection and reconciliation of the as-built condition to the final design basis loads be added to the ITAAC tables. In its response, the applicant referred to its response to **RAI 230, Question 14.03.02-28**. **The response to RAI 230, Question 14.03.02-28** does not address this issue. To ensure the requirements of GDC 2, GDC 4 and GDC 50 have been met and the guidance of SRP 14.3.2, SAC-03 has been implemented, the applicant is requested to add under the Inspections, Tests, Analyses column in Tables 2.1.1-8, 2.1.1-11, 2.1.1-4.2, 2.1.1-10, 2.1.1-11, 2.1.2-3 and 2.1.5-3 a statement which requires that a final analysis be performed to verify that as built conditions of the structures are reconciled, as appropriate, with their structural design basis loads.

**Response to Question 14.03.02-47:**

The SRP calls for 'reconciliation,' not complete re-analysis. If there are no deviations to the design as supported by the final analysis, there is no reason to require a complete re-analysis. Or, if deviations are reconciled prior to completion of construction and there are no subsequent deviations, there is no need to redo the analysis.

The current ITAAC requires reconciliation of deviations as stated in the SRP and as provided by existing certified designs.

**FSAR Impact:**

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

**Question 14.03.02-48:****Follow-up to RAI 230, Question 14.03.02-15**

In SRP Section 14.3.2, SAC-08, for internal flood, it states that ITAAC should require inspections to verify that penetrations in division walls are at least 2.5 M above the floor and safety-related electrical, instrumentation, and control equipment are located at least 20 cm above the floor surface. The staff in **RAI 230, Question 14.03.02-15** requested that inspections for these features be added to the ITAAC tables or that the applicant provide justification for not doing so. The applicant's response was that the requirements for penetration and equipment locations are not part of the U.S. EPR design approach for protection against internal flooding which is described in U.S. EPR FSAR, Tier 2, Section 3.4.1. Therefore, an ITAAC to confirm that these requirements are met in U.S. EPR FSAR, Tier 1 is not appropriate. The staff reviewed U.S. EPR FSAR, Tier 2, Section 3.4.1 in which it states that the principal protective measure for Seismic Category I buildings is physical separation of the redundant safe shutdown systems and components. Starting on the bottom of page 3.4-1, it states that division walls below elevation 0 ft, 0 inches provide separation and serve as flood barriers to prevent flood waters spreading to adjacent divisions. However, it goes on to state that these division walls are water tight, have no doors, and a *minimal number of penetrations*. Thus, it appears penetrations may be present in which case it might be possible for water to flow from one division to another division and thus compromise the design approach for protection from internal flooding through physical separation. The applicant needs to state how water is prevented from entering adjacent safety divisions through these penetrations and why the acceptance criteria of SRP 14.3.2, SAC-08 need not be met for the U.S. EPR design.

**Response to Question 14.03.02-48:**

Penetrations through division walls in the Safeguard Buildings and the Fuel Building are watertight up to elevation +0 feet preventing water from entering adjacent safety divisions. Penetrations through division walls in the Emergency Power Generator Buildings are watertight to prevent water from entering adjacent safety divisions. There are no common division walls for the Essential Service Water Buildings that require internal flooding protection. Design requirements for penetrations to be at least 2.5 m above the floor and safety-related electrical, instrumentation, and control equipment to be located at least 20 cm above the floor surface as stated in SRP 14.3.2, SAC-08 do not apply to the U.S. EPR because penetrations in division walls are watertight and flooding above the cited distances above the floor can occur in the U.S. EPR design. For instance, in Seismic Category I buildings designed with divisional separation, including the Safeguard Building (SB), Fuel Building (FB), Emergency Power Generating Building (EPGB), and Essential Service Water Pump Building (ESWPB), one division of safe shutdown systems and components can flood without compromising the plant's ability to safely shut down. In buildings not designed with divisional separation, e.g., the Reactor Building (RB), all safety-related SSC required to achieve safe shutdown or mitigate the consequences of an accident are located above the maximum flood water level.

The design approach for protection from internal flooding through physical separation for the Safeguard and Fuel Buildings is confirmed in U.S. EPR FSAR Tier 1, Table 2.1.1.10, Item 2.2 and U.S. EPR FSAR Tier 1, Table 2.1.1.11, Item 2.2. The commitment wording for these ITAAC items identify the barriers that must maintain physical separation between adjacent divisions in the event of an internal hazard, such as internal flooding. The ITAAC requires that an internal flooding analysis and a walkdown are performed to establish that flooding protection

features are installed to confirm that the impact of an internal flood in one division cannot affect an adjacent division. This includes verifying that penetrations in divisional barriers below the internal flood elevation are appropriately sealed to prevent flooding in one division from affecting an adjacent division.

U.S. EPR FSAR Tier 1, Section 2.1.2 will be revised to include verification of the flooding protection features for the EPGBs.

U.S. EPR FSAR Tier 2, Section 3.4.1 was revised in U.S. EPR FSAR Revision 2 to clarify that penetrations in division walls are watertight up to elevation +0 feet.

**FSAR Impact:**

U.S. EPR FSAR Tier 1, Section 2.1.2 will be revised as described in the response and indicated on the enclosed markup.

**Question 14.03.08-3:**

FSAR, Tier 1, Table 2.4.22-1, Radiation monitoring System Equipment mechanical design, lists the containment high range dose rate monitors as located in the reactor building. However, according to FSAR, tier 2, section 12.3 of the FSAR, the reactor building includes the annulus and the containment building. Item II.F.1.3 states that the high range monitors should be located inside containment. Please modify this and any related tables so that they state the containment high range dose rate monitors are located inside containment.

**Response to Question 14.03.08-3:**

U.S. EPR FSAR, Table 2.4.22-1 will be revised to specify that the monitors are located in the Reactor Containment Building as indicated in the question.

**FSAR Impact:**

U.S. EPR FSAR Tier 1, Table 2.4.22-1 will be revised as described in the response and indicated on the enclosed markup.

# U.S. EPR Final Safety Analysis Report Markups



**Table 2.1.2-3—Emergency Power Generating Building  
ITAAC (3 Sheets)**

|     | <b>Commitment Wording</b>  | <b>Inspections, Tests, Analyses</b>   | <b>Acceptance Criteria</b>  |
|-----|--|---|---|
| 3.3 | <p>The basic configuration of the EPGB structures contains an internal hazards separation barrier so that the impact of internal hazards, including fire, flood, high-energy line break and missile impact, is contained within the EPGB of hazard origination. Figure 2.1.2-4 identifies the internal hazards separation barrier.</p> | <p>a. An inspection of the EPGBs will be performed.</p> <p>b. A fire protection analysis will be performed.</p> <p>c. Inspection of as-built conditions of barriers, doors, dampers, and penetrations through the barriers identified on Figure 2.1.2-4, versus construction drawings of barriers, doors, dampers, and penetrations as determined in the part (b) analysis, will be performed.</p> <p><u>d. An internal flooding analysis for the EPGBs will be performed.</u></p> <p><u>e. A walkdown of the EPGB features identified in the internal flooding analysis in part (d) that maintain the impact of the impact of the internal flooding to the EPGB of origin will be performed.</u></p> | <p>a. The as-built configuration of the EPGBs provides internal hazards barriers as shown on Figure 2.1.2-4.</p> <p>b. Completion of analysis that indicates that barriers, doors, dampers and penetrations providing separation have a minimum 3-hour fire rating and mitigate propagation of smoke to the extent that safe shutdown is not adversely affected.</p> <p>c. The as-built configuration of walls, doors, dampers and penetrations through the barriers listed on Figure 2.1.2-4 agrees with the construction drawings.</p> <p><u>d. Completion of the internal flooding analysis for the EPGBs indicates that the impact of internal flooding is contained with the EPGB of origin.</u></p> <p><u>e. The EPGB flood protection features that maintain the impact of internal flooding to the EPGB of origin are installed and agree with the construction drawings.</u></p> |

14.03.02-48

**Table 2.4.22-2—Radiation Monitoring System Equipment I&C and Electrical Design**

14.03.08-3

| Description                              | Tag Number <sup>(1)</sup> | Location                            | IEEE Class 1E <sup>(2)</sup>     | EQ – Harsh Env. | MCR/RSS Displays                    |
|--|---------------------------|-------------------------------------|----------------------------------|-----------------|-------------------------------------|
| Containment High Range Dose Rate Monitor | 30JYK15CR101              | <u>Containment</u> Reactor Building | 1 <sup>N</sup><br>2 <sup>A</sup> | Yes             | Radiation Alarm/<br>Radiation Alarm |
| Containment High Range Dose Rate Monitor | 30JYK15CR102              | <u>Containment</u> Reactor Building | 2 <sup>N</sup><br>1 <sup>A</sup> | Yes             | Radiation Alarm/<br>Radiation Alarm |
| Containment High Range Dose Rate Monitor | 30JYK15CR103              | <u>Containment</u> Reactor Building | 3 <sup>N</sup><br>4 <sup>A</sup> | Yes             | Radiation Alarm/<br>Radiation Alarm |
| Containment High Range Dose Rate Monitor | 30JYK28CR101              | <u>Containment</u> Reactor Building | 4 <sup>N</sup><br>3 <sup>A</sup> | Yes             | Radiation Alarm/<br>Radiation Alarm |

- 1) Equipment tag numbers are provided for information only and are not part of the certified design.
- 2) <sup>N</sup> denotes the division the component is normally powered from. <sup>A</sup> denotes the division the component is powered from when alternate feed is implemented.

- 4.2 VCT level, temperature, and pressure.
- 4.3 RCDT level, temperature, and pressure.
- 4.4 RCS temperature and pressure.
- 4.5 SI Accumulator level and pressure.
- 4.6 Time interval.

5.0 ACCEPTANCE CRITERIA

- 5.1 Identified and unidentified leakage shall be within the limits described in Section 5.2.5 and ~~in~~ Technical Specification 3.4.12.
- 5.2 The values determined by the radiation monitoring instrumentation described in Technical Specification 3.4.14 are within reasonable agreement with the instrumentation used to calculate Technical Specification 3.4.12 leakage and the instrumentation's response conforms with the operational range stated in Section 5.2.5.5.3.

14.02-157 →

**14.2.12.14.10 Post-Core Incore Instrumentation (Test #188)**

1.0 OBJECTIVE

- 1.1 To measure the leakage resistance of the fixed incore detectors.
- 1.2 To demonstrate that the incore thermocouples are functional (refer to Section 7.1.1.5.2 for a description of fixed thermocouples).

2.0 PREREQUISITES

- 2.1 Permanently installed instrumentation is calibrated and is operating satisfactorily prior to performing the following test.
  - 2.1.1 The calibration will demonstrate that currents generated by the thermocouples will be accurately translated into temperature indications.
- 2.2 Special test equipment for measurement of thermocouple resistance is available and calibrated.
- 2.3 The reactor is at 350°F conditions.

3.0 TEST METHOD

- 3.1 Measure and record the leakage resistance of each incore detector. This step can be performed at a lower RCS temperature than 350°F but the test can not be completed until the various temperature indications are compared at 350°F.
- 3.2 Verify that the core exit thermocouples indicate a temperature that corresponds to 350°F.
- 3.3 Increase RCS temperature by 50°F and collect corresponding thermocouple and RTD data.