ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Wednesday, December 22, 2010 6:58 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); Carneal, Jason; HALLINGER Pat (EXTERNAL AREVA); WILLIFORD Dennis (AREVA); HAMMOND Philip (AREVA); FLECK Sherri (AREVA)
Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Question 02.03.01-14
Attachments: RAI 256 Q.2.3.1-14 - MASTER - DRAFT 2.pdf

Getachew,

To support a final response date of January 27, 2011, a second draft response to RAI 256 question 02.03.01-14 is attached. Let me know if the staff has questions or if the response 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: Monday, December 13, 2010 5:57 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. AREVA NP provided Supplement 1 on April 2, 2010 to revise the commitment date for the remaining questions. AREVA NP submitted Supplement 2 to the response on April 20, 2010 to address 2 of the remaining 4 questions. AREVA NP submitted Supplement 3 to the response on May 4, 2010 to address 1 of the remaining 2 questions. A revised schedule to complete the remaining response was submitted via Supplement 4 on May 26, 2010, revised again via Supplement 5 on July 7, 2010, revised again via Supplement 6 on September 3, 2010 and revised again via Supplement 7 on October 6, 2010. The schedule is being revised to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to the remaining question has been changed and is provided below.

Question #	Response Date
RAI 256—02.03.01-14	**January 27, 2011**

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

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, October 06, 2010 4:22 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. AREVA NP provided Supplement 1 on April 2, 2010 to revise the commitment date for the remaining questions. AREVA NP submitted Supplement 2 to the response on April 20, 2010 to address 2 of the remaining 4 questions. AREVA NP submitted Supplement 3 to the response on May 4, 2010 to address 1 of the remaining 2 questions. A revised schedule to complete the remaining response was submitted via Supplement 4 on May 26, 2010, revised again via Supplement 5 on July 7, 2010, and subsequently revised again via Supplement 6 on September 3, 2010.

In order to reflect the related response to RAI 345 and RAI 351 questions (which are in review with NRC) a revised schedule is provided in this e-mail.

The schedule for a technically correct and complete response to the remaining question has been changed and is provided below:

Question #	Response Date
RAI 256—02.03.01-14	**December 16, 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

From: BRYAN Martin (External RS/NB)
Sent: Friday, September 03, 2010 4:12 PM
To: 'Tesfaye, Getachew'; Miernicki, Michael
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. AREVA NP provided Supplement 1 on April 2, 2010 to revise the commitment date for the remaining questions. AREVA NP submitted Supplement 2 to the response on April 20, 2010 to address 2 of the

remaining 4 questions. AREVA NP submitted Supplement 3 to the response on May 4, 2010 to address 1 of the remaining 2 questions. A revised schedule to complete the remaining response was submitted via Supplement 4 on May 26, 2010 and subsequently revised again via Supplement 5 on July 7, 2010.

In order to reflect the related response to RAI 345 and RAI 351 questions (which are in review and comment resolution with NRC) a revised schedule is provided in this e-mail.

The schedule for a technically correct and complete response to the remaining question has been changed and is provided below.

Question #	Response Date
RAI 256—02.03.01-14	**November 16, 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

From: BRYAN Martin (EXT)
Sent: Wednesday, July 07, 2010 5:51 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Supplement 5

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. AREVA NP provided Supplement 1 on April 2, 2010 to revise the commitment date for the remaining questions. AREVA NP submitted Supplement 2 to the response on April 20, 2010 to address 2 of the remaining 4 questions. AREVA NP submitted Supplement 3 to the response on May 4, 2010 to address 1 of the remaining 2 questions. A revised schedule to complete the remaining response was submitted via Supplement 4 on May 26, 2010.

In order to address cross-cutting issues between Design Certification and COL RAIs and to reflect the related response to RAI 351 questions (which have an NRC commitment date of August 31, 2010), a revised schedule is provided in this e-mail.

The schedule for a technically correct and complete response to the remaining question has been changed and is provided below.

Question #	Response Date
RAI 256—02.03.01-14	**September 27, 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

From: BRYAN Martin (EXT)
Sent: Wednesday, May 26, 2010 5:40 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. AREVA NP provided Supplement 1 on April 2, 2010 to revise the commitment date for the remaining questions. AREVA NP submitted Supplement 2 to the response on April 20, 2010 to address 2 of the remaining 4 questions. AREVA NP submitted Supplement 3 to the response on May 4, 2010 to address 1 of the remaining 2 questions.

A revised schedule to complete the remaining response is required in order to address cross-cutting issues between Design Certification and COL RAIs. In addition, the response is dependent upon the RAI 351 response (which has an NRC commitment date of July 1, 2010).

The schedule for a technically correct and complete response to the remaining question has been changed and is provided below.

Question #	Response Date
RAI 256—02.03.01-14	**July 15, 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

From: BRYAN Martin (EXT)
Sent: Tuesday, May 04, 2010 4:45 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. AREVA NP provided Supplement 1 on April 2, 2010 to revise the commitment date for the remaining questions. AREVA NP submitted Supplement 2 to the response on April 20, 2010 to address 2 of the remaining 4 questions. The attached file, "RAI 256 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the remaining 2 questions.

Appended to this file are the affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 256 Question 02.03.01-13.

The following table indicates the respective pages in the response document, "RAI 256 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 256 — 02.03.01-13	2	3

The schedule for a technically correct and complete response to the remaining question has been changed based on discussion with NRC staff on April 19, 2010. This additional time is necessary to ensure a thorough discussion of proposed new COL items.

Question #	Response Date
RAI 256—02.03.01-14	**May 27, 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

From: WELLS Russell D (AREVA NP INC)
Sent: Tuesday, April 20, 2010 10:50 AM
To: 'Getachew Tesfaye'
Cc: BRYAN Martin (EXT); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. AREVA NP provided Supplement 1 on April 2, 2010 to revise the commitment date for the remaining questions. The attached file, "RAI 256 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the remaining 4 questions.

Appended to this file is the affected page of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 256 Question 02.03.05-6.

The following table indicates the respective pages in the response document, "RAI 256 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 256 — 02.03.05-6	2	2
RAI 256 — 02.03.05-7 (Part 4)	3	3

The schedule for technically correct and complete responses to the remaining 2 questions has been changed based on discussion and comments from NRC staff on April 19, 2010. This additional time is necessary to process the required changes to the responses.

Question #	Response Date
RAI 256—02.03.01-13	May 4, 2010
RAI 256—02.03.01-14	May 4, 2010

Sincerely,

(Russ Wells on behalf of)
Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Friday, April 02, 2010 4:11 PM
To: 'Getachew.Tesfaye@nrc.gov'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch. 2, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 7 questions of RAI No. 256 on February 26, 2010. To allow time for AREVA to discuss proposed responses to the remaining 4 questions with the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the remaining 4 questions has been changed as provided below:

Question #	Response Date
RAI 256 — 02.03.01-13	**April 20, 2010**
RAI 256 — 02.03.01-14	**April 20, 2010**
RAI 256 — 02.03.05-6	**April 20, 2010**
RAI 256 — 02.03.05-7	**April 20, 2010**

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.

Tel: (434) 832-3016
Martin.Bryan@areva.com

From: BRYAN Martin (EXT)
Sent: Friday, February 26, 2010 5:17 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch. 2

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 256 Response US EPR DC.pdf" provides technically correct and complete responses to 3 of the 7 questions.

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 256 Questions 02.03.01-15, 02.03.04-7, and 02.03.04-8.

The following table indicates the respective pages in the response document, "RAI 256 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 256 — 02.03.01-13	2	2
RAI 256 — 02.03.01-14	3	4
RAI 256 — 02.03.01-15	5	6
RAI 256 — 02.03.04-7	7	9
RAI 256 — 02.03.04-8	10	11
RAI 256 — 02.03.05-6	12	12
RAI 256 — 02.03.05-7	13	13

A complete answer is not provided for 4 of the 7 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 256 — 02.03.01-13	April 2, 2010
RAI 256 — 02.03.01-14	April 2, 2010
RAI 256 — 02.03.05-6	April 2, 2010
RAI 256 — 02.03.05-7	April 2, 2010

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
Martin.Bryan.ext@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, July 24, 2009 4:19 PM
To: ZZ-DL-A-USEPR-DL
Cc: Harvey, Brad; Hart, Michelle; Patel, Jay; Lauron, Carolyn; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 256 (2937, 2938,2940), FSAR Ch. 2

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on July 7, 2009, and discussed with your staff on July 23, 2009. No changes were made to the Draft RAI Questions as a result of that discussion. As we informed you during our discussion, the questions in this RAI are considered potential open items for Phases 2 and 3 reviews. As such, the schedule we have established for your application assumes technically correct and complete responses prior to the start of Phase 4 review. For any RAIs that cannot be answered prior to the start of Phase 4 review, it is expected that a date for receipt of this information will be provided 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: 2394

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB710871FF00)

Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 256, FSAR Ch 2, Question 02.03.01-14
Sent Date: 12/22/2010 6:57:30 PM
Received Date: 12/22/2010 6:58:55 PM
From: BRYAN Martin (EXTERNAL AREVA)

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

Recipients:
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
"Carneal, Jason" <Jason.Carneal@nrc.gov>
Tracking Status: None
"HALLINGER Pat (EXTERNAL AREVA)" <Pat.Hallinger.ext@areva.com>
Tracking Status: None
"WILLIFORD Dennis (AREVA)" <Dennis.Williford@areva.com>
Tracking Status: None
"HAMMOND Philip (AREVA)" <Philip.Hammond@areva.com>
Tracking Status: None
"FLECK Sherri (AREVA)" <Sherri.Fleck@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	16340	12/22/2010 6:58:55 PM
RAI 256 Q.2.3.1-14 - MASTER - DRAFT 2.pdf	327472	

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

Response to

Request for Additional Information No. 256 (2937, 2938, 2940) Revision 0, Supplement 9

7/24/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 02.03.01 - Regional Climatology
SRP Section: 02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases
SRP Section: 02.03.05 - Long-Term Atmospheric Dispersion Estimates for Routine Releases
Application Section: FSAR Ch. 2

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

Question 02.03.01-14:

POTENTIAL OPEN ITEM

This question is related to the applicant's supplement 1 response to RAI 02.03.01-10 and supplement 1 response to RAI 02.03.02-11.

FSAR Tier 2 Table 2.1-1 presents a set of site parameters which are the postulated physical, environmental, and demographic features of an assumed site which the U.S. EPR standard design is based. FSAR Section 2.0 states that these site parameters represent more demanding conditions than normally expected for most U.S. nuclear power plant sites.

U.S. EPR Combined License Information Item 2.0-1 (from FSAR Table 1.8-2) states a COL applicant that references the U.S. EPR design certification will compare site-specific data to the design parameter data in Table 2.1-1. If the characteristics for the site fall within the assumed site parameter values in Table 2.1-1, then the U.S. EPR standard design is bounding for the site. For site characteristics that are outside the bounds of the assumptions presented in Table 2.1-1, the COL applicant will confirm that the U.S. EPR design acceptably meets any additional requirements that may be imposed by the more limiting site characteristics, and that the design maintains conformance to the design commitments and acceptance criteria described in the FSAR.

The response to RAI 02.03.01-10 states that although the 81 °F zero percent exceedance non-coincident wet bulb design point may be exceeded at locations throughout the U.S, it was used as design point for the ultimate heat sink (UHS) cooling towers. The U.S. EPR UHS design was also evaluated using site specific meteorological data for several COL applicants referencing the U.S. EPR design to verify that the site-specific data yield acceptable UHS basin temperatures. Similarly, the response to RAI 02.03.01-11 states the UHS cooling tower basins are design based on zero percent exceedance coincident wet bulb and dry bulb temperatures such that no makeup to the basin is required for three days following the initiation of a design basis accident under the worst case environmental conditions. The sizing of the U.S. EPR UHS cooling tower basins was also evaluated using site-specific meteorological data for several COL applicants referencing the U.S. EPR design.

There are several site design parameters listed in Table 2.1-1 that can be deleted from FSAR Tier 2 Table 2.1-1 because (1) comparison with site characteristic values will not be particularly meaningful and/or (2) there are (or can be) Combined License Information Items providing more specific details regarding demonstrating that the design of the U.S EPR is acceptable at a proposed COL site. In particular:

1. Consider deleting the hourly wet bulb temperature and concurrent dry bulb temperature values presented in FSAR Tier 2 Table 2.1-3 (containing the design values for maximum evaporation and drift loss of water from the UHS) as site parameters. It is not clear how COL applicants can demonstrate that the wet bulb temperature and concurrent dry bulb temperature characteristics for their site are bounded by the 72 sets of hourly wet bulb temperature and concurrent dry bulb temperature site parameter values presented in Table 2.1-3.
2. Consider adding a Combined License Information Item to FSAR Tier 2 Table 1.8-2 stating that a COL applicant that references the U.S. EPR design certification will demonstrate that

no makeup water to the UHS cooling tower basin is required for three days following the initiation of a design basis accident under the worst case site-specific environmental conditions pursuant to Regulatory Guide (RG) 1.27, "Ultimate Heat Sink for Nuclear Power Plants."

3. Consider deleting the 81 °F zero percent exceedance non-coincident wet bulb air temperature as a site parameter. The supplement 1 response to RAI 02.03.01-10 states that although this site parameter value (which is used solely as a design point for the sizing of the UHS cooling towers) may be exceeded at locations throughout the U.S., the UHS design was evaluated using site-specific meteorological data from COL applicant referencing the U.S. EPR design. There is no benefit specifying a site parameter value that is known to be exceeded at number of locations.

4. Consider deleting the hourly wet bulb temperature and concurrent dry bulb temperature values presented in FSAR Tier 2 Table 2.1-4 (containing the design values for minimum water cooling from the UHS) as site parameters. It is not clear how COL applicants can demonstrate that the wet bulb temperature and concurrent dry bulb temperature characteristics for their site fall within the 24 sets of hourly wet bulb temperature and concurrent dry bulb temperature site parameter values presented in Table 2.1-4.

5. Consider adding a Combined License Information Item to FSAR Tier 2 Table 1.8-2 stating that a COL applicant that references the U.S. EPR design certification will demonstrate that the UHS cooling tower design is validated with site-specific time dependent wet bulb temperature profiles to verify that the site-specific data yield acceptable maximum UHS basin temperatures pursuant to RG 1.27.

6. Consider deleting the potential for water freezing in the UHS water storage facility as a UHS meteorological condition site parameter. Combined License Information Item 2.4-8 in FSAR Tier 2 Table 1.8-2 already directs a COL applicant that references the U.S. EPR design certification to evaluate the potential for freezing temperatures that may affect the performance of the ultimate heat sink makeup, including the potential for frazil and anchor ice, maximum ice thickness, and maximum cumulative degree-days below freezing.

Response to Question 02.03.01-14:

1. As stated in the response to RAI 351 Question 29, the Tier 2 Table 2.1-3 was relocated to Tier 2 section 9.2.5 as Table 9.2.5-3.

2. As stated in the response to RAI 351 Question 29, COL information item 9.2-6 was added to Tier 2 section 9.2.5.3 and Table 1.8-2.

3. The temperature parameter "81°F wet bulb (non coincident) UHS Design Only" and its corresponding Notes, 2 and 5, will be deleted from U.S. EPR FSAR Tier 2, Table 2.1-1. The 81°F wet bulb, non coincident, zero percent exceedance, will remain in U.S. EPR FSAR Tier 2, Table 9.2.5-2, and a reference to Table 9.2.5-2 will be added to U.S. EPR FSAR Tier 2, Section 2.3.1.2. U.S. EPR FSAR Tier 2, Section 9.2.5.3.1 will be revised to include the information in Notes 2 and 5, which were previously included in COL Item 2.0-1, as new COL Items 9.2-10 and 9.2-11. U.S. EPR FSAR Tier 2, Table 1.8-2 will also be revised to include these two COL Items. An additional note explaining the use of this temperature parameter will be added to U.S. EPR FSAR Table 9.2.5-2, as follows:

   "An important meteorological design point for the establishment of the cooling tower performance for the U.S. EPR DBA maximum load case and consequently establishes all subsequent cooling tower performance for other wet bulb conditions and lower loads."

4. As stated in the response to RAI 351 Question 29, the Tier 2 Table 2.1-4 was relocated to Tier 2 section 9.2.5 as Table 9.2.5-4.

5. As stated in the response to RAI 351 Question 29, a COL information item 9.2-7 was added to Tier 2 section 9.2.5.3 and Table 1.8-2.

6. The potential for water freezing in the UHS water storage facility as a UHS meteorological conditions site parameter was deleted from Tier 2 Table 2.1-1 in U.S. EPR FSAR Revision 2.

FSAR Impact:

U.S. EPR FSAR, Tier 2, Table 1.8-2, Table 2.1-1, Section 2.3.1.2, Table 9.2.5-2, and Section 9.2.5.3.1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 23 of 39

Item No.	Description	Section
9.2-8	A COL applicant that references the U.S. EPR design certification will confirm that the UHS makeup capacity is sufficient to meet the maximum evaporative and drift water loss after 72 hours through the remainder of the 30-day period consistent with RG 1.27.	9.2.5.3
9.2-9	A COL applicant that references the U.S. EPR design certification will compare site-specific chemistry data for normal and emergency makeup water to the parameters in Table 9.2.5-5. If the specific data for the site fall within the assumed design parameters in Table 9.2.5-5, then the U.S. EPR standard design is bounding for the site. For site-specific normal and emergency makeup water data or characteristics that are outside the bounds of the assumptions presented in Table 9.2.5-5, the COL applicant will provide an analysis to confirm that the U.S. EPR UHS cooling towers are capable of removing the design basis heat load for a minimum of 30 days without exceeding the maximum specified temperature limit for ESWS and minimum required basin water level.	9.2.5.2 02.03.01-14(3)
9.2-10	A COL applicant that references the U.S. EPR design certification will evaluate site-specific conditions to determine a wet bulb correction factor.	9.2.5.3.1
9.2-11	A COL applicant that references the U.S. EPR design certification will perform an evaluation of the interference effects of the UHS cooling tower on nearby safety-related air intakes. This evaluation will confirm that potential UHS cooling tower interference effects on the safety related air intakes does not result in air intake inlet conditions that exceed the U.S. EPR Site Design Parameters for Air Temperature as specified in Table 2.1-1.	9.2.5.3.1
9.4-1	A COL applicant that references the U.S. EPR design certification will provide site-specific design information for the turbine building ventilation system (TBVS).	9.4.4
9.4-2	A COL applicant that references the U.S. EPR design certification will provide site-specific design information for the switchgear building ventilation system, turbine island (SWBVS).	9.4.4
9.5-1	A COL applicant referencing the U.S. EPR certified design will identify additional site-specific communication locations necessary to support effective communication between plant personnel in all vital areas of the plant during normal operation, as well as during accident conditions.	9.5.2.3
9.5-2	A COL applicant that references the U.S. EPR design certification will submit site specific information to address the Regulatory Guide 1.189, Regulatory Position C.1.7.1, Design and Procurement Document Control.	Table 9.5.1-1 C.1.7.1

Table 2.1-1—U.S. EPR Site Design Envelope
Sheet 5 of 7

U.S. EPR Site Design Envelope			
Temperature (Refer to Section 2.3)			
Air	0% Exceedance Values[3]	Maximum	115°F Dry Bulb / 80°F Wet Bulb (mean coincident) ~~81°F Wet Bulb (non-coincident) UHS Design Only~~ (2)
		Minimum	-40°F
	1% Exceedance Values (seasonal basis)[4]	Maximum	100°F dry bulb/77°F mean coincident wet bulb 80°F wet bulb (noncoincident)
		Minimum	-10°F
Atmospheric Dispersion and Deposition Factors (χ/Q) (D/Q) (Refer to Section 2.3)			
Maximum Annual Average (limiting sector)			≤4.973E-06 s/m^3 (χ/Q) ≤5.0E-08 m^{-2} (D/Q)
Accident			
0-2 hr (EAB)			≤1E-03 s/m^3
0-2 hr (LPZ)			≤1.75E-04 s/m^3
2-8 hr (LPZ)			≤1.35E-04 s/m^3
8-24 hr (LPZ)			≤1.00E-04 s/m^3
1-4 day (LPZ)			≤5.40E-05 s/m^3
4-30 day (LPZ)			≤2.20E-05 s/m^3

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Table 2.1-1—U.S. EPR Site Design Envelope
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U.S. EPR Site Design Envelope									
2–8 hours (s/m³)	3.71E-03	1.47E-02	2.68E-03	1.47E-03	6.67E-03	1.66E-03	2.12E-03	1.48E-02	7.21E-03
8–24 hours (s/m³)	1.46E-03	5.96E-03	1.15E-03	5.74E-04	2.88E-03	6.69E-04	8.28E-04	5.88E-03	2.96E-03
1–4 days (s/m³)	1.12E-03	4.28E-03	7.59E-04	4.37E-04	1.89E-03	5.02E-04	6.38E-04	4.55E-03	2.22E-03
4–30 days (s/m³)	1.03E-03	3.89E-03	6.89E-04	4.00E-04	1.71E-03	4.65E-04	5.85E-04	4.16E-03	2.06E-03

1. The effect of the extreme liquid winter precipitation event on roof loads is negligible due to the lack of parapets. ~~The maximum 48-hour PMWP liquid of 32 inches is based on data obtained from National Oceanic and Atmospheric Administration Hydrometeorological Report No. 53 "Seasonal Variation of 10-square-mile Probable Maximum Precipitation Estimates, United States East of the 105th Meridian" for the three winter months—December through February. However, the effect of rainfall events on roof loads is negligible, due to the lack of parapets.~~
2. Deleted. ~~COL applicant to determine wet bulb temperature correction factor to account for potential interference and recirculation effects. (Refer to COL Item 2.0-1 in Table 1.8-2—U.S. EPR Combined License Information Items).~~
3. By definition, zero percent exceedance temperature values exclude peaks of temperatures less than two hours in duration. The zero percent exceedance temperature values are based on conservative estimates of 100-year return period values and historic extreme values, whichever is bounding.
4. For maximum values, data from the summer months or June, July, and August are used. For minimum values, data from the winter months of December, January, and February are used.
5. Deleted. ~~COL applicant to confirm potential UHS cooling tower interference effects on safety-related air intakes do not result in air intake inlet conditions that exceed the site design envelope ambient air conditions (refer to COL Item 2.0-1 in Table 1.8-2—U.S. EPR Combined License Information Items).~~

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the addition of the weight of the extreme frozen or liquid precipitation event, whichever is greater. Snow pack and snowfall are adjusted for density differences and ground level values are adjusted to represent appropriate weights on roofs.

A COL applicant that references the U.S. EPR design certification will provide site-specific characteristics for regional climatology.

2.3.1.2 Meteorological Data for Evaluating the Ultimate Heat Sink

As described in Section 9.2.5, the ultimate heat sink (UHS) is designed to operate for a nominal 30 days following a LOCA without requiring any makeup water to the source, or it must be demonstrated that replenishment or use of an alternate or additional water supply can provide continuous capability of the heat sink to perform its safety-related functions. The tower basin contains a minimum 72-hour supply of water.

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Meteorological conditions resulting in the maximum evaporative and drift loss of water for the UHS over a 72 hour period are presented in Table 9.2.5-3. The UHS cooling tower basin is designed considering the ~~air~~wet bulb temperature data of Table 9.2.5-2~~ 2.1-1~~ and maintains its cooling function for the Table 9.2.5-3 meteorological conditions.

Water makeup to the UHS cooling tower basin beyond 72 hours is site-specific. As described in Section 9.2.5.3, the COL applicant ~~that references the U.S. EPR design certification~~ will describe the means for providing UHS makeup sufficient to meet the maximum evaporative and drift water loss after 72 hours through the remainder of the 30 day period consistent with RG 1.27.

Meteorological conditions resulting in minimum water cooling are presented in Table 9.2.5-4. These conditions reflect a 1 day period where evaporative cooling is at a minimum. The UHS heat loads peak and decline within the first day, such that extending the 1 day meteorological profile for 5 consecutive days does not cause the UHS cooling tower basin water temperature to exceed the maximum temperature of 95°F listed in Table 9.2.5-2. The potential for water freezing in the UHS water storage facility is addressed in Section 2.4.

2.3.2 Local Meteorology

A COL applicant that references the U.S. EPR design certification will provide site-specific characteristics for local meteorology.

2.3.3 Onsite Meteorological Measurement Program

A COL applicant that references the U.S. EPR design certification will provide the site-specific, onsite meteorological measurement program.

the COL applicant. The site-specific UHS systems are shown in Figure 9.2.5-2—[[Conceptual Site-Specific UHS Systems]].

9.2.5.3 Component Description

9.2.5.3.1 Mechanical Draft Cooling Towers

The cooling towers are rectangular mechanical-induced draft-type towers. Each tower consists of two cells in a back-to-back arrangement. The two cells of the cooling tower in a particular division share a single cooling tower basin and each cell is capable of transferring fifty percent of the design basis heat loads for one division from the ESWS to the environment under worst-case ambient conditions. The division four cooling tower shares use with the dedicated ESW train and can transfer severe accident (SA) heat loads to the environment under worst-case ambient conditions.

The Division 4 cooling tower fans can be supplied by a standby EDG or a station blackout diesel generator (SBODG) that is provided as an alternate AC power source.

The cooling tower fill design and arrangement maximize contact time between water droplets and air inside the tower. The tower fill spacing is chosen to minimize the buildup of biofilm and provide for ease of cleaning, maintenance, and inspection.

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.

The UHS 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). The method to be used to protect the UHS fans from overspeed due to tornado effects will be a brake system or the resistance of the fan gear reducer.

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.

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To account for potential recirculation and interference effects of the cooling towers, an inlet wet bulb correction factor is used. A COL applicant that references the U.S. EPR design certification will evaluate site-specific conditions to determine a wet bulb correction factor. With respect to interference effects site factors including orientation (with respect to wind direction), location, and wind velocity and direction

should be considered. With respect to recirculation effects, factors including the site layout should be considered. The site-specific wet bulb correction factor will be applied when evaluating the applicability of the UHS design parameters provided in Table 9.2.5-2. If the site-specific 0% exceedance maximum non-coincident wet bulb temperature exceeds the value provided in Table 9.2.5-2 when the site-specific wet bulb correction factor is applied, then a site-specific evaluation will be performed to demonstrate the acceptability of the UHS design for the site-specific conditions.

Depending on site layout and site meteorological conditions, the UHS cooling tower could have interference effects that would impact nearby safety-related air intakes. A COL applicant that references the U.S. EPR design certification will perform an evaluation of the interference effects of the UHS cooling tower on nearby safety-related air intakes. This evaluation will confirm that potential UHS cooling tower interference effects on the safety related air intakes does not result in air intake inlet conditions that exceed the U.S. EPR Site Design Parameters for Air Temperature as specified in Table 2.1-1.

~~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.To account for potential interference effects from the UHS cooling tower, an evaluation of the effects on nearby safety-related air intakes will be performed by the COL applicant. 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 confirm that potential UHS cooling tower interference effects on the safety-related air intakes does not result in air intake inlet conditions that exceed the U.S. EPR Site Design Envelope air temperature parameters specified in Table 2.1-1.~~

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. In the event of torrential rains and hurricanes, water would enter through the air inlet and air outlet area of the cooling tower portion of the Essential Service Water Buildings. Refer to Figure 3.8-95 through Figure 3.8-102 for details of the Essential Service Water Building. As the water level reaches the high level, an alarm in the control room will alert the operator. Operator action is performed to remove water from the cooling tower basin through the use of

Table 9.2.5-2—Ultimate Heat Sink Design Parameters

Cooling Tower Cells 31/32/33/34 URB	
Description	**Technical Data**
Cooling Tower Type	Mechanical Induced Draft
Design Water Flow (total both cells)	19,200 gpm
Design Hot (Inlet) Water Temperature	135°F
Design Cold (Outlet) Water Temperature	≤95°F (max, DBA)
Winter Design Cold (Outlet) Water Temperature @ 50°F Inlet WB	71°F Normal Ops/72°F Cooldown 78.5°F DBA
Design Inlet Wet Bulb Temperature	81°F (non-coincident, 0% exceedance value)(1)(2)
Maximum Drift Loss (Percent of Water Flow)	< 0.005%
Maximum Evaporation Loss at Design Conditions (total both cells)	571 gpm
Number of Cells	2 Cell/Tower
Basin Water Volume (Min)	≥295,120 ft^3
Basin Water Level (Min)	23.75 ft
Required Cooling Tower Emergency Makeup Flow, ~~72 hours,~~ post-DBA (72 hours through 30 days)	300 gpm

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Note:

1. COL applicant to determine wet bulb temperature correction factor to account for potential interference and recirculation effects. (Refer to COL Item ~~2.0-1 in Table 1.8-2~~).

2. An important meteorological design point for the establishment of the cooling tower performance for the U.S. EPR DBA maximum load case and consequently establishes all subsequent cooling tower performance for other wet bulb conditions and lower loads.

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